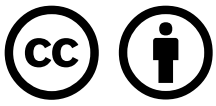
مؤسسة دبي للمستقبل
DUBAI FUTURE FOUNDATION

اقتصادية دبي
DUBAI ECONOMY

NEW DATA ECONOMY REPORT

MAY 2021

DUBAIFUTURE.AE



FOREWORD

Over the last two decades, we have witnessed exponential growth in the use of digital technologies. This has been accelerated by the increasing awareness of data in creating economic value. Global economic development has surged due to a growing wave of digitalisation. National statistical accounts have evolved to develop new definitions of 'digital and data-related' economic sectors, covering digital platforms, cashless financial transactions, social media, and structured and unstructured data. This represents an evolution of the traditional measures of what constitutes the information and communications technology (ICT) sector. The digital and new data economy has arrived, bringing major implications for value creation.

The new data economy has the capacity – and potential – to collect, exchange, process and analyse data through sophisticated artificial intelligence and machine learning algorithms, allowing businesses to reinforce their market position and drive a cycle of continuous growth and expansion. Most fundamentally, data is also spurring the development of entirely new technologies and business models that were not previously imaginable, much as global information system (satellite) data did for today's global positioning system (GPS) mapping industry. At the economy level, data-related activities are no longer mere side activities in the production of goods and services. Instead, data is having a multiplier effect on the economy and assuming a central role in many mature economies.

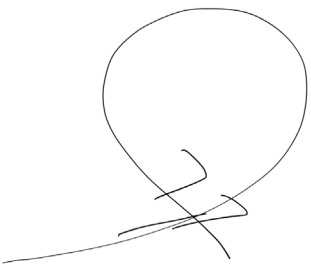
Dubai has been at the forefront of technology adoption since it announced the first ICT strategy in 1999 and has followed through with such initiatives as e-Government, m-Government, Smart City, open data, autonomous transport and the mandating of block chain for government transactions. What makes the city stand out among the rest in the region is the fact that digitalisation has been built into the government's public service and economic development strategy.

In the current pandemic scenario, national strategies have further emphasised the role of the digital economy as a priority sector. Action needs to be taken to unlock this enormous but partially-tapped resource.

However, the potential of data for economic development is still underexplored. As noted by the World Economic Forum “many institutions have focused their attention and resources mostly on data protection and privacy. This approach limits the power to harness the full value of data. It has also led to the rapid fragmentation of data governance policies and impeded data sharing for agreed-upon purposes.” This acknowledgment and understanding are driving global debates and discussions around the regulatory frameworks and commercial models used to enable data exchange and use.

To this end, the Dubai Future Foundation and the Department of Economic Development collaborated to explore how Dubai’s data economy is shaping up and what can be done to exploit new opportunities and address current gaps in the areas of innovation, infrastructure, entrepreneurship, small and medium enterprise development, talent, skills, regulation and policy development. The focus of the present study will be on addressing how governments and businesses can work towards harnessing the value of data for economic development.

Khalfan Belhoul
CEO
Dubai Future Foundation



Mohammed Shael Alsaadi
CEO
Corporate Strategic Affairs Sector
Dubai Economy

TABLE OF CONTENTS


THE
NEW DATA
ECONOMY

THE NEW DATA ECONOMY

The rapid and constant accumulation of data on our smart devices, combined with advances in analytics and storage technology, has transformed data into a critical resource. Companies and governments are using data to increase efficiency, streamline operations and derive strategic insights with a level of accuracy that was not previously possible. The global market for Big Data estimated at US$70.5 Billion in the year 2020, is projected to reach a revised size of US$243.4 Billion by 2027.[1] (see Box 1)

Simultaneously, however, data is also spurring the development of entirely new technologies and business models that were not previously imaginable. The opening of geographic information systems (GIS) data,[i] for example, has fueled the growth of the global positioning system (GPS) industry that now represents a market worth over $128 billion.[2] GIS data also underpins several new technologies and businesses that combine it with cross-sector data to create new applications such as urban planning and logistics.[3] Similarly, in the healthcare sector, data sharing and analytics across research institutions and hospital facilities have driven the emergence of the precision medicine industry. Medical researchers can now use aggregated and anonymised patient data to identify genetic mutations and molecular abnormalities to detect diseases earlier and develop patient-specific treatments.[4] The global precision medicine industry is expected to be worth $105 billion by 2026.[5]

1. Big Data - Global Market Trajectory & Analytics, Global Industry Analysts, Inc, 2021.
2. Reportlinker, “The Global GPS (Global Positioning System) Market size is expected to reach $128.7 billion by 2025, rising at a market growth of 20.3% CAGR during the forecast period”, 2020.
3. William D. Eggers, Rob Hamill, and Abed Ali, Deloitte Review, “Data as the new currency Government’s role in facilitating the exchange”, 2013.
4. Tim Hulsen, Saumya S. Jamuar, Alan R. Moody, Jason H. Karnes, Orsolya Varga, Stine Hedensted, Roberto Spreafico, David A. Hafler, and Eoin F. McKinney, “From Big Data to Precision Medicine”, Frontiers in Medicine, 2019.
5. UnivDatos Market Insights, “Precision Medicine Market to Reach US$ 105.6 Billion by 2026, Globally |CAGR: 9.9%”, 2020.

DATA IS SPURRING THE DEVELOPMENT OF ENTIRELY NEW TECHNOLOGIES AND BUSINESS MODELS THAT WERE NOT PREVIOUSLY IMAGINABLE.

1

Box 1 – Growth of the Data Economy: Mergers and Acquisitions

According to the Organisation for Economic Co-operation and Development (OECD), the economic importance of data access and the rapid growth of the data economy is visible through the increasing number of mergers and acquisitions (M&As) of data-intensive firms. In order to ensure access to business-critical data, a number of key M&As have been initiated in recent times: Monstanto acquired Climate Corporation, an agriculture analytic firm, for $1.1 billion in 2013; IBM acquired a majority share of the Weather Company, a weather forecasting and analytic company, for over $2 billion in 2015; and Alibaba invested a total of $4 billion to acquire Lazada, a leading e-commerce platform founded in 2018. Start-ups specialised in big data are also increasingly the target of acquisitions. The annual number of these acquisitions increased from more than 100 acquisitions in 2013 to more than 400 acquisitions in 2017, with the average price paid exceeding $1 billion in some cases.

Such vast uses and applications of data are underpinning the growth of what can be termed the new 'data economy' – the "financial and economic value created by the storage, retrieval and analysis – via sophisticated software and other tools – of large volumes of highly detailed business and organisational data at very high speeds".[6ii]
As noted in figure 1, data could already be worth anywhere between 7-10% of the GDP in certain advanced economies; while the UK's data economy is already estimated to be worth $90 billion, while Germany's is estimated at $130.9 billion.[7]

6–7. Digital Reality, "The Data Economy Report," 2018.

Figure 1 – Untapped Potential of the Data Economy[8]

8. Digital Reality, "The Data Economy Report," 2018.

Global metrics to comprehensively measure the growth and impact of the data economy are still being developed. Given that data is enabling existing businesses across all industries to generate more value while also underpinning the growth of new technology sectors such as artificial intelligence (AI) and the Internet of Things (IoT), it is likely that the actual size of a country's data economy may be much greater than current estimates can indicate.

To measure the impact of data on an economy or within an economy more accurately, therefore, it is crucial to understand certain unique characteristics of data as a resource. Unlike oil or other commodities, which are key economic or business inputs, data does not get used up as it is consumed; it can be used multiple times without losing any of its value (i.e., it is non-rivalrous).[9] Furthermore, data typically increases in value when combined with other data, as larger and more comprehensive datasets allow more accurate insights and correlations.[10] In this sense, data comprises a relatively unique industry and therefore requires governments and businesses to develop new models of valuing, exchanging and governing it. Policymakers, in particular, will need to ensure data is easily accessible as it enables other parts of the economy to grow and be more productive.

