WE ARE DATA.

WE ARE NEWHAM.

NEWHAM SPARKS: CHAPTER TWO

Unleashing the power of data to drive shared prosperity:
A roadmap to a transformative data society

BUILDING A FAIRER NEWHAM

WE ARE NEWHAM.

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NEWHAM SPARKS: CHAPTER TWO

MESSAGE FROM
THE MAYOR OF NEWHAM

It's clear that data and technology will continue to play a big role in how Councils and public bodies operate and deliver for citizens for the public good anchored in the fundamental importance of protecting personal privacy; as well as help us accelerate recovery from Covid-19, drive inclusive growth and respond to the climate emergency.

Moreover, as this commendable report shows, significant growth opportunity exists in the 'indirect' open data economy, within businesses that may use open data but are not data specific companies; and in fast innovation sectors such as robotic process engineering, data science and data visualisation.

Here at the Council, we want our people in Newham to benefit from the growth of the data economy in London and the UK; for our residents and businesses to benefit through inward investment, skills training and the creation of pathways into the high skills and higher income jobs of the future that our local residents and young people can take advantage of.

THAT OPPORTUNITY IS FOR US TO SEIZE NOW: OVER 5,500 NEW JOBS THAT DON'T YET EXIST CAN BE CREATED IN OUR BOROUGH BY 2035, ALONGSIDE £104 MILLION IN OUR LOCAL ECONOMY TO BENEFIT OUR RESIDENTS AND BUSINESSES AS PART OF THE ESTIMATED £999 BILLION VALUE OF THE DATA SECTOR MARKET AS IT GROWS IN THE UK.

That's why we launched Newham Sparks in September 2021, which is part of our inclusive economy strategy, precisely because of the value potential the data sector will have on productivity, growth and jobs. It is our declaration that technology and data can be an effective driver as we respond to the spectrum of social and economic challenges we face, including those caused by the Covid-19 pandemic – and a driver in creating the conditions to unleash the incredible talent and innovation potential we have in Newham.

We'll be working with other public bodies, partners, businesses, entrepreneurs and our residents to ensure the growth of the data economy benefits Newham, fuels innovation and creates jobs – and uses data to support our actions to address the climate emergency and for the public good.

Following on from the successful launch of our Newham Sparks Chapter One 'Call to Action' last year, I am delighted that through our exciting research collaboration with University College London's Institute for Global Prosperity we are publishing Newham Sparks Chapter Two: 'Unleashing the power of data to drive shared prosperity: A roadmap to a transformative data society'.

It provides the clearest empirical evidence yet from experts about the potential of the data economy for Newham: quantifying the growth opportunity for our borough, London and the UK. That opportunity is for us to seize now: over 5,500 new jobs that don't yet exist can be created in our borough by 2035, alongside £104 million in our local economy to benefit our residents and businesses as part of the estimated £999 billion value of the data sector market as it grows in the UK.

The report also sets out crucial areas for further exploration concerning citizens' relationship with data, privacy and transparency of data use; alongside the important role that Newham Council can play in convening vital discussions and promoting actions that are driven by data use for the public good. I am excited about progressing across all of these areas with University College London and the Institute and enabling a spectrum of opportunities for our young people, residents and the community of Newham in the coming years.
Best wishes,

Rokhsana Fiaz OBE
Mayor of Newham

@rokhsanafiaz

FOREWORD FROM PROFESSOR HENRIETTA L. MOORE

The Institute for Global Prosperity (IGP), University College London is delighted to be engaged with the London Borough of Newham as part of Newham Sparks. Our contributions to the report build on our ongoing collaborations with the Borough, including the 'Newham Sparks' event at London Tech Week. The IGP and the London Borough of Newham have a long-standing partnership with key areas of work including our citizen-led prosperity index pilots in east London, the launch of UCL's citizen science academy, and the longitudinal study of prosperity in 13 post-industrialised neighbourhoods in east London, 6 of which are located in the borough of Newham. The IGP is committed to cross-sectoral and cross-community prosperity in Newham.

Our partnership offers the opportunity to incubate and grow London's 'Data Sector' in the borough and bring significant socio-economic benefits for local citizens, not just through business and job growth, but also through greater prosperity and improvements in quality of life, including democratic participation. In order for the value and benefits of data to be realised for all, we need whole system changes to data policy, data governance and digital value capture and sustainability. We provide five ambitious recommendations for Newham to lead the way in these areas and demonstrate the opportunity, potential and possibilities that data can bring to the citizens of Newham.

Putting citizens at the centre of our thinking, planning and actions is our main recommendation. Reformed and co-designed data citizenship provides a compass for Newham's vision and leadership in this new and exciting sector. Newham is committed to putting people at the heart of everything they do, and anchoring this work to the prosperity of citizens will be key to its success.

We look forward to working with Newham to ensure the Sparks initiative blossoms in the coming years and to creating an innovative framework for action with concrete exemplifications and impact that will influence the scaling up of the data sector across London and the UK.

Professor Henrietta L. Moore
Founder & Director, Institute for Global Prosperity
Chair of Culture, Philosophy and Design
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The IGP's vision is to help build a prosperous, sustainable, global future, underpinned by the principles of fairness and justice, and allied to a realistic, long-term vision of humanity's place in the world. The IGP undertakes pioneering research that seeks to dramatically improve the quality of life for this and future generations. Its strength lies in the way it allies intellectual creativity to effective collaboration and policy development. Of particular importance to the IGP's approach is the way in which it integrates non-academic expertise into its knowledge generation by engaging with decision-makers, business, civil society, and local communities.

For further information please contact: **igp@ucl.ac.uk**

WE ARE DATA.

NEWHAM SPARKS MISSION

Newham aims to be at the forefront of the data revolution in the capital, as London positions itself to become the preeminent Data City in the UK. Newham has long been one of London's most diverse boroughs. Pre-Covid, it experienced a decade of significant growth and change, with increased job growth, new communities emerging, strong commercial demand, and a large and relatively well skilled workforce. The borough benefits from the broader 'eastward' movement of London's economy, high levels of transport connectivity, rapid increases in the supply of office and industrial space, and innovation districts located around the Olympic Park and the Royal Docks. This makes Newham uniquely placed to seize the data opportunity.

Newham's mission is to become a catalyst – and London's destination – for innovators and investors in the data sector as the wider digital economy fuels UK recovery from the Covid-19 pandemic. We will support our residents to seize opportunities and benefit from the growth of the new data economy in all aspects and position Newham as the focal point for growth and investment in this sector.

Newham Sparks is our declaration to become a public-sector data leader in local government by improving public service delivery through use of data and technology; promoting responsible data use, with trust and transparency and for the public good. We will also harness partnerships to facilitate a sustainable data ecosystem locally that will support innovation, business growth and new jobs - including the development of new learning pathways, as well as opportunities for training and acquiring new skills. It is also a statement of our ambition to unlock the value of data and digital in everything we do as a Council to benefit our people, borough and place: to improve the environment, promote inclusive growth as well as improving how the Council works to deliver better for residents. Use of data for the public good is an important infrastructure issue in keeping our streets clean, managing refuse collections, promoting sustainable transport and improving the air that we breathe.

This report is the result of a research collaboration between the London Borough of Newham and University College London's Institute for Global Prosperity. It will inform Newham Sparks' future programme of work and influence wider national and regional policy to drive the growth of the Data Sector in Newham, in London as a city and the UK as a whole. The research is exploring the potential scale of the Data Sector in Newham, and in London and the UK, examining scope for inclusive economic growth and job creation, education and skills training needs, and the social value that data can generate for citizens and communities.

EXECUTIVE SUMMARY

Data is one of the most powerful tools societies currently have at their disposal. Data is already a core resource in everyday life for individuals, communities, businesses, and governments - through social media, search, smart devices in our homes, data analytics, and the digital services we have come to rely on. In the face of urgent challenges - from tackling Covid, addressing widening inequalities to facing the climate emergency - data has the potential to tackle these most pressing challenges[1] and positively improve almost every aspect of social and economic life; driving innovation, creating jobs and economic growth, improving decision-making, reducing costs, and changing the way public services are delivered.

The potential for data to drive new industries and create high-income jobs is evident in the aims and areas of opportunity outlined in the National Data Strategy. While the data market in the UK – meaning money made from products or services derived from digitised data – is the largest in Europe[2], the potential of data to benefit society in other ways that unlock social value, support social innovation, and deliver on the goal of greater fairness in society are not yet fully understood nor well explored. Reaching the social and environmental, as well as the economic, potentials for data is critical to our shared prosperity in the coming decades.

Local government has a critical role to play in ensuring that the social and economic transformations driven by growth of the data sector in the coming years benefit people, places, and communities, as part of wider ambitions to create genuinely inclusive economies. This will involve working collaboratively with central government and business to create a data ecosystem that ensures the right digital and data infrastructures are put in place.

We use a conceptual framework 'Citizen', 'City' and 'Champions' to understand how data cuts across various domains and we make five recommendations for Newham to create a thriving data ecosystem:

1. Data Citizenship
2. Spark Centres
3. Spark ID
4. Data Exchanges
5. Digital Dependencies

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[1] King, R., (2022). Predictions 2022: 'Data can help address the world's biggest challenges - 5 experts explain'. World Economic Forum. Available at: https://www.weforum.org/agenda/2022/01/data-can-help-tackle-global-challenges-2022-predictions/

[2] European Commission, (2020). 'Moving Towards the European Data-Agile Economy: Final Report on Policy Conclusions'. Available at: https://datalandscape.eu/sites/default/files/report/D2.8_Final_Report_on_Policy_Conclusions_20200515_final.pdf

1. INTRODUCTION

The UK has defined objectives to secure the potential benefits of data through; The Grand Challenges[3]; National Data Strategy[4]; and the Climate Change Committee 6th Carbon Budget[5]. The barriers to reaching those goals are well known and documented in all of the above reports, as well as arising in the panel discussion at the Newham Sparks launch event at London Tech Week, September 2021.

The barriers include: the quality of data; enabling sharing of data which links with standards, skills, education and access; and the protection of individuals' rights and the rule of law. The potential of a data economy lies at the fulcrum of overcoming such barriers.

