

BEYOND PERSONAL DATA: THE COST OF DATA FLOW RESTRICTIONS TO EU COMPANIES

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EXECUTIVE SUMMARY

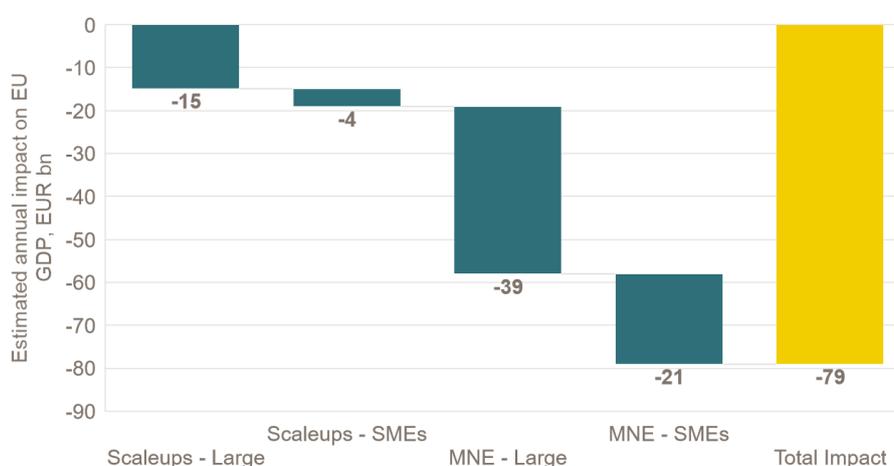
Data flows across borders are critical for most European companies that operate internationally. Companies routinely collect, use and share data across teams, subsidiaries, partners, and suppliers in various parts of the world to improve their efficiency, research and develop innovative products, support their marketing strategies, reach customers in different countries or even monitor security threats on their network and services. Therefore, restrictions to the movement of data across borders, ranging from red tape to outright bans, risk significant disruptions for European companies' operations and would dampen innovation and growth in the European Union (EU).

In this study, commissioned by the Computer and Communications Industry (CCIA Europe), we estimate the potential cost of restrictions to cross-border flows of non-personal, commercially sensitive data between the EU and other geographies. We focus on the impact of such restrictions on EU high-growth enterprises or "scaleups", which typically account for 50-60% of all employment growth in the EU, and on enterprises that operate across borders (multinational enterprises (MNEs)). We commissioned a survey of EU scaleups and MNEs that transfer data between EU and non-EU locations to investigate the impact of potential restrictions.

In our survey, **40% of companies** considered that regulations which require them to assess the laws and practices of non-EU countries they share non-personal, commercially sensitive data with/from effectively amount to a requirement to stop their cross-border flows of such data. Further, EU-based scaleups and other MNEs **estimated that the cost of complying with such regulations** (including the cost of legal uncertainty) **would amount to around 4% of their global annual revenues**. The impact is **larger for businesses that share data for innovation purposes, which reported a potential loss of 5% or around EUR 15m per business**. These would be non-recuperable costs, not investments, which would divert EU businesses' resources away from their business objectives.

Overall, this would imply a gross domestic product (GDP) **loss of around EUR 79bn per year across the EU, or EUR 553bn over 2021-2027. This is almost six times the amount that the EU will be spending to boost research and innovation under the Horizon Europe framework programme for the same period.** Figure 1 below shows how this total impact is distributed between large and small MNEs and scaleups.

FIGURE 1 ESTIMATED ANNUAL IMPACT OF RESTRICTIONS ON GDP



Source: Frontier Economics calculations and analysis of survey data

Small and medium enterprises (SMEs) account for a minority of the overall impact, around 32% (EUR 25bn). This is because large enterprises are more likely than SMEs to have an international presence and therefore to share data across borders. However, for each SME that shares data, the impact of restrictions would be similar to the impact on large firms. Moreover, these figures do not include the potential loss in economic activity from companies (in particular SMEs) which may be discouraged from starting to operate and/or share data across borders as a result of the restrictions.

The total cost of new restrictions is likely to be higher than the costs quantified in this report. This is because the total cost would also include effects that have not been quantified through this study, including:

- The effect on companies that do not directly share data across borders (for example, those that purchase services from those directly affected), which may experience higher costs or lower quality of services as a result of restrictions;
- The effect of potential retaliation from non-EU countries, which may impose restrictions on their data flowing to the EU in response to new restrictions introduced by the EU; and
- The effect on competition in EU markets, which may decrease due to EU SMEs struggling to scale up as a result of restrictions.

The EU has set ambitious targets for the digitalisation of society and business as part of its “Digital Decade” initiative. At the same time, the EU has also unveiled several legislative proposals which aim to unlock the benefits of digitalisation and enhance the security of data, while mitigating possible economic and social costs from harmful uses of digital technology. Meeting these objectives requires careful consideration of the likely impact of new regulations so that they can be defined in a way that maximises their benefits while minimising costs and avoiding unintended consequences. The findings described above attempt to quantify one of the key components of such unintended consequences. Moreover, our study provides new evidence on how EU businesses transfer data across borders and the likely effects of restrictions to such data flows on EU businesses’ operations, summarised below.

