



# The British National Strategic Fund

In promoting economic equality and independence

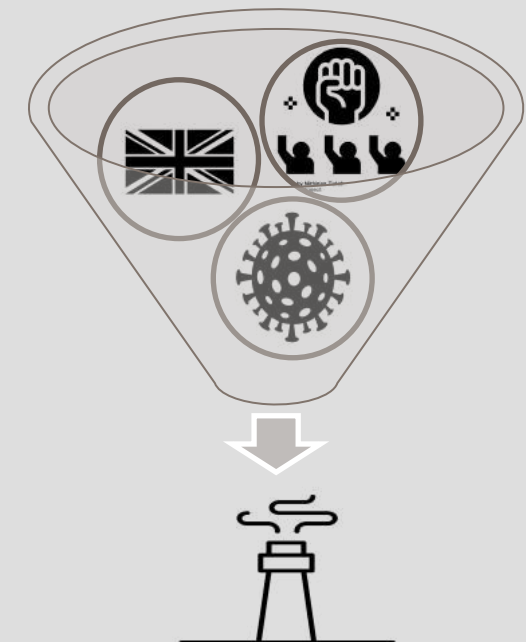
Ahsan Khan, Shang Wu, Lisa Yu, Lu Zhang



During the 18th century, The industrial revolution was born in England.

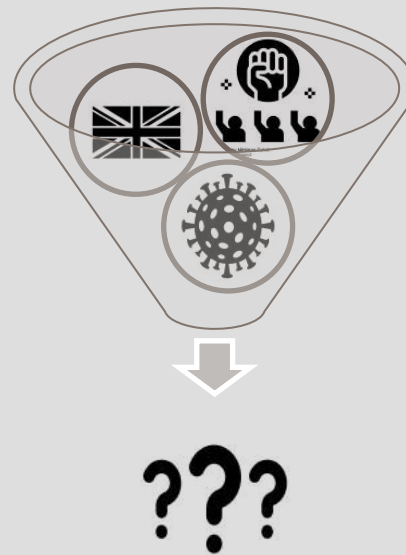
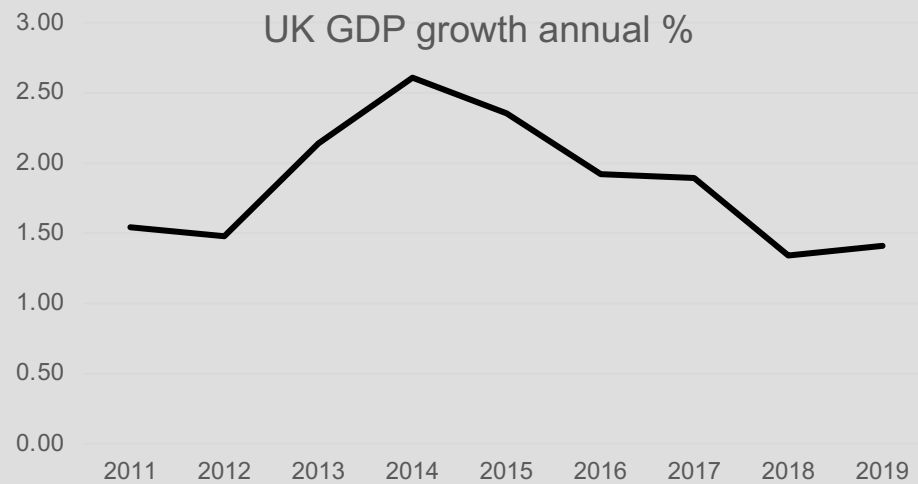
It was not too long after a pandemic-- the Great Plague of London, and a huge societal change-- the Glorious Revolution. They set the tone for a change that transformed U.K into still one of the world's leaders today.

**Year 1800s:**



Today, UK's economical and societal condition has been declining and it is now much in danger. Will UK be able to shine once again, following the same pattern as last time: huge societal change--the Brexit; and a pandemic--COVID-19?

**Year 2020:**



# Rainbow Consulting Inc.

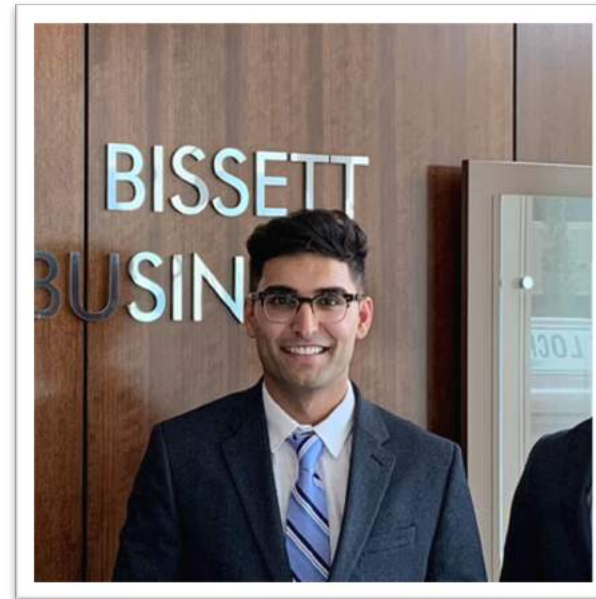
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Shang Wu



Lu Zhang



Ahsan Khan



Lisa Yu

# Introduction

## BNSF's Triple Mandate



### Economic Independence

Economic growth, stability, and self-efficiency within the UK



### Long Term Well-Being

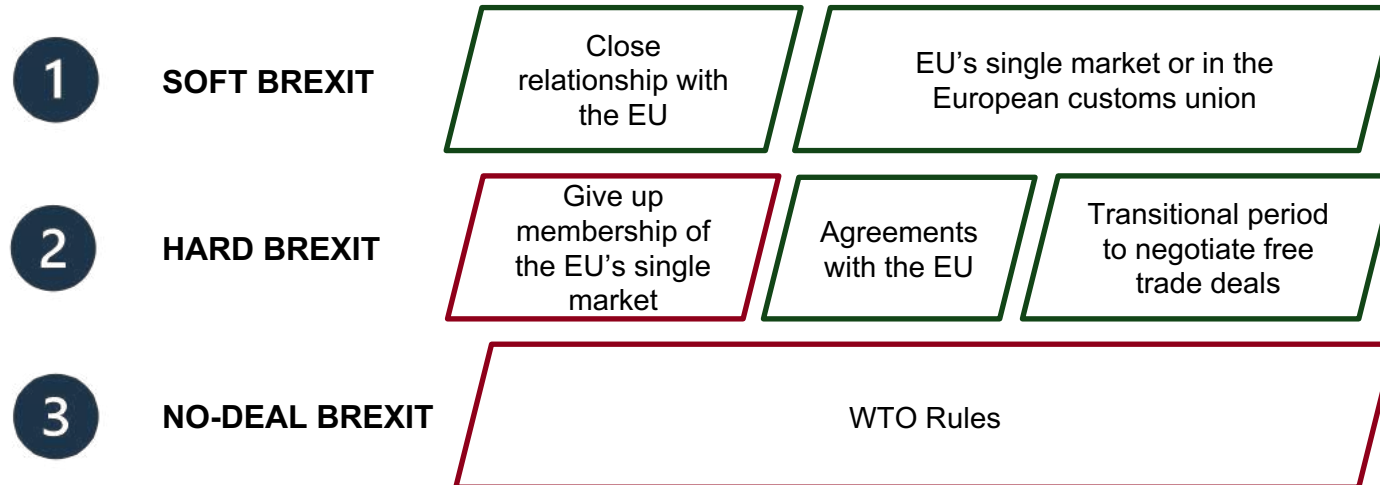
Socio-economic issues like income inequality and unemployment



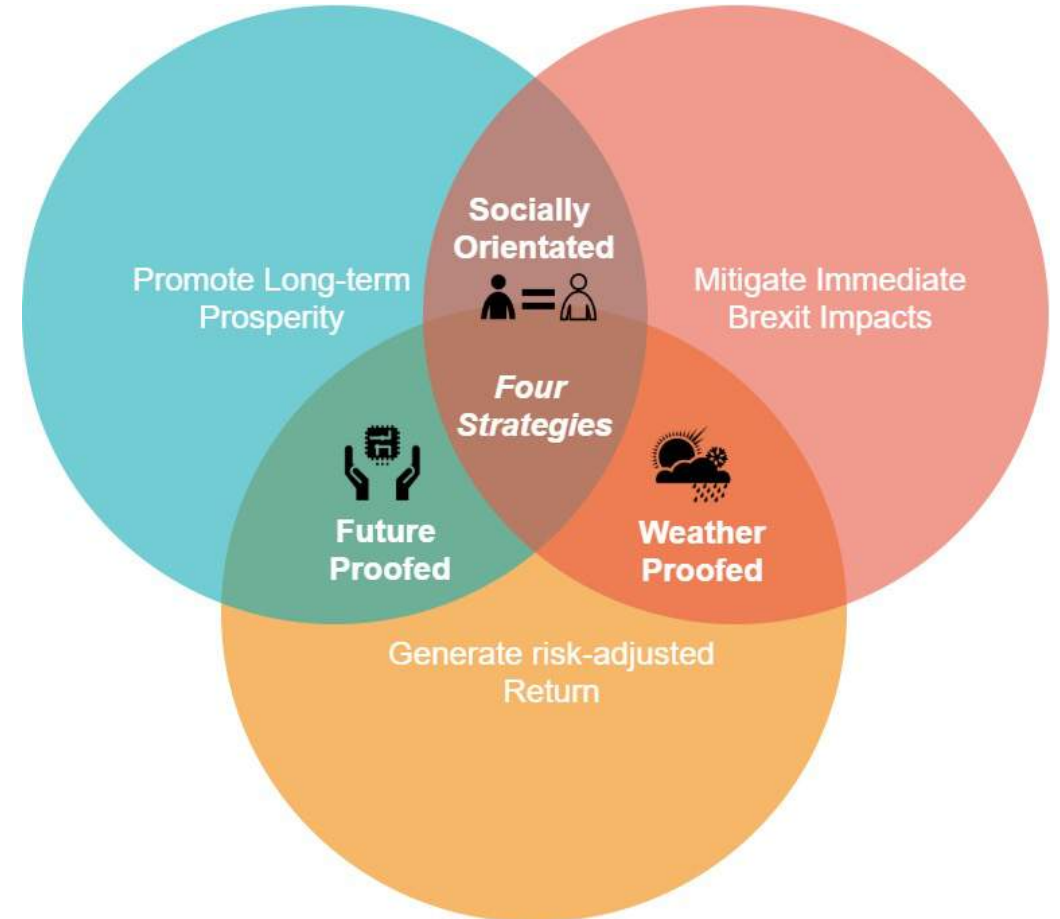
### Return and Sustainability

Maximize risk-adjusted returns to ensure the fund's long-term sustainability

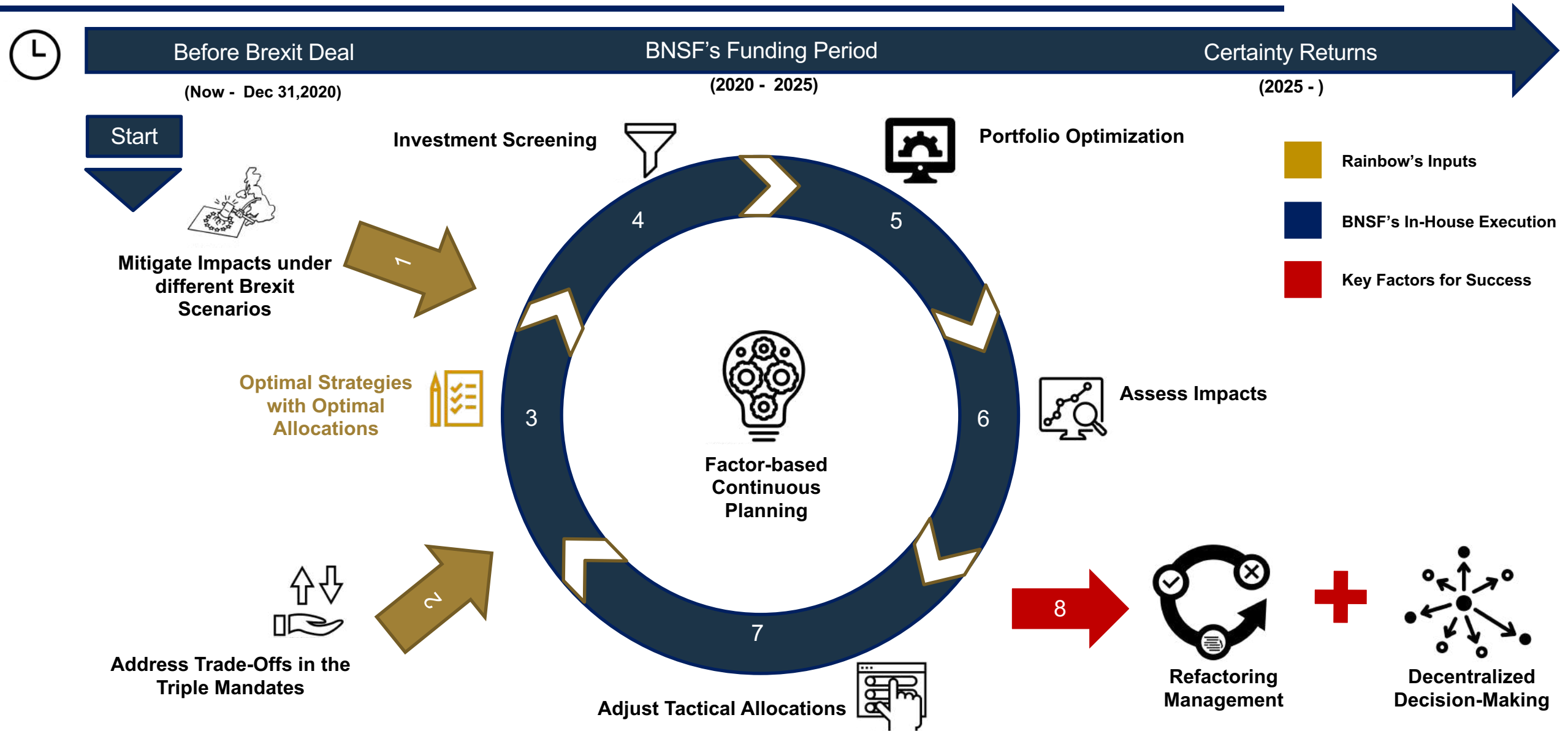
## Uncertainties Amid Brexit Outcome



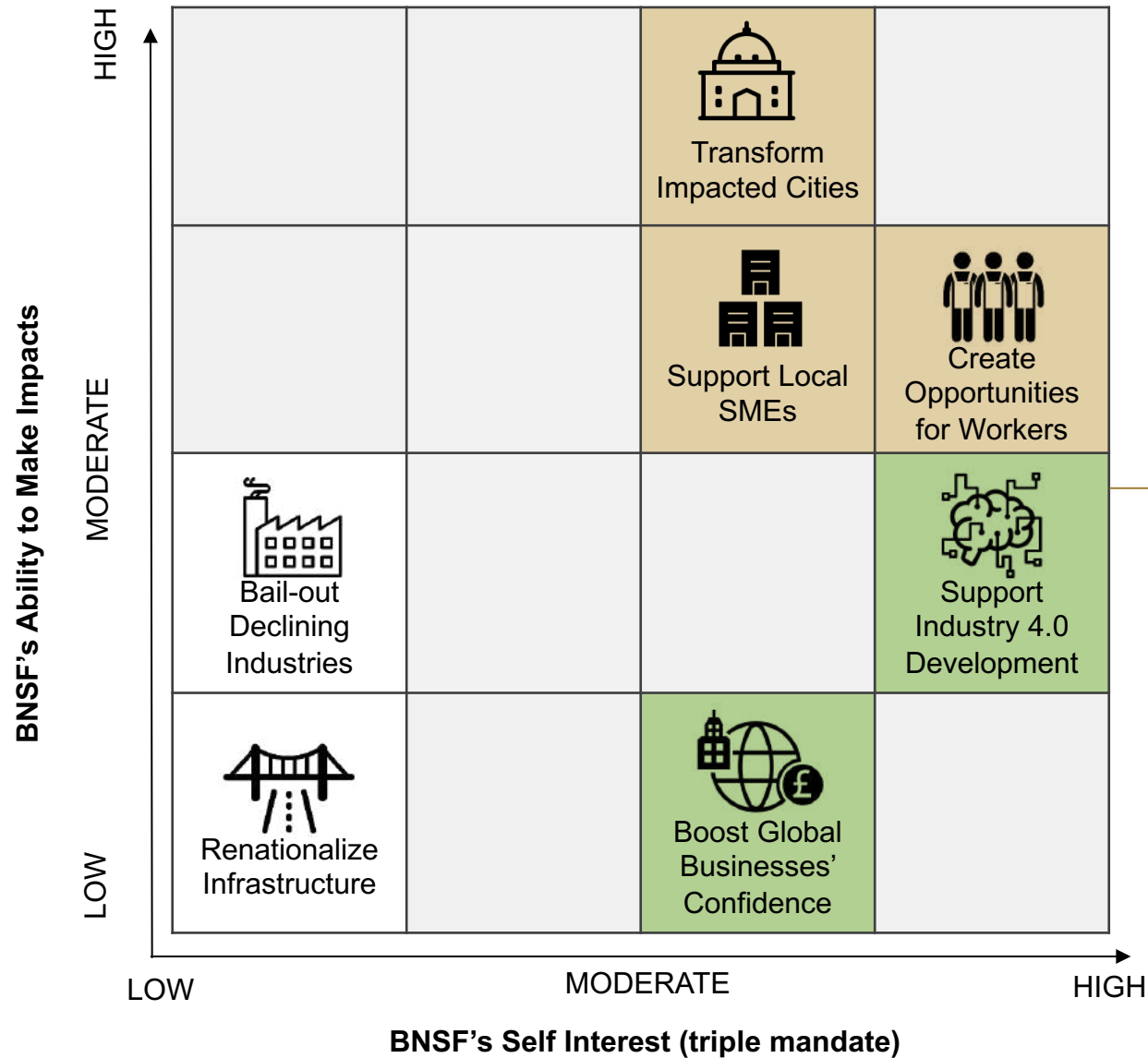
## Key Objective



# Navigate Amid Uncertainties



# The Optimal Strategy



## City Development

To invest in municipal bonds to promote the UK's economic independence and address its socio-economic inequalities.

## Impact Investment

To invest in PE funds and social enterprises in areas that are most vulnerable to Brexit to address immediate impacts in the event of a hard Brexit; to invest in PE funds and social enterprises which promote the long-term well-being of the British population.

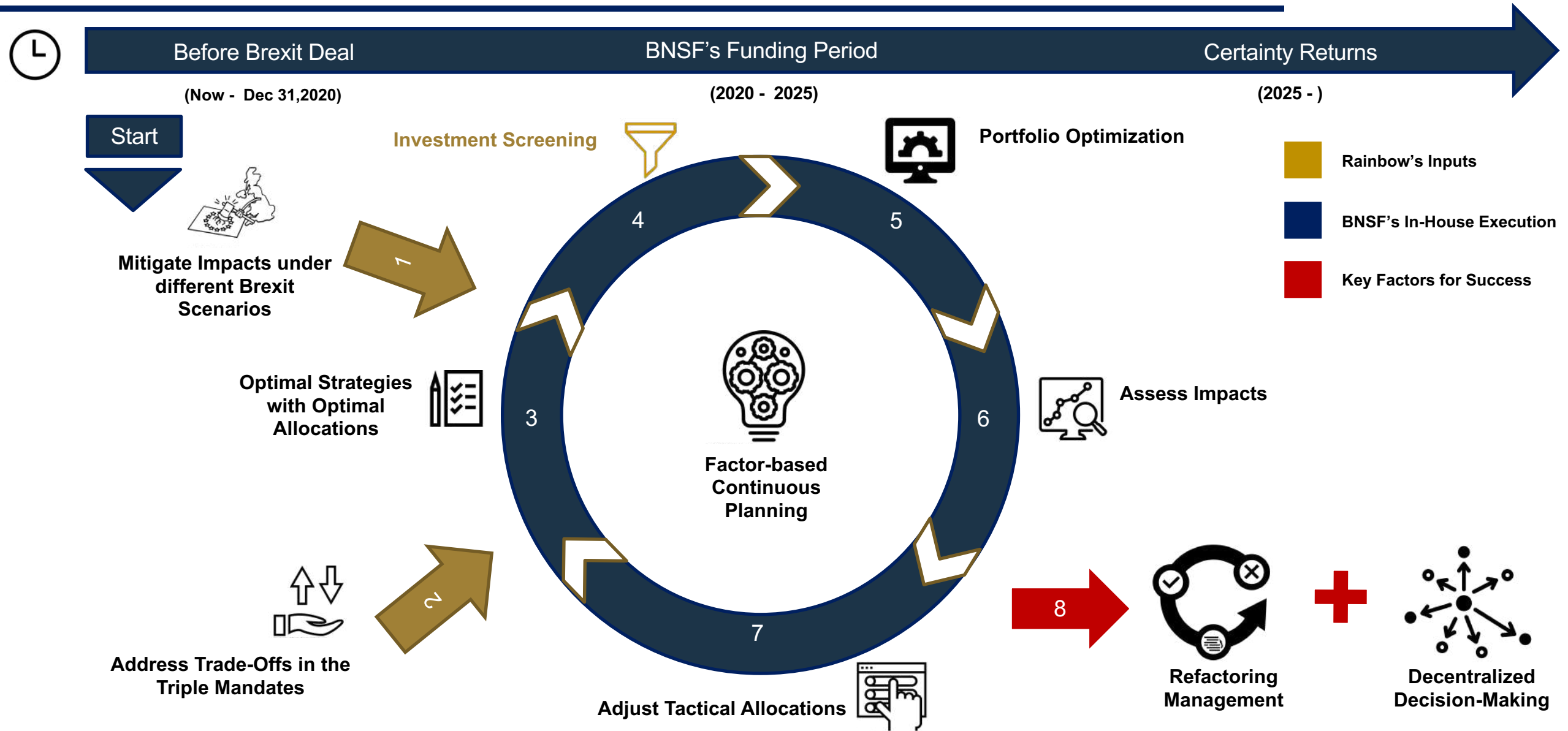
## Global Diversification

To invest in low/non-correlated assets and British international conglomerates with high ESG scores and local employees to ensure the fund meeting its return objective despite a No-Deal Brexit.