Comparable to the 'electricity economy' or the 'transport economy' in this context, the infrastructure facilitating the exchange and distribution of data will be just as critical as the resource itself to drive the growth of the data economy.

9. Organisation for Economic Co-operation and Development, "Enhancing Access to and Sharing of Data: Reconciling Risks and Benefits for Data Re-use across Societies", 2019.
10. Global System for Mobile Communications, "The Data Value Chain", 2018.

Realising the significance of their data economies, forward-looking governments are now not only strengthening public data platforms (see Box 2) but they are also actively working on fuelin the growth of their domestic data industries. Public sector entities are working with businesses on developing use cases, building data marketplaces and exchanges, designing sector-specific data regulations (see Box 3), and establishing data privacy models (see Box 4).

Governments around the world are clearly acknowledging that economic competitiveness in the future will rely on the sophistication and maturity of a country's data ecosystems.

2

Box 2 – Estonia: Once Only

Estonia's Information Sharing Data Sheet (X-Road) initiative facilitates data sharing by connecting the main national databases in Estonia. It therefore allows government entities, businesses, and citizens to access and use data, including Europe-wide datasets, from these national registries. The initiative follows an "once-only" principlem which asserts that government entities must only collect data that has not been previously gathered or which does not already exist in any other public-sector database. In other words, if a company or individual has already submitted data to one authority, they should not be forced to do it twice.

3

Box 3 – Open Banking: A Sector-Specific Approach to Data Sharing

Open banking regulations, such as the European Union's (EU) Second Payment Services require banks to publish standardised open data about banking products; branches and ATMs, facilitate permissioned access to customer account data; and provide wider access to payment services between banking providers.

Mandated in the EU and UK among a few other countries, the purpose of open banking regulations is to create opportunities for 'third-party providers' in the financial services industry, for instance fintech startups, that significantly rely on data access for application and platform development, to create innovative services for banking customers. These include budgeting software platforms, retail investment platforms, credit and loan facilities, and services that allow consumers to switch banking providers more easily. Open banking also allows existing large market players an opportunity to work with startups and develop innovative products and services for their customers.

For example, through open banking application programming interfaces (APIs), Barclays in the UK works with startups through standardised interfaces, rather than bespoke data sharing. Knowledge of the Open Banking Standard in the fintech community allows Barclays to engage with an experienced set of startups, potentially reducing time for new products and partnerships to reach the market. Startups using data via Barclays APIs include:

- Chip, an app which uses an algorithm to analyse a customer's spending and work out how much they can afford to save each month, and then transfers that amount to a Barclays instant-access account;
- Bean, an app allowing customers to compare deals on their household bills, track payments and cancel unwanted subscriptions from a simple dashboard; and
- Money Box, an app enabling people to round up the cost of digital payments and invest the spare change, helping people to build savings via micro-payments.

By increasing access to data across the industry, open banking has the potential to allow banks to benchmark their products and services against competitors, reach new customers more easily through affiliated third-party services, and access the necessary evidence without difficulty for fraud prevention checks and customer identity verification (otherwise known as Know Your Customer (KYC)). Understanding the Open Banking Standard, both as a provider of APIs and a consumer of data, means Barclays is in a strong position to understand, explore and capitalise on the benefits of wider industry adoption.

4

Box 4 – General Data Protection Regulation:
An Overarching Data Privacy Framework for the EU[11]

The General Data Protection Regulation (GDPR) is concerned with the control and processing of personal data (that is any information relating to a person who can be directly or indirectly identified in particular by reference to an identifier) and sensitive personal data. It addresses data privacy through a number of channels:

- Strengthening existing individual privacy rights;
- Harmonizing data protections standards within the EU; and
- Increasing enforcement powers and biometric data that allows to uniquely identify an individual.

The GDPR refers to natural persons whose rights it protects as data subjects, while referring to entities that determine the purpose and means of processing personal data as data controllers, and to entities that process data on behalf of the controller as data processors. For example, if Emirates wants to advertise its services to European consumers and uses MailChimp to deliver e-mail campaigns on its behalf, then Emirates are a data controller and MailChimp is a data processor. This distinction is important, as under the GDPR it is the data controllers that carry the majority of responsibilities. Through the GDPR, individuals have the right of access, rectification, erasure, restricting processing, objection and being informed.

Geographic Scope
Although the GDPR is an EU regulation, its territorial scope reaches far beyond Europe as its provisions pertain to all entities that offer goods or services to the data subjects in the EU or monitor data subjects' behavior within the EU. This means that some of the non-European entities that were not obliged to comply with the previous Data Protective Directive (DPD), which the GDPR replaced, have new duties under the GDPR.

Harmonisation
The GDPR introduces a wider harmonisation of data protection standards within the EU, which not only strengthens the equal protection of citizens, but also incentivises transnational expansion for businesses that were previously hesitant to engage due to administrative burdens and conflicted regulatory requirements.

Enforcement
The GDPR ensures compliance through the introduction of hefty fines. Article 83(5)(a) states that infringement of the principles of personal data processing is subject to the highest tier of administrative fines. This may mean a fine of up to 20 million euros, or 4% of a company's total annual turnover, whichever is higher.

11. Organisation for Economic Co-operation and Development, "Enhancing Access to and Sharing of Data: Reconciling Risks and Benefits for Data Re-use across Societies", 2019.

THE SOPHISTICATION AND MATURITY OF A COUNTRY'S DATA ECONOMY WILL BE CRITICAL FOR ITS ECONOMIC COMPETITIVENESS IN THE FUTURE.

WHAT IS THE DATA ECONOMY?

In the data economy, 'data' can be distinguished as a novel commodity which is refined, processed and consumed. Data services are also technically 'new' economic activities that extract value from data or add value to it before it is exchanged or consumed. In this context data, as a new resource, is comparable to what has come to be known as 'big data'.[12]

Big data differs from traditional data, intelligence and statistics as it represents larger, more complex datasets that are increasingly collected by new data sources such as sensor-enabled equipment, clickstreams on webpages and mobile apps, or live data feeds from online platforms such as Twitter, YouTube or Facebook. Moreover, these datasets are larger in quantity than traditional datasets; they could range from tens of terabytes to hundreds of petabytes, covering text, images, sound, and videos, and therefore, they cannot be processed by traditional data processing software (see Box 5). In other words, such data requires new or more sophisticated processing techniques and skills. To this end, data science has emerged as a new skill or expertise, merging mathematics and statistics with computer programming and machine learning (ML) to extract value from this massive amount of data.

5

Box 5 – The Emergence of the data economy[13]

The emergence of the Data Economy can be traced to the widespread use of the internet over the late 1990s. Over this period, personal computers became widely available, allowing individuals, companies and governments to begin accumulating larger datasets. The subsequent increase in internet access followed by the development of smartphone technology at the turn of the century made personal mobile phones, email, and other web browsing services readily accessible to a larger share of the global population. Dramatic improvements in smart phone technology since then, including the proliferation of touch screen user interfaces which increased smart phone usage, and the appearance of numerous 'smart' devices, alongside significant upgrades to the supporting telecommunication networks, have all facilitated the generation and collection of vast amounts of data and driven the growth of the data economy.

12. Oracle, "Big Data Defined", 2020.
13. Statistics Canada, "The value of data in Canada: Experimental estimates", 2020.