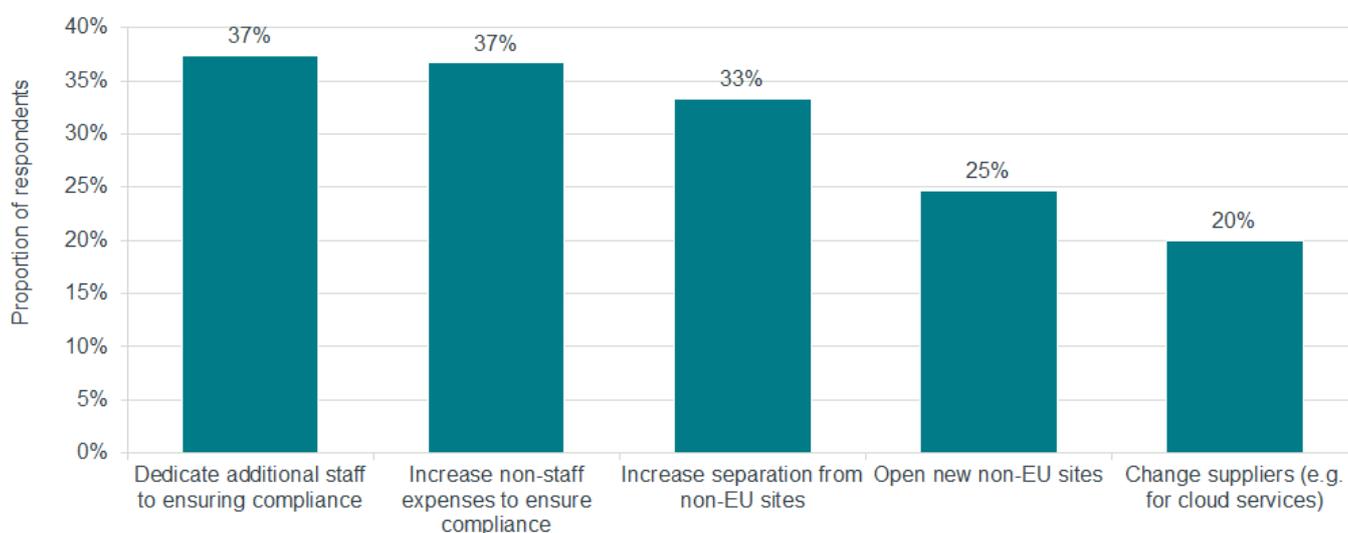
COMMERCIALLY SENSITIVE, NON-PERSONAL DATA IS THE MOST COMMON TYPE OF DATA SHARED ACROSS BORDERS

In our sample of 150 EU companies, commercially sensitive non-personal data is the most common type of data shared across borders (54% of companies), followed by publicly available data (48%), personal data (46%) and other non-personal data (33%). Seventy-five percent of the companies in our sample transfer data to or from two or more non-EU jurisdictions. Data is shared across borders within the business to perform essential functions, such as accounting and payroll (81% of companies in our sample), with supply chain partners and other external organisations (65% of companies) and is accessed from or shared with customers (64% of companies). There are many companies that share data across borders but are not directly affected by existing restrictions on personal data flows. **A quarter of companies in our sample transfer commercially sensitive, non-personal data across borders but do not transfer personal data in the same way.** This indicates that they are less likely to already have processes in place to comply with new potential restrictions on cross-border sharing of non-personal data. These companies may also have chosen not to share personal data across borders as a result of existing restrictions and may choose a similar approach in response to additional restrictions on non-personal data.

RESTRICTIONS ON NON-PERSONAL DATA SHARING WOULD REDUCE THE COMPETITIVENESS OF EU BUSINESSES

88% of companies reported that they would need to make significant immediate (“short-term”) changes if they were restricted from sharing non-personal, commercially sensitive data. Over a third of companies would have to increase separation from non-EU sites, reduce cross-border sharing of data and hire staff or incur non-staff expenses to comply with the ban. This is consistent across scaleups and MNEs. These effects were reported more frequently by businesses that share data for innovation purposes (“innovation sharers”) and those that share data intensively.

FIGURE 2 SELECTED SHORT-TERM EFFECTS OF RESTRICTIONS ON CROSS-BORDER DATA FLOWS



Source: Frontier Economics analysis of survey data

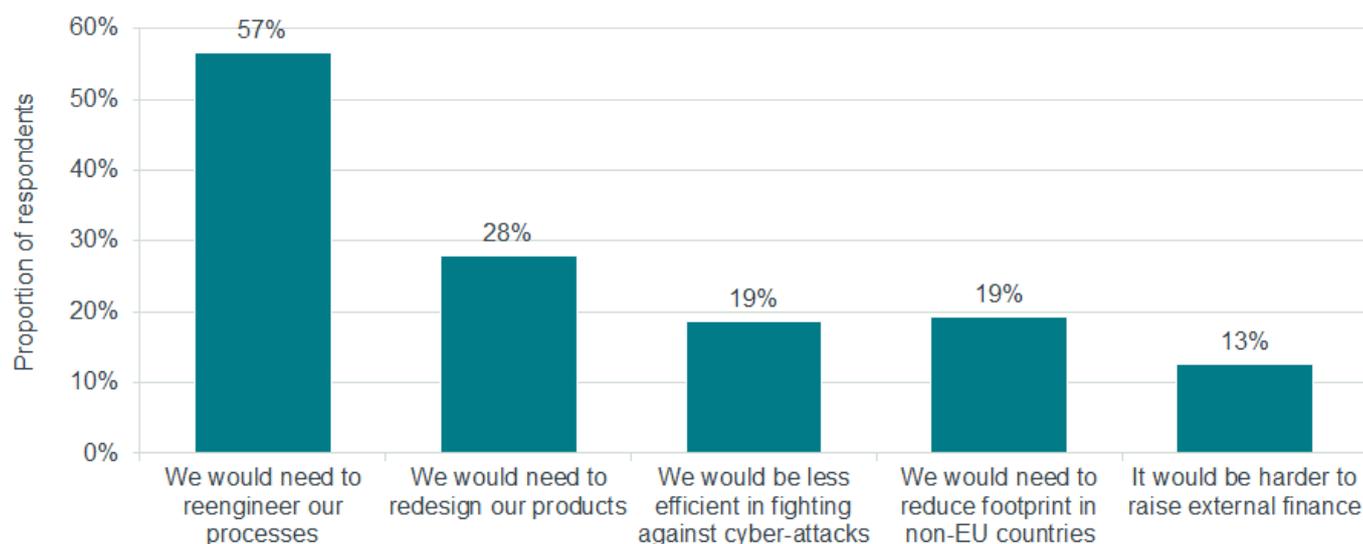
Note: Sample size: 150 EU companies

Another short-term effect of restrictions on cross-border data flows may be to hinder EU companies’ ability to use Artificial Intelligence (AI) effectively. 35% of the companies in our sample use AI, and among these, **80% indicated that a ban on data sharing would limit the availability of data to use AI, their ability to develop new AI applications or to use third-party AI solutions.**

These effects would materialise in the short term but would likely have lasting consequences for the affected companies. Indeed, we also asked respondents about the medium-term consequences of potential restrictions. Around **65% of companies said they would need to either redesign their products or reengineer their processes.** This increases to 87% among companies that share data intensively.¹ Again, the reported medium-term effects are consistent between scaleups and MNEs.

¹ Defined as companies that share data in at least 10 out of the 17 possible ways described in our survey questionnaire. Intensive data sharers account for around 20% of our sample.