## Industry 4.0

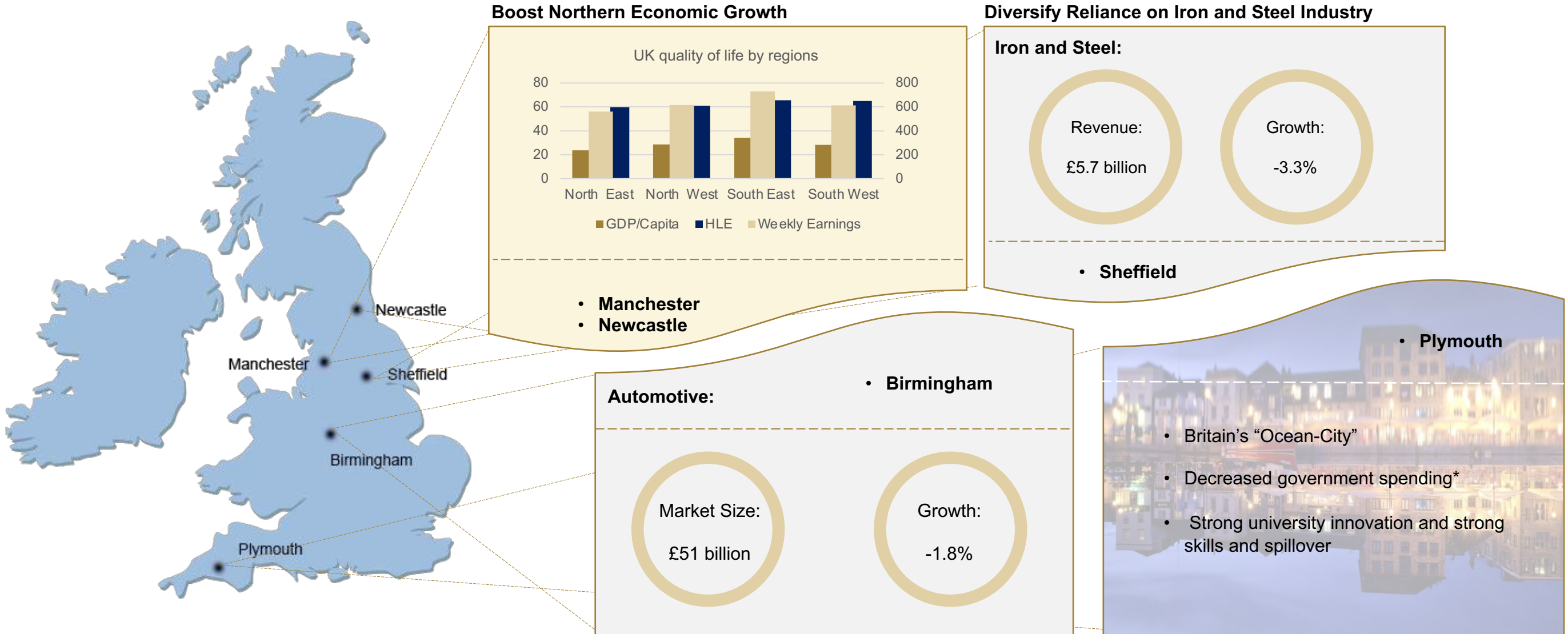
To boost the UK's long-term sustainability and independence by investing in British venture capital funds that focus on late stage investing in the industry 4.0 and digital economy value chain start-ups, help U.K transition away from declining industries

# Navigate Amid Uncertainties





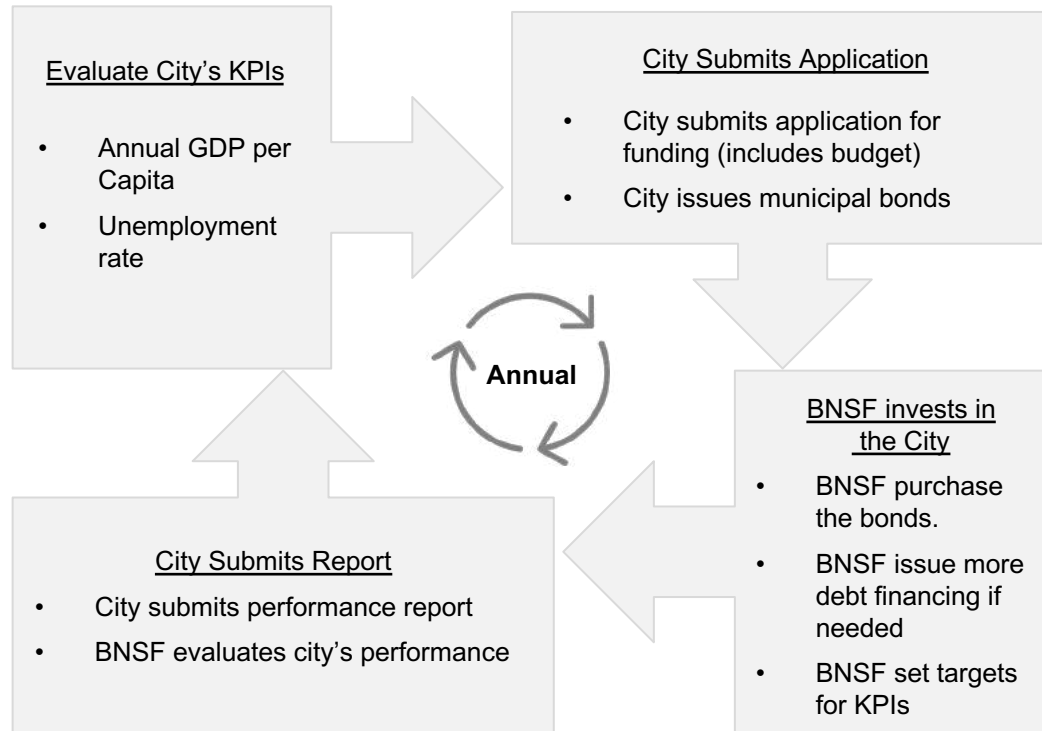
# Invest in UK Cities



8 | \* Plymouth had government spending decrease by 12% from 2010 to 2018, and are ranked among the lowest of the UK cities in terms of number of business starts, business stock per capita, proportion of private sector jobs, and housing growth stocks. (CenterForCities, 2019)

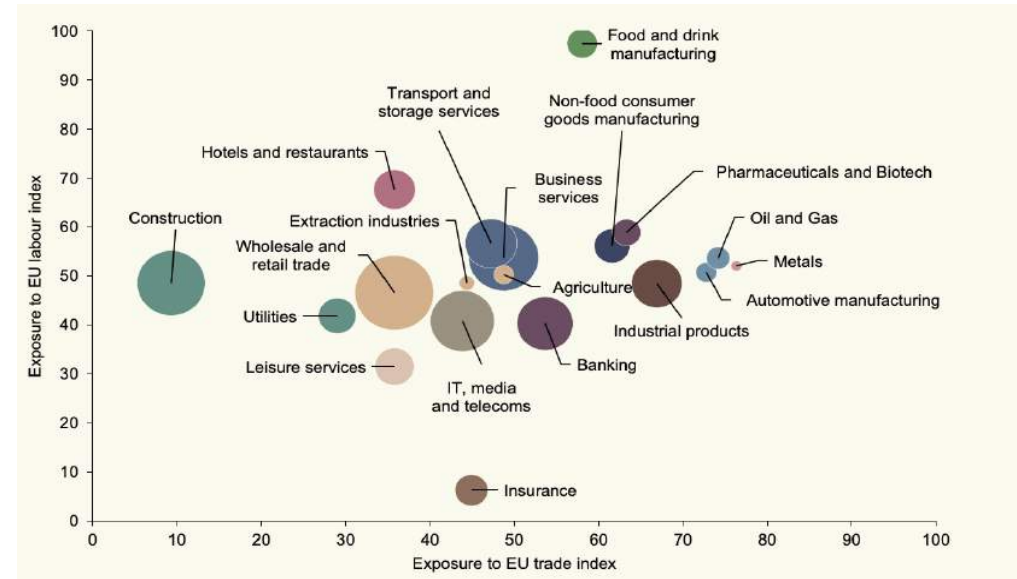


# Invest in UK Cities Cont.

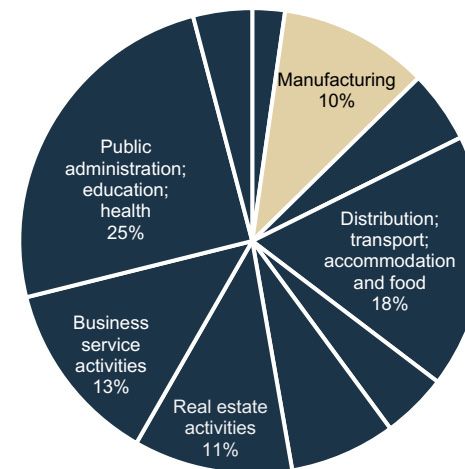


Weights	Soft Brexit	Hard Brexit	No-Deal Brexit
Manchester	20%	20%	20%
Newcastle	20%	10%	5%
Birmingham	20%	25%	35%
Sheffield	20%	25%	35%
Plymouth	20%	20%	5%

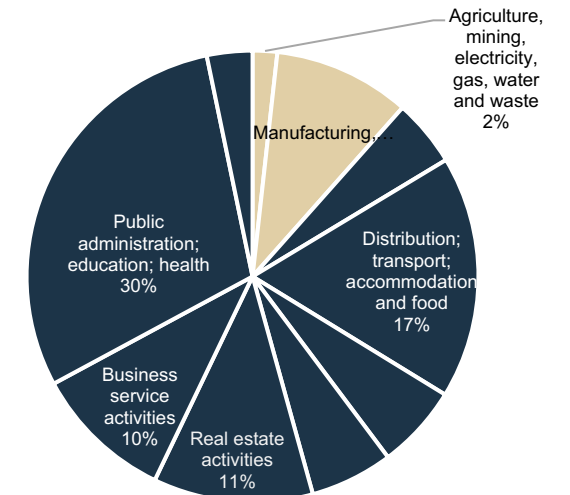
## Sector exposure to EU labour and EU exports



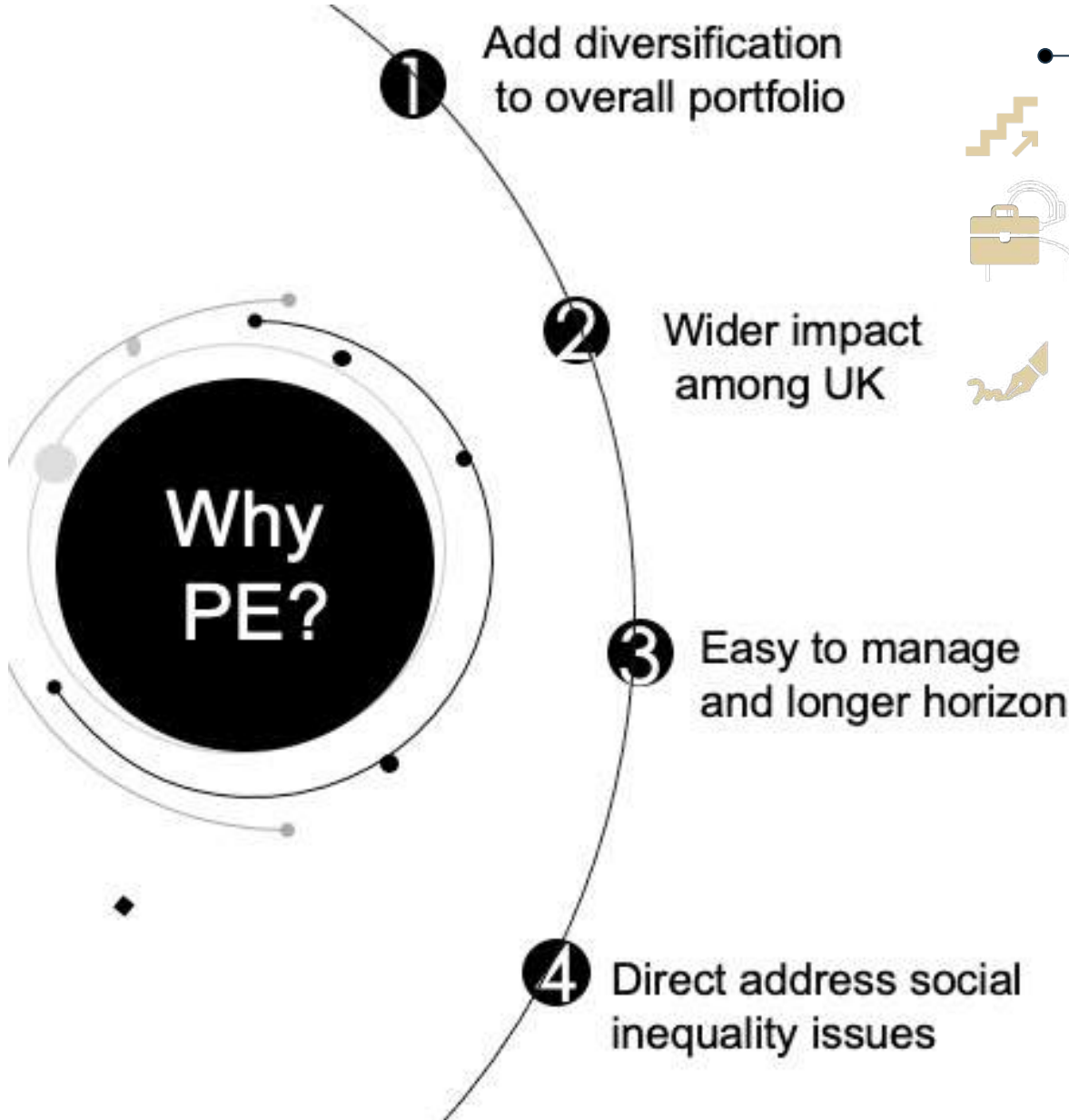
Birmingham 2017 GVA by industries



Sheffield 2017 GVA by industries



# Impact Investment in Private Equity Funds



## Key Stats



20% increase in social impact investments since 2018, increasing from £830 million in 2011 to £5.1 billion in 2019

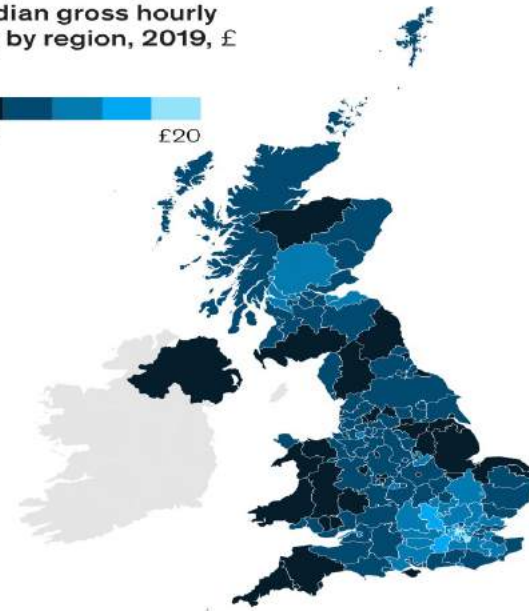


Major companies in the United Kingdom have over 80,000 job cuts due to the pandemic. 436,296 due to Brexit as of 31 Jan 2020

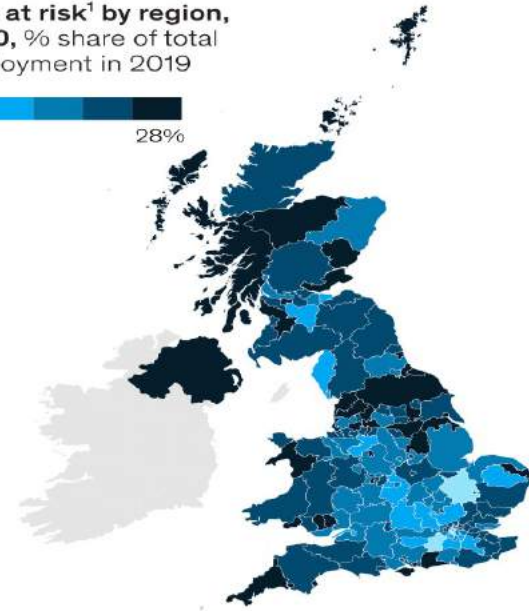


UnLtd. Invest in more than 30 areas in UK and supported 335 social entrepreneur. 832 people's lives were positively impacted through the creation of jobs for every entrepreneur they supported. In 2017 over 1,000 jobs and volunteering opportunities were created with 7.7 million investment

Median gross hourly pay by region, 2019, £



Jobs at risk<sup>1</sup> by region, 2020, % share of total employment in 2019



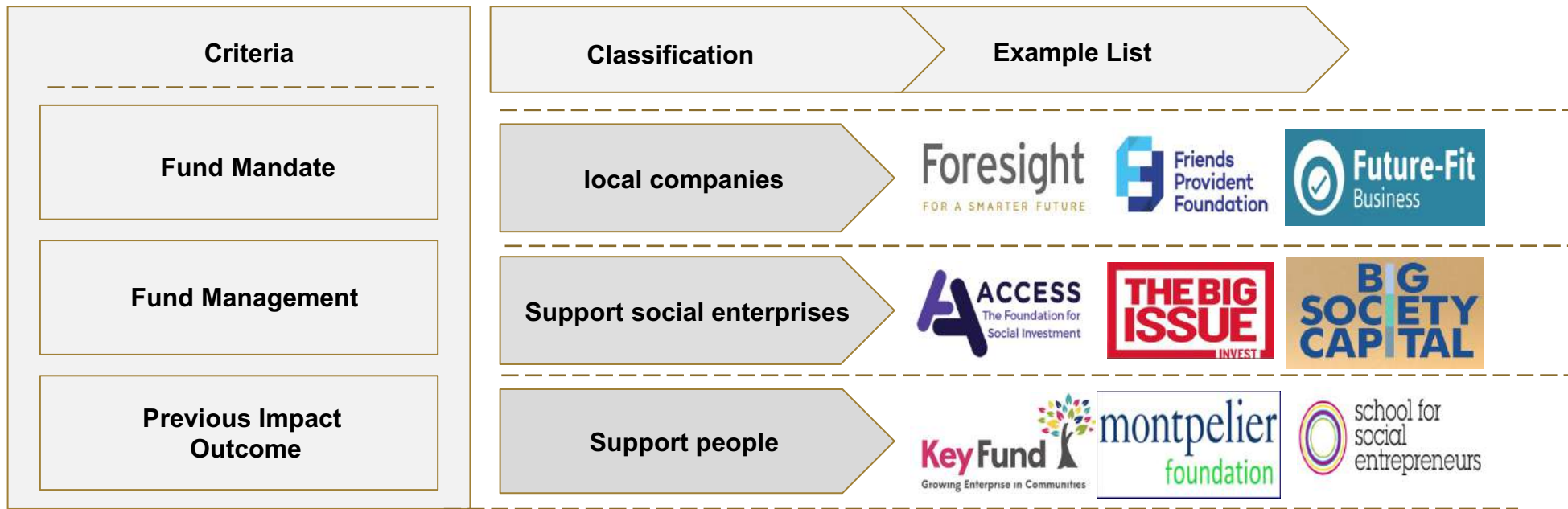
# Impact Investment in Private Equity Funds

**Objectives: Address immediate impacts in the event of a Hard Brexit and promote the long-term well-being of the British population.**

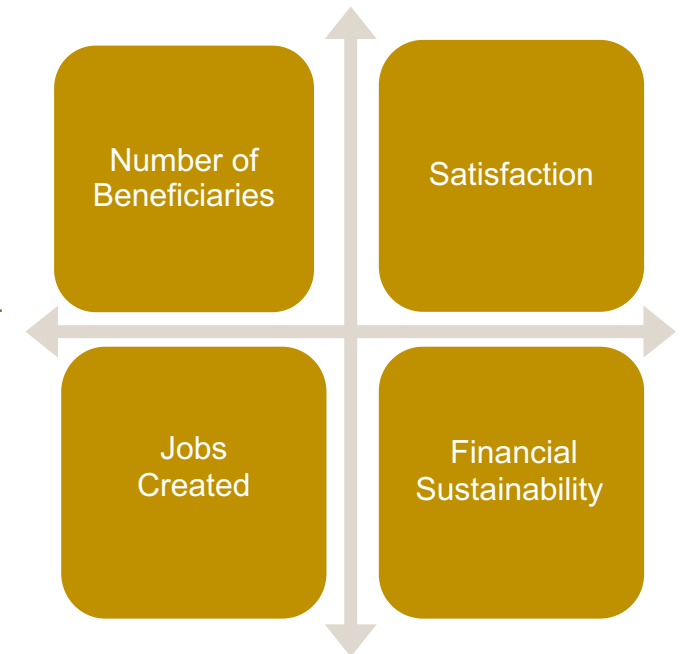
## PE fund investment process



## Fund Selection

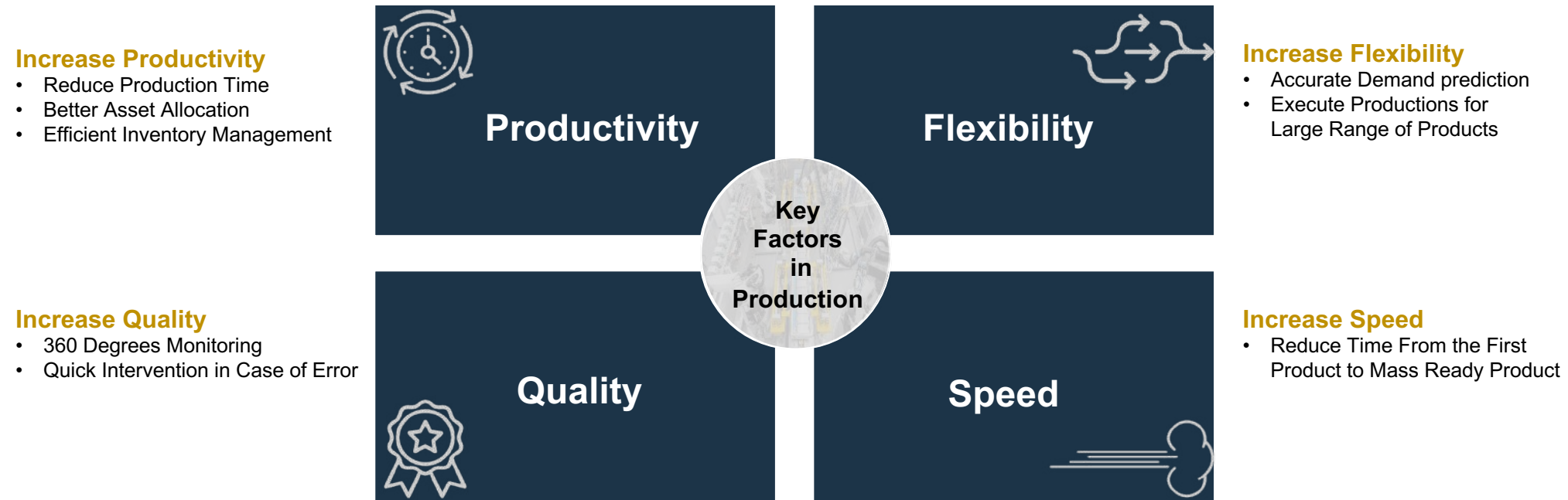


## Performance Metrics

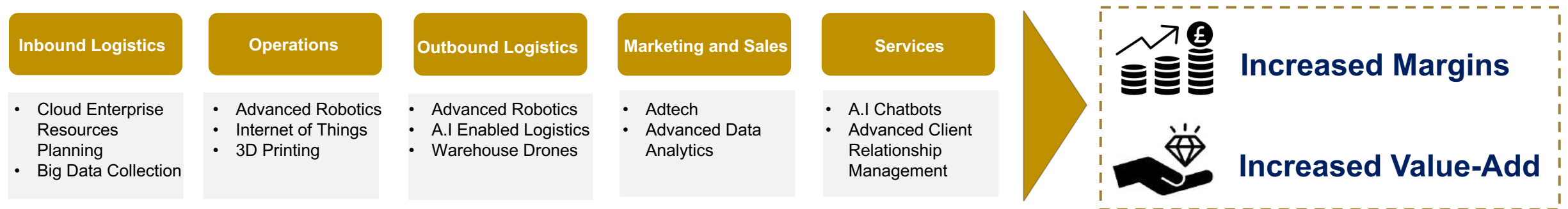


BNSF will require the funds to send impact reports annually to ensure that the funds allow us to achieve our overall portfolio's goal