Big data also differs from traditional data in the speed with which it is delivered. For example, the proliferation of smart devices and network infrastructure now enables the gathering of data in real time or near real time, leaving little or no lag between evaluation and action as opposed to traditional data or statistics collected at longer intervals and uploaded in bulk on a quarterly or annual basis. Normally, high velocity data streams go directly into memory as opposed to being temporarily written to disk. Moreover, whereas traditional data types were structured and fitted neatly into relational databases, new data can consist of unstructured or semi-structured data types, such as text, audio, images and video, and requires additional pre-processing to derive analysis and support metadata.

Although still in its infancy, the growth of this economy is already driving significant debate and discussion around the regulatory and commercial frameworks put in place to enable data exchange and use. As open data is free to share and use, it theoretically constitutes a public good.[14] Therefore, like other public services provided by governments, it is argued that public data infrastructure would have to be supported by fiscal budgets and potentially require dedicated 'taxes'.[15] Moreover, as some data clearly has a commercial value for businesses and government entities that buy and sell it, it also constitutes a commodity. In this case, it is argued that individuals that contribute to data generation could receive remuneration for the data they provide. Most fundamentally, however, it will be critical to understand how governments and businesses can work towards harnessing the value of data. The focus of the present study will be to address the latter question.

14. Open Data Institute, "What Makes Data Open?", 2013.
15. World Economic Forum, "Data for a Common Purpose Initiative", 2021.


DATA-DRIVEN
BUSINESS
MODELS

DATA-DRIVEN BUSINESS MODELS

Digital businesses are creating new value from real-time data generated from their platforms. Indeed, a significant share of the growth and success seen by tech giants such as Amazon, Google, Facebook and Netflix can be attributed to the zettabytes of data they generate and use. By integrating different streams of data on demographics, historical purchases, interactions and shopping patterns, such businesses are able to develop detailed customer demand and market profiles and offer highly tailored and personalised products and services. Data thereby takes on a multiplier effect, allowing companies to augment existing revenues and create new revenue streams which in turn allows them to generate more data (see Box 6). Data can enable companies to develop a competitive advantage and gradually increase this advantage as they generate more data, further reinforcing their market position. Research, therefore, shows that data-focused businesses typically generate higher returns than other businesses, even in traditional sectors, as entrepreneurs and developers extract and create value from data through a range of innovative models. These include:

DATA SUPPLIERS / DATA AS A SERVICE

Such entities can be government offices or private sector companies that publish data they gather as a by-product of their core function via an open interface, allowing others to use and reuse it. Alternatively, data suppliers can sell data privately in a relatively raw form, aggregated and anonymised. If data is openly shared, it is typically associated with broader business benefits of greater transparency, reputational enhancement and wider economic or societal good. On the other hand, if data is sold, it adds a revenue stream to the entities' core functions.

Examples are Google, Asos and government-led open data initiatives such as Dubai Pulse and Bayanat.

AGGREGATORS / INSIGHT AS A SERVICE

Aggregators are largely private sector companies that collect and aggregate open data, internal data and potentially other proprietary data, typically on a particular sector-specific theme. By applying advanced analytics to such data, actionable insights can then be provided as value-added services to businesses, consumers or governments. Revenue models for such data can include 'freemium' pricing, charging subscription fees for access to their insights. Others may charge suppliers to publish their data, have a pay-per-use pricing model for API access, or earn revenue from advertising.

Examples include Euromonitor, Economist Intelligence Unit, Oxford Analytica and Akzonobel.

ENRICHERS

Such entities are typically larger, established businesses that use data to enhance their existing products and services through better insight. Such products and services are not entirely dependent upon data and may be focused in more traditional sectors such as retail or aviation. However, data is indirectly monetised by allowing them to improve operational efficiency and streamline costs. Such companies can also be suppliers of data to downstream or upstream players in the entity's existing value chain.

Examples are Barclays and Airbus (see Boxes 3 and 7 respectively).

ENABLERS

Some entities facilitate the supply or use of data but are not themselves users or re-users of data. Such business models are directly revenue-generating. They also encourage greater supply of open or shared data by providing cost-effective solutions for businesses that may not have the funds to invest in bespoke platform developments or data analytics.[16]

Examples include Rainforest QA, InnoCentive and Qmarkets Innovation Management.

16. Deloitte, "Open Growth: Stimulating Demand for Open Data in the UK".

PLATFORMS

Digital platforms typically enable two or more groups to interact and bring different players together in the data value chain. Platforms can bring together customers, advertisers, service providers, producers, suppliers, and even physical objects. In the case of most platforms, the more people that use them the greater the utility of the platform and the greater the value creation potential.[17]

Examples are Ebay and Facebook.

DEVELOPERS

Developers use data and analytics to design, build and sell web-based, tablet or smartphone applications for individual consumption. Such applications typically use more dynamic types of open data, which are updated frequently. These companies typically offer the greatest 'value' to consumers using sophisticated and proprietary algorithms by generating enriched, highly transformed customised real time data delivered to consumers via cloud-based services.

Examples include Google Maps, Uber and Deliveroo.

17. Global System for Mobile Communications, "The Data Value Chain", 2018.

6

Box 6 – The Diversity of Revenue Models in the Data Ecosystem

As noted by the OECD in their report "Data-Driven Innovation: Big Data for Growth and Well-Being," businesses in the data ecosystem use diverse revenue-generation models:

FREEMIUM
In this revenue model, which is one of the most commonly used, basic products are available for free and additional charges are added on for more proprietary data or features.

ADVERTISEMENTS
Advertisements are typically used to provide revenues for business-to-consumer (B2C) offers where the products are offered free of charge, or with a discount to users, in exchange for their viewing of paid-for advertisements. Examples include Facebook and YouTube.

SUBSCRIPTION
Subscription-based revenue models are also commonly used, particularly in business-to-business (B2B) markets. These include data portals that can be accessed through regular daily, monthly or annual subscriptions, such as Spotify and Netflix. Subscription-based revenue models are often combined with the freemium revenue model.

USAGE FEES
Businesses with usage fee revenue models typically charge consumers usage fees for use of online services or offers that are provided on an 'Everything-as-a-Service' basis, such as cloud computing. These services are offered through a pay-as-you-go model, where usage fees are charged for the use of the service.

SELLING OF GOODS
Asset sale is still used in the data ecosystem, including by service platform providers that sell sensor-equipped smart devices as a source for generating data and delivering added-value services. This includes pay-per-download revenue models, where users pay per item of download, including data and digital content such as music and videos.

SELLING OF SERVICES
This revenue model includes the provision of B2B services including services provided by intermediaries, such as web hosting and payment processing. It also overlaps with the revenue models based on subscriptions and usage fees, often used for IT service contracts.

LICENSING
This model is typically used to generate revenues from intangible assets that are protected through intellectual property rights such as patents and copyrights. Licensing can therefore be used to monetise data, software, software components, algorithms, libraries and APIs.

COMMISSION FEES
These are mainly used in B2C markets by intermediaries that use data analytics to better match supply and demand. Payments are often calculated based on a percentage of the price of products supplied and will only be obtained when successfully matching supply and demand.

METHODOLOGY

In order to strengthen Dubai's data economy and accelerate the use of data as a resource for business and economic development in Dubai (and potentially in the region should Dubai be able to position itself as a data services hub) the present report seeks to gauge the dynamics of the existing data market and identify key constraints in the ecosystem.