Arguably, data is today a critical resource in almost all areas of human-led activity, from policymaking, administration, and public services, to finance, business and trade, and agriculture, through health, language, education, research and innovation, climate adaptation and humanitarian efforts, and security and defence sectors. However, drawing out value and realising the full potentials of data, and the development of its accompanying digital transformation, requires developing trust amongst the general population and developing robust political strategies that take account of: the heterogeneity of data types and applications; its beneficial and negative impacts and how to address them; and finally the trust, awareness, and interest of the general population.

3 Department for Business, Energy and Industrial Strategy, (2021). 'The Grand Challenges'. Available at: https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges

4 HM Government, (2020). 'UK National Data Strategy'. Available at: https://www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy

5 Climate Change Committee, (2020). 'The Sixth Carbon Budget The UK's path to Net Zero'. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

This report explores the possibilities and challenges of building a data sector that drives prosperity and economic growth that is fair and inclusive. In Section 1, we introduce the basis of this work and the context of the UK stance on data as well as, outlining our research methodology. In Section 2, we provide an economic analysis of the data sector in terms of market size, employment and Gross Value Added (GVA) highlighting future jobs and education. For Section 3, we discuss our conceptual framework, 'Citizen, City and Champions' to translate the deeply cross-sectional requirements for realising the potential of data into policies that cut across the private, public, and commercial domains.

Finally, in Section 4, we look at the levers that local government has at their disposal to make this possible in the years ahead, and we make five recommendations that will lay the foundations to make this possible in the years ahead with ambitions to influence wider government at both the national and local level.

The report is the result of a desk base literature review analysing the data sector, roundtable discussions with industry-leading experts of data including individuals from academia, finance, commercial and (local) government organisations to discuss the potential and barriers associated with data. Interviews with various data experts were also held to expand the evidence base. However, this report presents future opportunities for further research in an amorphous and highly evolving field to grow the evidence base in a significant area.

2. THE DATA SECTOR AND ITS POTENTIAL

People have been collecting and recording facts, figures, artifacts, maps, and documents since the advent of agriculture and the invention of seasonal calendars and writing systems. The differences with data now are: first, the size, speed and reach at which it is being collected, used, re-used, copied, edited, transferred, and processed every day; second, the proliferation and growing interaction of digital devices, platforms, algorithms, analytic tools, and services applications taking place across societies and economies at a global scale; and third, the value that private and public sector organisations now place on data.[6]

In this section we explore the economic potential of the data sector by presenting new market growth forecasts, future employment opportunities, and the Gross Value Added (GVA) or contribution the sector is set to make to the overall economy.

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[6] OECD, (2019). 'Data in the digital age'. OECD Going Digital Policy Note, OECD, Paris. Available at: https://www.oecd.org/digital/ieconomy/data-in-the-digital-age.pdf

2.1 DEFINING THE DATA SECTOR

There is no single definition of the data sector. As a result, published estimates of current market size and growth forecasts tend to focus on 'open data' as a more mature and clearly defined part of the sector. However, the spectrum of data ranges from 'closed' to 'shared' to 'open'[7], therefore IGP's new analysis builds on published data to provide new forecasts for growth in the wider data sector.

Open Data

The Open Data Institute (ODI) defines 'open data' as "data that anyone can access, use and share. For data to be considered 'open', it must be published in an accessible format, with a licence that permits anyone to access, use and share it".[8]

In 2015, ODI research identified 270 open data companies in the UK with an annual turnover of more than £92 billion and over 500,000 employees. An open data company is defined as one that utilises open data as a key part of its work through direct use, production, or investment.[9]

These open data companies operated in a diverse range of sectors including: Information and Communication (54 per cent); Professional, Scientific and Technical (21 per cent); Business administration and Support services (11 per cent). The remaining 14 per cent of open data companies were spread across a range of industries. The most common data used by these companies included geospatial, transport, environmental and demographic.[10]

Data

In 2017, Arcus Global's then CEO Denis Kaminskiy defined data as "a set of qualitative or quantitative variables – it can be structured or unstructured, machine readable or not, digital or analogue, personal or not". Kaminskiy reiterates the potential of data stating, "Ultimately it is a specific set or sets of individual data points, which can be used to generate insights, be combined and abstracted to create information, knowledge and wisdom".[11]

[7] Open Data Institute, (2020). 'Data and Public Services Toolkit'.
Available at: https://theodi.org/service/tools-resources/data-and-public-services-toolkit/#1556123268350-758d1c19-357b3ee1-c87c
[8] Open Data Institute, (2015) 'Open data means business: UK innovation across sectors and regions'. ODI report, London, UK.
Available at https://theodi.org/article/research-open-data-means-business/
[9] Ibid.
[10] Ibid.
[11] Kaminskiy, D. (2017). 'What's the Difference Between 'Big Data' and 'Data'?'. Arcus Global, https://www.arcusglobal.com/news/whats-the-difference-between-big-data-and-data

However, the data sector and data economy include companies and organisations that directly produce, deliver or use all kinds of data through digital products, services and technologies. In 2020, the total number of UK data companies (unrelated to a specific data type) was approximately 327,900[12]. In the subsequent paragraph and section 2.2, we introduce the concept of 'baseline' and 'optimistic' forecasts. IGP's new analysis presents 'baseline' and 'optimistic' forecasts to reflect the spectrum of growth scenarios[13] in what is an emergent market.

Conservative or 'baseline' estimates by the IGP suggest there will be 425,100 data companies in the UK by 2035, with corresponding optimistic forecasts suggesting there will be 644,400 data companies (see Table 1 in the appendix).

For the overall data economy, the following sectors have contributed the most in terms of Gross Value Added in 2016: the Information and Communication sector (41.3 per cent); Financial Services (15.8 per cent); and Professional Services (7.0 per cent). Between 2012 and 2016, the highest growth areas included these same sectors[14]

Research by the EU[15] reported that the total revenues of UK data companies in the data sector totalled £17 billion (0.9 per cent of GDP) in 2020 and forecasted to reach £25 billion by 2020, assuming this growth potential remains, by 2035 we expect an increase to £52 billion (2.0 per cent of GDP) at 'baseline' and £194 billion (7.5 per cent of GDP) in the 'optimistic' scenario (see Table 1 in the appendix). However, in 2018, estimates from Digital Reality[16] based on 2016 figures show that the UK was operating only at 58% of its potential in the data economy leaving an untapped potential of approximately £52.3 billion. Therefore, maximising the full potential of the data economy will be key for Newham's ambitions to play a leading role in the data sector.

[12] European Commission, (2020). 'Final Report on Facts and Figures: Updating the European Data Market Monitoring Tool'. Available at: https://datalandscape.eu/sites/default/files/report/EDM_D2.7_FinalReportFactsFigures_02.04.20.pdf

[13] European Data Portal, (2020). 'The Economic Impact of Open Data: Opportunities for Value Creation in Europe'. Available at: https://data.europa.eu/en/highlights/the-economic-impact-of-open-data

[14] Digital Realty, (2018). 'Data Economy Report 2018'. Available at: https://www.digitalrealty.co.uk/data-economy

[15] European Commission, (2020). 'Final Report on Facts and Figures: Updating the European Data Market Monitoring Tool'. Available at: https://datalandscape.eu/sites/default/files/report/EDM_D2.7_FinalReportFactsFigures_02.04.20.pdf

[16] Digital Realty, (2018). 'Data Economy Report 2018'. Available at: https://www.digitalrealty.co.uk/data-economy

2.2 NEW ESTIMATES OF ECONOMIC POTENTIAL

IGP has produced new estimates of the economic potential of the data sector in order to understand the market size and benefits in terms of employment, skills and professionalisation opportunities to Newham as a borough, London as a city, and the UK as a whole.

IGP's new estimates of the open data market use the European Commission's European Data Portal (2020) report analysing the economic impact potential of the open data sector to the EU27+ and EU28+ member countries as a starting point[17]. New estimates for Newham, London and the UK have been produced by interpolating back from the EU level. This is because forecasts about the size and growth potential of the data sector are limited to the macro level of countries and trading blocs such as the UK and EU hence, are scarce at the level of cities and local authorities. Data from the ODI is briefly used to derive an estimate for the number of open data employees in 2020.

To analyse the economic potential of the wider data economy, we also use secondary reports from the European Data market study, 'Moving Towards The European Data-Agile Economy report'[18] and the 'Final Report on Facts and Figures: Updating the European Data Market Monitoring Tool' report.[19]

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[17] European Data Portal, (2020). 'The Economic Impact of Open Data: Opportunities for Value Creation in Europe'.
Available at: https://data.europa.eu/en/highlights/the-economic-impact-of-open-data
[18] European Commission, (2020). 'Moving Towards the European Data-Agile Economy: Final Report on Policy Conclusions'.
Available at: https://datalandscape.eu/sites/default/files/report/D2.8_Final_Report_on_Policy_Conclusions_20200515_final.pdf
[19] European Commission, (2020). 'Final Report on Facts and Figures: Updating the European Data Market Monitoring Tool'.
Available at: https://datalandscape.eu/sites/default/files/report/EDM_D2.7_FinalReportFactsFigures_02.04.20.pdf

2.3 DATA SECTOR - MARKET SIZE

Open Data Market Size

IGP's new estimate of the size of the UK open data market suggest a 'baseline' market size of £36 billion in 2020, with forecasts of £42 billion in 2025, £46 billion in 2030 and £51 billion in 2035. Contrastingly, the 'optimistic' estimate of the UK open data market size is approximately £36 billion in 2020, while 'optimistic' forecasts estimate the size of the open data market at £44 billion, £54 billion and £67 billion for 2025, 2030 and 2035, respectively. See Table 2 in the appendix for a full breakdown of the direct, indirect and total open data market size figures.