FIGURE 3 MEDIUM-TERM EFFECT OF BAN ON CROSS-BORDER DATA FLOWS



Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies

Respondents quantified **the amount of work that would be required to reengineer their processes or redesign their products at around 11 full-time equivalents (FTEs) in a year**. This would be equivalent to at least around EUR 900,000 in additional annual costs. In proportion to their overall employment, the effect is greater for SMEs (9% of their average employment) than for large businesses, and this difference is statistically significant. This finding should be interpreted with caution as it is based on relatively small sample sizes, but it suggests that, in the short term, the burden of restrictions on data sharing would fall disproportionately on SMEs.

1 INTRODUCTION

1.1 BACKGROUND

The use of data is integral to business models in advanced economies. A large majority of enterprises use digital technologies in their business, and the use of digital technology can be a source of competitive advantage.² Virtually all uses of digital technology involve the use and movement of data between different physical locations, from the use of cloud computing, storage and cloud-based software to the use of enterprise resource planning and customer relationship management solutions, and voluntary data sharing to coordinate complex supply chains.

The European Union (EU) has set ambitious targets for the digitalisation of society and business as part of its “Digital Decade” initiative. At the same time, the EU has also unveiled several legislative proposals which aim to unlock the benefits of digitalisation while ensuring fair competition in digital markets and mitigating possible economic and social costs from harmful uses of digital technology. Against this backdrop, the EU is also preparing a “Data Act” and working on a number of initiatives related to the commercial use and hosting of data (including the Data Governance Act and new cybersecurity certification for cloud services). This raises the possibility of changes to the regulation of non-personal data, including the conditions under which non-personal data can be transferred to jurisdictions outside the EU.

The transfer of personal data across borders is already subject to restrictions and to uncertainty following the Court of Justice of the European Union’s ruling in the C-311/18 (“Schrems II”) case, which invalidated the EU-US Privacy Shield. Indeed, according to the International Association of Privacy Professionals, nearly 6 in 10 privacy professionals consider complying with cross-border data transfer laws to be their most difficult task.³ Further restrictions, applying to non-personal data, while pursuing valuable policy objectives, require careful consideration so that they can be defined in a way that maximises their benefits while minimising costs and avoiding unintended consequences.

1.2 OBJECTIVES OF THIS STUDY

The Computer and Communications Industry Association (CCIA Europe) has commissioned Frontier Economics (Frontier) to produce new evidence to inform policymakers and stakeholders about the role of data flows between EU and non-EU locations and the impact of potential restrictions to these flows.

This study adds to existing evidence on the role of cross-border data flows in the following ways:

- We focus on non-personal, commercially sensitive data;
- We focus on innovative, international enterprises that play a particularly important role in driving economic growth;
- We focus on the role of data sharing across borders in enabling the internal operations of these companies, providing new evidence from a survey of these businesses; and

² OECD Digital Economy Outlook 2020, available at: https://www.oecd-ilibrary.org/sites/bb167041-en/1/3/4/index.html?itemId=/content/publication/bb167041-en&_csp_=509e10cb8ea8559b6f9cc53015e8814d&itemIGO=oecd&itemContentType=book

³ <https://iapp.org/resources/article/iapp-ey-annual-privacy-governance-report-2021/>

- We estimate the likely impact on EU gross domestic product (GDP) that might result from restrictions on these businesses' use of data.

1.3 OUR APPROACH

Our approach has two building blocks:

- **Primary data collection in the form of a survey** of 150 EU businesses on the role of cross-border data flows and the potential impact of restrictions to these flows on company activities; and
- **Economic modelling** based on input from the survey and data from secondary sources to determine the potential impact of restrictions on EU GDP and employment.

The survey collected data from 150 European companies, including:

- **90 high-growth companies (“scaleups”),**⁴ and
- **60 companies with at least 50 employees (“multinational enterprises” or “MNEs”).**

For both scaleups and MNEs, we selected companies that:

- Have a presence outside the EU; and
- Share data between their EU sites and their own sites or other organisations based outside the EU.

Among scaleups, we gathered data from 20 companies active in cybersecurity, health technology or green innovation to help understand if and how disruptions to cross-border data flows would affect companies in sectors that are crucial in supporting key EU policy objectives. The survey was conducted by Ronin International, a market research provider. Survey respondents were given the option to complete the survey online or via telephone. The survey focused on respondents in specific senior roles within companies to ensure that the respondents had the appropriate knowledge of the company's data sharing activities and the commercial implications of data flow restrictions.⁵

1.4 STRUCTURE OF THE REPORT

This report sets out our findings and the underpinning evidence. **Chapter 2** focuses on the role that cross-border data flows play in the EU economy. **Chapter 3** considers the impact of restrictions to cross-border data flows. **Chapter 4** considers the implications of this evidence for policymakers and stakeholders. Finally a **Technical Annex** provides additional information on (i) the survey methodology, (ii) the data sources and assumptions made in report calculations, and (iii) survey results not presented in Chapter 2 and Chapter 3.

1.5 GLOSSARY

Data, data flows and data sharing

By “data” we mean quantitative or qualitative information in computerised form.

⁴ Scaleups are defined as businesses that have grown their employment and/or revenues by 20% or more on average in the last three years, starting from a minimum threshold of 10 employees.

⁵ The majority of respondents fell into one of the following four categories: (i) company director/VP/C-level; (ii) functional director with overall responsibility for an overall business function; (iii) data protection officer; and (iv) head of function with significant management responsibility for a business function.

When we talk about “sharing and accessing” data across borders, we are thinking about instances when a company:

- Shares/accesses data with company sites located in a non-EU jurisdiction (i.e. with plants, offices, affiliates, subsidiaries located abroad); and/or
- Shares/accesses data with other companies located in a non-EU jurisdiction (i.e. suppliers, customers and collaborators).

Throughout this report, unless otherwise specified, we are interested in activities that involve a significant amount of data processing. For example, sharing the contact details of an individual customer or supplier with another company site would not qualify as “significant”. Vice versa, sharing data about hundreds of customers, or data on sales by product line, customer group and region of sale would qualify as “significant”.

We use “data sharing” and “data transfer” or “data flow” interchangeably.