# Future-Proofing UK's Economy



## Industry 4.0 Development as the Pillar to a Sustainable UK Economy



# Future-Proofing UK's Economy

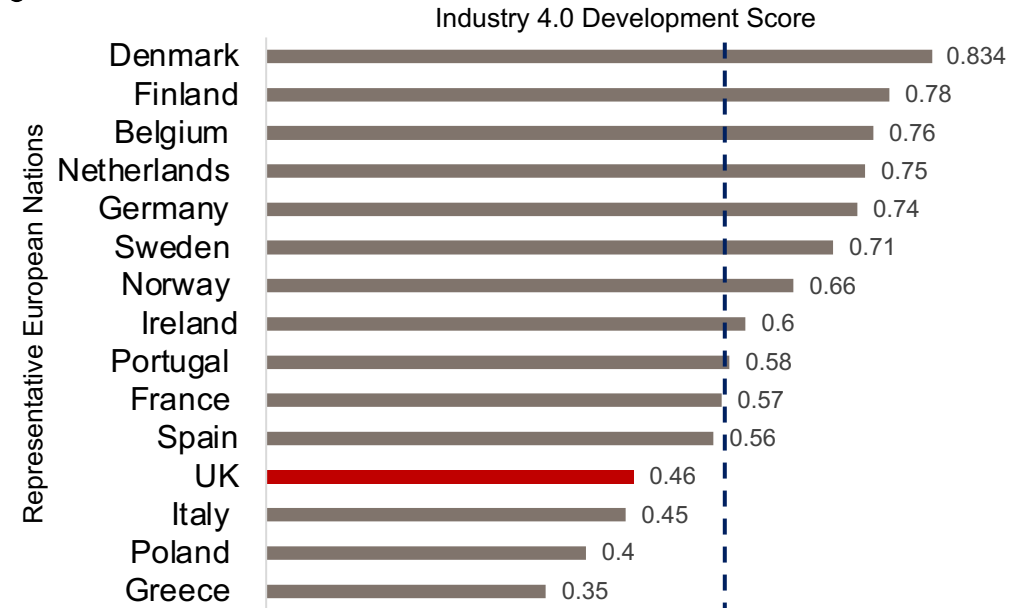
## Leadership in Industry 4.0 Matters

**1 Provide Tailwinds for Declining Industries**  
 ✓ Cost-Saving      ✓ Higher Efficiencies

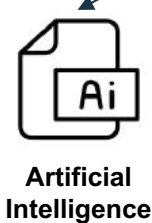
**2 Key Pillars to Digital Economy**  
 ✓ Faster Logistics      ✓ Enhanced Customer Analytics

**3 Mitigate National Security Concerns**  
 ✓ Data Security      ✓ International Voice

## U.K Lacks Industry 4.0 Development



### Late-Stage Venture Investments in UK Start-ups



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Our Approach

Optimal Strategies

**Screening**

Optimization

Assess Impacts

Risks

# Weather Proofing BNSF's Return

## Key Consideration Factors

 **High ESG Factor**  
Investing in high Environmental, Social and Governance (ESG) companies to ensure long-term sustainability of the fund

 **Local Employees**  
Focus on companies that help employ local Britons to support economic stability and economic independence

 **Low Correlation**  
Invest in asset classes that have low correlation with returns on the UK stock market. I.e. Gold, 20-year US treasuries

 **Sustained long-term growth of capital**

 **Weather downturn in the UK economy**

 **Support foreign investment in the UK**



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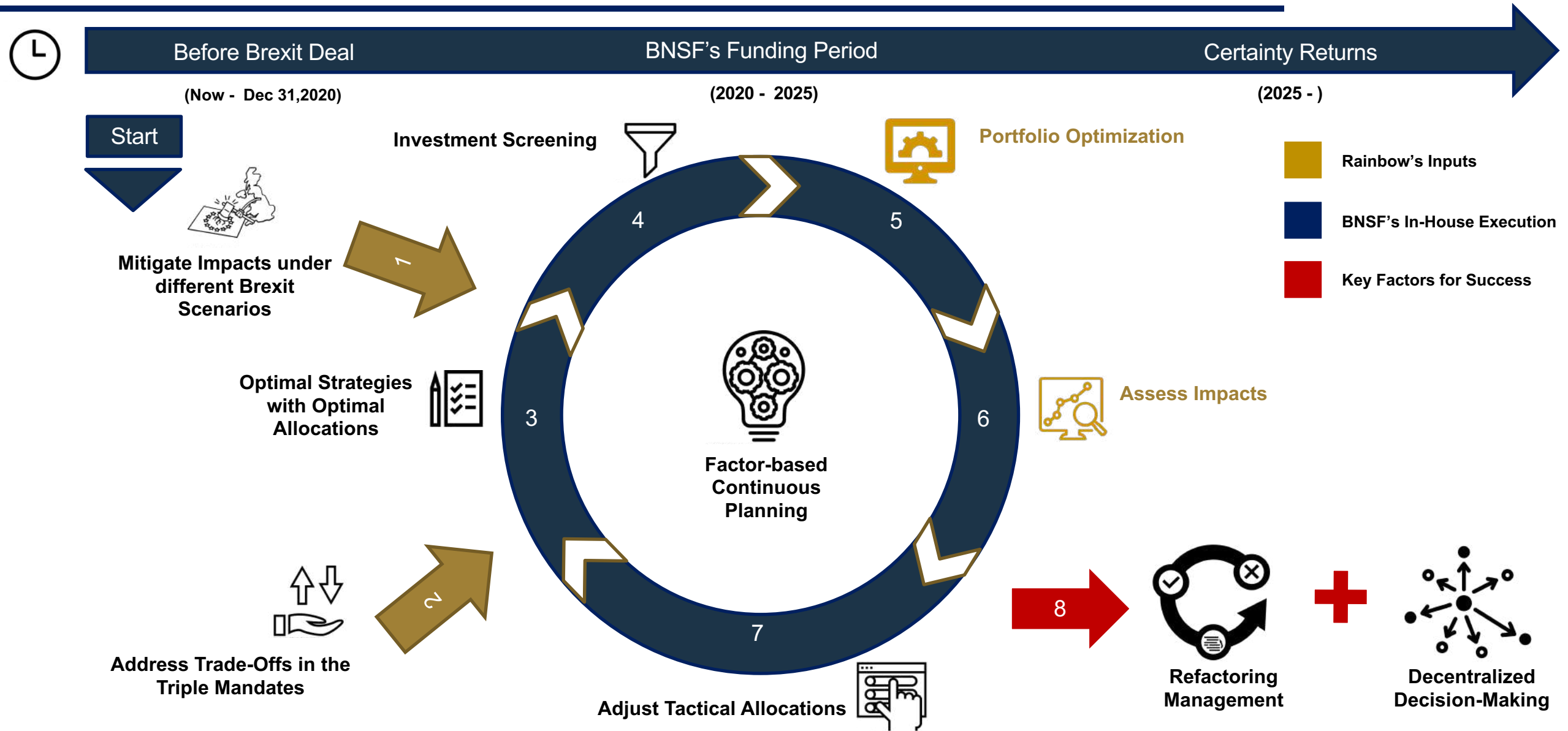
Screening

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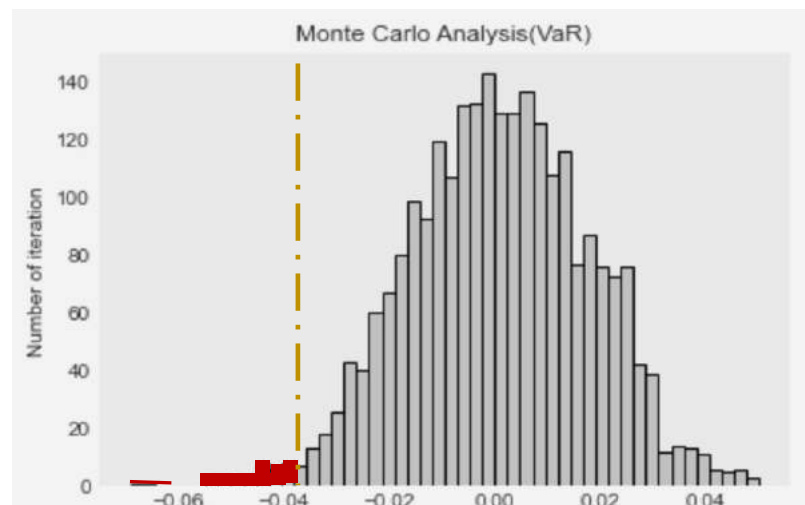
Risks

# Navigate Amid Uncertainties





# Weather Proofing BNSF's Return



## Expected Performance VS British Stock Index

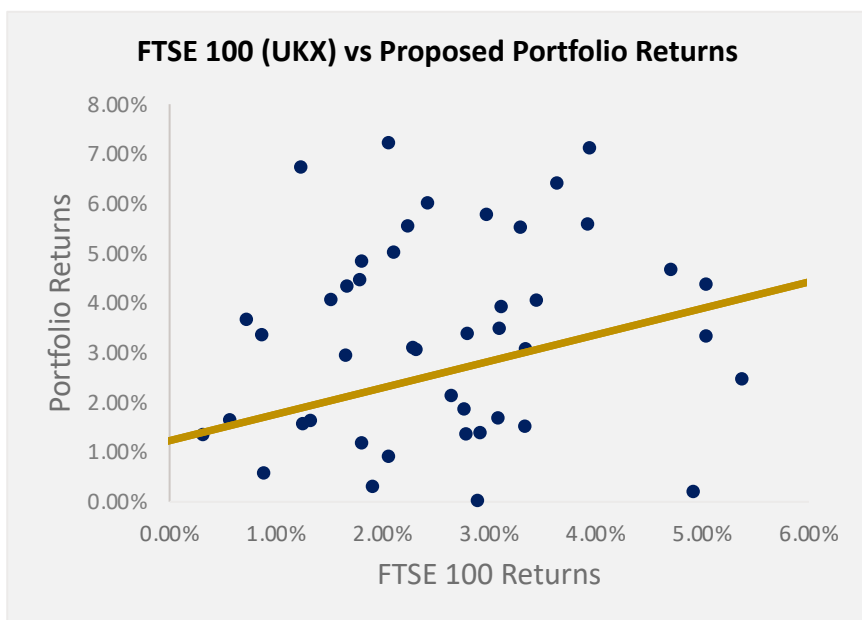
	Annualized Returns	Volatility	Sharpe	97.5% VaR	Correlation
BNSF	8.59%	8.59%	1.54	3.21%	0.55
FTSE 100	5.09%	11.94%	0.43	4.53%	-

**3.21%** probability of 2.5% drawdown

Correlation of **0.55** with FTSE 100

## Allocation

Asset Type	Asset	% of Global Portfolio	Asset Type % of Total Assets
Treasuries	iShares 20 Plus Year Treasury Bond ETF	15.95%	3.99%
Equities	Microsoft Corporation	14.86%	14.51%
	PepsiCo, Inc.	6.20%	
	Aecom	6.50%	
	Alphabet Inc Class A	1.27%	
	BP plc	6.67%	
	Siemens AG	1.10%	
	Sanofi SA	0.18%	
Alternatives	iShares MSCI Japan ETF	3.53%	
	SPDR Gold Trust	13.11%	6.50%
	Vanguard Real Estate Index Fund ETF	0.73%	
	iShares S&P/TSX Capped REIT Index ETF	12.16%	



# Assess Impacts

Sustainable portfolio annual return

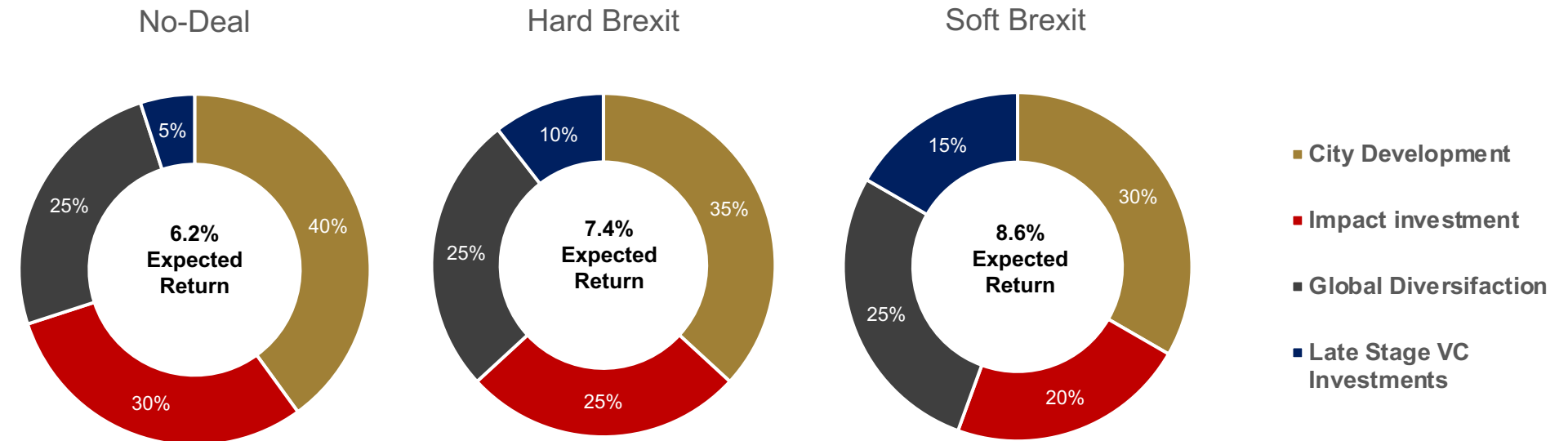
Boost UK's long-term economic independence, growth, and sustainability

Promote the long-term well-being of the British population

## Assumptions and Considerations

	Maximize Macro Impacts on UK			Optimize Internal Return	
	Immediate Macro Impact	Mid-term Macro Impact	Long-term Macro Impact	Returns	Risk
City Development	1	2	3	2.4%	LOW
Impact Investment	2	1	2	8%	MEDIUM
Global Diversification	4	4	4	8%	LOW
Late Stage VC Investment	3	3	1	20%	HIGH

## Allocation

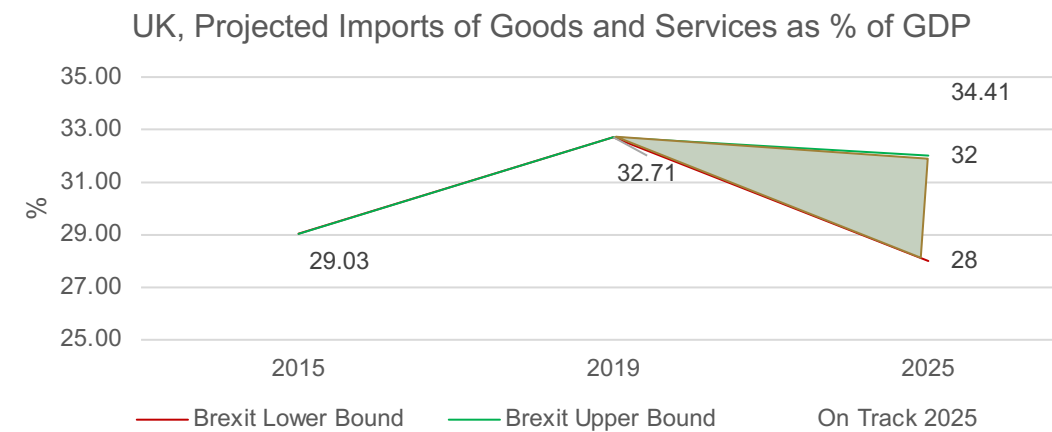
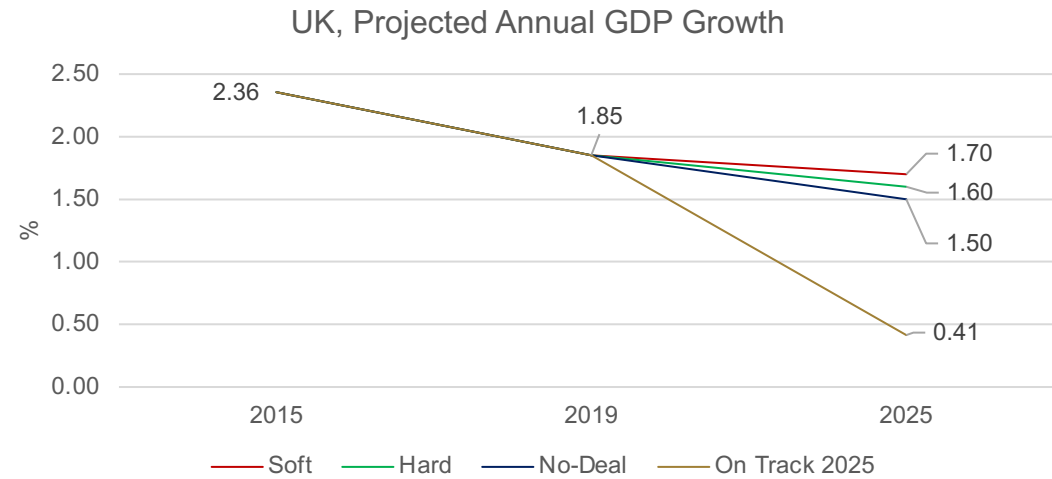


# Assess Impacts

Sustainable portfolio annual return

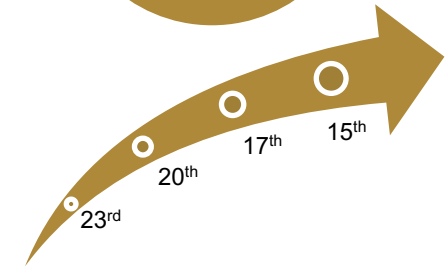
Boost UK's long-term economic independence, growth, and sustainability

Promote the long-term well-being of the British population



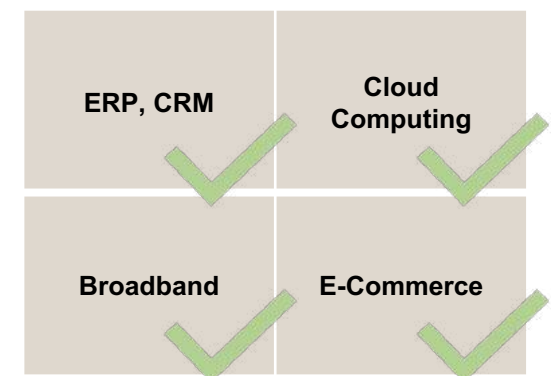
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M2M Cards Penetration:  
Ranking: 23<sup>rd</sup>  
9.46 MM  
14.2%



4

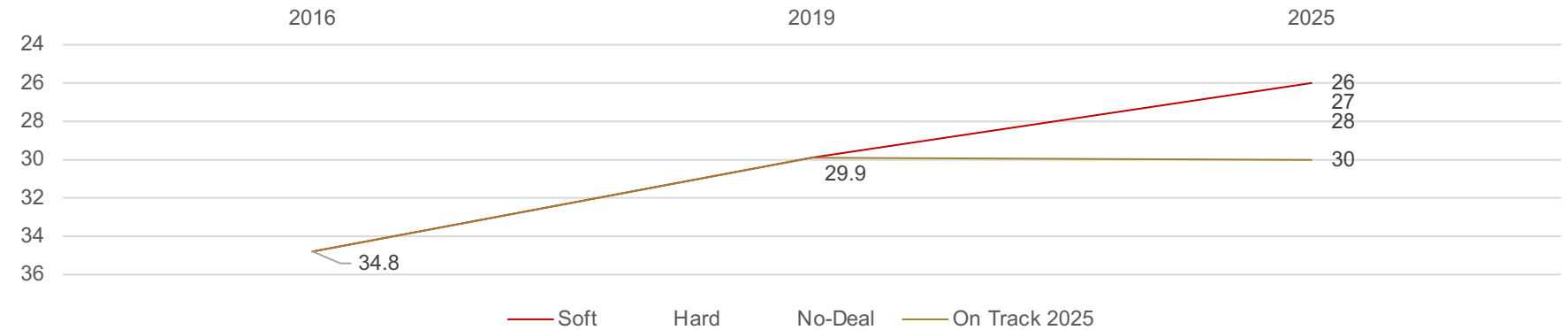
Industry 4.0 Index



# Assess Impacts

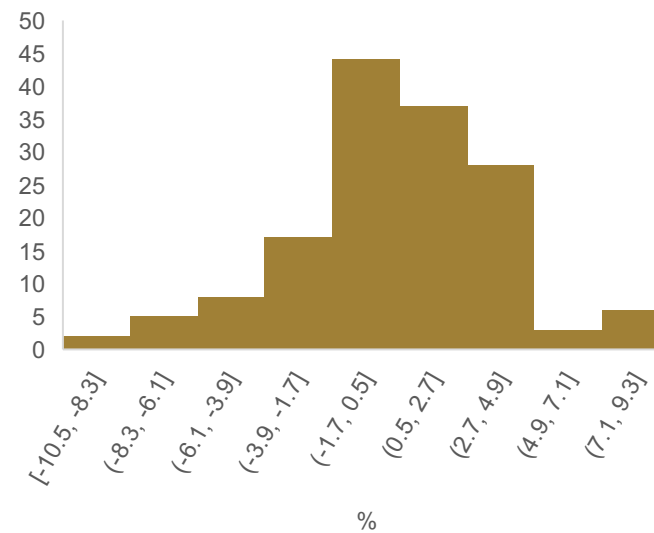
Sustainable portfolio annual return

UK, Projected Gini Coefficient



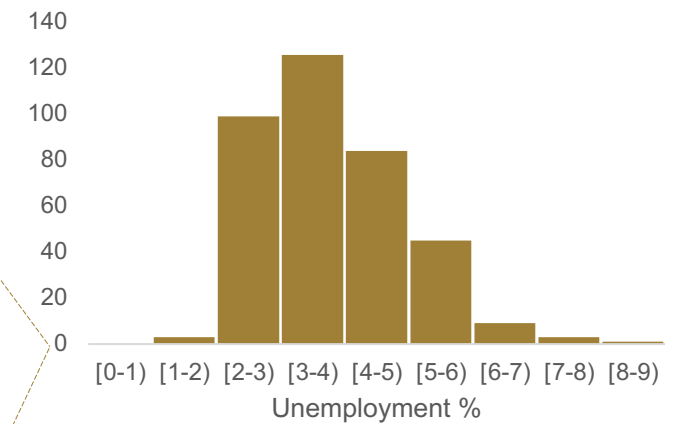
Boost UK's long-term economic independence, growth, and sustainability

2018 UK Cities' Annual GDP Per Capita Growth % Distribution



	Current	(Soft Brexit)	(Hard Brexit)	(No-Deal Brexit)
Mean:	0.66	Var: 5.58	Var: 5.77	Var: 5.89
Var:	6.21	(10% decrease)	(7% decrease)	(5% decrease)
Mean:	3.81%	Var: 1.10%	Var: 1.13%	Var: 1.16%
Var:	1.22%	(10% decrease)	(7% decrease)	(5% decrease)

Distribution of Average Unemployment Rate from 2017-2020 of UK Cities



Promote the long-term well-being of the British population

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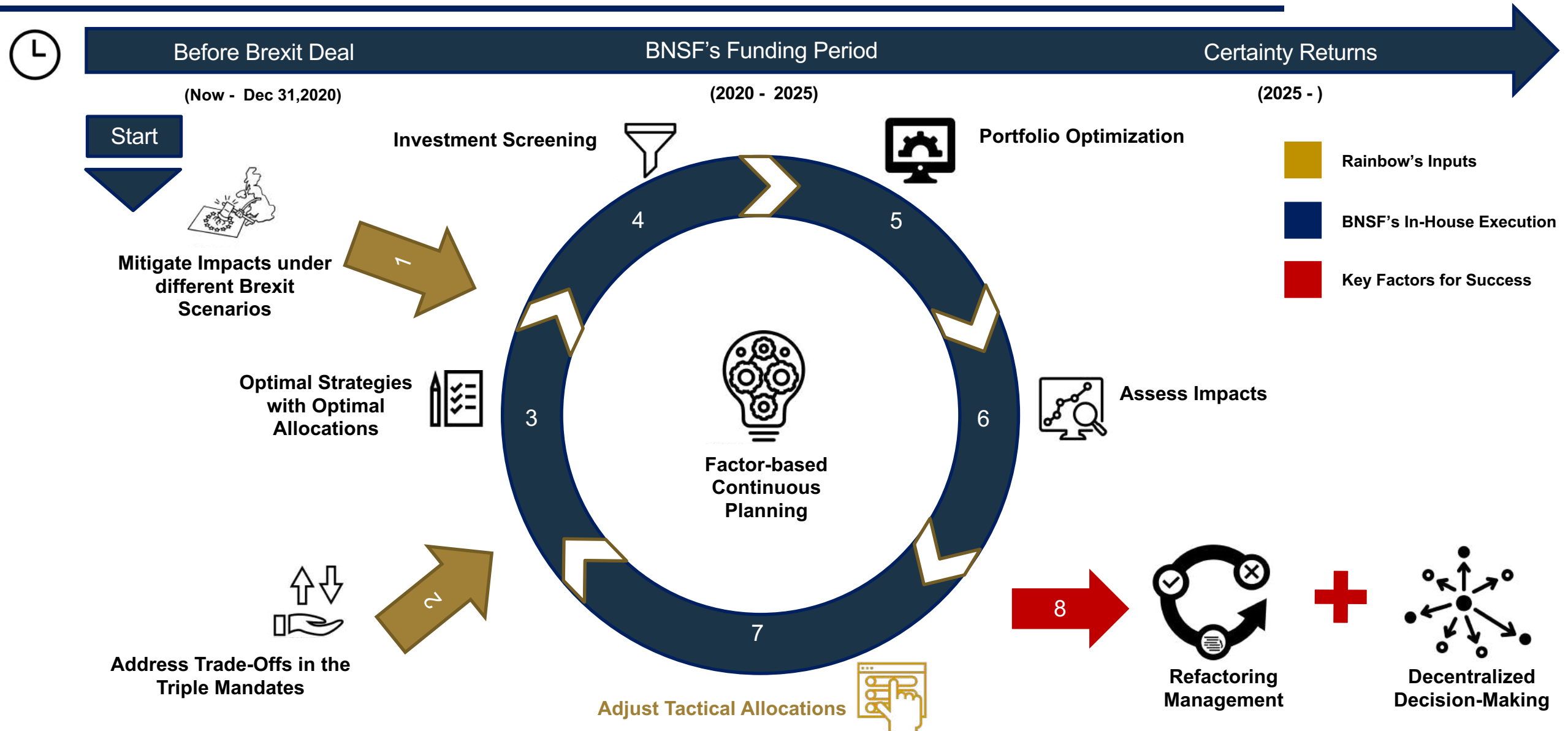
Screening