Figure 1: Total Uk Open Data Sector Market Size Estimate And Forecasts (IGP, 2021)
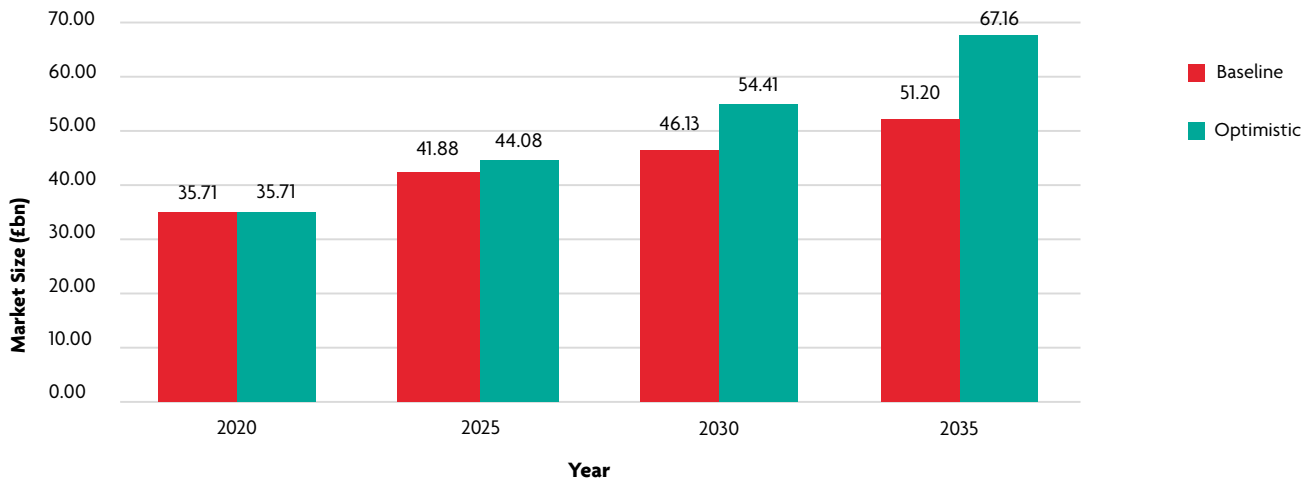
2.3 DATA SECTOR - MARKET SIZE

Data Economy Market Size

On the other hand, we now analyse the UK market size of the wider data economy using the value of the 'data economy' which is defined as how the overall data market impacts the economy as a whole which includes the direct, indirect and induced impacts of data. The data economy "involves the generation, collection, storage, processing, distribution, analysis elaboration, delivery, and exploitation of data enabled by digital technologies".[20]

The 'baseline' value of the UK data economy is estimated at £75 billion in 2020 and £106 billion in 2025 by the European Commission, increasing 41 per cent.[21] Our predictions suggest

this will rise to £149 billion in 2030 and £209 billion in 2035 (a 137 per cent increase from 2020).

The 'optimistic' or 'high growth' scenario is estimated at £75 billion in 2020 and forecasted at £178 billion in 2025[22] (rising 137 per cent), while our estimates forecast these figures to reach £422 billion in 2030 and £999 billion in 2035 (a 1232% increase from 2020) assuming the same growth trajectory from 2020 to 2025 arises between 2025 and 2030 as well as, 2030 and 2035.

The estimates and forecasts of the value of the 'data market' which differs from the 'data economy' can be found in the appendix, Table 3.

Figure 2: Value Of The Uk Data Economy Estimate And Forecasts (IGP, 2021) and (European Commission, 2020)*
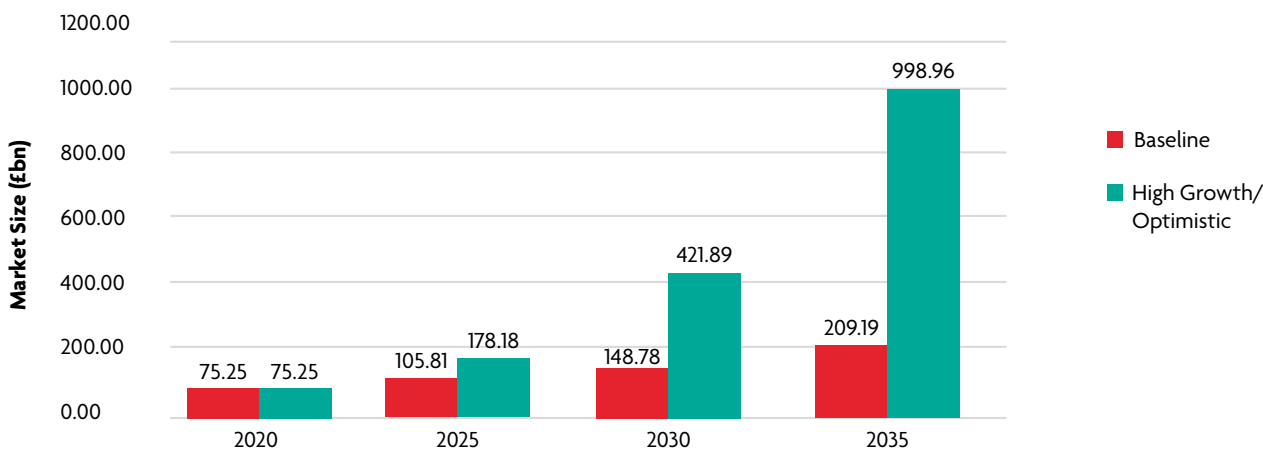
*European Commission (2020) figures used in 2020 and 2025

[20] Ibid.
[21] Ibid.
[22] Ibid.

2.4 DATA SECTOR - EMPLOYMENT

Open Data Employees

IGP's analysis suggests that at 'baseline', the UK employment potential for open data is estimated at 521,900 open data employees in 2020, increasing to 531,300, 545,300 and 558,800 employees in 2025, 2030 and 2035, respectively. The 'optimistic' employment is expected to reach 644,100; 795,100; 981,300 employees at the same points in time.

In London, the 'baseline' open data employment is estimated at 73,500 employees in 2020 and forecasted to rise to 78,700 employees by 2035 whereas, the 'optimistic' scenario expects a rise to 138,200 employees. For Newham, 2,900 open data employees are estimated in 2020, which is forecasted to rise to 3,100 (baseline) and 5,500 (optimistic) open data employees in 2035. See Table 2 in the appendix to view the breakdown of direct and indirect employment forecasts for the UK, London and Newham.

The above figures are estimates and forecasts for the employment potential, with the right data infrastructure and ecosystem in place, Newham could supersede these figures.

Figure 3: Total Uk Open Data Employment Estimate And Forecasts (IGP, 2021)
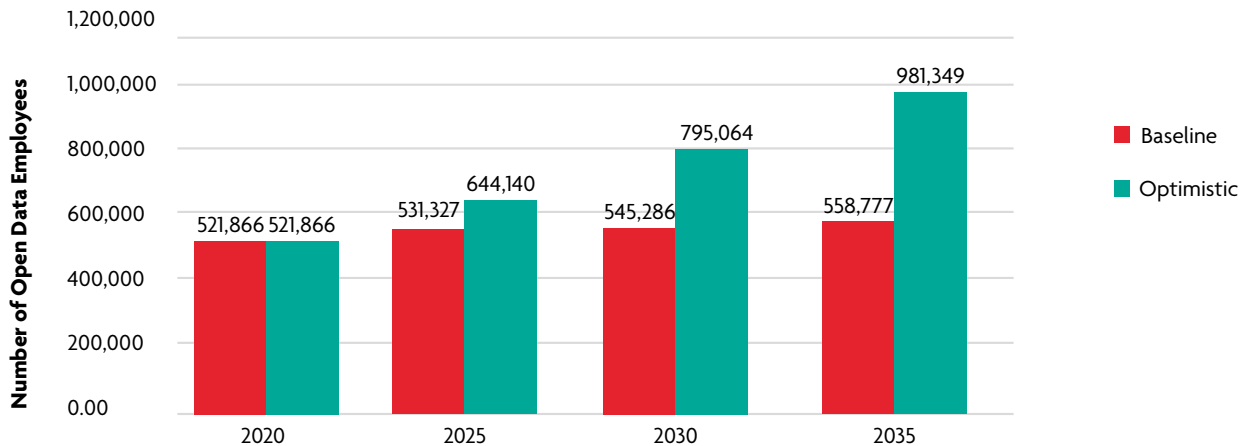
2.4 DATA SECTOR - EMPLOYMENT

Data Professionals

Another aspect is the number of data professionals in the UK which differs from the analysis above as this does not relate to a specific data type. Data professionals are those "who collect, store, manage, analyse, interpret, and visual data as their primary or as a relevant part of their activity".[23]

In 2020, this figure at 'baseline' was derived at 1.67 million which is forecasted to rise to 2.02 million in 2025[24] (3 per cent of the UK population), 2.43 million in 2030 (3.5 per cent of the UK population) and 2.92 million in 2035 (4.2 per cent of the UK population). Moreover, 'optimistic' forecasts demonstrate an increase to 2.31 million in 2025[25] (3.4 per cent of the UK population), 3.19 million in 2030 (4.6 per cent of the UK population) and 4.40 million in 2035 (6.3 per cent of the UK population).