The report will essentially look at each part of the data value chain and attempt to determine the state of:

I. DATA ACCESS

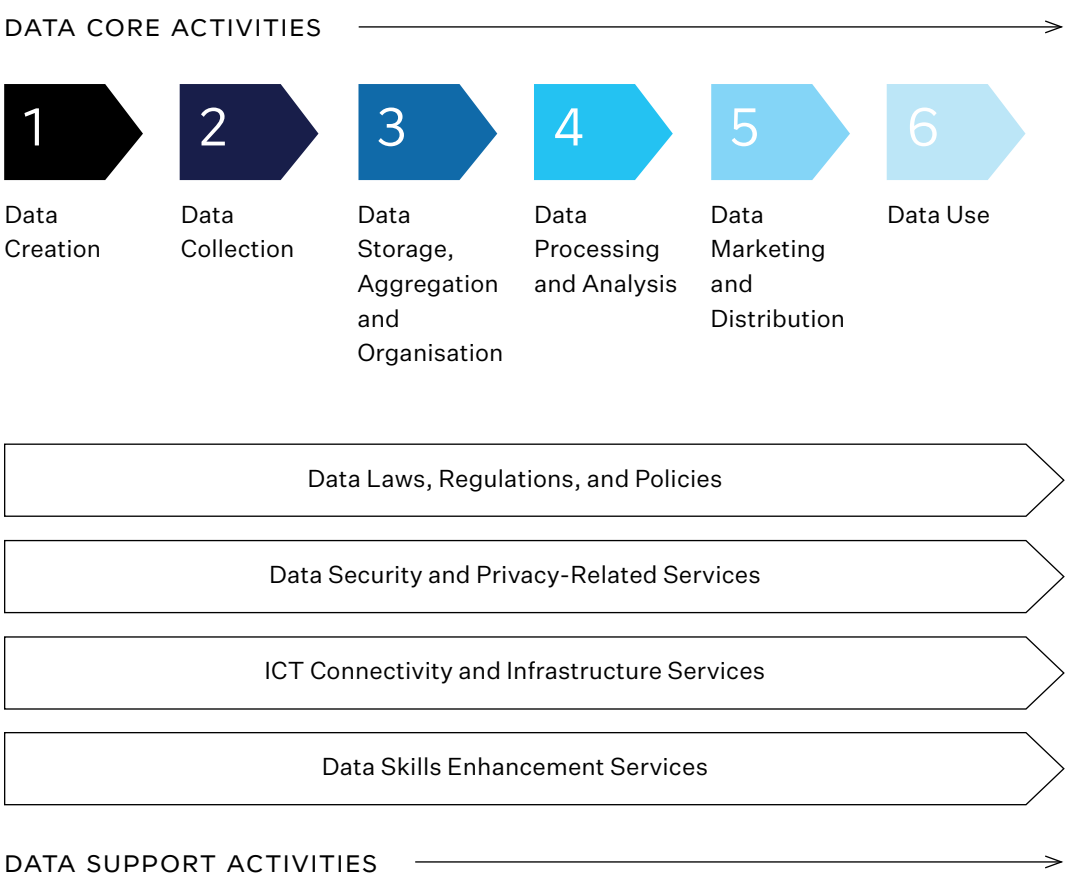
How widely/effectively is data generated, collected and exchanged/shared in Dubai (i.e., data supply) and to what extent is this data available to users?

II. DATA USE

How widely is data used for analytics, AI, ML and other value-added applications (i.e., data demand)?

DATA VALUE CHAIN

Figure 2– Data Value Chain[18]



RESEARCH SOURCES FOR THIS STUDY

1. Interviews with 30+ key public/private sectors stakeholders
2. EngageDxB business leaders' survey (Q4-2020) '150+ respondents'
3. Consultations with subject matter experts (Dubai Data Establishment (DDE), Open Data Institute (ODI), IBM, etc)
4. Secondary data

18. International Telecommunications Union, "Technical Specification D5 - Data economy: Commercialization, ecosystem and impact assessment," 2019.

NURTURING

THE DATA ECONOMY

IN DUBAI

STATE OF DUBAI'S DATA INFRASTRUCTURE

The Dubai Data Establishment (DDE) was launched in 2016 to strengthen data access in Dubai. Public entities are now mandated to comply with a number of data publication guidelines as stipulated by the Dubai Data Law. Essentially however the DDE works to

1. Promote Clear and Decisive Data Governance

Initiatives to promote governance include DDE's Dubai Data Standards, AI Ethics principles and guidelines and Data Sharing Toolkit. Dubai Data Standards, published in 2017, form a foundational element of DDE's work and seek to enhance data quality and standards in the Emirate. They are regularly updated to reflect advancements in data management and use.

2. Share and Enable the Exchange of Data

Initiatives to strengthen data sharing and exchange include Dubai Pulse and the Dubai Registers initiative. The Registers form a network of accurate, reliable and interconnected data registries for the city. DDE has also developed a network of data champions in 48 government entities and works extensively to build capacity through training public sector employees in data management practices.

3. Drive Advanced Data Analytics Collaborations

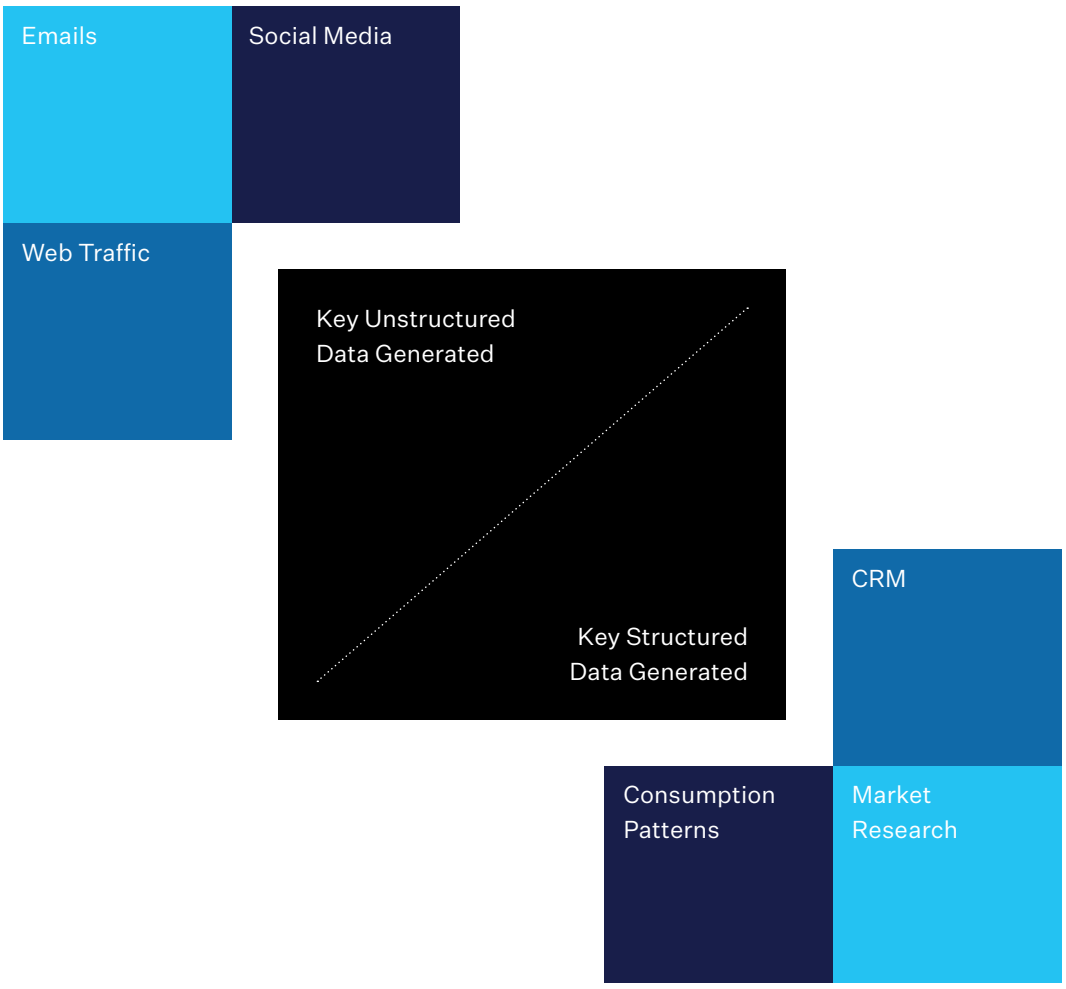
DDE also works to enhance and drive analytics collaborations across public and private sector entities. Examples include DDE's Covid 19 Dashboards and retail analytics initiatives.