Personal data versus non-personal data

Data can include personal data and non-personal data (many datasets are a mix of personal and non-personal data). In this survey, we define these as follows:

- Personal data is data that contains information related to an identified or identifiable person, for example where the data includes identifiers such as a person’s name, location, customer number or address.
- Non-personal data is data that does not contain any information that can be used to identify a person. In other words, all data that is not personal data. Examples include financial information such as pricing, technical information generated by the applications used by a business and Internet of Things (IoT) data.

Commercially sensitive, non-personal data

Commercially sensitive non-personal data as used in this report includes:

- Data related to assets protected by intellectual property rights, such as patents, copyright, industrial designs or trade secrets. This may include, for example, data on the performance of a patented technology in the field or data on the sales of a patented technology;
- Data protected by intellectual property rights, such as software or databases. This may include, for example, predictive models acquired from other organisations or developed in-house; and
- Other commercially sensitive data. This may include, for example, information on pricing strategies or data on the utilisation of assets (e.g. information technology (IT) infrastructure, machinery).

“Innovation sharers” and “intensive data sharers”

We define “**innovation sharers**” as the companies in our survey which:

- Told us they share data between their EU and non-EU sites in performing research & development (R&D) or broader innovation business functions (for example, if their innovation functions are

located across different countries or if their innovation activities use data from the company's operations across different countries); and

- Told us they share data with or access data from supply chain partners as part of R&D/innovation activities (for example, data on new product designs or combining their data with external sources to improve accuracy, and also including machine-to-machine communication)

We define “**intensive data sharers**” as the companies in our survey that share data in at least 10 out of the 17 possible ways described in our survey questionnaire. Intensive data sharers account for around 20% of our sample.

2 CROSS-BORDER DATA FLOWS IN THE EUROPEAN ECONOMY

This report adds to existing evidence on the economic importance of cross-border data flows. To date, this evidence includes:

- Estimates of the overall volume of data flows (in terabytes) in the OECD, as documented for example in Nguyen & Paczos (2020);⁶
- Information on EU imports and exports from digital-intensive sectors (e.g. business services, high-value manufacturing, information and communication technology (ICT) hardware and software).⁷ This information provides a broad proxy for the amount of economic activity that relies most directly on data and data sharing;
- Survey evidence on the extent of data sharing between companies (which, however, did not specifically consider cross-border data sharing); and⁸
- Evidence on the potential impact of cross-border data flow restrictions on:
 - Specific sectors of economic activity, including telecommunications, ecommerce, services outsourcing, pharmaceutical R&D⁹
 - International trade¹⁰
 - The performance of companies that buy goods or services from sectors reliant on electronic data.¹¹

In filling this gap, as explained in Section 1, this study focuses on cross-border data flows by two types of companies: scaleups and MNEs. We focus on these companies because they play an important role in driving economic growth and because they are likely to be affected by new regulations on cross-border data flows.

There are approximately 73,000 scaleups in the EU. This is around 5% of all companies; yet scaleups typically account for 50-60% of new jobs created in a given year and 40-50% of GDP growth. Therefore, policies that have an impact on scaleups are likely to have a disproportionately large impact on economic growth and job creation as a whole. Scaleup companies, by their very nature, are driven to develop new products and services and to grow their sales domestically and internationally as quickly as possible. In

⁶ https://www.oecd-ilibrary.org/science-and-technology/measuring-the-economic-value-of-data-and-cross-border-data-flows_6345995e-en

⁷ https://www.digitaleurope.org/wp/wp-content/uploads/2021/06/Frontier-DIGITALEUROPE_The-value-of-cross-border-data-flows-to-Europe_Risks-and-opportunities.pdf

⁸ <https://op.europa.eu/en/publication-detail/-/publication/8b8776ff-4834-11e8-be1d-01aa75ed71a1/language-en>

⁹ <https://about.fb.com/wp-content/uploads/2021/06/The-Importance-of-Cross-Border-Data-Flows.pdf>

¹⁰ https://www.digitaleurope.org/wp/wp-content/uploads/2021/06/Frontier-DIGITALEUROPE_The-value-of-cross-border-data-flows-to-Europe_Risks-and-opportunities.pdf and [How Barriers to Cross-Border Data Flows Are Spreading Globally, What They Cost, and How to Address Them | ITIF](#)

¹¹ [Do Data Policy Restrictions Impact the Productivity Performance of Firms and Industries? | ecipe.org](https://www.ecipe.org/)

this context, new regulatory requirements can have a significant impact on the speed of growth of scaleups.¹²

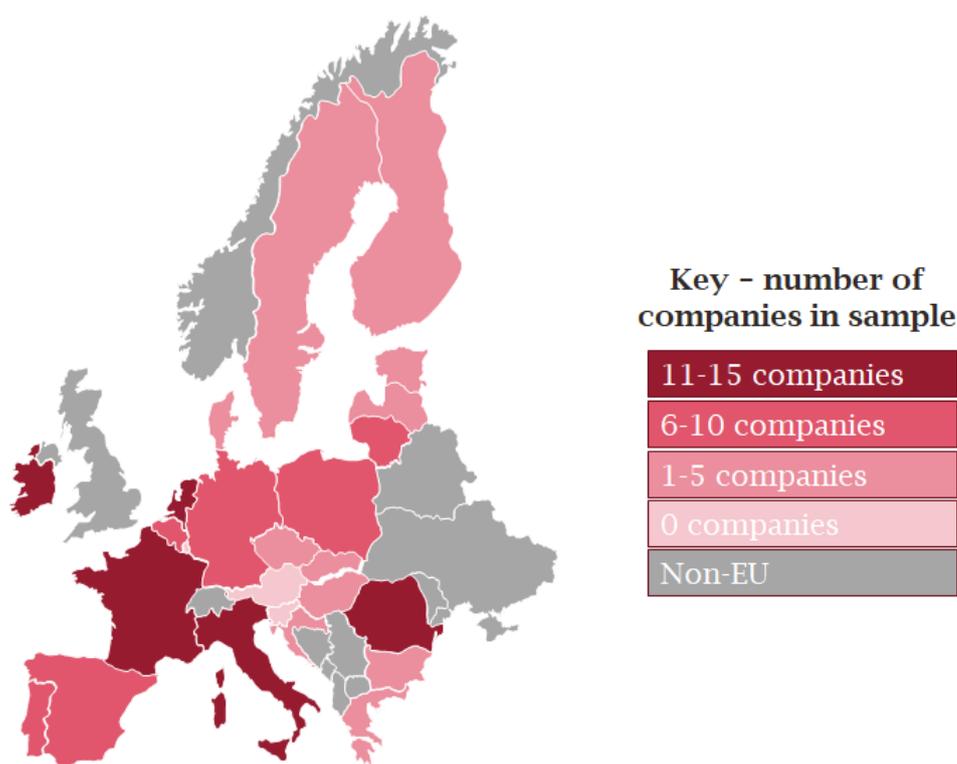
There are approximately 174,000 multinational groups active in the EU, which employ around 41 million people in the EU. By definition, multinationals operate across borders and therefore are particularly likely to share data internationally in delivering their products or in support of their operations.