Figure 4: Total Uk Data Professionals Estimate And Forecasts (IGP, 2021) and (European Commission, 2020)*

*European Commission (2020) figures used in 2020 and 2025

Baseline   High Growth/Optimistic
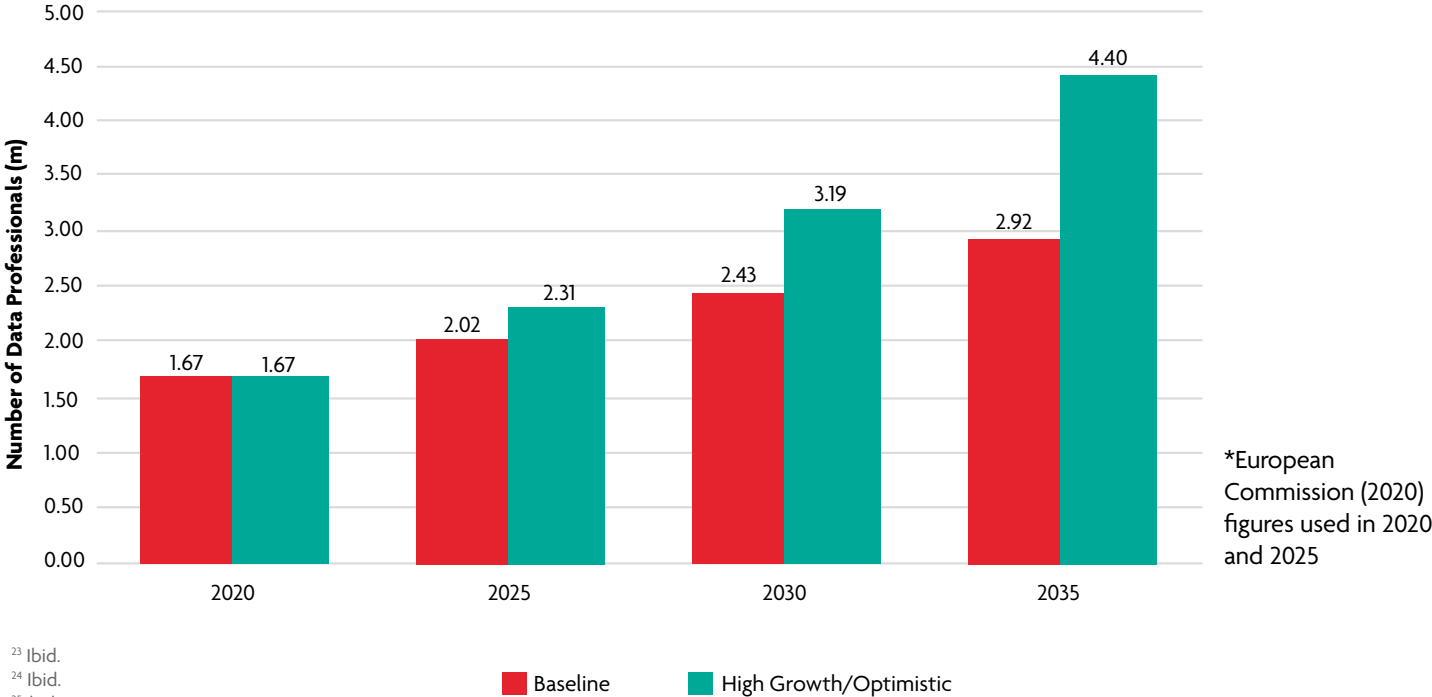
23 Ibid.
24 Ibid.
25 Ibid.

2.5 DATA SECTOR - GROSS VALUE ADDED (GVA)

Research from Lateral Economics commissioned by the ODI[26] has estimated the value added of open data to range between 0.4% to 1.2% of GDP. Using these figures, we extrapolate the GVA of the open data sector for the UK where 0.4% represents a 'baseline' scenario and 1.2% is regarded as an 'optimistic' scenario.

The GVA to the UK economy of open data is estimated to be £7.8 billion in 2020, and forecasted to reach £8.4 billion in 2025, £9.3 billion in 2030 and £10.3 billion in 2035, while the 'optimistic' estimate equates to £23.3 billion in 2020 with forecasts predicting figures of £25.3 billion, £27.8 billion and £31 billion across the same intervals. This would accrue to around £1.8 billion to the London economy in 2020, reaching £2.4 billion in 2035 or alternatively, £5.4 billion and £7.1 billion under a 'optimistic' forecast.

IGP's new analysis suggests GVA to the Newham economy is estimated at 'baseline' to equate to £23.1 million in 2020, rising to £34.6 million by 2035. Conversely, 'optimistic' forecasts show the corresponding figures to be £78.2 million and £104 million in 2020 and 2035, respectively.

Figure 5: Total Uk Gross Value Added Estimate And Forecasts (IGP, 2021)
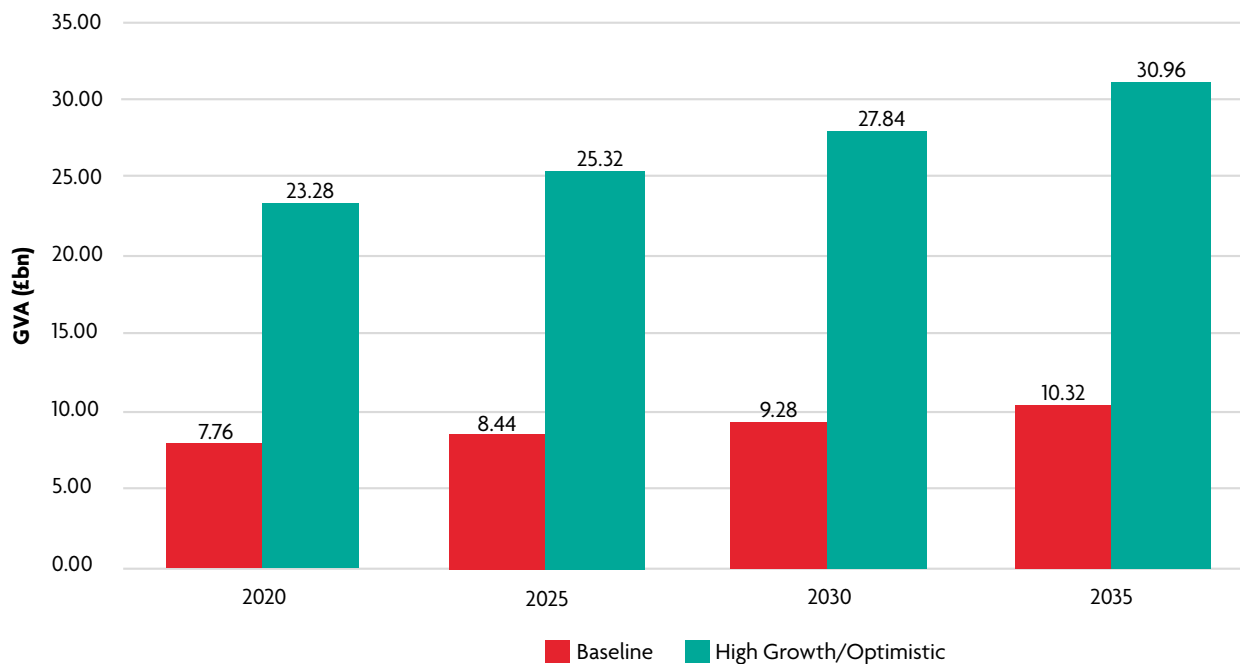
Baseline / High Growth/Optimistic

[26]ODI, (2016). Research: The economic value of open versus paid data. Available at: https://theodi.org/article/research-the-economic-value-of-open-versus-paid-data/

2.6 DATA SECTOR - JOBS OF THE FUTURE

A report by LinkedIn on emerging jobs, estimates vacancies for data science are growing annually by 37 per cent in the US.[27] As the data sector evolves with the rise of Artificial Intelligence (AI), the demand for data related roles is expected to increase.

In the UK, demand for data scientists and data engineers has grown rapidly with a 231 per cent growth evident across five and a half years between 2013 and 2017/2018.[28] Growth for data related roles in data science and analytics was around 35 per cent, closely matching that of growth in all other jobs which experienced 36 per cent growth.[29]

Moreover, our research found that data science overlaps with the following areas: computer science; statistics; machine learning and data mining; operations research and business intelligence.

Some of the skills sets required in data jobs include programming tools (e.g. SQL, Python, R), Data Visualization and Communication, Data Intuition, Statistics, Data Wrangling, Machine Learning, Software Engineering, and Multivariable Calculus and Linear Algebra. Figure 6 below depicts how important these skills are depending on the four most common data scientist jobs: data analyst, machine learning engineer, data engineer, and data scientist.[30]

Currently, the top five roles that organisations recruit for are: Data Analysts; Head of Data; Data Manager; Chief Technology Officer and Data Protection Officer.[32] Future jobs are also not just related to the specialist data related roles, white-collar jobs will also require a basic understanding of data.[33] These jobs currently tend to require a basic understanding of IT skills with 22 per cent of UK businesses indicating they require such skills.[34]

Despite 15 per cent of businesses hiring specifically for data analyst roles, there will be a need for everyone to become data literate as we move towards a more data orientated economy. However, the extent of data literacy will differ as there are different degrees of data that is required as part of a job. For example, jobs that are entirely focussed on data such as data science or employees who need to understand and use data such as robotic process automation, whereas jobs that will need to use data adequately enough such as in local government administration and running businesses.

Furthermore, we would expect more roles within the manufacturing, banking and retail industries as these were the sectors that had the highest percentage of employers stating that data skills are 'very or somewhat important' to their company.[35]

[27] Dempsey, M. (2021). New ways into the lucrative world of data science. BBC News. 4 November. Available at: https://www.bbc.co.uk/news/business-59157040
[28] The Royal Society, (2019). Dynamics of data science skills. Available at: https://royalsociety.org/topics-policy/projects/dynamics-of-data-science/
[29] Ibid.
[30] Holtz, D. (2014). 'What is Data Science? 8 Skills That Will Get You Hired in Data'. Available at: https://www.udacity.com/blog/2014/11/data-science-job-skills.html
[31] Ibid.
[32] Department for Digital, Culture, Media and Sport, (2021). 'Quantifying the UK Data Skills Gap – Full report'.
   Available at: https://www.gov.uk/government/publications/quantifying-the-uk-data-skills-gap/quantifying-the-uk-data-skills-gap-full-report
[33] Ibid.
[34] Ibid.
[35] Ibid.

Figure 6: Required Skills And Software Tools By Type Of Data Job (Holtz, 2014)

	Data Analyst	Machine Learning Engineer	Data Engineer	Data Scientist
Programming Tools	Very Important	Very Important	Very Important	Very Important
Data Visualization and Communication	Very Important	Somewhat Important	Somewhat Important	Very Important
Data intuition	Somewhat Important	Very Important	Somewhat Important	Very Important
Statistics	Somewhat Important	Very Important	Somewhat Important	Very Important
Data Wrangling	Not that Important	Not that Important	Very Important	Very Important
Machine Learning	Not that Important	Very Important	Not that Important	Very Important
Software Engineering	Not that Important	Somewhat Important	Very Important	Somewhat Important
Multivariable Calculus and Linear Algebra	Not that Important	Very Important	Not that Important	Somewhat Important

Legend:
- Not that Important
- Somewhat Important
- Very Important

2.7 DATA SECTOR - LEARNING, EDUCATION AND SKILLS

While the figures outlined in the previous sections appear promising, a key aspect to achieving and realising such potential is through a strong education programme around upskilling and ensuring that citizens have the capacities and capabilities to read and understand their data, extract value and make meaningful interpretations from their data. This includes developing sound data and digital skills to not just address the inequalities and skills gap but crucially to create the environment for the current and future, SME's, microbusinesses, entrepreneurs, business leaders and the residents of Newham to thrive.