Optimization

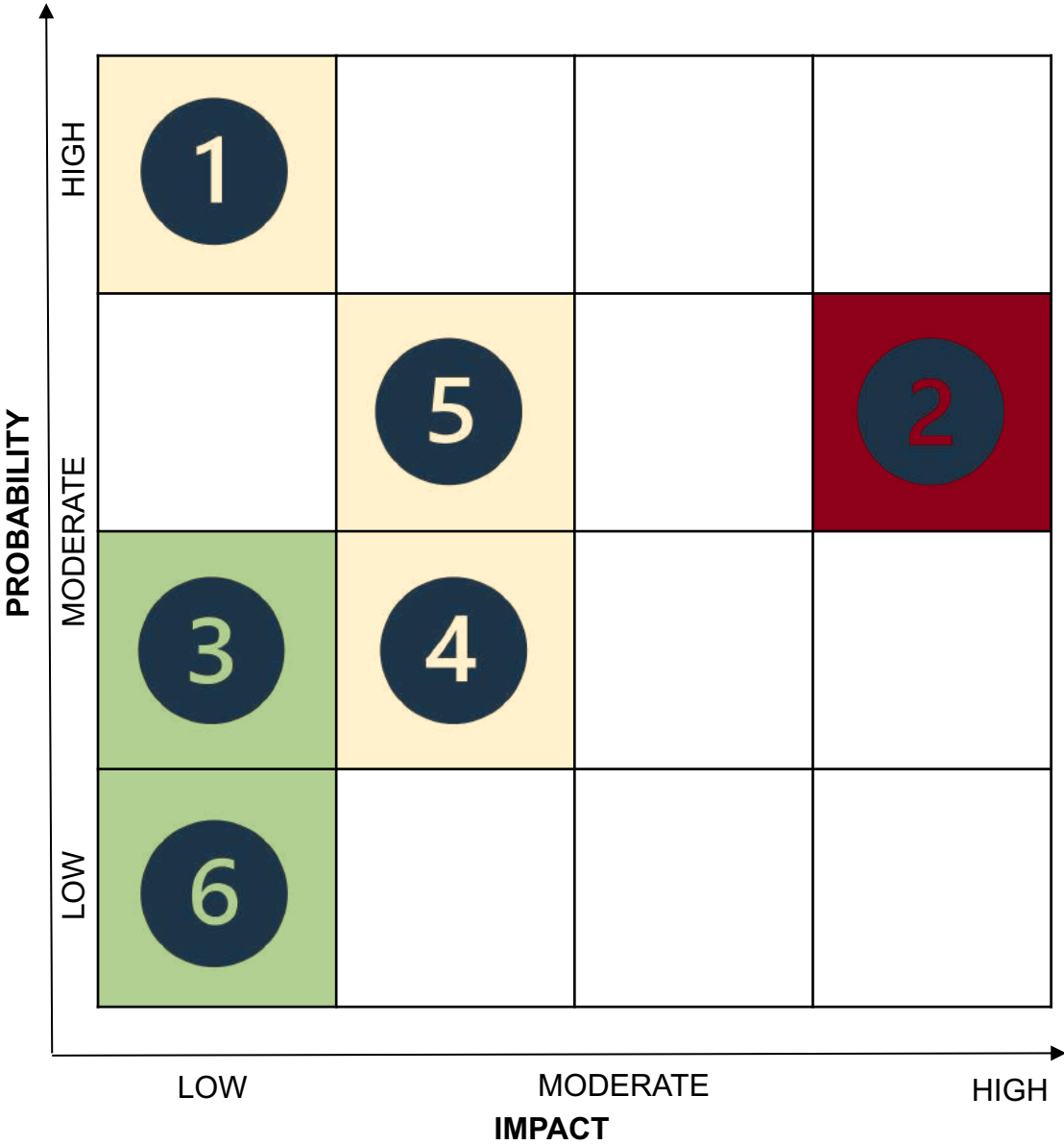
**Assess Impacts**

Risks

# Navigate Amid Uncertainties

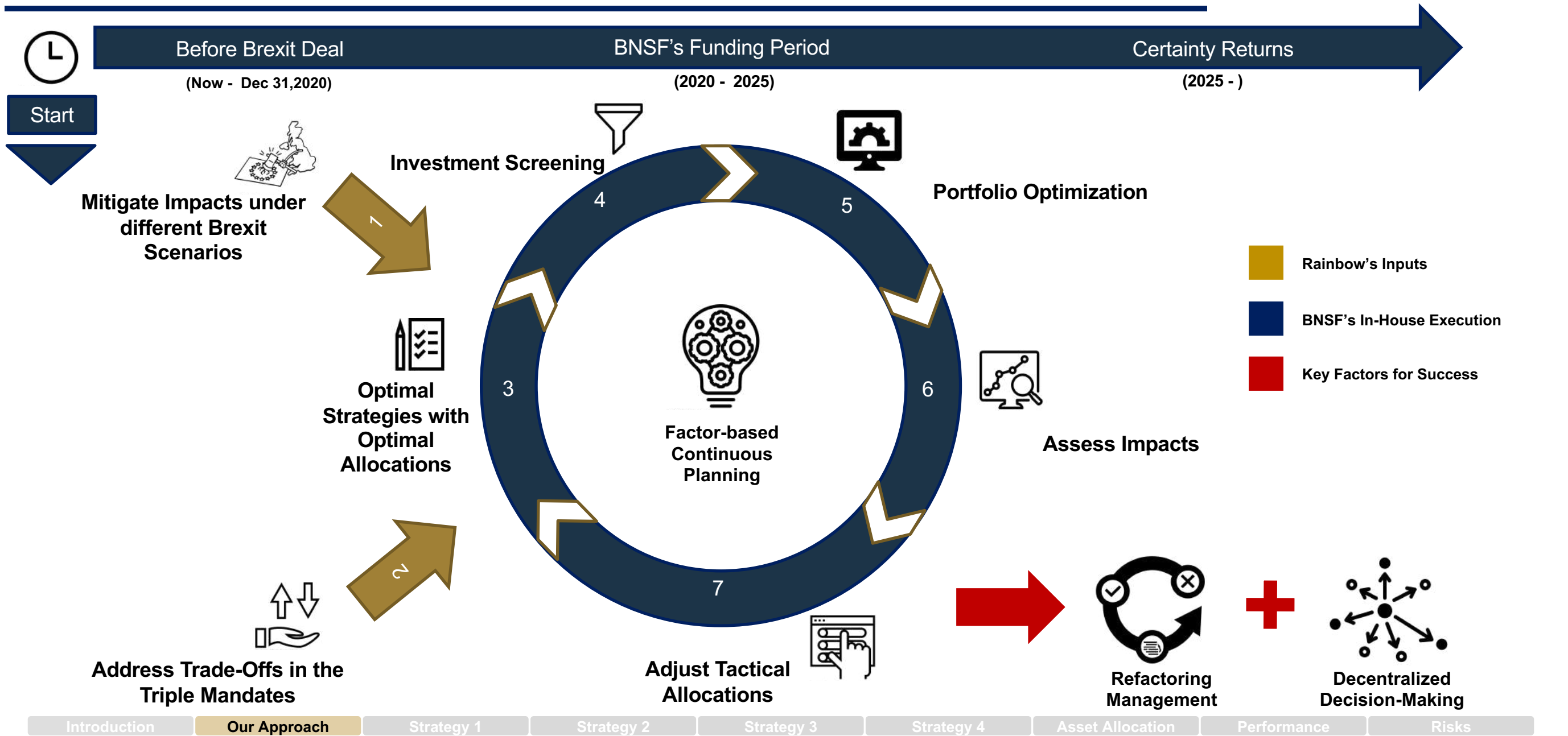


# Risks and Mitigations



Risk Factors	Impact			Risk Mitigation
	H	M	L	
1 Failing to actively monitor the portfolio	●			Construct compliance team Have Fund manager reported regularly
2 Unable to implement Municipal city investment due to political pressures	●			Stick to investment philosophies Use annual budget constraints
3 Prolonged COVID-19 lockdowns		●		Diversify portfolio
4 Depreciation of the Pound		●		Purchase USD and hold other currencies Hedge by entering forward contracts
5 Venture risk of investing in Start-ups		●		Invest in late-stage venture
6 High inflation			●	Unlikely to happen

# Navigate Amid Uncertainties



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**Our Approach**

Strategy 1

Strategy 2

Strategy 3

Strategy 4

Asset Allocation

Performance

Risks

# Appendix

Intro	BNSF Board Members	UK GDP By Regions	UK Healthy Life Expectancy By Regions	UK Average Weekly Earnings By Regions	UK Sector Exposure to Brexit	Diversified
Navigate	Potential UK Growth Cities	COVID-19 Impact on UK Sectors + Brexit Impact	5 Cities' Performance Targets for Year 1	Manchester GVA By Sector	Northumberland and Tyne and Wear GVA By Sectors	Public Return
Strategy	Sheffield GVA By Sector	Birmingham GVA By Sector	Plymouth GVA By Sector	Impact Investment's Execution Process	Screening Process for Impact Investing	Mandate 3
Cities	Example Funds	Table of Diversified Equities	Efficient Frontier	Portfolio Returns & Optimal Weights	FTSE 100 vs. Global Portfolio Correlation	Mandate 1
PE	Rationale Behind Late-Stage VC Investing	Digitalizing Michael Porter's Value Chain	Asset Allocation	Mandate #1 Targets	M2M Card Penetration	Mandate 2
Future	Industry 4.0 Index	EPR Penetration	UK GDP and Imports	Mandate #2 Targets	Gini Coefficient	Risks
Fund Returns (Mandate #3)			Expected Returns For Impact Investment			



# BNSF Board Members

[Appendix Home](#)

Board Member	Views
Aadi Singh	Support declining industries and support UK based firms
Lewis Hughes	Focus on small industries & national champions & focus on technological innovation
Anna Aylmer	Focus on foreign investment & social inequalities
Elizabeth Shelby	Renationalize infrastructure & increase opportunities through finance, engineering and construction
Oliver Edwards	Invest in foreign firms
Robert Grey	Focus on local enterprises
Laura Spencer	Invest in start-ups

# UK GDP By Regions

Appendix Home

Summary of gross domestic product statistics for the NUTS1 countries and regions, 2018<sup>1 2</sup>

NUTS1 Regions	Population <sup>3</sup>	Total GDP (£ million) <sup>4</sup>	GDP per head (£) <sup>1 4 6</sup>	Annual growth in 'real' GDP (%) <sup>5</sup>	Annual growth in 'real' GDP per head (%) <sup>5 6</sup>
UK	66,435,550	2,140,278	31,976	1.4	0.8
England	55,977,178	1,839,264	32,857	1.4	0.8
North East	2,657,909	62,644	23,569	0.9	0.4
North West	7,292,093	207,452	28,449	1.4	0.9
Yorkshire and The Humber	5,479,615	141,698	25,859	1.2	0.6
East Midlands	4,804,149	124,647	25,946	1.1	0.4
West Midlands	5,900,757	159,832	27,087	2.0	1.3
East of England	6,201,214	186,462	30,069	1.7	1.2
London	8,908,081	487,145	54,686	2.0	1.1
South East	9,133,625	311,300	34,083	0.6	0.0
South West	5,599,735	158,084	28,231	0.9	0.1
Wales	3,138,631	74,906	23,866	1.3	0.9
Scotland	5,438,100	161,295	29,660	0.9	0.7
Northern Ireland	1,881,641	48,887	25,981	-0.5	-1.1
Extra-Regio <sup>7</sup>	n/a	15,927	n/a	7.1	n/a

Notes:

1 Figures may not sum due to rounding in totals; per head (£) figures are rounded to the nearest pound sterling.

2 2018 estimates are provisional.

3 Population estimates are sourced from the Population estimates for the UK release.

4 GDP in current prices.

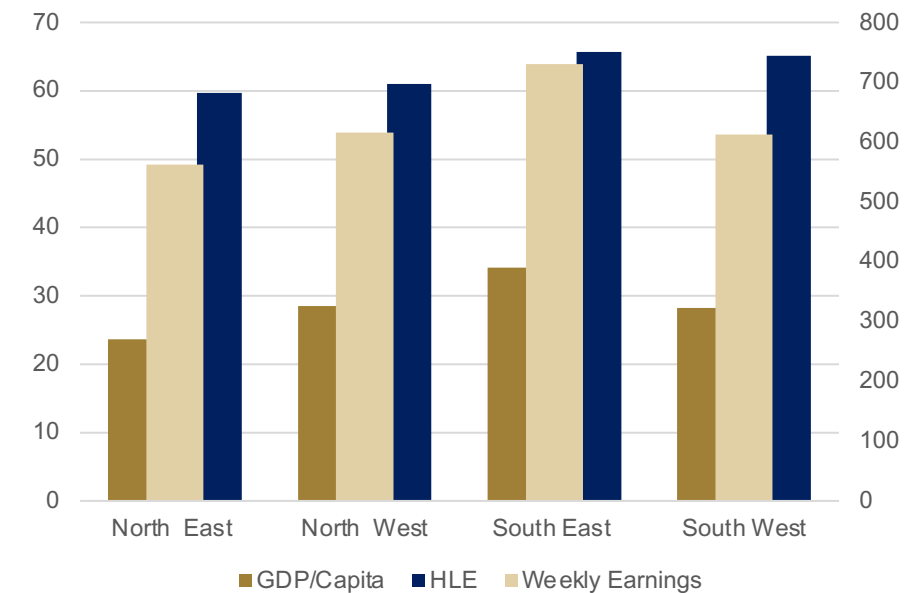
5 GDP in chained volume measures.

6 Per head figures exclude Extra-Regio: the off-shore contribution to GDP that cannot be assigned to any region.

7 n/a equals not applicable.

Source: Office for National Statistics - Regional economic activity by gross domestic product, UK: 1998 to 2018

UK quality of life by regions



# UK Healthy Life Expectancy By Regions

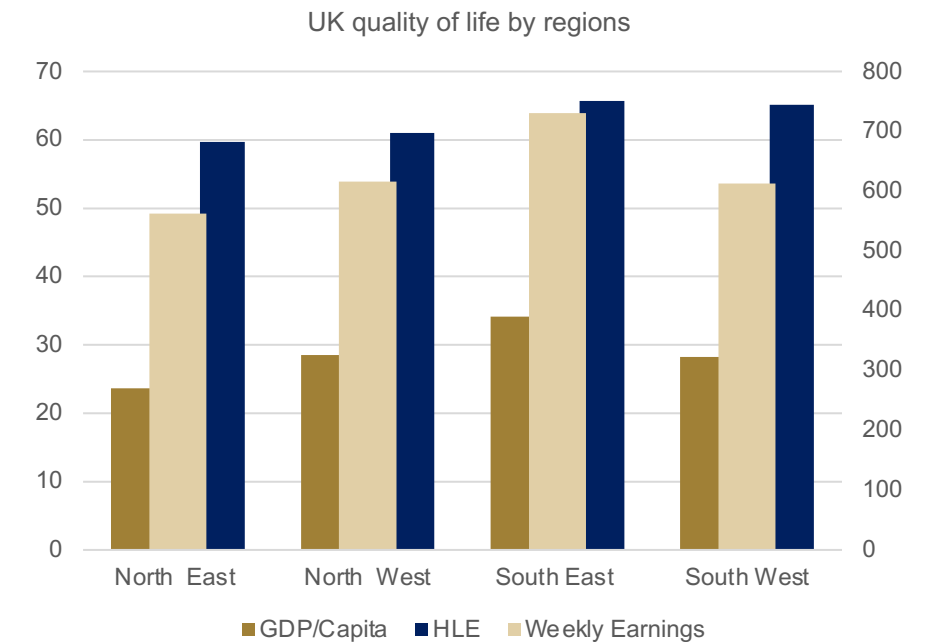
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Healthy life expectancy (HLE) and life expectancy (LE) for males and females at birth by English regions, 2009 to 2011

English region	LE (years)	HLE (years)	Lower 95% confidence interval	Upper 95% confidence interval	Proportion of life spent in "Good" health (%)	LE rank	HLE rank
<b>Males</b>							
South East	80.0	65.7*	65.3	66.1	82.1	1	1
South West	79.8	65.1*	64.6	65.6	81.6	3	2
East of England	79.9	64.8*	64.3	65.3	81.1	2	3
East Midlands	78.7	63.0	62.4	63.6	80.0	5	4
London	79.3	63.0	62.5	63.4	79.4	4	5
West Midlands	78.4	62.5**	62.0	62.9	79.7	6	6
North West	77.4	61.0**	60.7	61.4	78.9	9	7
Yorkshire and The Humber	78.1	61.0**	60.5	61.5	78.1	7	8
North East	77.5	59.7**	59.2	60.3	77.1	8	9
England	78.9	63.2	63.1	63.4	80.1		
<b>Females</b>							
South East	83.8	67.0*	66.6	67.5	80.0	1	1
South West	83.7	66.3*	65.8	66.9	79.2	2	2
East of England	83.6	66.2*	65.6	66.7	79.2	4	3
London	83.6	63.8	63.3	64.3	76.3	3	4
East Midlands	82.8	63.3**	62.7	64.0	76.5	5	5
West Midlands	82.6	62.8**	62.3	63.3	76.1	6	6
Yorkshire and The Humber	82.0	62.1**	61.6	62.6	75.7	7	7
North West	81.5	61.7**	61.3	62.1	75.7	8	8
North East	81.5	60.2**	59.7	60.8	73.9	9	9
England	82.9	64.2	64.0	64.3	77.4		

Notes

- Excludes residents of communal establishments except NHS housing and students in halls of residence where inclusion takes place at their parents' address.
- Regions are presented by gender and have been ranked at the England level, based on HLE to more than one decimal place. Their respective rankings within England are also shown.
- Figures may not sum due to rounding.
- \* denotes that the region HLE estimate is significantly higher than the England HLE estimate at the 95% confidence level.
- \*\* denotes that the region HLE estimate is significantly lower than the England HLE estimate at the 95% confidence level.
- The significance test refers to a one tailed Z test of the difference of the estimates as detailed in:



# UK Average Weekly Earnings By Regions

Appendix Home

EARN05: Average gross weekly earnings of full-time<sup>1</sup> employees, by region: People (not seasonally adjusted)

Date of publication: Tuesday, August 11, 2020 Date of next publication: Tuesday, November 10, 2020

Inquiries: Email: [labour.market@ons.gov.uk](mailto:labour.market@ons.gov.uk) Telephone: +44 (0)1633 455400

United Kingdom, not seasonally adjusted

Averages (£ per week)

	United Kingdom	Great Britain	England	North East	North West	Yorks & the Humber	East Midlands	West Midlands	East of England	London	South East	South West	Wales	Scotland	Northern Ireland
Jan-Mar 2018	609	612	620	526	561	534	515	562	654	780	675	562	542	567	512
Apr-Jun 2018	619	621	631	550	537	533	552	568	652	797	711	575	528	578	532
Jul-Sep 2018	617	619	629	494	559	569	554	554	655	780	690	576	527	570	539
Oct-Dec 2018	637	639	645	523	564	561	564	579	656	846	685	585	564	628	545
Jan-Mar 2019	623	626	634	560	575	564	574	565	674	762	691	571	553	586	513
Apr-Jun 2019	640	642	650	537	575	574	554	577	653	831	718	603	576	601	545
Jul-Sep 2019	646	648	658	551	595	550	584	591	685	830	710	595	527	622	542
Oct-Dec 2019	647	650	655	530	595	577	580	595	668	805	728	582	566	648	537
Jan-Mar 2020	650	653	663	590	583	606	591	586	653	847	702	608	548	611	537
Apr-Jun 2020	659	662	674	562	616	582	564	612	693	843	730	613	535	618	555

Source: Labour Force Survey

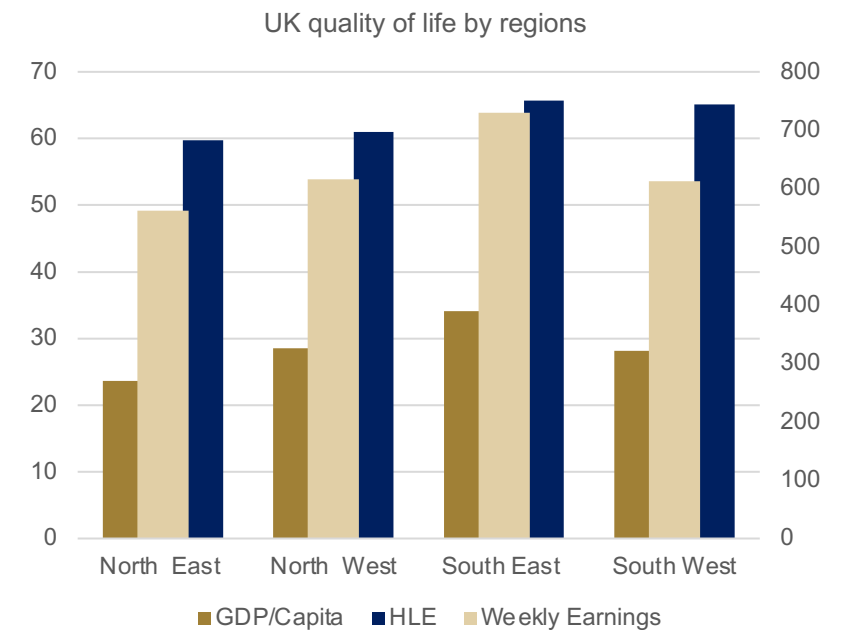
IMPORTANT NOTE REGARDING LFS EARNINGS ESTIMATES

The data on individual's earnings captured by the LFS is thought to be of a lower quality than ASHE or AWE as LFS information is self-reported by employees. ASHE and AWE however, gather information from the employer which is thought to be more accurate as employers can consult payroll records. Individuals may not have such records to hand and their responses may therefore be subject to higher levels of recall error. Furthermore LFS responses can be given by proxy (by other individuals in the same household) when an individual is unavailable for interview. This gives further scope for recall error from respondents. Due to this recall error, estimates of earnings based on the LFS that are published by the ONS typically exclude those who earn more than £100 per hour as a quality assurance measure. These factors combined mean that gross weekly and hourly pay are known to be underestimated on the LFS.