2.1 COMPOSITION OF THE SAMPLE

In total, 150 companies from 25 EU Member States responded to the survey. Our sample includes a broad spread of Member States, industrial sectors and company sizes.

The country with the highest business participation in the survey was Ireland (15), followed by the Netherlands (13), Italy (12) and France (12). The figure below shows the distribution per country of the 150 companies that participated in the survey.

FIGURE 4 GEOGRAPHIC DISTRIBUTION OF RESPONDENTS



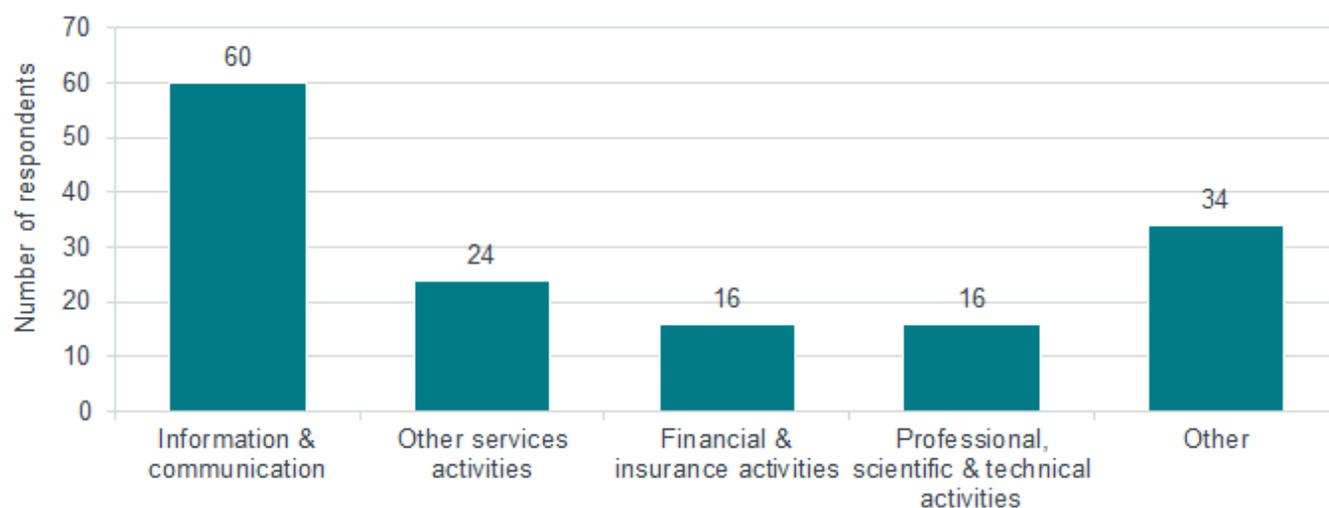
Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies. Includes Ireland (15), Netherlands (13), Italy (12), France (12), Romania (10), Poland (9), Germany (9), Spain (9), Belgium (9), Portugal (8), Malta (6), Lithuania (6), Cyprus (4), Bulgaria (3), Finland (3), Greece (3), Slovakia (3), Estonia (3), Sweden (3), Hungary (2), Czech Republic (2), Croatia (2), Latvia (2), Luxembourg (1) and Denmark (1)

¹² For example, according to an independent report commissioned in 2014 by the UK government, a large proportion of the scaleup leaders that had chosen to relocate their headquarters from the UK to the USA cited the time taken for decisions by governments, regulators and banks – or the “cycle time” – as a driver of relocation. Source: scaleupinstitute.org.uk/wp-content/uploads/2019/12/scaleup-report_2014.pdf

Compared to the overall distribution of businesses in the EU economy, our sample includes a relatively high proportion of businesses in the ICT sector and a relatively high proportion of large businesses. This is likely a result of our focus on companies that share data across borders. However, unless specified otherwise, none of the findings in this report are driven specifically by responses from ICT and/or large companies in the sample.

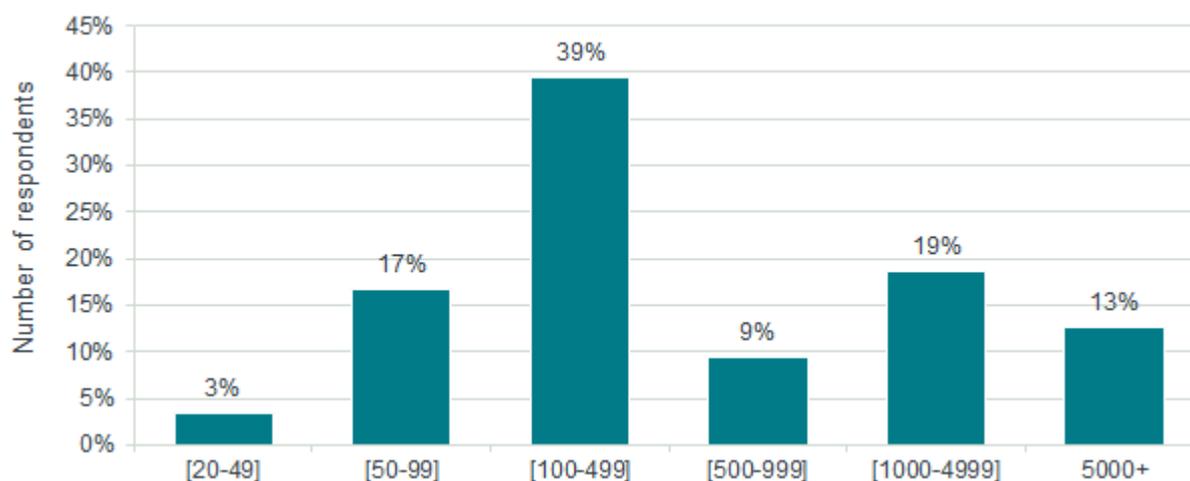
FIGURE 5 **SECTORAL DISTRIBUTION**



Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies. Other includes manufacturing (6), arts, entertainment and recreation (5), transporting and storage (4), wholesale and retail trade (4), construction (2), public administration (2), education (2), human health and social work (2), administrative and support service activities (2), real estate (1), water supply (1), and accommodation and food (1)