The importance of the education of students is significant. Without a serious education programme and investing to educate local communities, the data available to those communities would be considered almost futile if people are unable to understand or read data. Equally, a lack of investment in the public sector and skills would be a potential barrier to adoption and evolution in this area. Skills that are adopted locally and not just beholden to the private sector is the direction to pursue. Therefore, educating local communities is a key factor to rectify and needs to be high on the agenda of both local and national governments.

A large part of the education required is centred on data literacy, ethics, and privacy which is about setting the right culture with citizens. Obtaining the communities' trust on open data and helping them understand and utilise open data can improve decision-making processes, hence communities need to be comfortable with the idea and concepts at first. That entails starting with education at the ground roots of data, such as policy, privacy, and ethics. A potential incubator type model in the community is one way of doing so.

The Department for Digital, Culture, Media and Sport (DCMS) quantified the UK data skills gap[36], acknowledging that data will be useful to businesses but also to citizens at the individual level with greater data literacy enabling people to reap the benefits and actively participate in a growing data sector and the wider data economy. Demand for data skills range between 178,000 to 240,000 data jobs to be filled with 46% of businesses finding it difficult to recruit for roles requiring data skills.[37] The supply for data skills is estimated at 10,000 university graduates per annum,[38] hence, there is strong need for upskilling the incumbent workforce.

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[36] Ibid.
[37] Ibid.
[38] Ibid.

2.7 DATA SECTOR - LEARNING, EDUCATION AND SKILLS

The education sector is one of the most prominent domains affected by and shaping the data sector, this is because "it transforms not only the ways in which teaching and learning are organised but also the ways in which future generations (will) construct reality with and through data."[39] Today schools, colleges, universities and other educational and cultural institutions and settings are becoming increasingly 'data-driven'. Newham's London Design & Engineering University Technical College (UTC) is one example of this as it has a focus on science, technology and digital skills.

Clearly, there is a role for higher education (HE) and further education (FE) institutions to drive the data agenda forward while also filling the skills gap. There are also calls to introduce data early in the school curriculum with important roles for education professionals, businesses as well as, mathematics and computing communities.[40]

Equally, the role of universities such as UCL to create degrees related to data are important and do exist, but also creating alternative pathways to data education such as partnering with the FE institutions to provide lectures, provide links with industry and, host summer schools and masterclasses. The Centre for Advanced Spatial Analysis (CASA) at UCL is one of many providers of high-level expertise that is open to dialogue, partnership and collaboration.

Everyone will need some understanding of data for a range of reasons pertaining to employment and the shift towards to a more digitised and data-driven economy. As highlighted in the previous section, with some data related jobs requiring a high level of knowledge, there are a mixture of vocational and academic

pathways for such roles more heavily focussed on data. For example, Amazon Web Services (AWS) recruits across the whole board with a wide variety of streams including graduates, apprenticeships and seasonal professionals. They also are in the process on working on programmes and a concept designed to help local authorities augment their resource pools.

Finally, AWS have recruited via philanthropic activities aimed to help people who may not have considered working in data or cloud into long-term employment by assisting in upskilling and positioning them as attractive prospects.
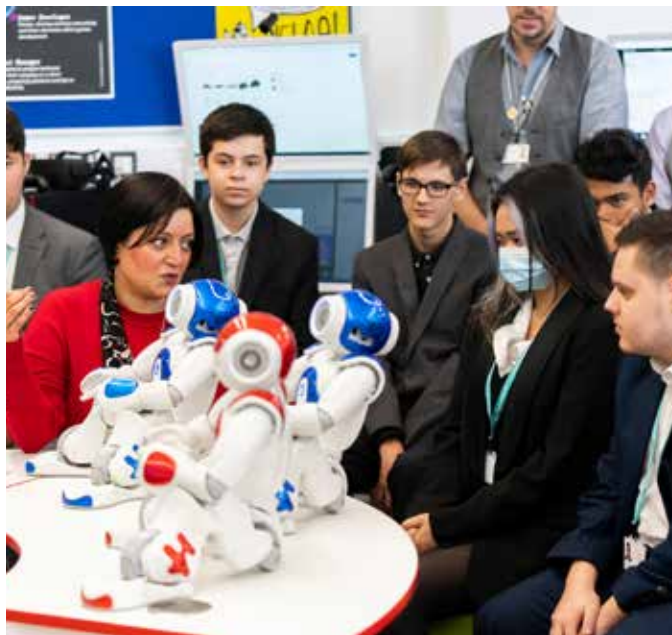
[39] Jarke, J. and Breiter, A., (2019). 'Editorial: the datafication of education, Learning, Media and Technology', 44:1, 1-6, DOI: 10.1080/17439884.2019.1573833
[40] The Royal Society (2019). 'Dynamics of data science skills'. Available at: https://royalsociety.org/topics-policy/projects/dynamics-of-data-science/

3. CAPTURING THE ECONOMIC AND SOCIAL VALUE OF THE DATA SECTOR – A NEW 'CITIZEN, CITY AND CHAMPION' POLICY FRAMEWORK

The potential for data sector growth to drive new industries and new kinds of employment is evident from the levels of economic growth forecast in the previous section. Ensuring this growth is inclusive, unlocks social value, and delivers on the goal of greater fairness in society will involving working collaboratively with business, central government, local public sector partners to create a data ecosystem that ensures the right digital and data infrastructures are put in place, and creating the conditions for what we call in this section 'data citizenship'.

Realising the future potential of data needs new kinds of policy and partnership that cuts across private, public, and commercial domains. In this section we propose a 'Citizen, City, and Champion' as the 'lenses' for a policy framework to achieve this.

NEWHAM SPARKS: OUR FUTURE BLUEPRINT FOR NEWHAM

1. Alice Billings House Creative Hub

2. Canning Town and Custom House regeneration

3. Our 15 minute neighbourhoods (Green Street)

4. East Bank Cultural Hub

5. Royal Docks Enterprise Zone

6. Mayor of London and City Hall Relocation

7. Newham Youth Zones

8. Creation of a new data corridor

9. TwelveTrees Park development and open space Wifi

10. Carpenters Estate Regeneration

11. Electric Vehicle Charging

12. Queen Elizabeth Olympic Park Innovation Zone

Wanstead Flats Playing Fields,
Epping Forest

City of London
Cemetery

7

FOREST GATE

West Ham
Cemetery

Manor
Park

Manor Park
Cemetery

MANOR PARK

7

WANSTEAD PARK

Little Ilford
Park

FOREST GATE

WOODGRANGE PARK

7

Woodgrange Park
Cemetery

7

MARYLAND

Jewish
Cemetery

Sports
Ground

GREEN STREET

Plashet
Park

7

LEYTON

BMX
Track

Basketball
Arena

Drapers
Field

Athletes
Village

STRATFORD   INTERNATIONAL

Westfield
Stratford
City

Water Polo
Arena

12

4

Aquatics
Centre

7

1

10

STRATFORD

STRATFORD HIGH ST.

Stratford
Park

West Ham
Park

Ornamental
Garden

11

EAST HAM

EAST HAM

Barking Rd
Rec Grd

Lady Trowen
Trent
Playing Fields
(disused)

**STRATFORD
& WEST HAM**

7

UPTON PARK

Priory
Park

3

ABBEY ROAD

PLAISTOW

PLAISTOW

Playing
Field

New
City

Central
Park

Flanders
Playing Field

Cuckhold's Haven
Nature Reserve

Folkestone Road
Allotments

9

WEST HAM

Memorial
Park

East London
Cemetery

Plaistow
Park

Brampton
Park

East Ham
Jewish Cemetery

Gooseley
Playing Field

Hermit Rd
Rec Ground

BROMLEY-BY-BOW

Three Mills
Green

STAR LANE

Star
Park

E. Ham
Nature
Reserve

**CUSTOM HOUSE
& CANNING TOWN**

7

BECKTON

Beckton District
Park (North)

8

CANNING TOWN

Bow Creek
Ecology Park

Canning Town
Rec Grd

King George V
Park

Newham
City Farm

Wildflower
meadow

New
Beckton
Park

BECKTON

NEWARK KNOK

7

2

Keir Hardie
Rec Grd

Cundy Park

Connaught
Allots

Beckton District
Park (South)

Cyprus Allots

GALLIONS REACH

7

6   **5**

ROYAL VICTORIA

CUSTOM HOUSE

PRINCE REGENT

ExCeL
Exhibition Centre

ROYAL ALBERT

BECKTON PARK

CYPRUS

UNIVERSITY
WAY

Albert
Basin

Royal Victoria Dock

Royal Albert Dock

ROYAL DOCKS

WEST SILVERTOWN

Royal Victoria

O2
Arena

LONDON CITY AIRPORT

PONTOON DOCK

King George V Dock

KING GEORGE V

7

Thames
Barrier
Park

Lyle
Park

River Thames

3.1 CITIZEN

We use the 'Citizen' lens to focus on the effects of data on individuals and to think about what data can do for citizens and societies, or data as a public good. We introduce the idea of 'data citizenship': equipping citizens with the tools and skills they need to understand the value of data for the public good; the skills to read and analyse data in their everyday lives; and the confidence to share their data, which means overcoming issues of trust and privacy.