I. DATA ACCESS

Across the public sector, data collection creation, or **data supply,** is notably and consistently high as the majority of entities collect data generated through the provision of services and other functions in compliance with the Dubai Data Law. Such data is typically cleaned and managed by internal data teams and in some instances used for analytics to increase efficiency and, inform strategy.

Top data sources include unstructured and structured datasets as seen in Figure 3. Similarly, 73% of local businesses, as seen in Figure 4, dedicate specific resources to collecting internal and external data. This indicates, at least theoretically, that data generation and collection, or data supply, is high in Dubai.[19]

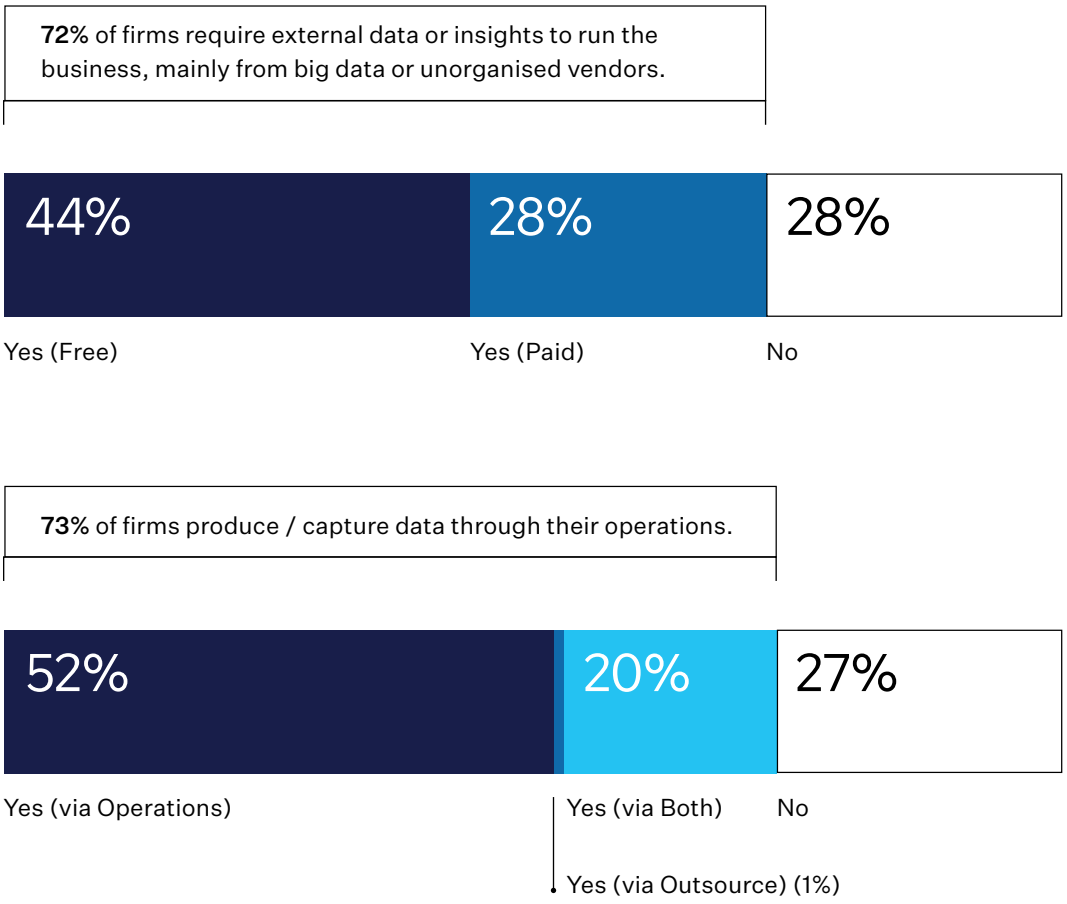
Figure 3 – Top 3 Structured Data and Unstructured Data Sources Used by Businesses



19. EngageDxB Business Leaders Survey, "The New Data Economy", 2020.

Data demand is also expected to be relatively high as noted in stakeholder interviews. Public sector entities regularly source external data through other government entities or external vendors[iii] and 72% of firms indicate that they require external data and insights.[20]

Figure 4 – Data Demand



Nevertheless, this demand is largely not met due to a number of key barriers to data access. Data quality and data availability from public and private sources were found to be the most significant barriers in stakeholder consultations and survey results, followed by the barriers of price, regulations and relevance. These barriers most likely account for the gap between supply and demand and explain that despite high levels of data generation and data collection, **data exchange**, or access to data, is still notably low.

20. Ibid

Figure 5 – Key Barries to Data Access

BARRIERS TO DATA ACCESS

a. Data Quality

One of the primary bottlenecks currently impeding the potential of public data to create value is its comparatively low quality. It is important to note that as various data standards are established by different emirate and federal level entities, the importance of driving awareness and actual use may help address this issue.

b. Availability

The private sector's direct access to data generated in the public sector remains low. In some industries, data is not easily accessible because there are many approvals and documents required to request public or official data. In other cases, the data is priced prohibitively high or cannot be accessed or purchased without a formal contract in place with the respective authority. Some entities are working on enhancing the consumer experience so that data is more easily accessible or purchasable.

c. Pricing

Whether data is sold through websites or on a case-by-case basis through contracts, pricing strategies are not commonly determined by market value or standard price benchmarks.

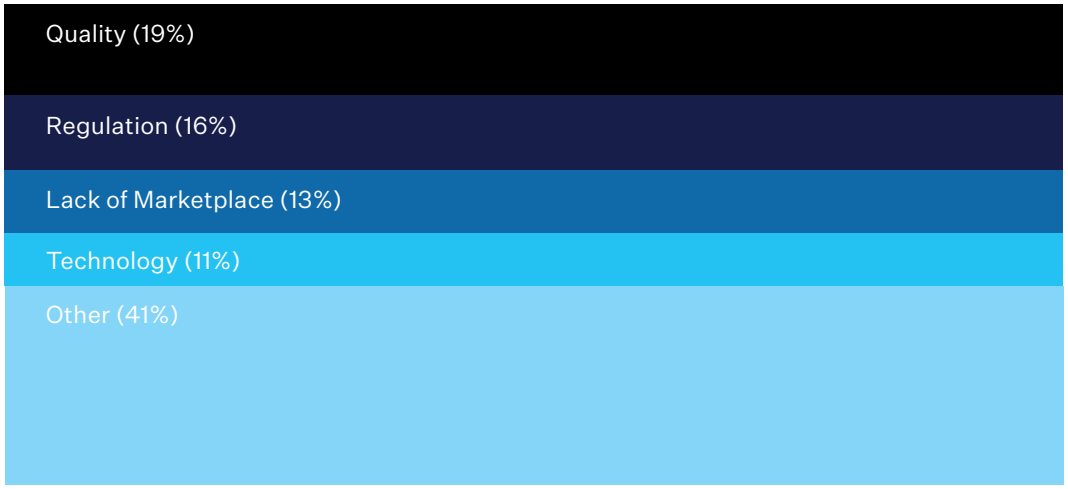
d. Regulations

Firms in the digital economy, which function on a 'region as a market' model as opposed to a 'city as a market' one, require data mobility and therefore clear data regulations to grow and scale.[21] However, due to data residency requirements in certain sectors, some businesses cannot operate at scale in the region, reducing competitiveness and potentially driving them to relocate to bigger markets such as Saudi Arabia. Such regulations are potentially obstructing the data value chain and therefore preventing the emergence of higher value-added business activities that rely on data such as the creation of new data-focused businesses and the integration of data analytics and AI technologies into existing business models.[22]

Figure 6 – Data Access and Monetisation Issues

64% of firms say Dubai/ UAE need better data standards.