Estimates of gross weekly and hourly earnings from the LFS are based upon 2/5 of the quarterly sample and are therefore subject to high sampling variability. For this reason, ONS recommends that any short term measurement of change be made with caution.

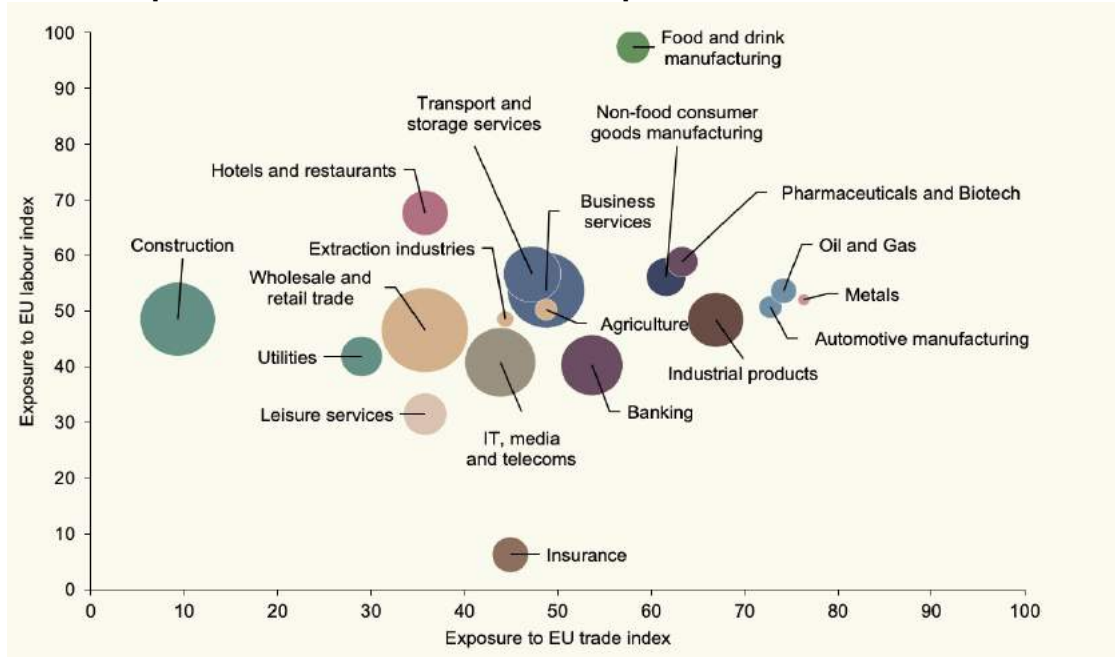
<sup>1</sup> Full-time is based on respondents' self assessment. The estimates relate to an individual's main job only.

Note: As the estimates are not seasonally adjusted, it is best practice to only compare the same quarter for different years (e.g., compare January-March 2018 with January-March 2019 but do not compare July-September 2018 with January-March 2019).

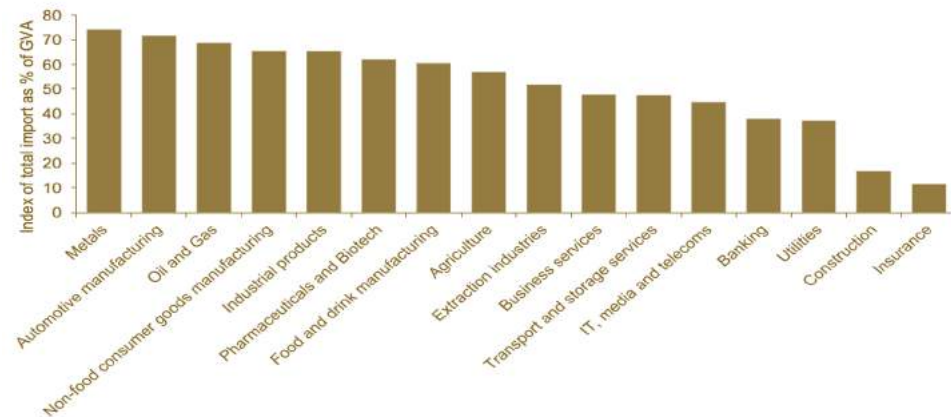


# UK Sector Exposure to Brexit

## Sector exposure to EU labour and EU exports



## Sector imports dependence



Source: ONS data, KPMG calculations.

## Brexit Sector Barometer

Hard Brexit		Free trade		Free labour	
Food and drink manufacturing	78	Food and drink manufacturing	94	Metals	74
Metals	64	Hotels and restaurants	64	Oil and Gas	72
Oil and Gas	64	Pharmaceuticals and Biotech	59	Automotive manufacturing	71
Automotive manufacturing	62	Non-food consumer goods manufacturing	57	Industrial products	65
Pharmaceuticals and Biotech	61	Transport and storage services	56	Pharmaceuticals and Biotech	63
Non-food consumer goods manufacturing	59	Oil and Gas	56	Food and drink manufacturing	62
Industrial products	58	Metals	54	Non-food consumer goods manufacturing	61
Transport and storage services	52	Business services	53	Banking	52
Hotels and restaurants	52	Automotive manufacturing	53	Business services	49
Business services	51	Industrial products	50	Agriculture	49
Agriculture	49	Agriculture	50	Transport and storage services	48
Banking	47	Extraction industries	48	Extraction industries	45
Extraction industries	46	Wholesale and retail trade	46	IT, media and telecoms	44
IT, media and telecoms	42	Construction	45	Insurance	41
Wholesale and retail trade	41	Banking	42	Hotels and restaurants	39
Utilities	35	IT, media and telecoms	41	Wholesale and retail trade	37
Leisure services	34	Utilities	41	Leisure services	35
Construction	29	Leisure services	32	Utilities	30
Insurance	26	Insurance	10	Construction	13

Source: ONS data, KPMG calculations.

# Potential UK Growth Cities

## Potential High Growth UK Cities Based on Ability to Soak in Investment Capital

	Patents strength	Trademarks strength	University innovation strength	Business innovation strength	Skills and spillover strength	Infrastructure strength	City size (PUA)	Region
Top 10%	London	Strong	Very strong	Strong	Very strong	Very strong	10,151,260	South East
	Slough	Strong	Very strong	Very weak	Strong	Very strong	149,112	South East
	Aldershot	Strong	Weak	Very weak	Strong	Strong	184,016	South East
	Reading	Strong	Weak	Weak	Very strong	Very strong	331,182	South East
	Derby	Very strong	Very weak	Strong	Strong	Strong	257,174	East Midlands
	Cambridge	Very strong	Very weak	Very strong	Very strong	Very strong	125,758	East
	Milton Keynes	Weak	Very strong	Very weak	Strong	Strong	268,607	South East
	Aberdeen	Very Weak	Weak	Weak	Strong	Weak	227,560	Scotland
	Crawley	Strong	Very weak	Very weak	Strong	Very strong	112,448	South East
	Oxford	Very strong	Very strong	Very strong	Strong	Very strong	154,327	South East
Top 20%	Edinburgh	Very weak	Very strong	Very strong	Strong	Strong	518,500	Scotland
	Luton	Very weak	Very weak	Very strong	Strong	Very Strong	214,109	East
	Southampton	Very weak	Weak	Very strong	Very strong	Strong	384,615	South East
	Swindon	Very weak	Very weak	Very weak	Weak	Strong	221,996	South West
	Bristol	Strong	Strong	Strong	Strong	Strong	746,049	South West
	Glasgow	Very weak	Strong	Strong	Weak	Strong	1,007,700	Scotland
	Birmingham	Very weak	Weak	Weak	Weak	Very strong	2,549,673	West Midlands
	Leeds	Very weak	Strong	Strong	Weak	Strong	789,194	Yorkshire
	Manchester	Very weak	Strong	Strong	Strong	Very strong	2,486,481	North West
	Blackpool	Very weak	Weak	Very weak	Weak	Very weak	219,075	North West
Top 30%	Portsmouth	Weak	Very weak	Weak	Strong	Strong	542,568	South East
	Coventry	Very strong	Strong	Strong	Weak	Strong	366,785	West Midlands
	Hull	Very weak	Weak	Weak	Very weak	Strong	260,645	Yorkshire
	Northampton	Very weak	Weak	Weak	Strong	Strong	225,146	East Midlands
	York	Strong	Weak	Strong	Weak	Weak	209,893	Yorkshire
	Cardiff	Strong	Strong	Very strong	Weak	Strong	364,248	Wales
	Bournemouth	Very weak	Strong	Weak	Weak	Weak	395,800	South West
	Liverpool	Very weak	Weak	Strong	Very strong	Strong	644,385	North West
	Warrington	Very weak	Strong	Very weak	Weak	Strong	209,547	North West
	Exeter	Weak	Weak	Strong	Weak	Strong	130,428	South West
50%	Basildon	Weak	Weak	Very weak	Strong	Weak	185,862	East

# Potential UK Growth Cities

## Potential High Growth UK Cities Based on Ability to Soak in Investment Capital

50%	Basildon	Weak	Weak	Very weak	Strong	Weak	Weak	185,862	East
	Brighton	Weak	Strong	Weak	Very strong	Strong	Very strong	354,264	South East
	Blackburn	Very weak	Very strong	Very weak	Weak	Very weak	Weak	148,942	North West
	Newcastle	Very weak	Very weak	Strong	Weak	Strong	Weak	858,954	North East
	Newport	Very weak	Very weak	Very weak	Strong	Very weak	Strong	246,351	Wales
	Wakefield	Very weak	Very weak	Very weak	Very weak	Very weak	Very weak	345,038	Yorkshire
	Gloucester	Strong	Strong	Very weak	Weak	Strong	Weak	129,285	South West
	Dundee	Very weak	Very weak	Strong	Weak	Weak	Very strong	148,750	Scotland
	Sunderland	Very weak	Very weak	Weak	Weak	Weak	Very weak	277,417	North East
	Peterborough	Strong	Strong	Very weak	Strong	Very weak	Very strong	201,041	East
	Chatham	Very weak	Very weak	Very weak	Weak	Weak	Weak	277,855	South East
	Ipswich	Very weak	Very weak	Weak	Weak	Strong	Very strong	137,532	East
	Sheffield	Weak	Very weak	Strong	Weak	Weak	Weak	847,177	Yorkshire
	Telford	Very weak	Very weak	Weak	Weak	Very weak	Very strong	177,799	West Midlands
	Worthing	Very weak	Weak	Very weak	Weak	Strong	Strong	110,025	South East
	Middlesbrough	Weak	Very weak	Weak	Weak	Weak	Very weak	474,476	North East
	Nottingham	Weak	Weak	Strong	Very weak	Strong	Weak	667,617	East Midlands
	Bradford	Very weak	Weak	Weak	Weak	Weak	Weak	537,173	Yorkshire
	Plymouth	Very weak	Very weak	Strong	Weak	Strong	Very weak	263,100	South West
	Doncaster	Weak	Very weak	Very weak	Weak	Very weak	Weak	310,542	Yorkshire
	Birkenhead	Very weak	Weak	Very weak	Very weak	Weak	Very weak	323,235	North West
	Barnsley	Very weak	Very weak	Very weak	Weak	Very weak	Very weak	245,199	Yorkshire
	Preston	Weak	Weak	Very Strong	Very weak	Weak	Very weak	369,166	North West
	Leicester	Weak	Strong	Weak	Weak	Strong	Weak	512,695	East Midlands
	Mansfield	Very weak	Very weak	Very weak	Weak	Very weak	Very weak	235,992	East Midlands
	Norwich	Weak	Very weak	Strong	Very weak	Very weak	Very weak	270,601	East
	Stoke	Weak	Very weak	Strong	Very weak	Weak	Strong	385,323	West Midlands
	Swansea	Weak	Very weak	Strong	Strong	Very weak	Very weak	389,372	Wales
	Wigan	Very weak	Very weak	Very weak	Very weak	Weak	Very weak	326,088	North West
	Burnley	Very weak	Very weak	Very weak	Strong	Very weak	Very weak	179,932	North West
	Huddersfield	Very weak	Strong	Weak	Weak	Very weak	Very weak	438,727	Yorkshire
	Southend	Very weak	Very weak	Very weak	Weak	Weak	Weak	359,514	East

# COVID-19 Impact on UK Sectors + Brexit Impact

## Covid-19 and Brexit Impact on UK Sectors

Industry Name	Rank of Net Increase in Business Volume, April 2020	Rank of Brexit Predicted Effect (CEP Trade Model)
Other Manufacturing	1	5
Other Supporting and Auxiliary Transport Activities	2	14
Electrical and Optical Equipment	3	19
Textiles and Leather	4	18
Other Business Activities, and Renting of Machinery and Equipment	5	17
Agriculture, Forestry and Fishing	6	3
Retail Trade, Excluding Motor Vehicles	7	12
Chemicals and Chemical Products	8	20
Other Non-Metallic Minerals	9	6
Transport Equipment	10	10
Real Estate Activities	11	15
Other Machinery	12	7
Rubber and Plastics	13	9
Basic Metals and Fabricated Metal	14	2
Hotels and Restaurants	15	7
Wholesale and Commission Trade, Including Motor Vehicles	16	11
Food, Beverages and Tobacco	17	4
Post and Telecommunications	18	16
Recreation, Community, Social and Personal Services	19	12
Pulp, Paper, Printing and Publishing	20	1

*Notes:* Industries are ranked in terms of net increase in business volume in April 2020 (see notes of Figure 1 for details on this variable). The rows are shaded according to the predicted long-term effect of Brexit (Dhingra et al, 2017): green for top, blue for middle, and red for most negatively affected. Sectors with fewer than 5 businesses in the data in April 2020 are omitted. Industries are ranked from least negatively affected (1) to most negatively affected (20).



# 5 Cities' Performance Targets for Year 1

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## Year 1 Targets

<b>Manchester</b>	<ul style="list-style-type: none"> <li>Maintain current level of annual GDP per capita (2.9%)</li> <li>Slow down annual unemployment rate growth by 0.2% then aim to reverse and decrease unemployment rate by 0.2% per year.</li> </ul>
<b>Newcastle</b>	<ul style="list-style-type: none"> <li>Reverse annual GDP per capita decline.</li> <li>Decrease change in annual unemployment rate to -0.3%.</li> </ul>
<b>Birmingham</b>	<ul style="list-style-type: none"> <li>Increase annual GDP per capita growth to 2%.</li> <li>Slow down annual unemployment rate growth by 0.3% then aim to reverse and decrease unemployment.</li> </ul>
<b>Sheffield</b>	<ul style="list-style-type: none"> <li>Increase annual GDP per capita growth to 2%.</li> <li>Maintain current level of annual unemployment rate decline of -0.9% each year.</li> </ul>
<b>Plymouth</b>	<ul style="list-style-type: none"> <li>Increase annual GDP per capita growth to 2%.</li> <li>Slow down annual unemployment rate growth by 0.1% then aim to reverse and decrease unemployment by 0.2% per year.</li> </ul>

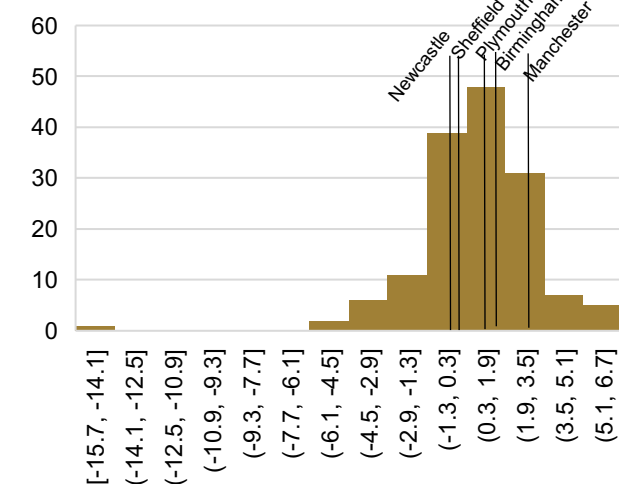
## Past GDP Per Capita Growth Rate

Area name	2016	2017	2018	avg. 2016-2018
Manchester	3.0	4.7	1.1	2.9
Newcastle upon Tyne	0.5	0.3	-1.5	-0.2
Birmingham	1.8	-0.2	3.6	1.7
Sheffield	0.2	0.7	-0.8	0.0
Plymouth	4.3	-2.0	1.3	1.2

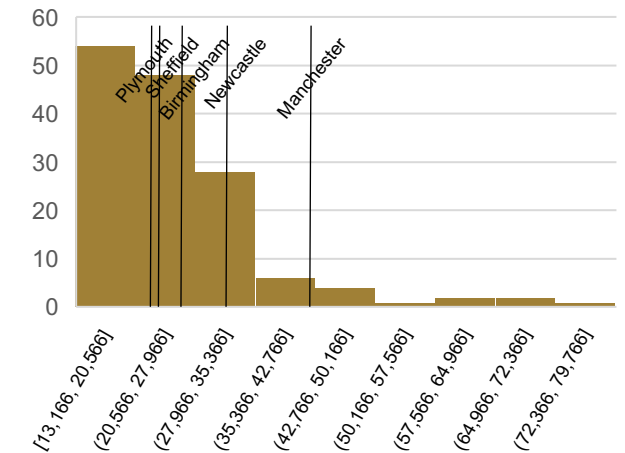
## Past Unemployment Rates and Growth Rate

Unemployment	Jan 2017 to Dec 2017	Apr 2017 to Mar 2018	Jul 2017 to Jun 2018	Oct 2017 to Sep 2018	Jan 2018 to Dec 2018	Apr 2018 to Mar 2019	Jul 2018 to Jun 2019	Oct 2018 to Sep 2019	Jan 2019 to Dec 2019	Apr 2019 to Mar 2020	Jul 2019 to Jun 2020	2017-2020	Avg annual %change
	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	Rate (%)	AVG Rate (%)	2017-2020
Manchester	5.6	5.6	5.2	4.9	5.2	4.7	5.4	5.5	5.8	6.1	6.1	5.5	0.307
Newcastle	6.8	6.3	5.8	6.2	5.4	5.3	5.3	5.4	6.1	6.2	6.0	5.9	-0.203
Birmingham	8.3	7.8	7.3	6.8	7.3	7.2	8.1	7.8	8.2	9.0	8.0	7.8	0.414
Sheffield	6.0	5.7	5.4	5.1	4.8	4.5	4.4	4.2	4.2	4.0	3.6	4.7	-0.915
Plymouth	4.7	4.4	4.4	3.9	4.5	4.5	4.3	4.6	4.3	4.8	4.7	4.5	0.126

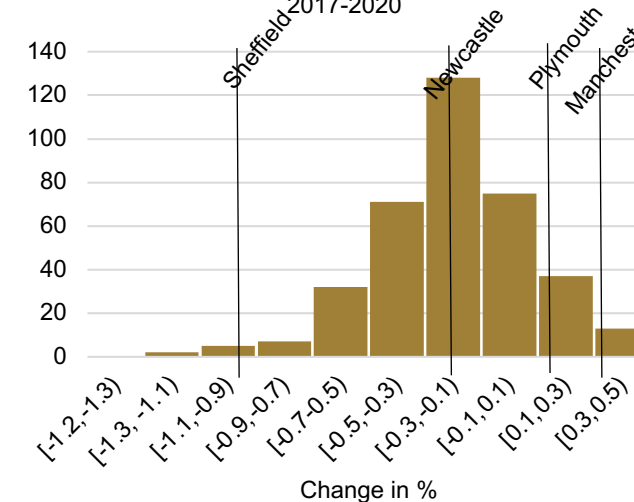
Avg 2016-2018 UK Cities' Annual GDP Per Capita Growth % Distribution



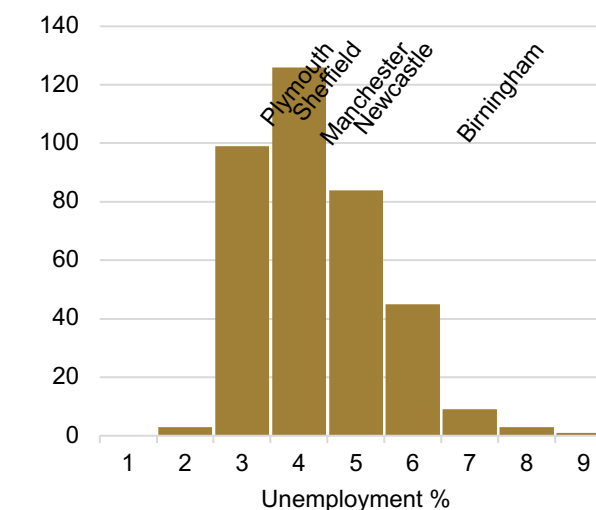
Distribution of UK Cities' Avg Annual GDP per Head between 2016 - 2018 (excluding London, Camden, Tower Hamlets, and Westminster)



Distribution of Avg Annual Change in Unemployment Rate in UK Cities between 2017-2020