The notion of data citizenship is an extension of data literacy and education combined with participation. Data has the power to do public good if we are willing to share our data. Crucially, however, this means ensuring citizens understand the value of data in society and the potential of their own data. Education and skills training are important in creating pathways to future jobs, but also in enabling citizens to understand, read and analyse data in their everyday lives. Citizens have rights to privacy, but capturing the wider societal value of data means encouraging citizens to share their data to improve knowledge and public services that will have wider benefits. The ZOE Covid App, which launched in 2020 to report on Covid infection and vaccination rates in the UK, is a good example. It is the largest community monitoring and reporting of Covid in the world based entirely on public data.

However, gaining the trust of citizens to regularly share their data requires new conversations about participation and privacy. There is currently a lack of public conversations about the value of sharing our individual data for the wider benefit of society and local communities. The participation of citizens in the collection and use of their data requires trust. Building this trust will require a new conversation about the public purpose and social value of data, supported by formal and civic education efforts. However, digital access and technology, and the training that enables citizens to contribute to and make use of data, are foundational.

Because the data with the greatest potential is personal, individuals must be at the centre of these efforts to harness the potential of data. Goals and outcomes defined by citizens in their own terms is the missing vital ingredient. People do not trust data or technology they do not understand, but they can trust inclusive and participatory processes they design and control. At the individual level of the Citizen, access and control that are the dominant features. The facilities that give citizens control of their identity, their privacy and who, how, and where their data is used are essential to building the trust that allows citizens to fully participate in the generation of data.

This is important, thinking about trust in relation to the lengthy (and prohibitive if rejected) terms and conditions citizens are required to sign-up to on most social media and data platforms (which are now core to our lived experiences), that trust is eroded and hidden behind 30 or more pages of technical jargon issued to the user of which they do not understand. Regulations insisting upon common standards for terms and conditions, and informed consent need to rest at the heart of the approach going forward and simplifying information that is being provided by the data collector is required to make it easier for citizens to understand. One interesting cross-sector example to highlight the step-change needed is the now easier to understand and transparent nutrition information on all foods that was absent only 20 years ago.

On the other side, the potential for data depends on making it openly and freely accessible to enable data sharing. As the most valuable and accurate data incorporates personal data, there must be a trusted and impartial intermediary who protects the personal data by abstracting it in what is shared. Essentially, this a process of anonymisation, but keeping the accuracy that comes from attribution. Accurate data, reliably based on personal data, with no threat to privacy, and shared for public good will be a 'gold standard' to aim for the future.

3.2 CITY - THE LOCAL NEXUS

The 'City' lens captures the implications and role of data for places – cities, boroughs and networks of communities – and for the governance of places to ensure the data sector offers inclusive and transformative benefits and is used to better the lives of citizens and communities.

Local government is uniquely placed to use data to improve services and create platforms for digital social services that facilitate local exchange and collaboration, and to engage citizens and communities who are excluded from data and digital services. Local public services are at the forefront of both data collection and beneficial use. Local governments are responsible for more public services that impact citizens' everyday lives than any other body. Even national services, such as the NHS, are often more deeply integrated with local public services than with their national bodies. Hospitals, for example, are part of a fabric of local services that extend beyond healthcare into social care, transport, energy, housing. Data from those local services creates information that is vital to effective resourcing decisions of every service operating in the community, including the hospital. For this reason, local government has a special role to play in building public trust.

In this sense, the 'City' level of the policy framework is the nexus for data citizenship. Local government is the collector, curator, holder, and provider of much public data, which is used to better the lives of citizens and their communities. Data is not yet seen by citizens as a common good or asset such as public parks and services - communal assets that have mutual benefits. However, local government has an opportunity to change such perceptions. Equally, treating data more as a common good or asset, requires not just a role for the state and local government in holding data, businesses are also vitally important to help citizens reap the benefits from their data.

Data citizens must have a counter party with whom they can exchange a data contract. Neither the nation state nor the neighbourhood can provide the nexus at which quantity, accuracy, and open access are optimised. The national government at the macro level is too big and doesn't have the trust, and the micro, community level, is too small to have an impact. Long-term Ipsos MORI research[41] illustrates that the 'local' level is trusted more than the 'national' level and the pandemic has shown how trust has remained higher than at the national level. Local government has the scale to generate network effects and justify the infrastructure investments needed to capture social and economic value of data.

Citizen-informed Data Charters and local supervisory Data Boards have emerged at the local government level – Newham produced a data charter during Covid-19 as part of their membership of the Covid-19 Local Government Good Practice Network (with Hackney, Camden and Barnet). Equally, Camden has established a data charter with its residents, and the Borough of Brent has established a data ethics board.

The key implications for local government and policy-makers to bear in mind are: creating education pathways and knowledge to skill-up ordinary citizens to have the capacities and capabilities to read, use and analyse data and make meaningful interpretations; reaching out to those with very little or no knowledge or experience of data is key; ensuring access to data, addressing inequalities related to access, use and benefits; and maintaining and sustaining data quality and ensuring that citizens' data is safeguarded provided that citizens are open to and willing to share their data.

41 Thornborough, J., (2021). Trust in local government is still high, and policymakers should take advantage of it. Available at: https://blogs.lse.ac.uk/covid19/2021/04/19/trust-in-local-government-is-still-high-and-policymakers-should-take-advantage-of-it/

3.3 CHAMPIONS

The 'Champions' lens frames the opportunities for entrepreneurial innovation in data such as individual skills, community data-use collaborations, and private sector co-ordination. 'Champions' are the people and organisations that will create new value from data. Fostering the talents of people in incubators that bring together educational, commercial, and social entrepreneurs around the availability of openly accessible, high-quality data, is how the potential of data can be maximised. Creating the avenues, spaces, and forums that bring skills, innovation, and experience together to collaborate around data is the task. Once 'Citizens' are participating, and 'Cities' are enabling, the 'Champions' can help to turn data's potential into better lives, greater prosperity, higher productivity, and deeper social value.

There is potential for the London Borough of Newham to host digital incubators or digital open data exchanges to support people within the community and build 'champions' locally. This can be achieved through involving the further education (FE), sixth forms, higher education (HE) institutions as well as, the public and private sectors, related to the education and the creation of multiple pathways to learn about data in the 'Citizen' section. This has also been emphasised in our roundtable discussion and panel discussion at the Newham Sparks launch event.

Micro-markets and microbusinesses that connect communities from the street to the borough through shared access to community data has the potential to improve wellbeing, livelihoods, and public safety. The Borough of Newham could build on private citizen identity to enable forums and marketplaces that allow citizens to build their communities and address local needs and priorities with local resources, thus strengthening the circular economy of Newham, and building resilience.

The London Data Store is an example of 'City' level ownership, governance and sharing of data with private sector institutions also. Newham is currently engaged in a data pilot assessing the high streets with MasterCard who have anonymised and aggregated data in Forest Gate. However, this will only succeed with the successful establishment of strong relationships between city, local authority, and citizen.

4. ROADMAP FOR A DATA SOCIETY

Our roadmap for a data society reflects the most potent levers available to local government, which can be adopted by Newham and other local authorities to create a physical, digital and social infrastructure to capture the value of data in the years ahead. These are important areas for local government to focus on in order to achieve a thriving data society that: creates more jobs; improve efficiency, access and ease of using public services; and improves the quality of life and prosperity of its citizens. In each recommendation, we have reflected these levers, summarized in this diagram and also explained below:

Shaping Local Economies
This lever reflects how local government can impact and shape the local economy through interactions with businesses, citizens and other organisations by creating the environment that fosters local economic growth. Within London, local government has already successfully pioneered economic growth of digital and data sectors through initiatives like the Camden digital campus, and the Old Street silicon roundabout, and there is a significant untapped potential in local government's capacity to foster local economic growth.

Data Custodians
Local government unlike no other government department, national or otherwise has access to the breadth, richness and fullness of data on their citizens which they hold and process for the public good. This capability was critically utilised as part of the national response to COVID when local authorities connected data on a household level to best guide and target their humanitarian, testing, tracking and tracing response by closely working with key local strategic partners and central government. Local government is at the cutting edge of innovation in sharing and enabling safe access to data relating to their citizens, and if properly supported can bring about a step-change in how data can bring about positive social and economic change across all communities. Working at a local level, and partnering regionally where appropriate, local and regional government have also secured innovative public and private partnerships in the dissemination and sharing of data through initiatives such as the London Data Store, and the GLA High Streets data pilot.

LOCAL GOVERNMENT LEVERS

SHAPING LOCAL ECONOMIES

DEMOCRATICALLY TRANSPARENT AND ACCOUNTABLE

CONVENERS AND CONNECTORS

Local Government Levers

DATA CUSTODIANS

PHYSICAL INFRASTRUCTURE AND CONNECTIVITY

EDUCATION AND FUTURE SKILLS

4. ROADMAP FOR A DATA SOCIETY

PHYSICAL INFRASTRUCTURE AND CONNECTIVITY

Data will only be able to realise it's transformational potential if we have the infrastructure and connectivity to capture and transmit it. Across the local government sector, hundreds, if not thousands of large-scale digital infrastructure improvements are underway, with a pipeline of physical infrastructure and digital connectivity improvements planned for the coming decade.

EDUCATION AND FUTURE SKILLS

Local government is well-positioned to enable effective investment in data skills and professions for the future, working in partnership with local primary and secondary schools and further education providers. This involves regularly working together with education partners to develop future initiatives that connect children and young people to the careers of the future. Local schools, colleges and technology colleges are moving at a pace that is significantly faster than our national curriculum to connect young people to the latest ways of learning and pedagogy in readiness for the careers of the future, some of which have yet to be imagined or designed.

CONVENERS AND CONNECTORS

Local government connect citizens to the everyday public services by sharing data with their partners running and managing these services to benefit the borough economically and socially. They also connect with colleagues in the private sector on key initiatives, delivering smart cities programmes involving and engaging cross-sector partnerships across local and regional areas.

DEMOCRATICALLY ACCOUNTABLE AND TRANSPARENT

Finally, most importantly local government has a unique local mandate to act in the best interests for everyone. Through that mandate, local government are able to innovatively use data without compromising on the interests and security of their citizens, and can demonstrate through the duties to be transparent to its citizens that they are ultimately in control of how their data will be used.

4.1 DATA CITIZENSHIP

Our first recommendation is to place 'Data Citizenship' at the heart of Newham's data sector strategy.