DATA MONETISATION ISSUES

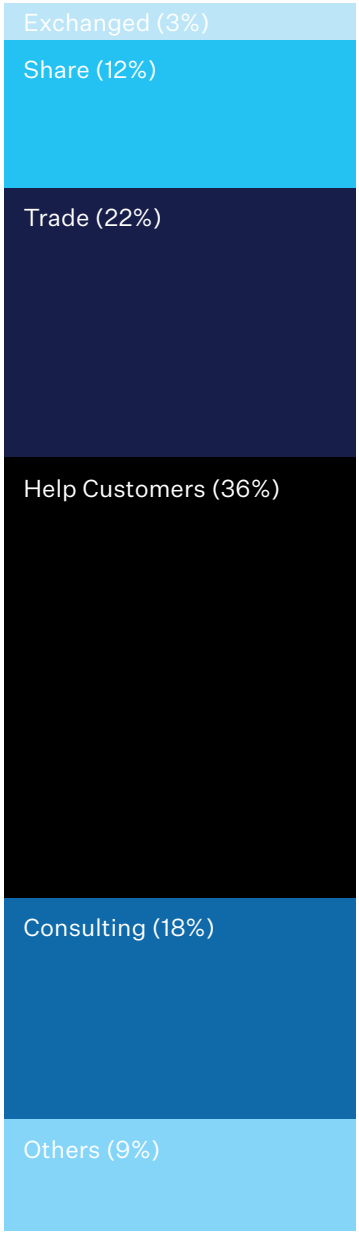


21–22. Ibid

LOW PRIVATE SECTOR DATA EXCHANGE

Although it is difficult to estimate the share of public data that is untapped, in the private sector survey results show that only 38% of all data produced is shared or traded and 45-70% of high value data is untapped.[23]

Figure 7 – How Different Firms Use Data They Generate



Only **37%** of firms share/trade their data and generate insights. Around 40-70% high-value data is untapped.

PUBLIC SECTOR	PRIVATE SECTOR
Share (45%)	Help Customers (40%)
Consulting (22%)	Trade (24%)
Trade (11%)	Consulting (17%)
Help Customers (11%)	Others (12%)
Other (11%)	Share (7%)

23. Ibid.

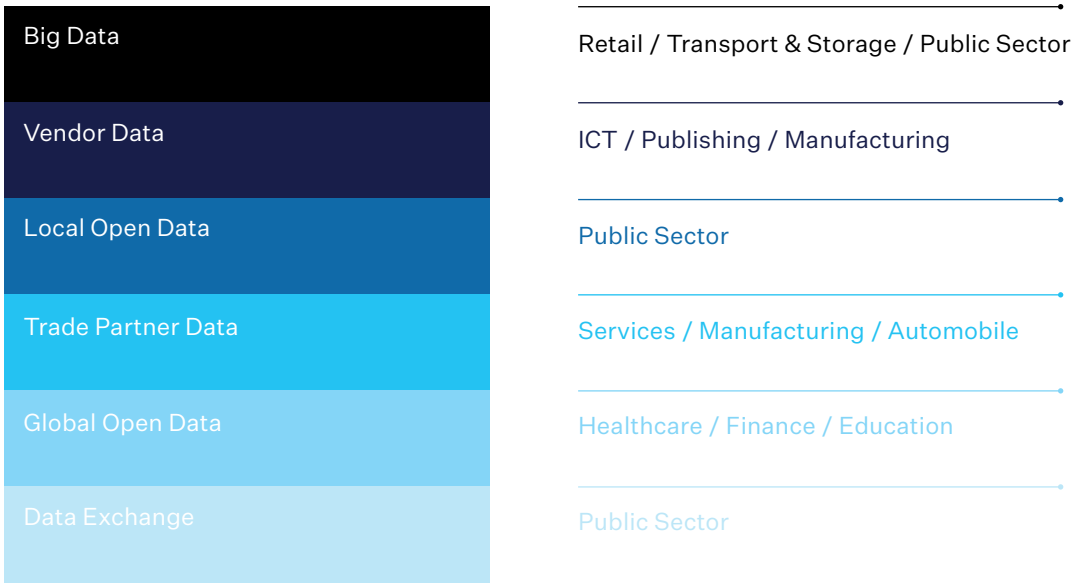
In this context, Dubai's ecosystem is most likely not exceptional in comparison to other markets. Data sharing across the private sector globally tends to be low, due to the perception that opening or sharing data may give competitors access to commercially valuable information and erode competitive advantage. Nevertheless, there are a growing number of large companies that provide data openly or share data with upstream or downstream suppliers for supply chain optimisation and other reasons (see Box 7).

7

Box 7 – Data Sharing in the Private Sector

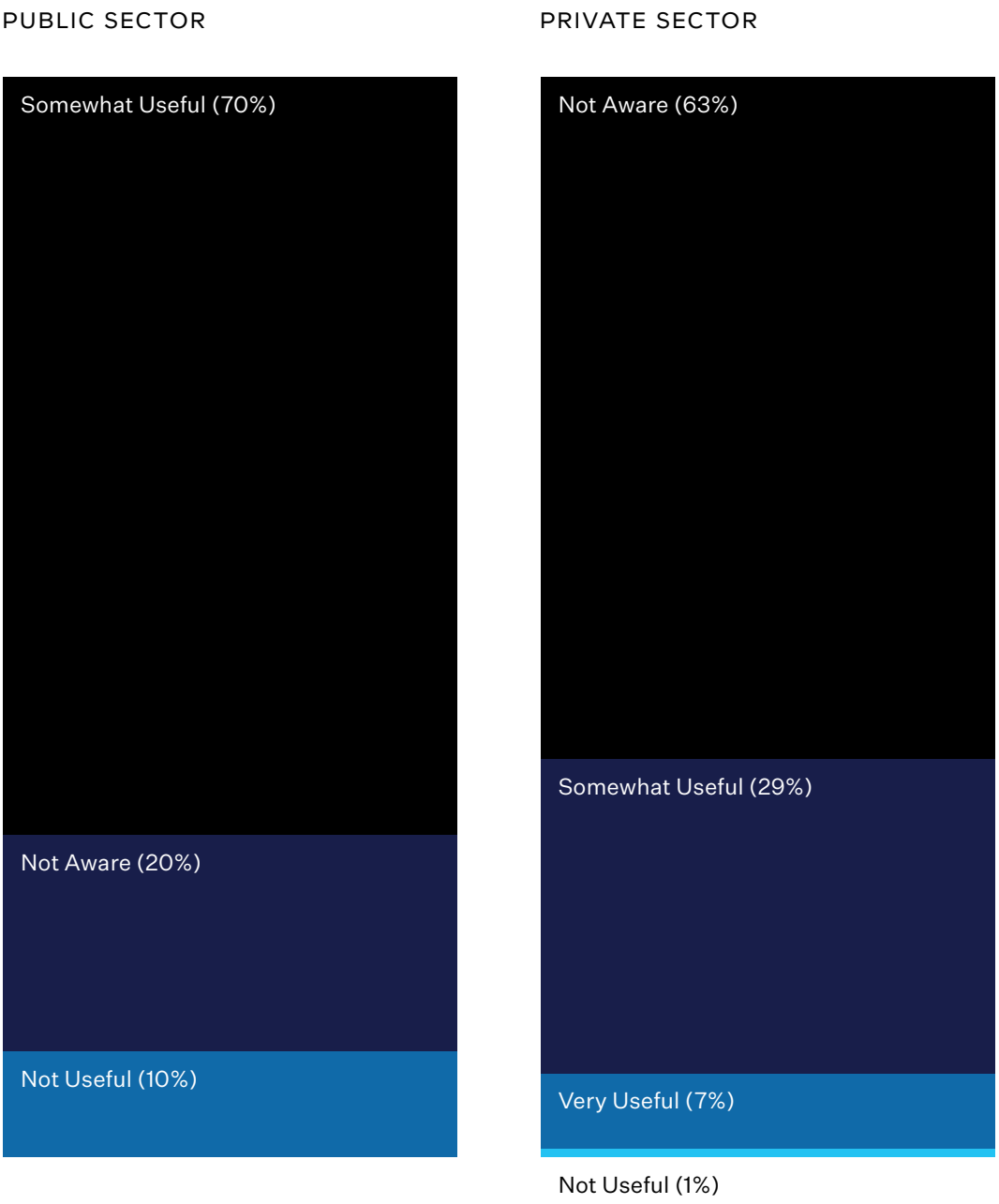
Airbus shares engineering data on its aircraft concepts with supply-chain partners to improve the efficiency and accuracy of its product design. Sharing trusted data allows aerospace manufacturing to become much more efficient. Design processes that used to require weeks to complete can now be completed in a matter of hours. Creating a secure and efficient means to share data has helped companies like Airbus engage with new technology providers and researchers to support innovation as well as optimise supply chains. Improvements in supply chain optimisation are leading to more environmentally friendly outcomes designed to reduce the industry's carbon footprint.