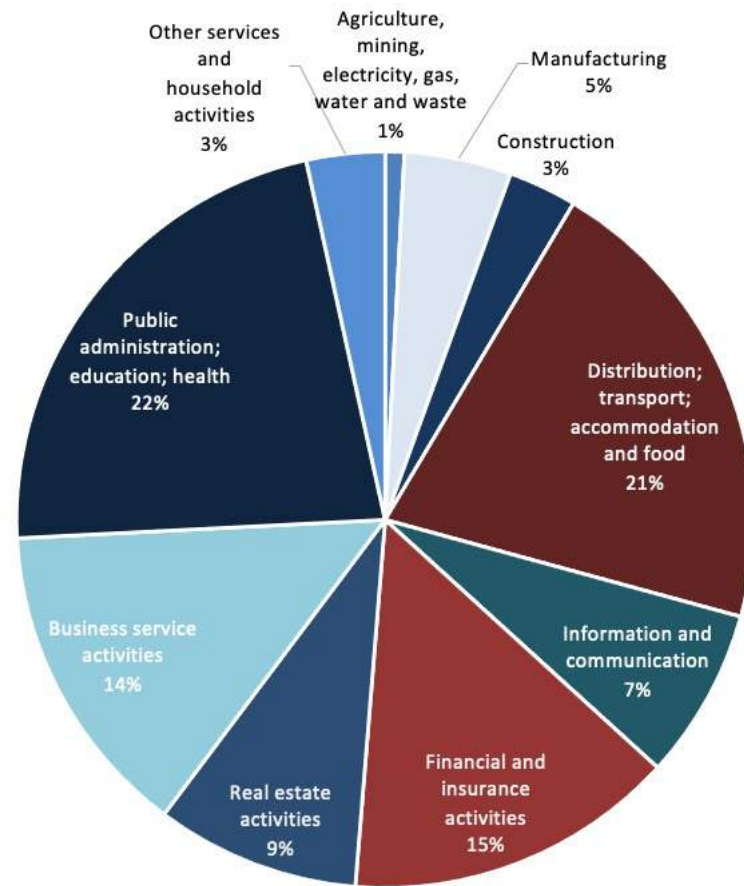


Distribution of Average Unemployment Rate from 2017-2020 of UK Cities

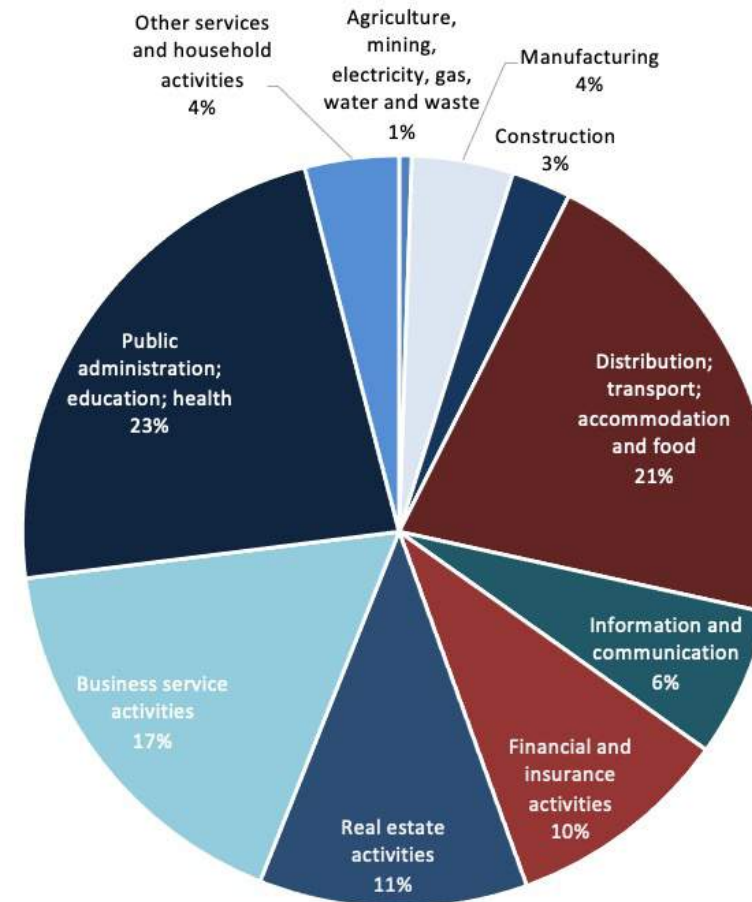


# Manchester GVA By Sectors

Manchester 2007 GVA by industries



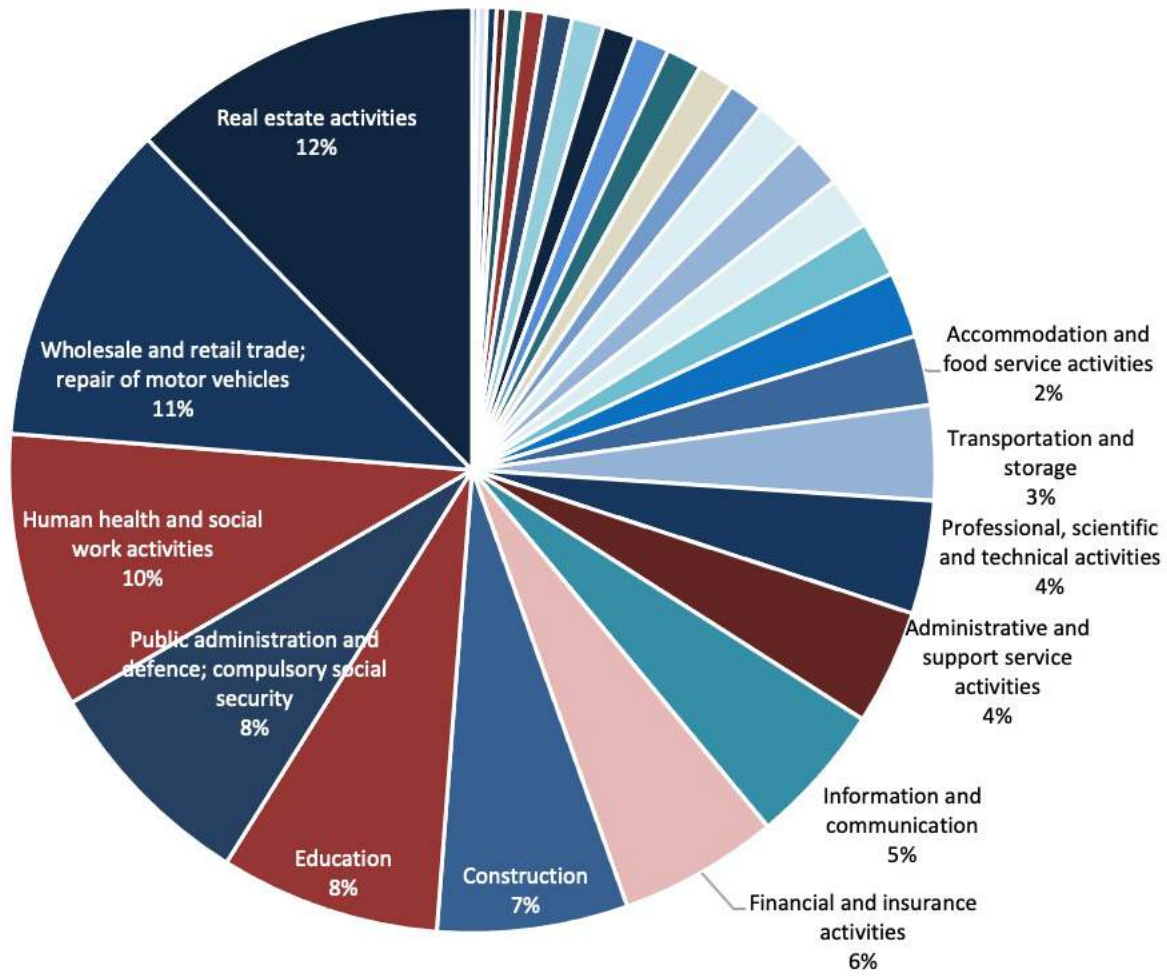
Manchester 2017 GVA by industries



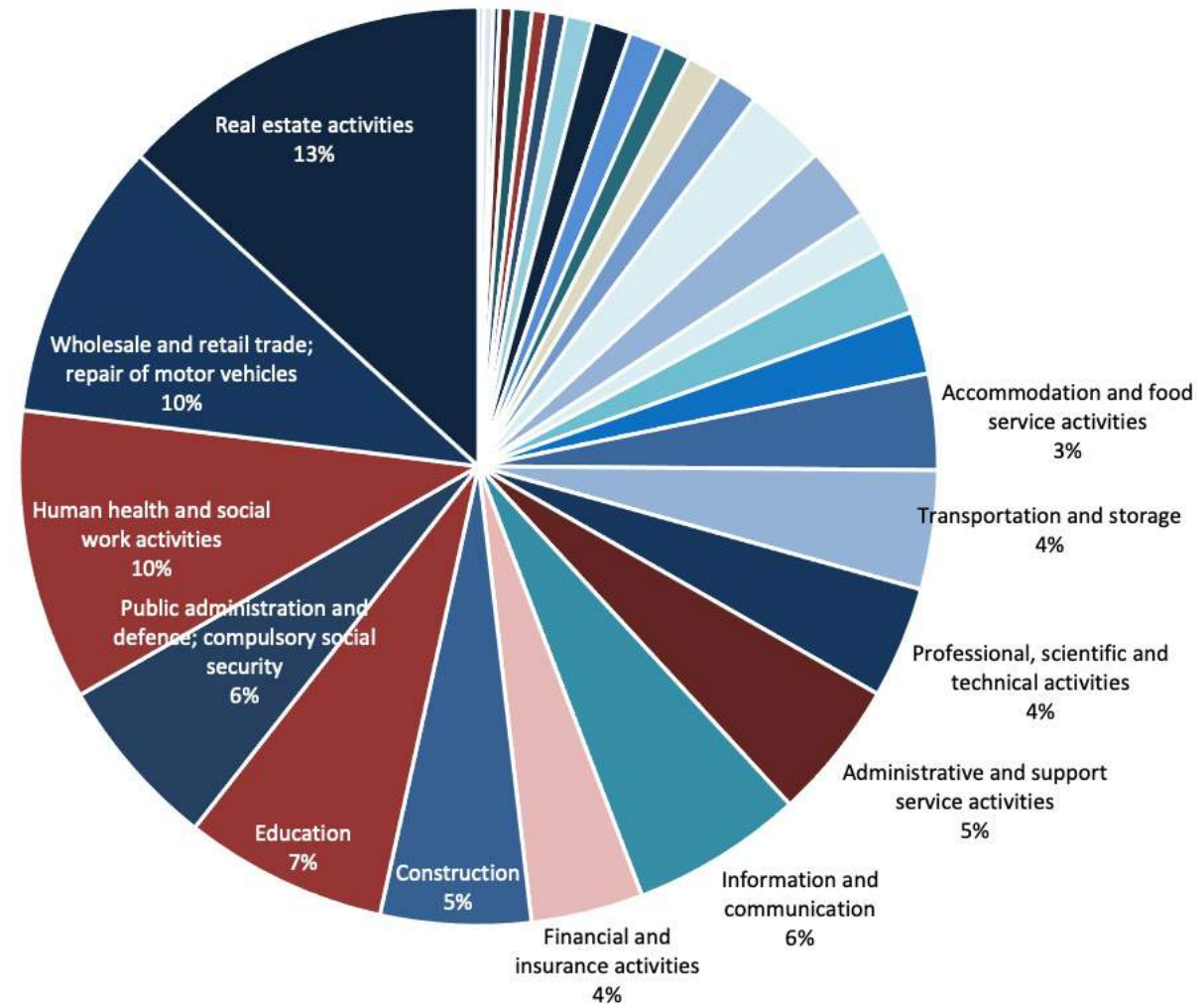
# Northumberland and Tyne and Wear GVA By Sectors

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Northumberland and Tyne and Wear 2007 GVA by industries