Putting the people of Newham at the heart of a data strategy means establishing 'Data Citizenship' as the central focus around which other elements of a data sector strategy are orientated.

'Data citizenship' is about equipping citizens with the tools and skills they need to understand the value of data for the public good; the skills to read and analyse data in their everyday lives; and the confidence to share their data, which means overcoming issues of trust and privacy.

This creates a framework against which data sector initiatives can be evaluated and prioritised.

1. How can Citizens use this data to improve their own lives?
2. How can the Borough use this data to improve Citizens lives?

There are so many opportunities to collect and share data that local governments will have to focus their efforts on the best uses of limited resources. Answering those questions first, allows prioritisation and provides direction that help to focus efforts on deliverables.

Importantly, local government has a local mandate to act in the interests of their citizens, communities, and businesses to deliver positive change. No other institution has the levels of democratic accountability and transparency to secure the trust of citizens and to work in partnership with them to ensure that their data is used only for the public good.

4.2 SPARK CENTRES

A "Spark Centre" is a physical space with:

- open and free physical access
- loaner devices
- technical support desk
- "Spark Rooms" where up to 12 people can meet, with a large display
- very high-speed Internet connection (1Gb+)

In a Spark Centre the following kinds of activities take place:

- data literacy classes
- open ideas exchange
- coding clubs
- extra-curricular skills development
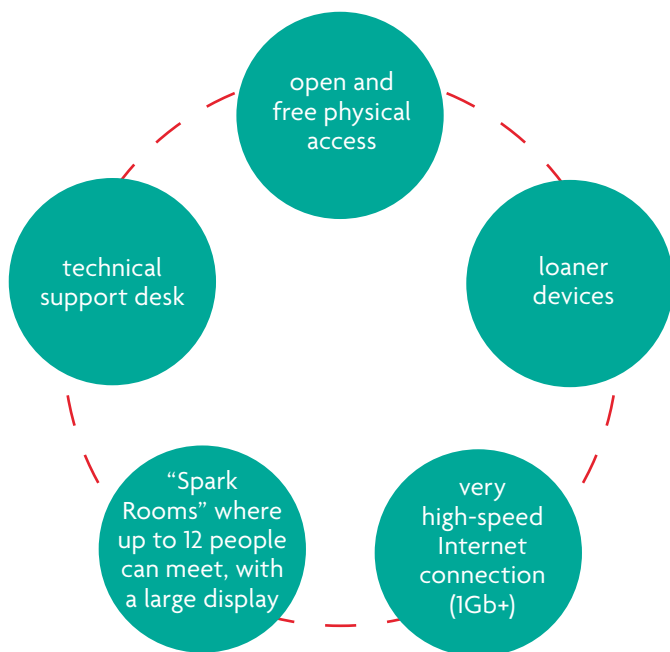
Our second recommendation is for Newham to integrate 'Spark Centres' into planning and regeneration, with a target of one being accessible within 15 minutes walking distance of every resident's home.

A Spark Centre is a social incubator. It brings the idea of stimulating commercial innovation through the use of shared physical space, to social innovation in the community.

Ideally, Spark Centres would be co-located with other shared services such as community kitchens, youth centres, libraries, transport hubs, and Advice Centres.

Planning should incorporate Spark Centres that facilitate mixing citizen, student, and commercial contributions to the upkeep, staffing, and programming of Spark Centre activities. Leveraging the model of affordable housing mandates, Spark Centres could be incorporated into development and regeneration agreements, with obligations to provide buildings and digital access.

Local government is uniquely positioned to enable local economic growth, through the relationships they have with local businesses, their role in establishing and connecting business improvement districts, in connecting and guiding local regeneration and housing, and their role in establishing the right enabling conditions to incubate and develop new local economies and sectors.

4.3 SPARK ID

Our third recommendation is for Newham to lead an initiative with London to establish a London-wide digital identity system that can be leveraged by each Borough and enable their role as trustworthy data custodians.

We propose that Newham take the lead in convening London boroughs with a view to establishing official digital identity with the framework of a pan London identity.

Local government holds and processes more data on behalf of citizens than any other body in the public or private sector, they are already the data custodians of choice. Regional and local government securely and innovatively uses data on a second-by-second basis to provide essential services to millions of our citizens as a core part of their business, and does so safely, securely and for the public good.

The UK national government has decided to abstain from the provision of digital identities, leaving it to either local government or commerce to establish practical manifestations of digital identity. The Passport Office will only provide a verification service to trusted third parties. If commercial platforms are left to control identity, they become controllers of the data.

The resource requirements of establishing digital identity are non-trivial. Digital identity management will require considerable physical infrastructure and systems, extensive governance and control, and skilled operations. Only a consortium of local governments could expect to marshal the necessary resources. London could leverage the DCMS' Trust Framework to participate in the national digital identity system. Newham could create and hold a Newham-specific digital identity, linked in to a London identity: a Spark ID.

Verified identity is at the heart of data. And citizenship is a set of rights conferred on a specific individual, so identity is inseparable from the concept of Data Citizenship.

A Spark ID would be a digital identity that could be loaded into a smartphone "wallet" and used to authenticate the holder to access Newham's services or prove identity. It could use Near-field communication (NFC) standards already in widespread use, such as for public transport. Importantly, it would not be a condition of access, but simply an easier method of access.

Newham could also assist residents without a passport or driver's license to build a sufficient set of attributes to allow them to establish a national digital identity. Thus, enabling citizens' participation locally and nationally.

A citizen's Spark ID could be used by Newham to replace personally identifying attributes in data with a verified token that simply assures that the data references a real person of known identity, but, crucially, not the actual identity of the person. A relatively simple technical process could process large quantities of data replacing private attributes with anonymous tokens. This would then allow those data sets to be shared openly.

A Spark ID could deliver as yet unachievable level of online safety and control to Newham residents. A further development of the Spark ID would allow Newham residents to use their Spark ID to control their information in other data platforms, such a social media. Newham and the wider London data ecosystem could work with social media platforms to accept Spark IDs as an authentication method and to allow the data collected on that platform to be encrypted with certificates linked to the user's Spark ID. The platform would gain the ability to validate the user's identity, and the citizen the ability to withdraw their consent at will.

4.4 DATA EXCHANGES

Our fourth recommendation is for Newham to convene and connect with London to consolidate and standardise the collection and sharing of data without compromising the privacy and freedom of residents. Data shared is data enjoyed. The value that data can generate for citizens, cities, and champions arises when it is shared.

Local government holds a pivotal role in convening and connecting a broad range of partners in the voluntary sector, strategic partners in the NHS, the police and the Education Sector, to improve local places, and to support citizens to be successful. This unique position means that they can connect the broadest range of institutions together to maximise the transformational potential of the data sector, and to share data with partners to enable positive social and economic change. Local government also connects with the private sector in key initiatives, delivering smart cities programmes involving and engaging cross-sector partnerships across local and regional areas.

The value of data is directly related to its quantity, quality, and accessibility. This means that the stronger the standardisation of data, the greater the value, as data from multiple local areas can be usefully combined. Standards that ensure that data collected in one Borough is structured in the same way as similar data collected in the next Borough increases the value of the data to everyone, and especially to data champions looking for new business opportunities.

The isolated development of information technology digital infrastructure in each London borough has created technically disparate systems that strongly resist integration at a digital level. However, at a data level, structured standardisation is an accessible objective.

Newham should take the lead in partnering with the London Data Board to implement standardised data structures, so that Newham's own data can be incorporated with other local data to amplify the total value.

"We recommend Newham to convene and connect with London to consolidate and standardise the collection and sharing of data without compromising the privacy and freedom of residents."

4.5 DIGITAL DEPENDENCIES

Our fifth recommendation is for Newham to tackle the barriers to developing the data sector. The data sector is critically dependent on the digital and educational sectors, which form vital scaffolding which underpin and enable the data sector.

Local government has been at the heart of the digital connectivity revolution, rapidly and efficiently overseeing the deployment of high-speed connectivity and data infrastructure resulting in national-level upgrades to data capabilities. This experience, combined with planning and use regulation, makes local government well placed to drive digital infrastructure deep into the public estate.

Newham should establish a set of Universal Basic Services that enables the data sector. Under the umbrella of a Universal Basic Service for Information, we include digital access, devices, literacy, and skills.

4.5 DIGITAL DEPENDENCIES

Digital

Data flows through digital connections, like water flows through pipes. The digital infrastructure must pre-exist the data in order to bring the benefits to people.

Data aspirations sit atop a comprehensive digital infrastructure that cherishes universal access. Societies should no more consider private digital connections than they do private roads. Digital connection is a public good, and universal access is its physical manifestation.

Digital access consists of mains, branches, households, and taps — much like a water system. Each is a necessary part of the whole. The taps in the digital world are the devices that are used to access data. So, expanding the concept of digital access to include devices is necessary.

We propose that governments at all levels prioritise unconditional, universal digital access to enable the benefits of data: a Universal Basic Service for Information.

A Universal Basic Service for Information will require a rearrangement of local taxation to remove the cost of basic service from private expenditure and replace it with a at least as good publicly funded service. This should be cost neutral for citizens who can afford private access today, but allow the city to ensure that all citizens have access. Private citizens can pay for enhanced services on top of the free service.

The generation of data is limited by access. Unless digital access is ubiquitous, and consent secured, the quantity of data available will be limited. This is the first readily identifiable barrier to achieving the potential of data. Universal access, tools, and education are essential to generating data, as well as using it.

A national strategy for high-speed networks as currently referenced in national digital infrastructure plans as part of the National Infrastructure Strategy[42] must be complemented with a universal right of access for data to reach its potential. The line from data to decision-making includes networks, access, devices, programs, and skills. Each of those links needs to be in place to complete the chain. A national strategy for data will have to include universal access, freely available basic devices that conform with usability and security standards, digital infrastructure for connectivity and a general programme of education for citizens to extract meaning from their data. This should include some form of data training implemented for future generations while upskilling those now can be achieved via investments in pathways and opportunities such as apprenticeships, internships in data-related roles.