Figure 8 – Sources of External Data



Private sector companies do not commonly access public sector data through open data portals. Indeed, around 63% of the companies were not aware of government open data portals.[24] According to survey findings, government open data portals largely see interaction from other government entities; however, 80% of these entities also find open data portals as only 'somewhat useful' or 'not useful'.

Figure 9 – Government Open Data Portals

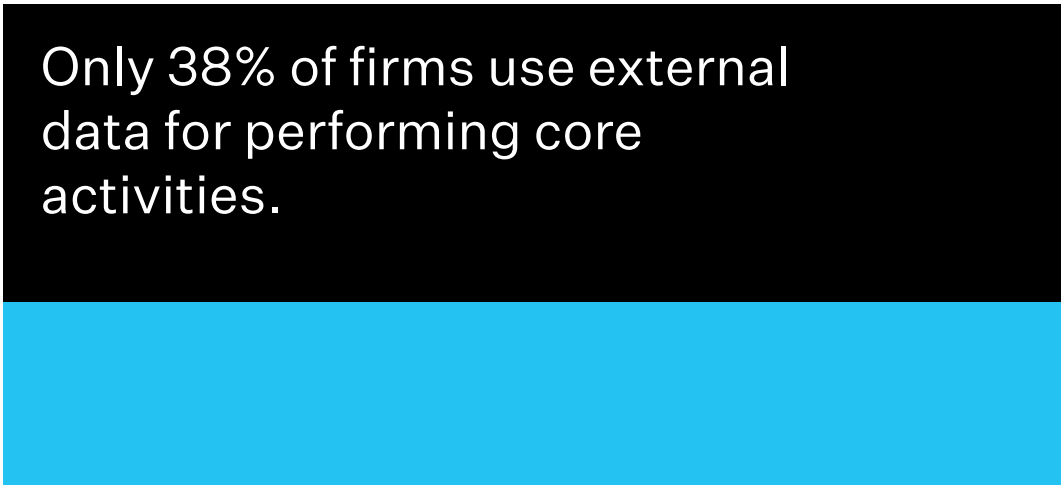


24. Ibid

II. DATA USE

The use of data varies significantly by entity, industry and specific application across the public and private sectors (see figure 10). In the case of the public sector, most entities noted that they have been slow in adopting data-driven strategies and are still determining how to use data to improve service provision. Some strong examples include the Ministry of Human Resources and Emiratisation which noted how data from bank guarantees and insurance policies was used to reduce the cost burden on visa holders. MOHRE and Dubai DED's jobs index also regularly uses external open data to develop forecasts for job demand and identify sectors which may be more vulnerable to disruption due to automation.[iv]

Figure 10 – Data Use



Dubai Customs is also a strong example of how government entities are using internal and external data to create value from advanced use cases. The Al Munasiq app, developed by Dubai Customs in partnership with Smart Dubai Government, uses official data records in addition to Google Clouds Vision API to allow customers to identify the harmonised system (HS) code for any product or object through image classification and text analytics. The app has cut down the time taken for this service from 20 hours, to 1 minute, with cost savings estimated to be around 48 million Emirati Dirham.

In the context of the private sector, Dubai has seen the development of a number of internationally competitive digital platforms, which rely on and utilise data or data services across various sectors, such as transport, real estate, food delivery, eCommerce and classified advertisements. Examples include Careem, Souq.com Dubai, Dubizzle and Propertyfinder. Dubai has also seen the significant growth of accelerator and incubator programs such as Dubai Future Accelerators, In5 Innovation Center, Hi2 Hamdan Innovation Accelerator and Dtec which seek to attract more digital businesses in different sub-sectors. Such initiatives indicate that efforts to increase the presence of such businesses in the local ecosystem, a large share of whom would theoretically provide and use data and data services, are growing in significance. However, according to the survey results only 20% of firms currently have a data strategy despite having access to the tools and teams needed to manage data. Moreover, only 38% of firms that do use data or insights use external data, indicating that the majority of data use is based on internal data (although the use of internal data is still an indication of value creation from data, more sophisticated data use would theoretically rely on combining multiple datasets from internal and external sources).

Figure 11 – Data Strategy

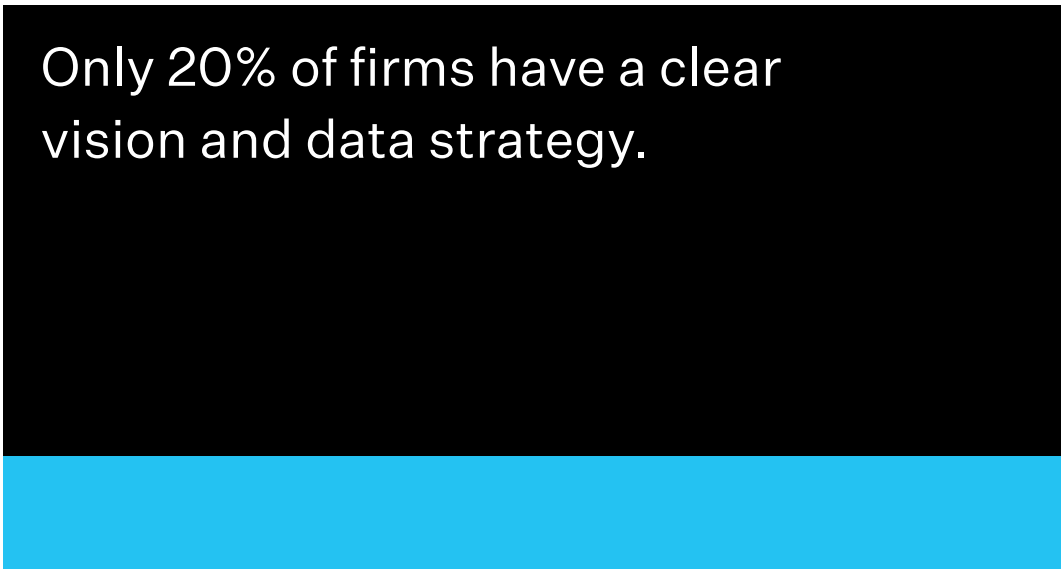


Figure 12 – Data Management

The key challenges noted as preventing firms from monetising data include lack of marketplace and technology readiness. Firms noted that they are not willing to share data freely on open platforms but would monetise data if they could have access to mentorship and data marketplaces.