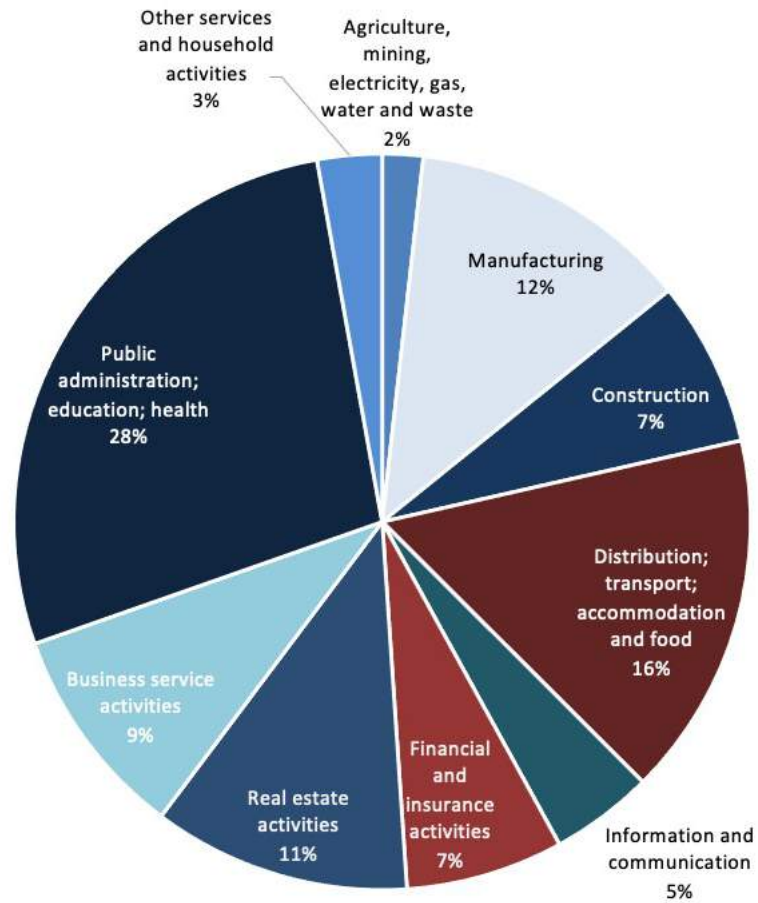


Northumberland and Tyne and Wear 2017 GVA by industries

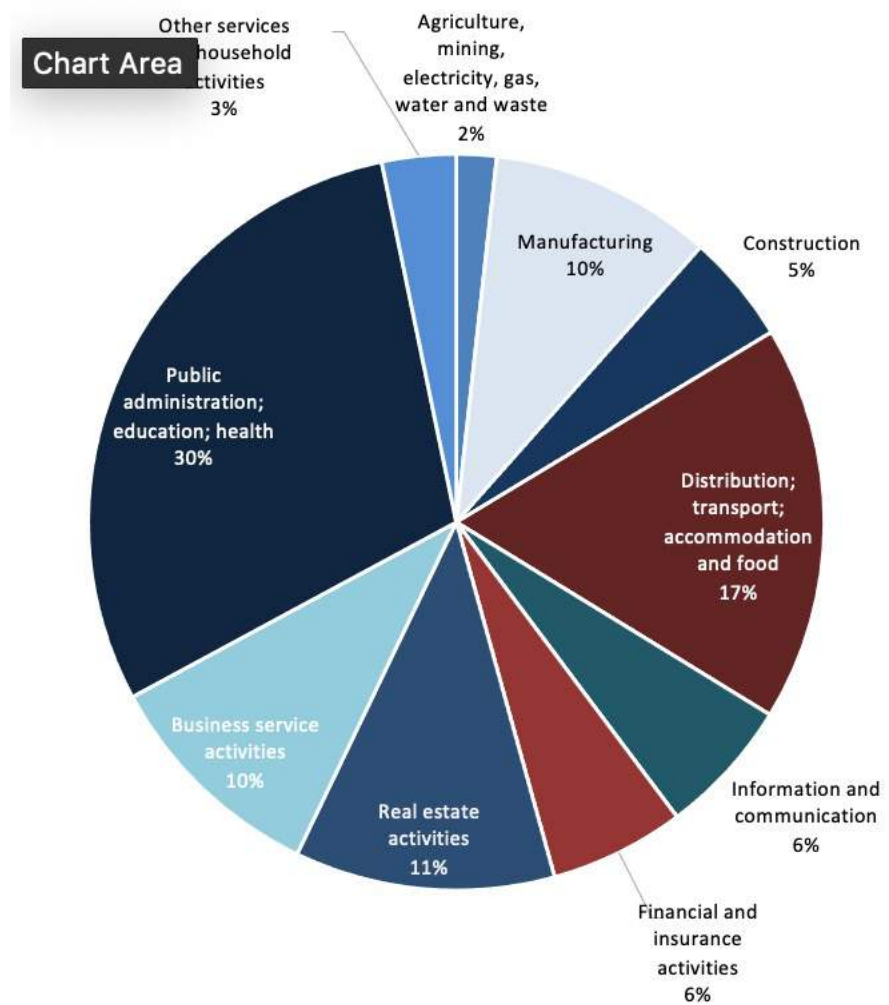


# Sheffield GVA By Sectors

Sheffield 2007 GVA by industries

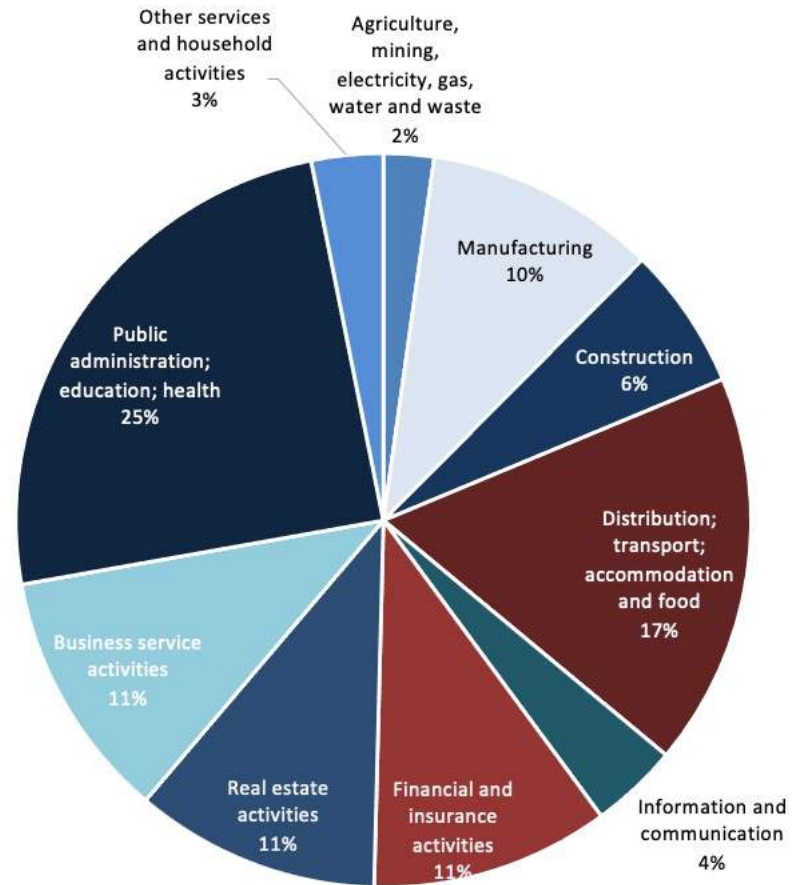


Sheffield 2017 GVA by industries

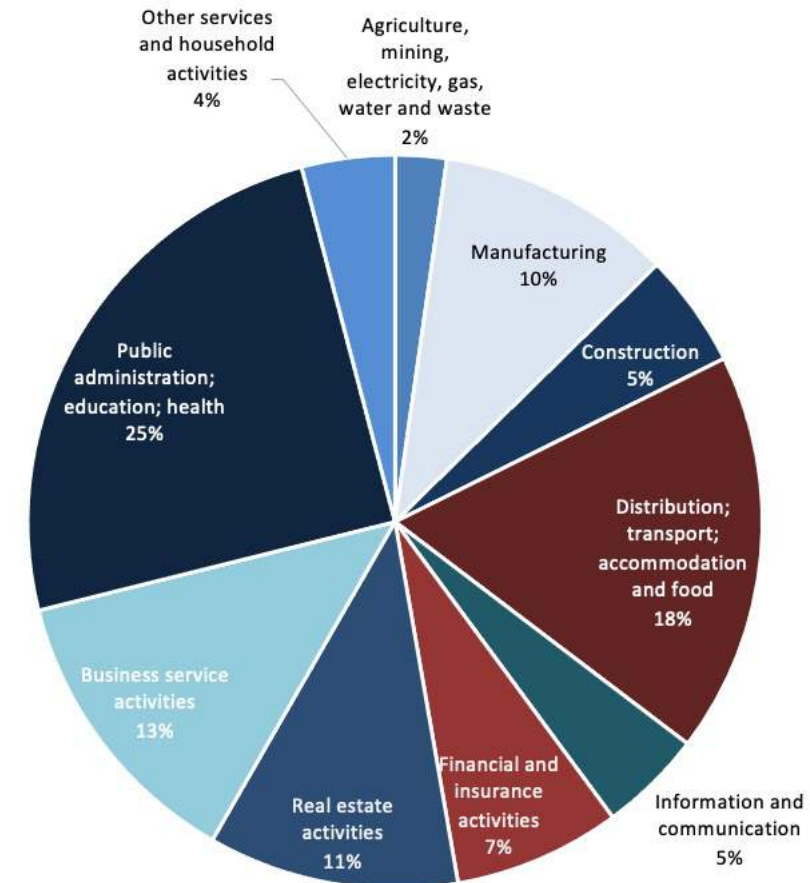


# Birmingham GVA By Sectors

Birmingham 2007 GVA by industries

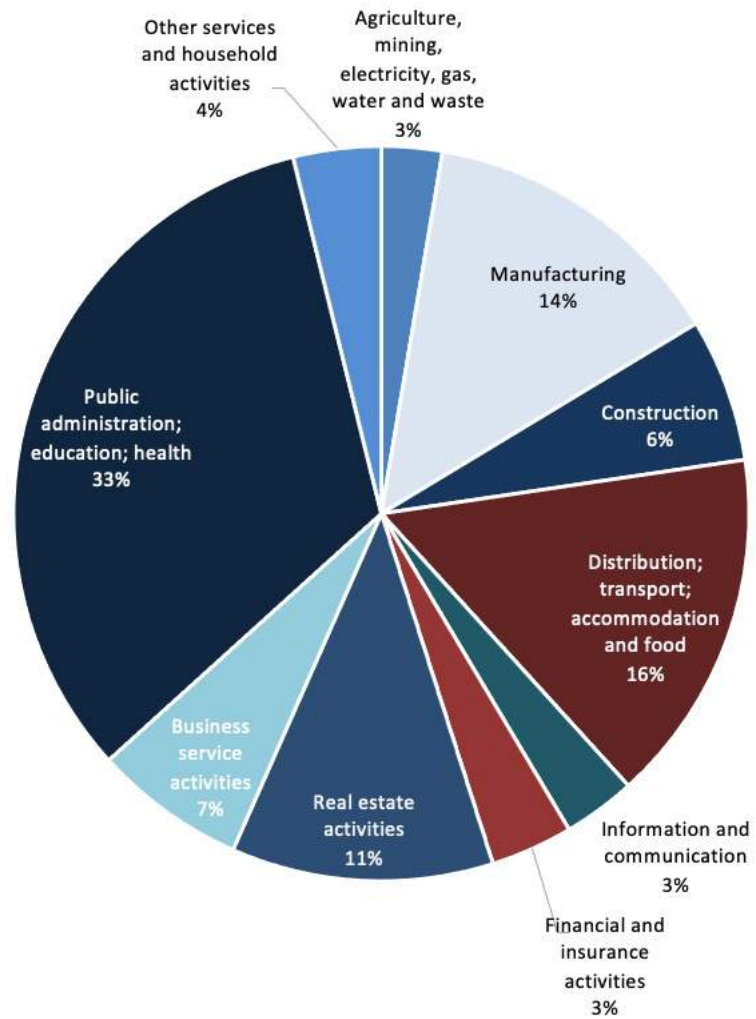


Birmingham 2017 GVA by industries

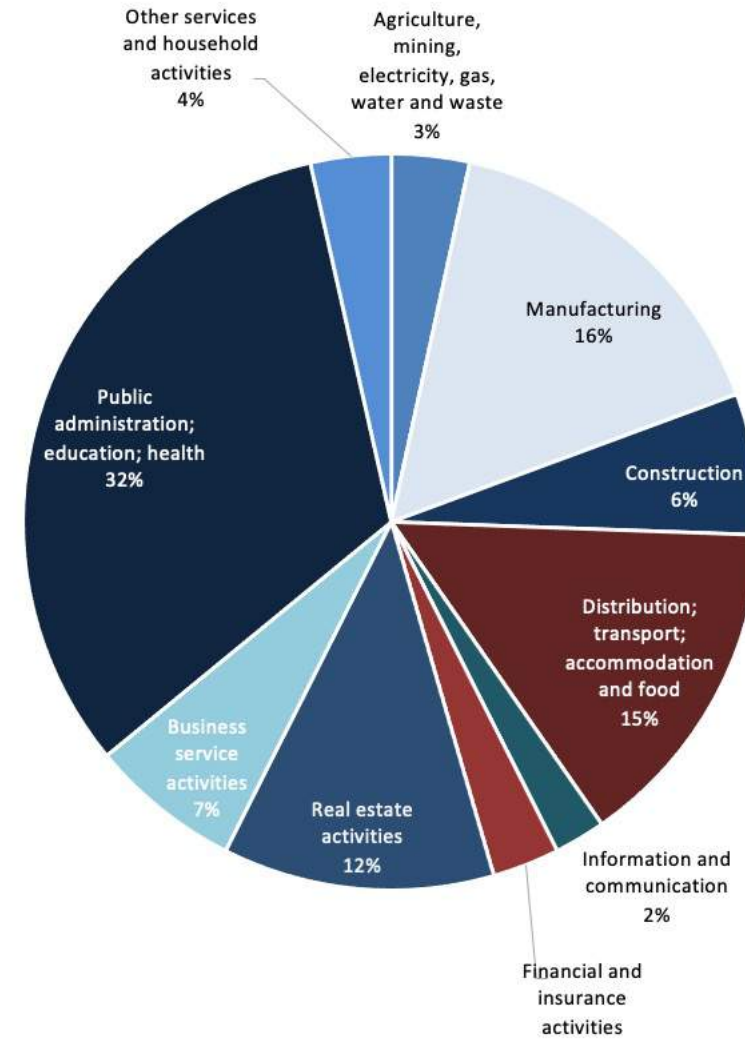


# Plymouth GVA By Sectors

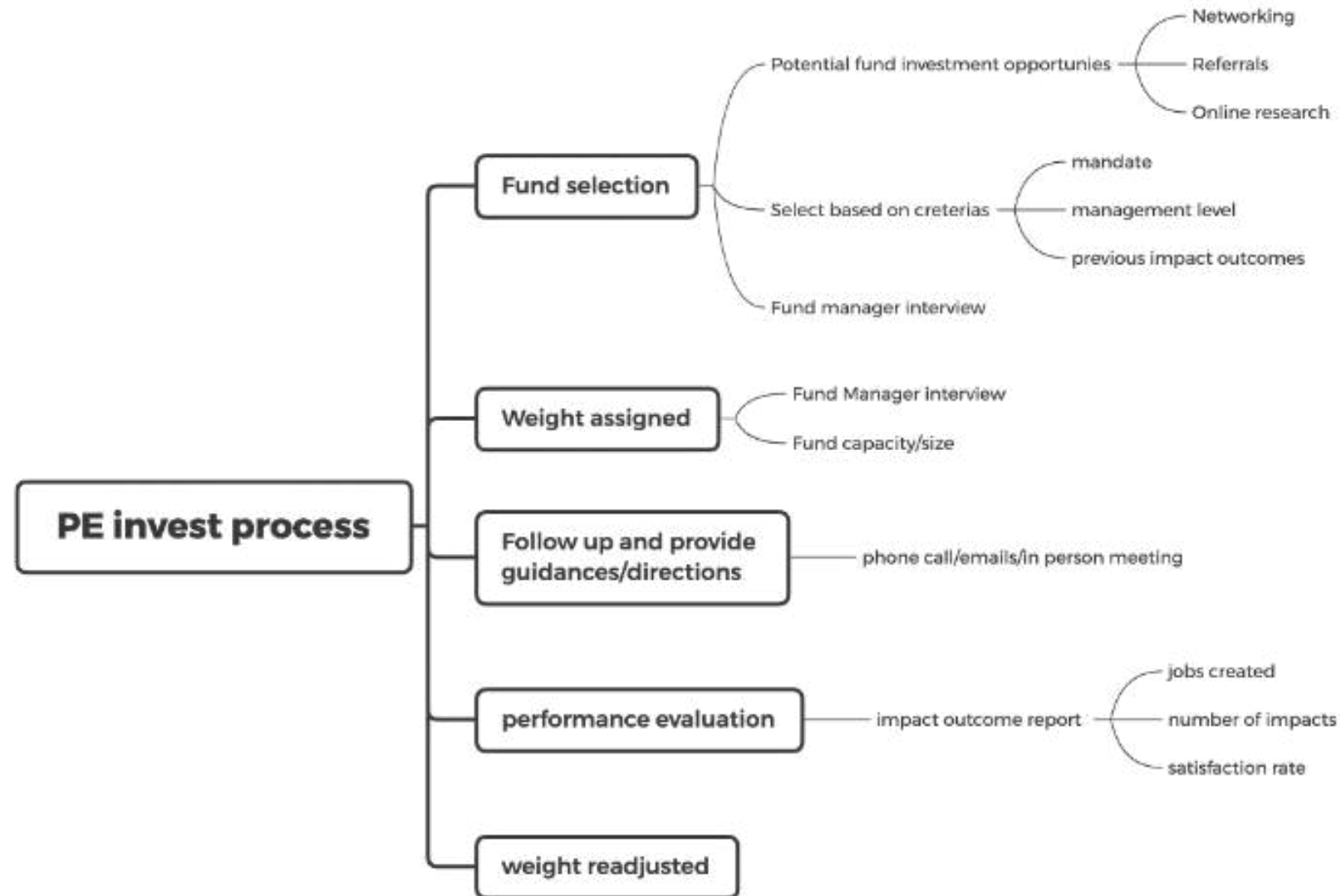
Plymouth 2007 GVA by industries



Plymouth 2017 GVA by industries



# Impact Investment's execution process



# Screening Process for Impact Investing

---

We selected funds and social enterprises based on three important criteria: 1. The mandate of the PE funds 2. Fund management. 3. The fund's previous impact outcome

## The mandate of the PE fund

As our strategy is focus on bringing down the unemployment rate, the fund that we choose should also reflect this. There are three situations/types of mandates that satisfy our focus:

1. Mandate is to support local small and medium sized companies.
2. Mandate is to support social enterprises that focus on solving social issues, including employment and income inequality.
3. Mandate is to help people develop the skills, strengths and networks and become more employable.

## Fund management

As the private fund's performance is highly correlated with the fund manager's decision, it is important to choose a right fund manager. Several factors should be considered: the fund manager's education, qualification, investment experience and fund management style. In addition, the most important is that he/she should understand our objectives and also be willing to include job creation into the overall fund strategy, and this could be achieved based on interviews with the fund manager.

## The fund's previous impact outcome

We will rely our analysis on the past outcomes of the fund. Example key indicators for different fund mandates could be number of jobs created, job conversion rate, and number of people/social enterprises/local companies benefitted.



We have selected three sample funds:

UnLtd. Venture fund: They help local social entrepreneurs to grow by offering both “loan and grant between £50,000 – £150,000 with business support”. They satisfy the mandate by focusing on the businesses that create more jobs and training for people furthest from the labor market for the minor groups (UnLtd, 2018).

Impact outcomes:

- More than 333k people have benefited from the fund.
- Over 1,000 jobs with 7.7 million investments.

The Big Issue Invest: This fund invests £20k to £3MM into social enterprises with sound business models. Their fund has various projects including one called Circle Collective. It helps young people get access to jobs, and also another project called Collage Arts which is designed to provide support to under-represented sections of the community by offering skills, experience and opportunities in the arts industry and therefore help them get jobs.

Impact outcomes:

- 150 organizations have benefited from the current investment in various projects.

Big Society Capital: It is a leading impact investment fund in the UK. They engage with investors, fund managers, charities and social enterprises including “The Big Issue Invest fund” mentioned as above. They aim to improve the UK population’s lives especially for homelessness and also help youth get employed.

Impact outcomes:

- More than 1200 social enterprises have benefited from the fund.

# Table of Diversified Equities

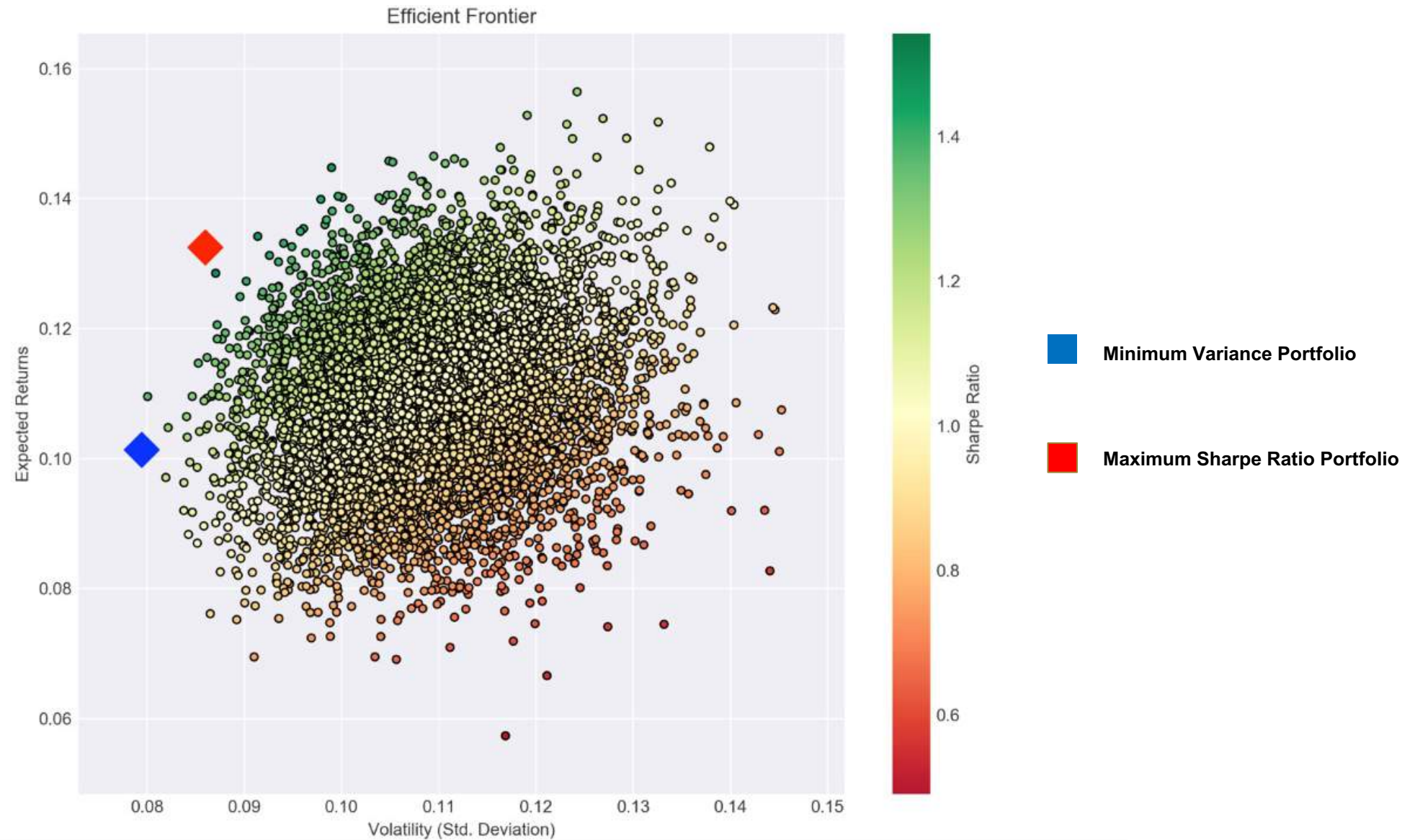
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Investment	ESG Rating (IBD, 2019)	Number of British Employees	Nationality
Microsoft (MSFT)	AAA	3,000	US
PepsiCo (PEP)	AA	4,500	US
Proctor & Gamble (PG)	AA	6,000	US
AECOM (ACM)	AA	11,000	US
Alphabet (GOOGL)	AA	4,439	US
Tesco (TSCO)	AA	423,092	UK
BP (BP)	A-	90,100	UK
20+ year US Treasury (TLT)	-	-	-
Gold (GLD)	-	-	-
Siemens (SIE)	A	16,500	Germany
Sanofi (SNY)	A	1,200	France
Japan ETF (EWJ)	A	-	Japan
Vanguard REIT ETF (VNQ)	-	-	US
Blackrock REIT ETF (XRE)	-	-	Canada

# Efficient Frontier

10-year monthly data

Returns 0.132556  
Volatility 0.085913  
Sharpe Ratio 1.542911  
MSFT Weight 0.148658  
PEP Weight 0.061975  
PG Weight 0.064992  
ACM Weight 0.012713  
GOOGL Weight 0.066741  
TSCO Weight 0.110263  
BP Weight 0.001883  
TLT Weight 0.159482  
GLD Weight 0.131154  
SIE Weight 0.060712  
SNY Weight 0.017224  
EWJ Weight 0.035258  
VNQ Weight 0.007327  
XRE Weight 0.121617



# Portfolio Returns & Optimal Weights

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	MSFT	PEP	PG	ACM	GOOGL	TSCO	BP	TLT	GLD	SIE	SNY	EWJ	VNQ	XRE	Portfolio returns
Date															
2010-10-31	0.0888	-0.0172	0.0681	0.0927	0.1672	-0.002	-0.0102	-0.0445	0.0368	0.0609	0.0559	0.0137	0.0474	0.0116	<b>6.02%</b>
2010-11-30	-0.0468	-0.0103	-0.0393	-0.0283	-0.0945	0.0748	-0.0211	-0.0168	0.0211	0.0316	-0.1307	0.025	-0.0185	-0.0393	<b>-2.55%</b>
2010-12-31	0.105	0.0183	0.0534	0.0858	0.0689	0.1417	0.1038	-0.0369	0.0244	0.0932	0.056	0.0694	0.0453	0.0118	<b>6.83%</b>
2011-01-31	-0.0066	-0.0156	-0.0112	0.0465	0.0108	0.0582	0.0734	-0.0308	-0.0638	0.0419	0.0676	0.0018	0.0325	0.0416	<b>-0.30%</b>
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2020-06-30	0.1106	0.0132	0.0315	-0.0307	-0.0108	0.0801	0.0069	0.0034	0.0274	0.0583	0.0395	-0.0009	0.024	0.0301	<b>4.34%</b>
2020-07-31	0.0074	0.0408	0.1032	-0.037	0.0493	0.0831	-0.0557	0.0443	0.1079	0.0265	0.0274	-0.0107	0.0364	0.0119	<b>9.72%</b>
2020-08-31	0.1026	0.0174	0.055	0.0917	0.0952	0.0455	-0.0369	-0.0504	-0.0032	0.0801	-0.0357	0.0679	0.0044	-0.0183	<b>4.48%</b>
2020-09-30	-0.0674	-0.0031	0.0048	0.059	-0.1006	-0.0369	-0.1665	0.0077	-0.0417	0.0265	-0.0081	0.0181	-0.0269	-0.0087	<b>-0.92%</b>

## Optimal Weights

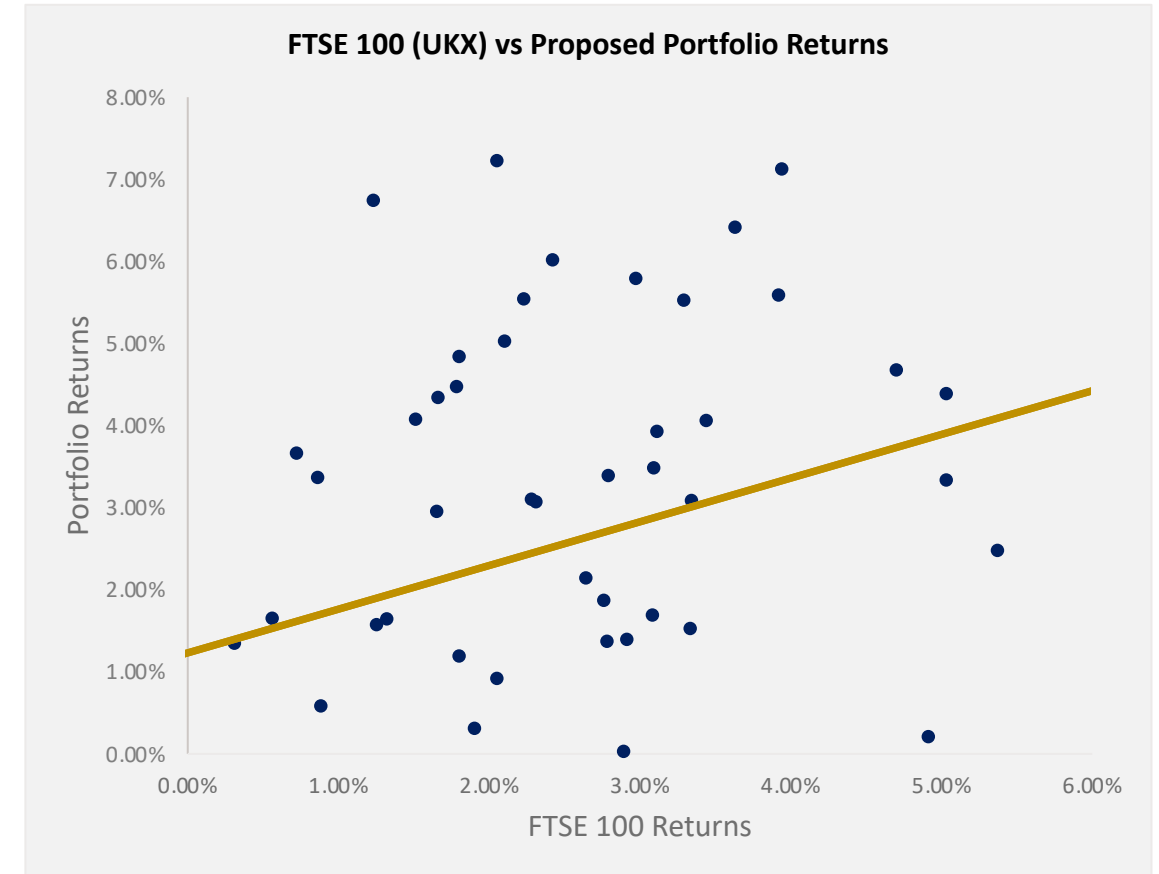
MSFT Weight	PEP Weight	PG Weight	ACM Weight	GOOGL Weight	TSCO Weight	BP Weight	TLT Weight	GLD Weight	SIE Weight	SNY Weight	EWJ Weight	VNQ Weight	XRE Weight
0.14865831	0.06197534	0.06499242	0.01271299	0.06674073	0.11026294	0.0018834	0.15948156	0.13115434	0.06071209	0.01722424	0.0352578	0.00732684	0.121617

10-year monthly data:  
 Returns 0.132556  
 Volatility 0.085913  
 Sharpe Ratio 1.542911

# FTSE 100 vs Global Portfolio Correlation

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Date	FTSE 100 Returns (UKX)	Portfolio Returns	Correlation
31-Oct-10	2.42%	6.02%	<b>0.5542364</b>
30-Nov-10	-2.26%	-2.55%	
31-Dec-10	6.81%	6.83%	
31-Jan-11	-0.55%	-0.30%	
...	...	...	
30-Jun-20	1.66%	4.34%	
31-Jul-20	-4.19%	9.72%	
31-Aug-20	1.78%	4.48%	
30-Sep-20	-1.54%	-0.92%	



# Rationale Behind Late-Stage VC Investing

## Anticipated Risk

<u>Stage at which investment is made</u>	<u>Risk of loss</u>	<u>Causation of major risk by stage of development</u>
Seed	66.2%	72.0%
Start-up stage	53.0%	75.8%
Second stage	33.7%	53.0%
Series C+	20.1%	37.0%
Bridge/pre-IPO stage	20.9%	33.0%

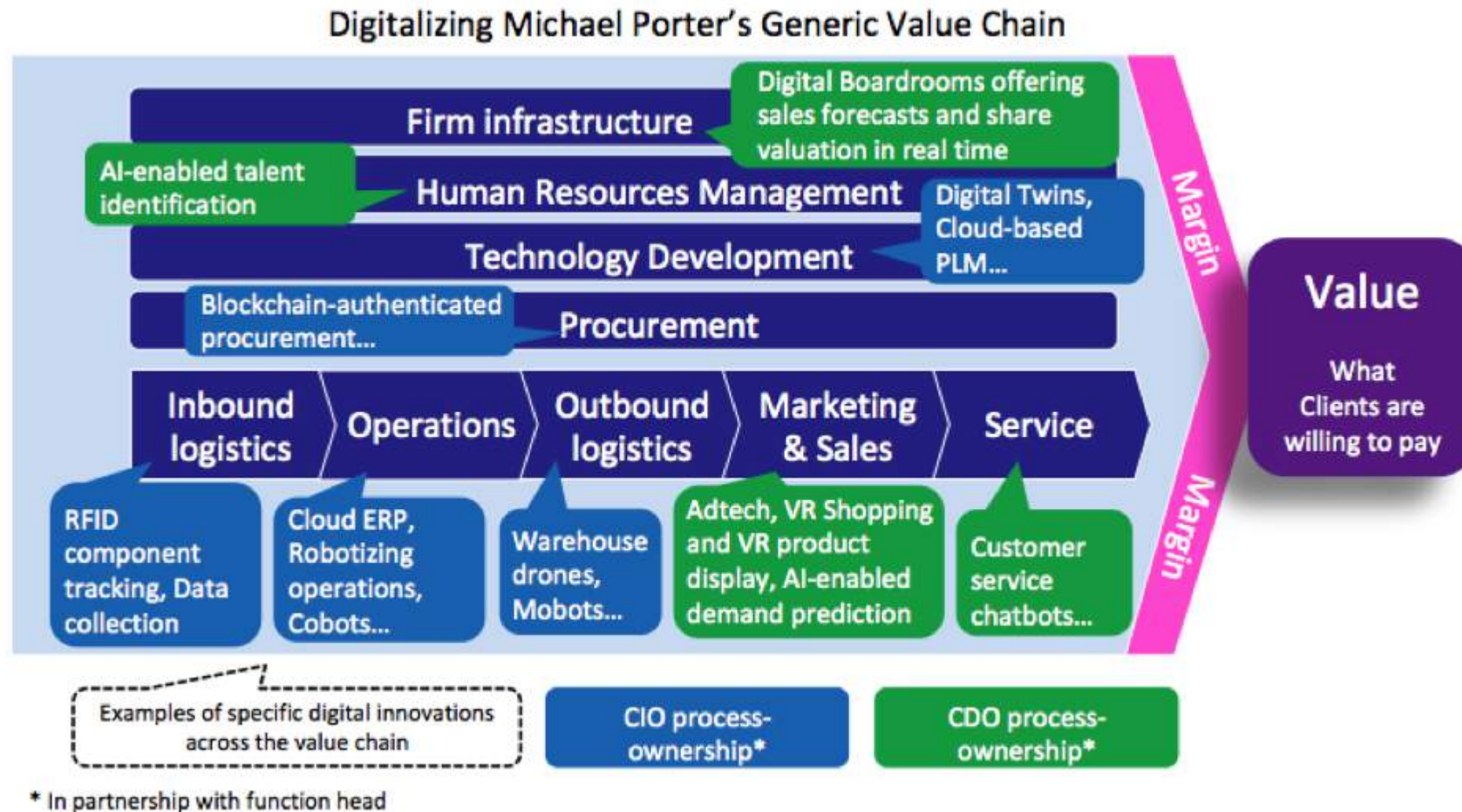
## Expected Return

	Exit Year for Investment									
	1	2	3	4	5	6	7	8	9	10
1.0x	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2.0x	100%	41%	26%	19%	15%	12%	10%	9%	8%	7%
3.0x	200%	73%	44%	32%	25%	20%	17%	15%	13%	12%
4.0x	300%	100%	59%	41%	32%	26%	22%	19%	17%	15%
5.0x	400%	124%	71%	50%	38%	31%	26%	22%	20%	17%
6.0x	500%	145%	82%	57%	43%	35%	29%	25%	22%	20%
7.0x	600%	165%	91%	63%	48%	38%	32%	28%	24%	21%
8.0x	700%	183%	100%	68%	52%	41%	35%	30%	26%	23%
9.0x	800%	200%	108%	73%	55%	44%	37%	32%	28%	25%
10.0x	900%	216%	115%	78%	58%	47%	39%	33%	29%	26%

Return Multiple on Invested Capital

Source: Industry Ventures LLC

# Digitalizing Michael Porter's Value Chain



## Portfolio Weights by cities

By City (Part of Municipal Bonds)	Weights (Soft Brexit)	Weights (Hard Brexit)	Weights (No-Deal Brexit)
Manchester	20%	20%	20%
Newcastle	20%	10%	5%
Birmingham	20%	25%	35%
Sheffield	20%	25%	35%
Plymouth	20%	20%	5%
Notes	<p>According to KPMG and VoxEU reports, industries hit the hardest by Brexit and COVID-19 are Automotive, Manufacturing, Oil and Gas, Metals, and Pharmaceuticals. They are the most dependent on EU labour, imports, and exports. Since Birmingham is one of the UK's main Automotive Manufacturing hub, and Sheffield is the "Steel City", BNSF will invest more heavily in these two cities given a No-Deal or Hard Brexit. Manchester is a center for foreign company headquarters and is a key city for biotechnology. BNSF will also prioritize investing in Manchester to encourage foreign investments. Investments in Newcastle and Plymouth are focused more on the long-term development of the cities in driving the UK economy.</p>		

## Portfolio Weights by Strategies

By Strategy	Weights (Soft Brexit)	Weights (Hard Brexit)	Weights (No-Deal Brexit)
Strategy 1 (City Development)	35%	37.5%	40%
Strategy 2 (PE funds)	20%	25%	30%
Strategy 3 (Asset Diversification)	25%	25%	25%
Strategy 4 (Industry 4.0)	20%	12.5%	5%
Notes	<p>We placed less emphasis on the industry 4.0 developments in the case of a no-deal Brexit as it is a more long-term goal. Strategy 3 summarizes all of the fixed income, equity, and alternative asset classes.</p>		

## Portfolio Weights by Asset Class

By Asset Class	Weights (Soft Brexit)	Weights (Hard Brexit)	Weights (No-Deal Brexit)
Public Fixed Income	3.99%	3.99%	3.99%
Public Equities	14.51%	14.51%	14.51%
Alternatives	6.50%	6.50%	6.50%
Private Fixed Income	35.00% +	37.50% +	40.00% +
Private Equity	40.00%	37.50%	35.00%
Notes	<p>* All weights rounded to 2 decimal places. See appendix for more precision.</p> <ul style="list-style-type: none"> <li>- Public Fixed Income includes treasuries mentioned in strategy 3.</li> <li>- Public Equities includes equity investment part of the public portfolio mentioned in strategy 3</li> <li>- Alternatives include real estate investment trusts and commodities in the public investment portion of the portfolio.</li> <li>- Private Fixed Income include municipal bond investments in the 5 cities. If cities require more funding and demonstrate appropriate usage of the fund, BNSF will issue more debt financing and invest into the municipal bonds.</li> <li>- Private Equity includes the social impact investment funds investments and private Industry 4.0 start-ups investments.</li> </ul> <p>The weightings of the public investments stay the same regardless of the Brexit outcomes as they are the minimum amount needed to ensure BNSF's return of 2.83%. BNSF will prioritize investments in the cities in the case of a no-deal Brexit to boost the UK economy in specific industries/locations in order to reach domestic demands and help Brexit-impacted sectors.</p>		



# Mandate #1 Targets

## Regarding UK's long-term economic independence, growth, and sustainability:

	Current (2019)	(Soft Brexit)	(Hard Brexit)	(No-Deal Brexit)
M2M cards per 100 inhabitants UK	<ul style="list-style-type: none"> <li>World Ranking: 23</li> <li>9.46 Million connections</li> <li>14.2% inhabitants</li> </ul>	<ul style="list-style-type: none"> <li>World Ranking: top 15</li> <li>(or) 20 Million connections</li> <li>(or) 25%+ inhabitants</li> </ul>	<ul style="list-style-type: none"> <li>World Ranking: top 17</li> <li>(or) 14 Million connections</li> <li>(or) 20%+ inhabitants</li> </ul>	<ul style="list-style-type: none"> <li>World Ranking: top 20</li> <li>(or) 12 Million connections</li> <li>(or) 12%+ inhabitants</li> </ul>
Note: GSMA intelligence forecasted in 2014 that UK would rank 3 <sup>rd</sup> in cellular M2M connections with a total of 43 million connections by 2020.				
Industry 4.0 development index	World Ranking: 23	World Ranking: top 15	World Ranking: top 17	World Ranking: top 20
Note: Currently, UK has a poor performance in the 4.0 development index's categories regarding ERP systems used in enterprises. Appendix shows that approximately 24% of UK enterprises have enterprise resource planning software in 2019 compared to 53% of Belgium enterprises.				
imports of goods and services as % of GDP	32.71%	Range: between 28% - 32%	Range: between 28% - 32%	Range: between 28% - 32%
Note: The past 5 years saw a steady increase in UK's imports as % of GDP (appendix). In order to achieve economic independence without limiting UK's growth and benefits of trade, BNSF has set a target range of 28%-32% imports as % of GDP.				
Annual GDP growth	1.41%	1.7%+	1.6%+	1.5%+
Note: The last 10-year average annual GDP growth is 1.85%, with the past 5 years seeing a continuous decline (appendix). Under a soft Brexit, BMSF expects to see a maintained 1.7% growth rate. BNSF aims to maintain a 1.5% growth rate in the case of a no-deal Brexit.				