In the UK, 5.3 million adults or equivalently 10 per cent of the population in 2018 had never used the internet nor accessed it (defined as internet non-users over a three-month period).[43] In 2018, 12% of those aged between 11 and 18 years (700,000) reported having no internet access at home from a computer or tablet, while a further 60,000 reported having no home internet access at all.[44] Of those in this age group, 68% who did have home internet access reported that in the absence of this access, they would find it difficult to complete schoolwork, highlighting the negative educational implications for those without sufficient internet access.[45]

Public-private partnerships for the design and production of the access devices and software should be considered. Technology manufacturers and developers respond to the needs of corporations with a few thousand users and would respond even more strongly to the needs of millions of users if standards are set and demand is assured.

[42] HM Treasury, (2020). National Infrastructure Strategy. Available at: https://www.gov.uk/government/publications/national-infrastructure-strategy
[43] Office for National Statistics, (2019). 'Exploring the UK's digital divide'. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04
[44] Lloyds Bank, (2018). 'UK Consumer Digital Index 2018'. Available at: https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/lb-consumer-digital-index-2018-report.pdf
[45] Ibid.

4.5 DIGITAL DEPENDENCIES

Literacy

The ability of ordinary citizens to use data to improve their lives requires that they have basic literacy in digital and data technologies.

Local government has a key role to play in broadening access to technical literacy development through life-long learning opportunities. Schools, colleges, and local Spark Centres can all play a role in providing ongoing technical literacy education that accessible by all.

Skill

It takes skill to turn data into information, and to present information so it informs better decision making. These skills have to be acquired.

Technology has moved so rapidly in recent decades that traditional education attainment models have struggled to keep up. By the time a technology is synthesised into a curriculum, and examinations developed to test comprehension, the underlying technologies have moved on and developed further. The emergent data sector faces the same problems with skills certification as digital and software technologies have done.

Government, academia, and business should work together to create new educational pathways that leverage the lessons learned from the adoption of agile programming techniques. Rather than targeting qualifications at specific technologies in a point in time, courses that are aligned with capabilities could be created in which sections of the curriculum are expected to continuously evolve independently.

For instance, a "Data Analysis" qualification would incorporate foundational theories with evolving practices and tools. The qualification would be period specific, and continuously updated. Students of earlier versions could earn qualifications in later versions of the same course through incremental certification. Rather than resulting in a 'data Analysis' qualification, the student would earn a 'data Analysis 2022' qualification.

5. CONCLUSION

Data is ubiquitous and its impact cuts across all sectors and policy silos. If we are to take advantage of its potential, bold new solutions are required and many of the solutions are human, not technical. For example, a data sector needs new kinds of human and physical infrastructure that weave together the capacities of government with the capabilities of citizens: putting greater emphasis on making best use of the data that public agencies and local government hold yet often do you not use in meaningful ways; rebalancing the flow of value from data towards citizens and communities; foregrounding citizen participation, inclusion and empowerment in ways that put people in control of sharing their own data; creating the data infrastructures and fibres that enable the physical transferring and sharing of data which is currently unstandardised and absent from the statutory rights of local authorities. Accurate data, reliably based on personal data, with no threat to privacy, and shared for the public good is the holy grail for data.

The Institute for Global Prosperity, UCL and the London Borough of Newham are calling on government, universities, businesses, citizens to partner with us and develop a joint approach to further research in this emerging area.

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APPENDICES

TABLE 1: BASELINE AND OPTIMISTIC ESTIMATE AND FORECASTS FOR THE NUMBER OF UK DATA COMPANIES AND THEIR REVENUES (IGP, 2021) AND (EUROPEAN COMMISSION, 2020)*

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	Data Companies						
		Baseline	Total	327,850	357,350	389,676	425,113
		Optimistic	Total	327,850	409,550	513,014	644,389
	Revenues of Data Companies (£bn)						
		Baseline	Total	17.23	24.95	36.13	52.33
		Optimistic	Total	17.23	38.63	86.61	194.20

*European Commission (2020) estimates and forecasts used for 2020 and 2025. Revenues of Data Companies (£bn) converted from euros to pounds (€/£ = 0.85)

TABLE 2: BASELINE AND OPTIMISTIC TOTAL, DIRECT, INDIRECT OPEN DATA MARKET SIZE ESTIMATES AND FORECASTS FOR THE UK (IGP, 2021) AND (EUROPEAN DATA PORTAL, 2015)*

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	Market Size (£bn)						
		Baseline	Direct	9.81	11.51	12.67	14.07
			Indirect	25.90	30.37	33.46	37.14
			Total	35.71	41.88	46.13	51.20
		Optimistic	Direct	9.81	12.11	14.95	18.45
			Indirect	25.90	31.97	39.46	48.71
			Total	35.71	44.08	54.41	67.16

*2020 figures for 'baseline' direct open data market size taken from European Data Portal (2015) and converted from euros to pounds (€/£ = 0.85)[46]

[46] European Data Portal, (2015). 'Creating Value through Open Data'. Available at: https://data.europa.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

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The European Data Portal (2020) distinguishes between the direct and indirect market size in the following way. "The direct market size refers to the monetised benefits that are realised in market transactions in the form of revenues and Gross Value Added (GVA). The indirect market size refers to the benefits of open data i.e. new job potential, new goods and services, time savings for users of applications using open data, knowledge economy growth, increased efficiency in public services and growth of related markets".[47]

TABLE 3: BASELINE AND OPTIMISTIC 'DATA ECONOMY VALUE' AND 'DATA MARKET VALUE' ESTIMATES AND FORECASTS FOR THE UK (IGP, 2021) AND (EUROPEAN COMMISSION, 2020)*

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	Data Economy Value (£bn)						
		Baseline	Total	75.25	105.81	148.78	209.19
		Optimistic	Total	75.25	178.18	421.89	998.96
	Data Market Value (£bn)						
		Baseline	Total	15.31	19.61	25.13	32.20
		Optimistic	Total	15.31	29.21	55.75	106.39

*European Commission (2020) estimates and forecasts used for 2020 and 2025. Data Economy Value (£bn) and Data Market Value (£bn) figures converted from euros to pounds (€/£ = 0.85)

Value of the 'data market'
The 'baseline' value of the data market defined as "the marketplace where digital data is exchanged as 'products' or 'services' as a result of the elaboration of raw data", is estimated at £15.31 billion in 2020 and forecasted at £19.61 billion in 2025[48], our forecasts find this to reach £25.13 billion 2030 and £32.20 billion 2035. The corresponding 'optimistic' figures in 2020 and 2025 are £15.31 billion and £29.21 billion respectively[49], with our forecasts suggesting the value of the data market is approximated at £55.75 billion in 2030 and £106.39 billion in 2035.

[47] Eu European Data Portal, (2020). 'The Economic Impact of Open Data: Opportunities for Value Creation in Europe'. Available at: https://data.europa.eu/en/highlights/the-economic-impact-of-open-data

[48] European Commission, (2020). 'Final Report on Facts and Figures: Updating the European Data Market Monitoring Tool'. Available at: https://datalandscape.eu/sites/default/files/report/EDM_D2.7_FinalReportFactsFigures_02.04.20.pdf

[49] Ibid.

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TABLE 4: ESTIMATED BASELINE AND OPTIMISTIC TOTAL, DIRECT, INDIRECT OPEN DATA EMPLOYMENT ESTIMATES AND FORECASTS FOR THE UK, LONDON AND NEWHAM (IGP, 2021)

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	Employment						
		Baseline	**Direct**	112,471	114,510	117,519	120,426
			Indirect	409,395	416,817	427,768	438,351
			Total	521,866	531,327	545,286	558,777
		Optimistic	**Direct**	112,471	138,823	171,350	211,498
			Indirect	409,395	505,317	623,714	769,852
			Total	521,866	644,140	795,064	981,349
London							
	Employment						
		Baseline	**Direct**	15,836	16,123	16,547	16,956
			Indirect	57,643	58,688	60,230	61,720
			Total	73,479	74,811	76,776	78,676
		Optimistic	**Direct**	15,836	19,546	24,126	29,779
			Indirect	57,643	71,149	87,819	108,395
			Total	73,479	90,695	111,945	138,174
Newham							
	Employment						
		Baseline	**Direct**	632	643	660	677
			Indirect	2,300	2,342	2,403	2,463
			Total	2,932	2,985	3,063	3,139
		Optimistic	**Direct**	632	780	963	1,188
			Indirect	2,300	2,839	3,504	4,325
			Total	2,932	3,619	4,467	5,513

The European Data Portal (2020) report[50] distinguishes between direct open data employees such as open data analysts and product marketers who work for firms creating such direct open data jobs, to those indirectly involved, for example, sales managers.

[50] EEuropean Data Portal, (2020). 'The Economic Impact of Open Data: Opportunities for Value Creation in Europe'. Available at: https://data.europa.eu/en/highlights/the-economic-impact-of-open-data

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TABLE 5: ESTIMATED BASELINE AND OPTIMISTIC TOTAL NUMBER OF DATA PROFESSIONALS ESTIMATE AND FORECASTS FOR THE UK (IGP, 2021)

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	Data Professionals (m)						
		Baseline	**Total**	1.67	2.02	2.43	2.92
		Optimistic	**Total**	1.67	2.31	3.19	4.40

TABLE 6: ESTIMATED BASELINE AND OPTIMISTIC TOTAL GROSS VALUE ADDED (GVA) FORECASTS FOR THE UK, LONDON AND NEWHAM (IGP, 2021)

Scale	Measure	Baseline/Optimistic	Total/Direct/Indirect	2020	2025	2030	2035
UK							
	GVA (£bn)						
		Baseline	**Total**	7.76	8.44	9.28	10.32
		Optimistic	**Total**	23.28	25.32	27.84	30.96
London							
	GVA (£bn)						
		Baseline	**Total**	1.78	1.94	2.13	2.37
		Optimistic	**Total**	5.35	5.82	6.40	7.12
Newham							
	GVA (£bn)						
		Baseline	**23.06**	28.34	31.16	34.65	2.37
		Optimistic	**Total**	78.17	85.02	93.49	103.96

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