CONCLUSION

AND

RECOMMENDATIONS

CONCLUSION AND RECOMMENDATIONS

It is clear that significant efforts to strengthen the data ecosystem in Dubai have materially improved certain parts of the data value chain. Data collection and generation, for example, are notably high due to ongoing efforts to enhance data quality and manage internal data use, particularly in public sector entities, wherein they are likely to improve consistently. Nevertheless, the ecosystem still faces two key gaps that are inhibiting business and economic growth in existing traditional industries and fundamentally obstructing innovation in emerging technology sectors.

- The primary constraint in the ecosystem as identified in the study is exceptionally low access to data, particularly for the private sector. Despite high levels of data supply, in terms of collection and generation, exchange and sharing is notably low.

- This constraint directly results in the low level of data utilisation. Despite significant initiatives to build and develop digital businesses, and thus the digital economy, the growth of data services and applications across the economy continues to be marginal. Data services and applications are undertaken most commonly by large market players with little or no spillover to the broader value chain.

It is likely that in this ecosystem markets alone cannot enable the economy to realise the full current or future value of data. As noted by the Open Data Institute, the challenges and problems outlined here are not unusual; for example, more mature open data portals in the UK are undergoing significant re-thinking and revision. Nevertheless, **the government will need to shape the infrastructure to enable the gains from data,** and may even choose to shape data markets and data use. The report therefore recommends the following sets of actions.

Increase data access and use across the value chain: Data generation, collection and exchange

- In addition to strengthening existing open data platforms and approaches, it will be critical to simultaneously develop alternative approaches to accelerate data exchange through hybrid data sharing models such as data trusts and data exchanges.

- Such trusts or exchanges must also focus on getting the 'buy-in' of large private sector players that can increase data access for smaller entities. The gains of this will be limited, however, if the process is not complemented by genuine data sharing efforts from public sector entities.

- In this context, it will be critical to reduce anti-competitive practices by large data holders, most typically in the public sector, that crowd out private sector growth and organic innovation by capturing certain markets or certain parts of the value chain. Although monopolistic anti-competitive behavior is visible across the economy, reducing such practices is particularly crucial in the data industry due to the 'multiplier effects' of data which allow for entities to form continuous cycles of data collection and utilisation to reinforce their dominant market position.

- It will also be important to develop sector-specific initiatives, not only by working with large business players to increase data access in key fields, through data trusts or data accelerators for instance, but by introducing data sharing policies that address specific sectors. Given that different industries produce and require different data types – including personal data, machine data, real-time data and statistical data – a 'one size fits all' approach will be ineffectual in addressing specific constraints.

- It will also be critical to develop greater data mobility across the UAE and the Gulf Cooperation Council. Given that digital businesses typically function on data-enabled models, they need to scale up to become profitable and survive. Therefore Dubai, which is typically seen as a commercial ‘hub’ for the region, will need to develop channels which allow efficient data flows to be attractive to digital businesses.

- There is a need for strengthened capacities to increase awareness of the value of data for evidence-based policies and the role that good quality data plays in generating better outcomes from emerging technologies. Data accelerators can increase awareness among businesses, policymakers and decision-makers in areas such as anonymisation techniques, licensing and data sharing agreements.

- Progress can also be encouraged by mentoring private sector players to build their capacity and capability, helping them to seize the data monetisation opportunities by developing data visions, strategies and systems.

ENDNOTES

i. Information produced from a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.

ii. The definitions of what constitutes the data economy vary between countries and institutions.

iii. Data demand however is somewhat uneven across public sector entities as some entities appear to be significantly more proactive than others in sourcing external data through vendors or subscribing to various data services. This is quite understandable given that depending on the function of a given entity the consumption of external data would of course be more relevant to some entities than others.

iv. Examples of such entities which have actively used data to improve services and efficiency could be held up for other government entities to shift away from a 'data for the sake of data' attitude.

CONTRIBUTORS

PROJECT TEAM

- Dubai Future Foundation, Aruba Khalid, Dr Patrick Noack
- Dubai Economy, Alexandar Williams, Rashid Hazari
- The Open Data Institute, Dr Jeni Tennison, Dr Milly Zimeta, Stuart Coleman, Louise Burke, Olivier Thereaux
- IE Business School, Christina Stathopoulos,

CONTRIBUTORS

- UAE National Program for Artificial Intelligence
- Security and Commodities Authority
- Dubai Financial Services Authority, Peter Smith, Elisabeth Wallace, and Ken Coghill, DFSA
- Dubai Competitiveness Office
- Dubai Customs
- Dubai Police
- Dubai Government Human Resources, Soobia Kazim
- Dubai Economy
- Dubai Statistics Center
- Telecommunications Regulatory Authority
- Moro
- Dubai Department of Tourism & Commerce Marketing
- Dubai International Financial Center, Christian Kunz
- General Directorate of Residency and Foreign Affairs, Major Ghalib Abdulla Almajid, Captain Nawaf Mohamed Al Rustamani
- Dubai Municipality, Asmahan Abdullatif Alzarooni
- Security Industry Regulatory Authority
- Dubai Electronic Security Center
- Ministry of Human Resources and Emiritisation
- Dubai Silicon Oasis Authority
- National Center of Meteorology
- DP World
- Tarabut Gateway
- Dubai Civil Aviation
- Knowledge and Human Development Authority
- Central Bank
- Majid Al Futtaim
- Dubai Data Establishment
- Raj Kishore Kamalanathsharma Vettikattu, Transport Analytics Expert

ACKNOWLEDGMENTS

- Seema Sequeira, Dubai Economy
- Armin Kech, MBC Group
- Chirag Kataruka, Swvl
- Gergana Abdulrahman, Sustain
- Gareth Deere, Ipsos
- Rob Preston, Jaguar Land Rover
- Aaima Rahman, Study Assist
- Ferakh Lakhany, Arabee
- Gaurav Sharma, Open Bonnet
- Jose Rubinger Filh, Key2enable
- Shasthi Dutt, International Rubber Co.
- Marcus Bernestrom, Fundedbyme
- Khalil Alami, Telr
- Brian De Francesca, Ver2 Digital
- Mohamed Adam, Trriple Payment
- Omar Al Ashi, Urent
- Maheshkumar Mathilakath, Samwin
- Mohamed Ali Maricar, Baniyas Building Materials
- Semih Kumluk, PwC
- Abdulrajak Rajvada, Dubai Parks And Resorts
- Haniya Salam, Tanmyah
- Moosa Abdulcader, Dorsch Middle East GmbH
- Dilip Sharma, Technical & Trading LLC
- Mark Wolmarans, Tamraat General
- Lynnette Abad, Property Finder
- Dr. Ghanem Al Hassani, Seha
- Gareth Deere, Ipsos
- Diego Moreno, Digital Ape Media
- Assim Al Khaja, Dubai Government
- Yehia Ahmed, Ncc Limited
- Abderrahmane Boutaib, Careem
- Jules Jabbour, Nas Administration

ABOUT DUBAI FUTURE FOUNDATION

Launched by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, the Dubai Future Foundation was established back in 2016 to play a pivotal role in shaping the future of Dubai, as well as to collectively imagine, inspire and design the city's future in collaboration with the government and private entities within various industries.

Mandated in positioning Dubai as a hub for innovation and a leading city of the future, the foundation's main areas of focus are Future Foresight and Imagination, Content and Knowledge Dissemination, Capacity Building, Future Design and Acceleration, and Future Experiences.

DFF builds bridges between government and private sector, innovators, startups, talents and industry experts, and creates an innovation ecosystem that enables innovations to take shape, promotes global dialogues, builds partnerships and cultivates disruptive mindsets.