FIGURE 6 **COMPANY SIZE DISTRIBUTION**



Source: Frontier Economics analysis of survey data

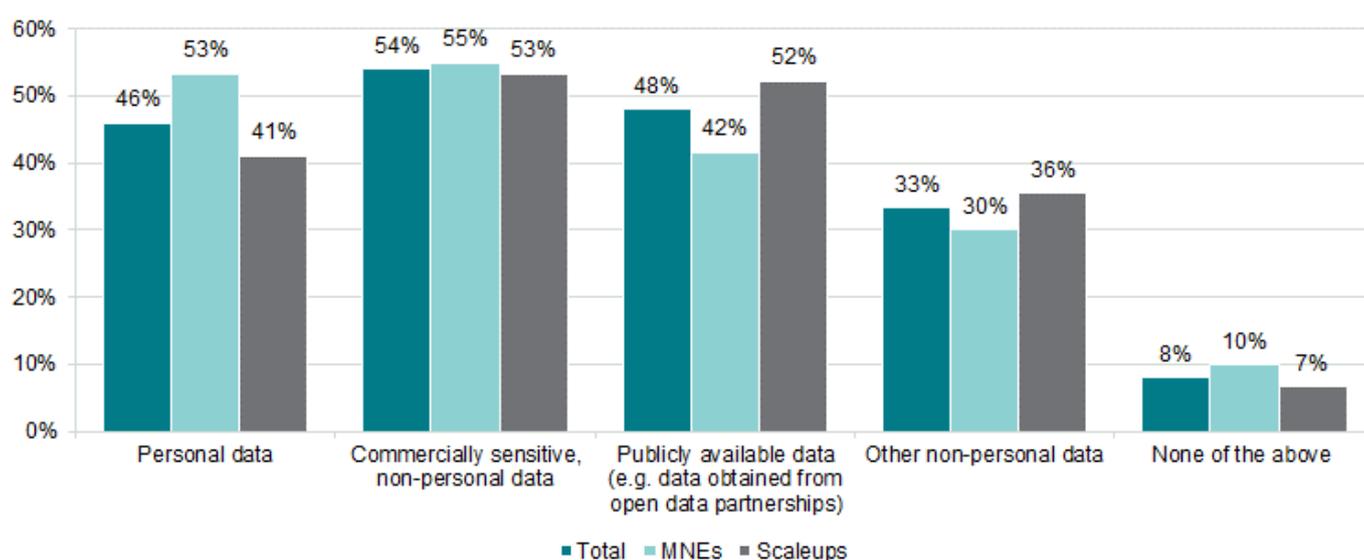
Note: Sample size: 150 EU companies

2.2 FINDINGS ON THE ROLE OF CROSS-BORDER DATA FLOWS

2.2.1 TYPES OF DATA SHARED

EU companies share different types of data across borders. Commercially sensitive, non-personal data is the most common type of data shared across borders (54% of companies), followed by publicly available data (48%), personal data (46%) and other non-personal data (33%). There are many companies that share data across borders but are not directly affected by existing restrictions on personal data transfers or have taken action to stop such sharing as a result of existing restrictions. A quarter of companies in our sample transfer commercially sensitive, non-personal data across borders but do not transfer personal data in the same way. This means that they are less likely to already have processes in place to comply with new potential restrictions on cross-border sharing of non-personal data.

FIGURE 7 TYPES OF DATA INVOLVED IN CROSS-BORDER DATA FLOWS



Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies. In response to the survey question: "Does any of your company's cross-border data sharing or access involve any of the following types of data? (Please select all that apply)"

2.2.2 EXTENT AND PURPOSE OF CROSS-BORDER DATA FLOWS

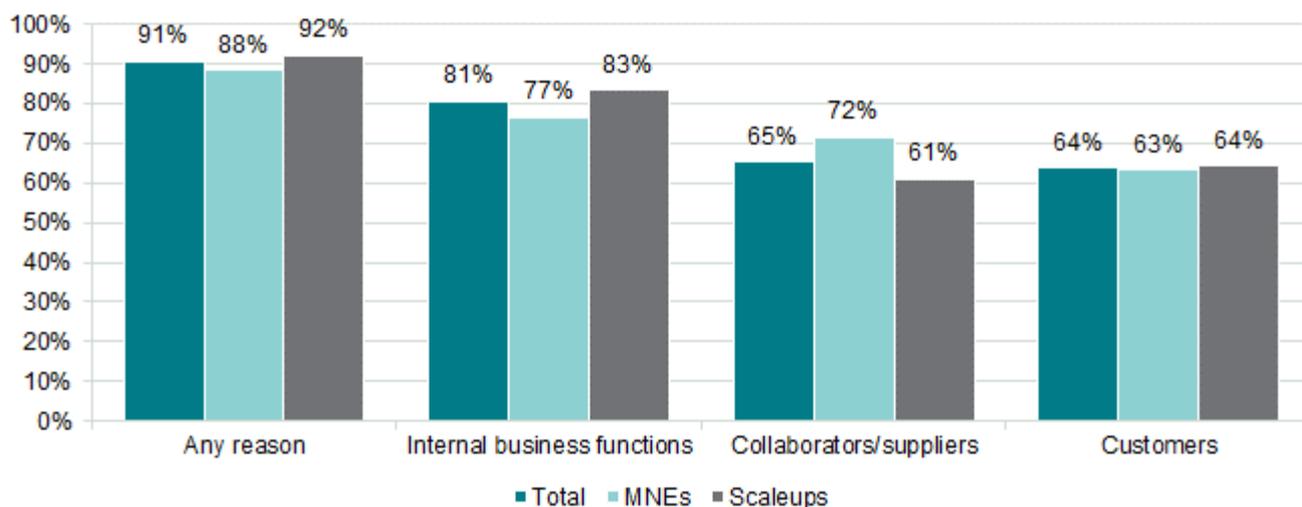
The companies in our sample share data between EU and non-EU geographies for a wide variety of purposes:

- 81% of companies share data between their EU and non-EU sites in performing internal business functions;
- 65% of companies share data with or access data from other non-EU organisations such as suppliers, collaborators and governments; and
- 64% of companies share data with or access data from their customers.