# M2M Cards Penetration

## 2014

	CAGR 2010-13	Rank	CAGR 2014-20	Rank
MENA	57%	1	24%	4
Asia Pacific	54%	2	29%	2
CIS	52%	3	29%	1
Latin America	41%	4	25%	3
Sub-Saharan Africa	38%	5	23%	5
Europe	27%	6	23%	5
Northern America	24%	7	22%	6
World	37%	-	26%	-

**Table 1:** Cellular M2M connections, compound annual growth rate by region

Source: GSMA Intelligence

	Q2 2014	Rank		Q4 2020	Rank
China	61.5	1	China	355.0	1
United States of America	37.5	2	United States of America	135.8	2
Japan	9.9	3	United Kingdom	43.0	3
Brazil	9.1	4	Brazil	41.9	4
France	7.8	5	Russian Federation	35.1	5
Italy	6.4	6	Germany	31.2	6
United Kingdom	6.2	7	France	31.1	7
Sweden	5.9	8	Japan	28.1	8
Germany	5.8	9	India	24.6	9
Russian Federation	5.5	10	Sweden	19.4	10

**Table 2:** Cellular M2M connections (in millions)

Source: GSMA Intelligence

## 2019

Ranking		M2M cards, millions (right axis)	M2M cards, per 100 inhabitants (left axis)
	1 Sweden	15.01	146.0
	2 Austria	4.99	56.3
	3 United States	137.00	41.6
	4 Netherlands	7.07	40.7
	5 Italy	24.25	40.2
	6 New Zealand	1.82	36.8
	7 Norway	1.96	36.7
	8 Germany	29.70	35.7
	9 France	20.86	30.9
	10 Finland	1.65	29.9
	11 Belgium	3.10	27.0
	12 Estonia	0.34	25.9
	13 Denmark	1.46	25.1
	14 Ireland	1.21	24.5
	15 OECD	328.12	24.2
	16 Japan	27.39	21.7
	17 Latvia	0.37	19.3
	18 Korea	9.64	18.6
	19 Slovak Republic	0.98	18.1
	20 Iceland	0.05	15.1
	21 Switzerland	1.25	14.6
	22 Spain	6.75	14.3
	23 United Kingdom	9.46	14.2
	24 Luxembourg	0.08	13.7
	25 Hungary	1.20	12.3
	26 Canada	4.63	12.3
	27 Portugal	1.19	11.6
	28 Lithuania	0.32	11.6
	29 Czech Republic	1.09	10.3
	30 Poland	3.82	10.0
	31 Turkey	5.86	7.1
	32 Greece	0.43	4.0
	33 Slovenia	0.08	3.8
	34 Chile	0.51	2.7
	35 Mexico	2.57	2.0

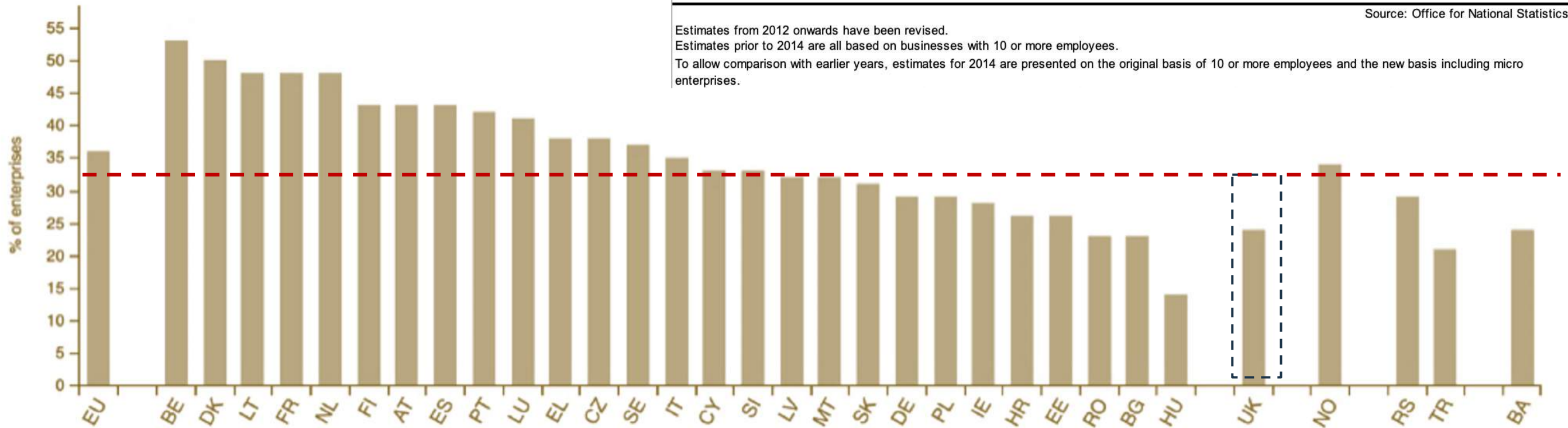
# Industry 4.0 Index (2019)

	Country			Secondary Indicators				Industry 4.0 Index			Score	Rank
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)		
Denmark	0.8043	0.5924	1	0.9623	0.9259	0.6561	0.8043	0.9545	0.8824	0.7576	0.834	1
Finland	0.587	0.7554	0.6364	1	0.5556	0.7884	0.587	1	0.9412	1	0.7851	2
Belgium	0.8696	0.8098	0.7273	0.7358	0.7778	0.8148	0.8696	0.8636	0.7059	0.4545	0.7629	3
Netherlands	0.7609	1	0.5909	0.5283	0.4815	1	0.7609	1	0.7353	0.6667	0.7524	4
Germany	1	0.9457	0.7727	0.4906	0.8519	0.9471	1	0.7727	0.5294	0.1818	0.7492	5
Sweden	0.5	0.7011	0.2273	0.8302	0.8889	0.6825	0.7174	0.8636	0.8824	0.8182	0.7112	6
Lithuania	0.6522	0.6739	0.7273	0.7547	0.5926	0.6561	0.6522	1	1	0.2727	0.6982	7
Norway	0.2174	0.7283	0.5455	0.8302	0.8889	0.7354	0.4783	0.6818	0.7059	0.8182	0.663	8
Austria	0.6739	0.9457	0.3182	0.6604	0.4444	0.9206	0.6739	0.9091	0.7941	0.2121	0.6552	9
Ireland	0.3261	0.538	0.2727	0.566	1	0.6296	0.3261	0.9091	0.8824	0.5758	0.6026	10
Portugal	0.7391	0.538	0.4091	0.566	0.5926	0.5238	0.7391	0.8182	0.7941	0.2727	0.5993	11
Luxembourg	0.6304	0.7011	0.4545	0.717	0.2222	0.709	0.6304	0.8636	0.7353	0.2424	0.5906	12
Cyprus	0.7174	0.8098	0.4091	0.3585	0.3704	0.7884	0.7174	0.8182	0.5882	0.1818	0.5759	13
France	0.6304	0.5652	0.2273	0.5849	0.5185	0.6032	0.6304	0.8182	0.9118	0.2121	0.5702	14
Spain	0.5435	0.6467	0.4091	0.6604	0.5926	0.6825	0.5435	0.8636	0.5	0.2424	0.5684	15
Czech Republic	0.4348	0.2663	0.5909	0.6792	0.8889	0.2857	0.4348	0.9091	0.8529	0.2424	0.5585	16
Slovenia	0.4348	0.538	0.2727	0.6981	0.4074	0.5238	0.5	0.9545	0.8235	0.3333	0.5486	17
Croatia	0.413	0.3207	0.7273	0.7925	0.5926	0.3386	0.413	0.5455	0.8235	0.3636	0.533	18
Iceland	0.0217	0.5109	0.3636	0.8679	0.7407	0.2593	0.0217	0.7273	0.7059	0.9091	0.5128	19
Malta	0.4348	0.4565	0.2273	0.6038	0.6296	0.4974	0.4348	0.7727	0.6765	0.303	0.5036	20
Estonia	0.2609	0.4293	0.3182	0.6415	0.4815	0.4709	0.2609	0.7727	0.8824	0.4242	0.4942	21
Slovakia	0.4348	0.2935	0.5909	0.6226	0.3333	0.3386	0.4348	0.6364	0.7941	0.2727	0.4752	22
<b>UK</b>	<b>0.1522</b>	<b>0.4837</b>	<b>0.1818</b>	<b>0.5094</b>	<b>0.5926</b>	<b>0.5503</b>	<b>0.1522</b>	<b>0.7273</b>	<b>0.7647</b>	<b>0.5455</b>	<b>0.466</b>	<b>23</b>
Italy	0.5652	0.5109	0.2273	0.4528	0.1852	0.5503	0.5652	0.7273	0.5882	0.1818	0.4554	24
Poland	0.2391	0.4022	0.4091	0.4528	0.2963	0.3915	0.2391	0.6818	0.7353	0.0909	0.3938	25
Macedonia	0.4565	0.5109	0.3636	0.5283	0	0.3386	0.1739	0.7273	0.7059	0.0909	0.3896	26
Serbia	0	0.5109	0.3636	0.5283	0.6667	0.1534	0	0.9545	0.7059	0	0.3883	27
Greece	0.587	0.2935	0.3182	0.1321	0.2593	0.3386	0.587	0.3182	0.5588	0.0909	0.3483	28

Codes	Name of the Indicators
(a)	Enterprises who have ERP software package
(b)	Enterprises using Customer Relationship Management (CRM)
(c)	Sharing supply chain management information
(d)	Enterprises giving portable devices for a mobile connection to the internet
(e)	Enterprises having received orders online
(f)	Enterprises using software solutions like Customer Relationship Management (CRM)
(g)	Enterprises who have ERP software package to share information between different functional areas

$$\frac{\text{country value} - \text{sample minimum}}{\text{sample maximum} - \text{sample minimum}}$$

Enterprises with Enterprise Resource Planning Software Packages, 2019



Proportion of UK businesses using Enterprise Resource Planning (ERP) software, by size of business, 2011 to 2014

		Employment size						%
		0 to 9 employees	10 to 49 employees	50 to 249 employees	250 to 999 employees	1000 or more employees	10 or more employees	Inc micro enterprises
Enterprise Resource Planning (ERP) Software	2011		5.6	22.9	43.4	57.5	9.4	
	2012		6.9	23.4	47.7	59.4	10.6	
	2013		6.7	28.5	52.4	64.4	11.2	
	2014	2.7	11.9	37.1	57.8	69.1	16.7	4.3

Source: Office for National Statistics

Estimates from 2012 onwards have been revised.

Estimates prior to 2014 are all based on businesses with 10 or more employees.

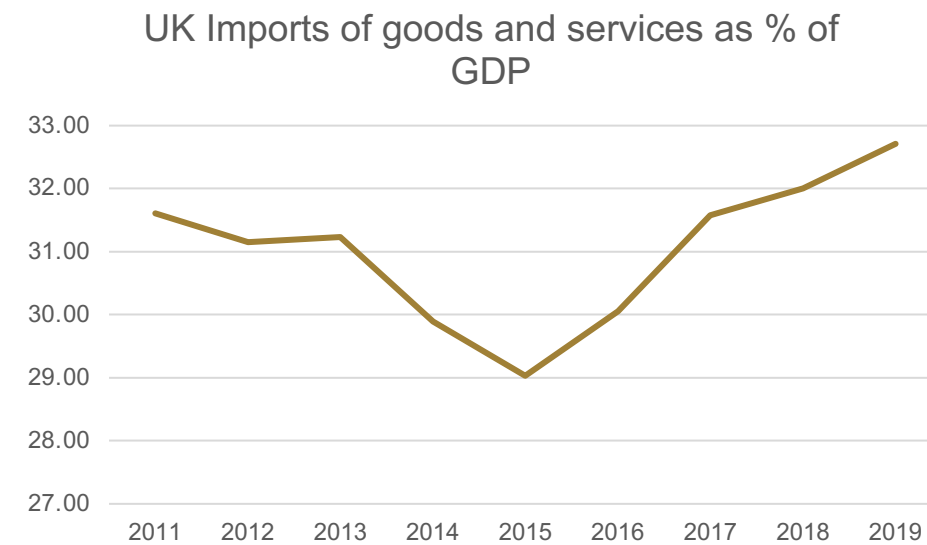
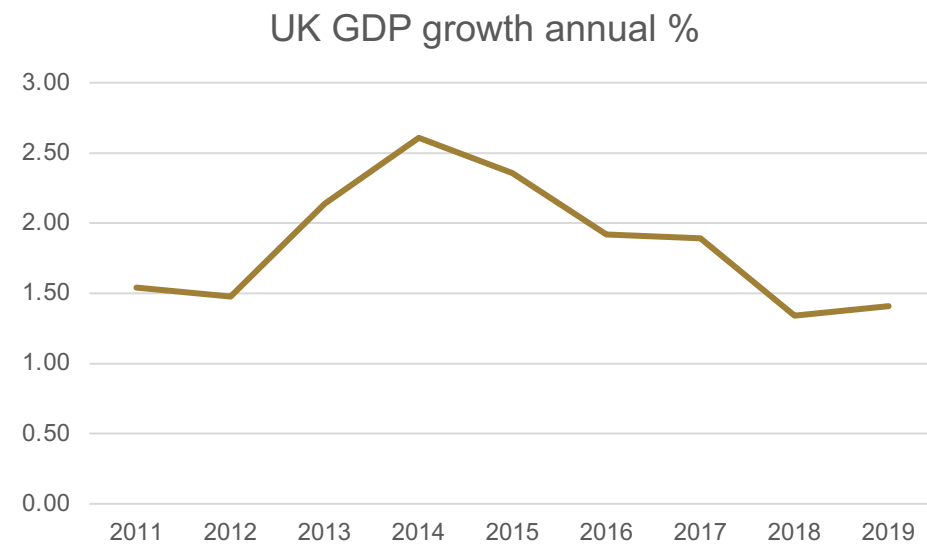
To allow comparison with earlier years, estimates for 2014 are presented on the original basis of 10 or more employees and the new basis including micro enterprises.

# UK GDP and Imports

[Appendix Home](#)

## UK GDP and Imports

		2011	2012	2013	2014	2015	2016	2017	2018	2019avg	on track 2025	
UK	Imports of goods and services (% of GDP)	31.60	31.15	31.23	29.90	29.03	30.06	31.58	32.00	32.71	31.03	34.41
UK	GDP growth (annual %)	1.54	1.48	2.14	2.61	2.36	1.92	1.89	1.34	1.41	1.85	0.41
UK	Imports as % of GDP, change		-0.46	0.08	-1.33	-0.86	1.03	1.52	0.43	0.71	0.56	3.38
UK	GDP growth %, change		-0.06	0.66	0.47	-0.25	-0.44	-0.03	-0.55	0.07	-0.24	-1.44
Data from database: World Development Indicators												
Last Updated: 10/15/2020												



# Mandate #2 Targets

## Regarding the long-term well-being of the British population:

	Current	(Soft Brexit)	(Hard Brexit)	(No-Deal Brexit)
Distribution variance of GDP per capita among cities	Mean: 0.66 Var: 6.21 (avg 2016-2018) (appendix)	Var: 5.58 (10% decrease in Var)	Var: 5.77 (7% decrease in Var)	Var: 5.89 (5% decrease in Var)
Note: BNSF will prioritize boosting economic development in the slow-growth regions given a soft Brexit. In the case of a no-deal Brexit, BNSF will prioritize more on meeting domestic economic demands instead.				
Distribution variance of average weekly full-time employee earnings by regions (£ per week)	Mean: 613 Var: 5630 (avg 2018-2020)	Var: 5067 (10% decrease in Var)	Var: 5236 (7% decrease in Var)	Var: 5349 (5% decrease in Var)
Note: BNSF will prioritize boosting economic development in the low-income regions given a soft Brexit. See appendix 9 for current earnings by regions.				
Gini Coefficient of final income of all individuals	29.9 (2019)	26	27	28
According to World Bank's last estimate in 2016, UK had a Gini coefficient of 34.8. Looking at the final income of all individuals in 2019, ONS estimates it to be at 29.9. Given the significant improvement over the years, BNSF should continue promoting income equality and reach the level of Finland's in 2015 (around 27)				
Distribution variance of unemployment rate in all UK cities	Mean: 3.81% Var: 1.22% (2017-2020)	Var: 1.10% (10% decrease in Var)	Var: 1.13% (7% decrease in Var)	Var: 1.16% (5% decrease in Var)
Note: BNSF will prioritize boosting economic development in the high unemployment cities given a soft Brexit. See appendix for current unemployment levels by cities.				

# Gini Coefficient

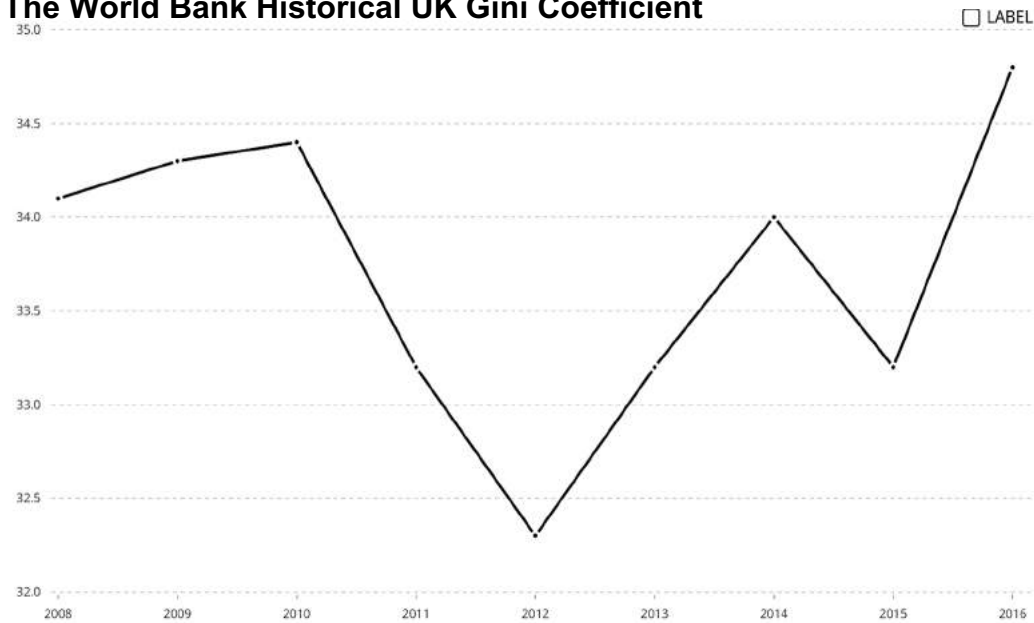
## 2019 ONS Estimate

	ALL individuals				
	Original income	Gross income	Disposable income	Post-tax income	Final income
<b>Quintile group<sup>2</sup></b>					
Bottom	4	6	7	6	10
2nd	8	11	12	12	14
3rd	15	15	17	16	17
4th	22	21	22	22	21
Top	51	46	42	44	38
<b>Decile group<sup>2</sup></b>					
Bottom	1	2	3	2	4
Top	34	31	27	29	25
Gini coefficient	50.2	40.2	34.7	38.5	29.9

## The World Bank Gini Coefficient Worldwide



## The World Bank Historical UK Gini Coefficient





# Fund Return (Mandate #3)

## Portfolio Annual Return:

	(Soft Brexit)		(Hard Brexit)		(No-Deal Brexit)	
	return	Weighted return	Return	Weighted return	Return	Weighted return
Strategy 1 (City Development)	2.40%*	0.84%	2.40%	0.84%	2.40%	0.96%
Strategy 2 (PE funds)	8.0%	1.60%	5%	1.25%	3%	0.90%
Strategy 3 (Asset Diversification)	13.26%***	3.32%	13.26%	3.32%	13.26%	3.32%
Strategy 4 (Industry 4.0)	20%****	3.00%	20%	2.00%	20%	1.00%
<b>Total fund return</b>		<b>8.76%</b>		<b>8.07%</b>		<b>6.18%</b>
Notes:	<p>* The recent issue of the £350 million 5-year FRN through the UK Municipal Bonds Agency Finance Company DAC to fund a matching loan to Lancashire County Council provided by the UK Municipal Bonds Agency was rated Aa3 by Moody's. Similarly, Lancashire County Council has an Aa3 rating from Moody's. (Moody's yield spread AAA is 2.4%)</p> <p>** Financial Times, Investing for Global Impact, 2017</p> <p>*** By portfolio optimization (appendix)</p> <p>**** Callan Institute, 2019 benchmark</p>					

# Expected Returns for Impact Investment

Average annual financial returns from impact investment: achieved and expected