This includes their sharing of both personal and non-personal data.

These results are broadly consistent for MNEs and scaleups, with MNEs somewhat more likely to share data with collaborators and suppliers (72% of respondents versus 61% among scaleups), perhaps as a result of their larger size or being embedded in more complex supply chains.

FIGURE 8 % OF BUSINESSES SHARING DATA ACROSS BORDERS, BY PURPOSE

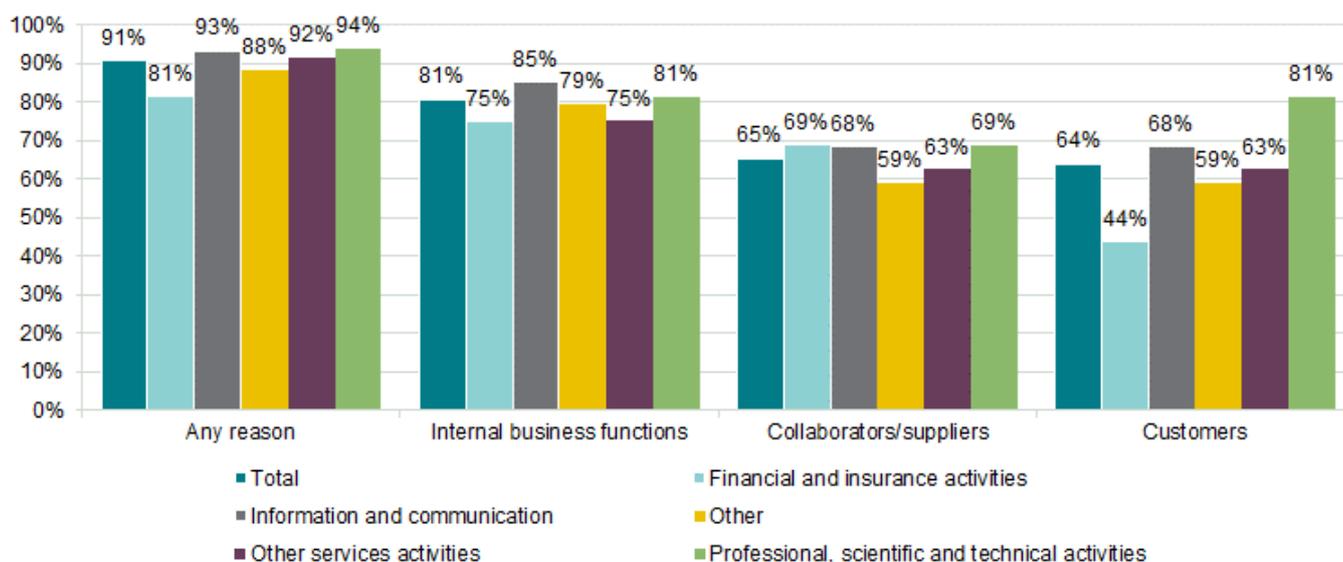


Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies. Based on combining data from the following three questions: "Do you share data between your EU and non-EU sites in performing the following business functions? (Please select all that apply)"; "Do you share data with or access data from other non-EU organisations in any of the following ways? (Please select all that apply)"; and "Do you share data with or access data from your customers in any of the following ways? (please select all that apply)"

Figure 9 shows that these results are also broadly consistent across industries. Data flows play an important role for companies in a wide range of economic activities – not just in the ICT sector.

FIGURE 9 CROSS-BORDER DATA SHARING, BY PURPOSE AND INDUSTRY



Source: Frontier Economics analysis of survey data

Note: Sample size: 150 EU companies. Based on combining data from the following three questions: "Do you share data between your EU and non-EU sites in performing the following business functions? (Please select all that apply)"; "Do you share data with or access data from other non-EU organisations in

any of the following ways? (Please select all that apply)”; and “Do you share data with or access data from your customers in any of the following ways? (please select all that apply)”

CROSS-BORDER DATA SHARING IN MEDICAL RESEARCH AND HEALTHCARE

Cross-border data sharing in the context of medical research and healthcare can bring about significant benefits. For example, pooling data from many countries can provide sufficient statistical power for studies of rare diseases or rare subgroups of common diseases. Moreover, access to data from European citizens is essential for ensuring that findings from international studies apply to European populations.¹³ Also, participant-level data from multiple trials can be combined to learn more than can be derived from the results of a single trial, and the number of meta-analyses of individual participant data has been growing substantially.¹⁴ Manufacturers of medical devices collect and analyse data on their devices in operation to monitor performance and identify opportunities for innovation.¹⁵

More broadly, scientific research increasingly involves collaboration between different international institutions.¹⁶ Bentzen et al. (2021) report that there are about 5,000 collaborative projects between the US National Institutes of Health (NIH) and European Economic Area countries.¹⁷

Restrictions to data flows pose challenges to the integration of research data and scientific collaboration across borders. At least 40 clinical and observational studies on risk factors and exposures for cancer have been suspended or delayed because of the current legal challenges.¹⁸ While current restrictions concern primarily the sharing of personal data, further restrictions on non-personal data could exacerbate existing challenges to data transfers. For example, when sharing data for research purposes, pseudonymisation of individual records may in some circumstances be used as a “sufficient supplementary measure for data protection” under the General Data Protection Regulation (GDPR).¹⁹ However, pseudonymisation would not help if the data is subject to other restrictions applicable to non-personal data. Such restrictions may therefore exacerbate existing hurdles in carrying out health research. Moreover, data on the performance of medical devices, which is not necessarily collected in a way that includes personal information, is nevertheless commercially sensitive and therefore may be subject to restrictions on sharing data across borders.²⁰

Digging deeper into how companies share data between their EU and non-EU sites in performing internal business functions (see Figure 10) we see that the most common internal function that requires data sharing is IT, which was relevant for 58% of companies (for example, to identify and react to cybersecurity threats). Companies are also sharing data to perform many business functions including

¹³ <https://www.nature.com/articles/s41591-021-01460-0?proof=t%29Nature>

¹⁴ <https://www.ncbi.nlm.nih.gov/books/NBK137823/>

¹⁵ https://www.medtecheurope.org/wp-content/uploads/2021/06/mte_160621_positionpaper_health-data.pdf

¹⁶ <https://www.nature.com/articles/d41586-021-01570-2>

¹⁷ Eiss, R. http://www.iscintelligence.com/archivos_subidos/robert_eiss_gdpr_us-eu_cooperation_in_biomedical_science_isc_gdpr_seminar_19_nov_2019.pdf (2019).

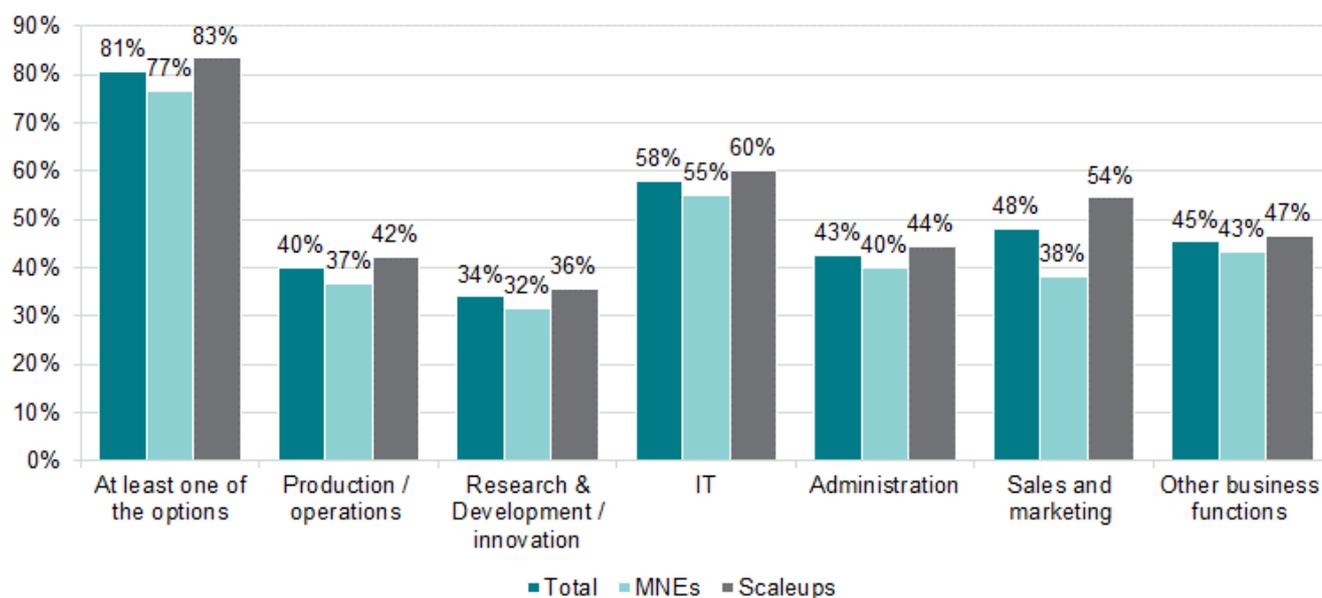
¹⁸ Eiss, R. *Nature* 584, 498 (2020).

¹⁹ Although pseudonymisation as currently described by the European Data Protection Board is not always achievable for health data. Source: <https://www.nature.com/articles/s41591-021-01460-0?proof=t%29Nature>

²⁰ https://www.medtecheurope.org/wp-content/uploads/2021/06/mte_160621_positionpaper_health-data.pdf

production/operations (e.g. to monitor production systems across borders, 40% of companies) and innovation (e.g. if innovation activities use data from the company's operations across different countries, 34% of companies).

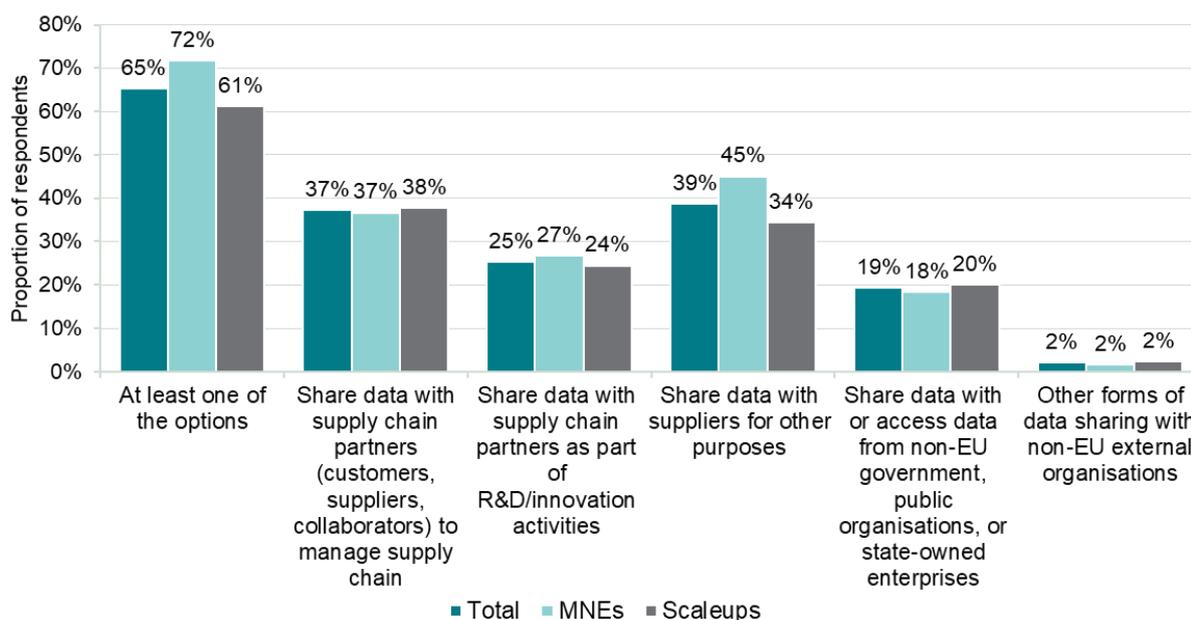
FIGURE 10 % OF BUSINESSES SHARING DATA ACROSS BORDERS WITHIN THE BUSINESS, BY FUNCTION



Source: Frontier Economics analysis of survey data

Note: In response to the survey question Q4: "Do you share data between your EU and non-EU sites in performing the following business functions? (Please select all that apply)". Other business functions could include customer service, human resources or finance and accounting

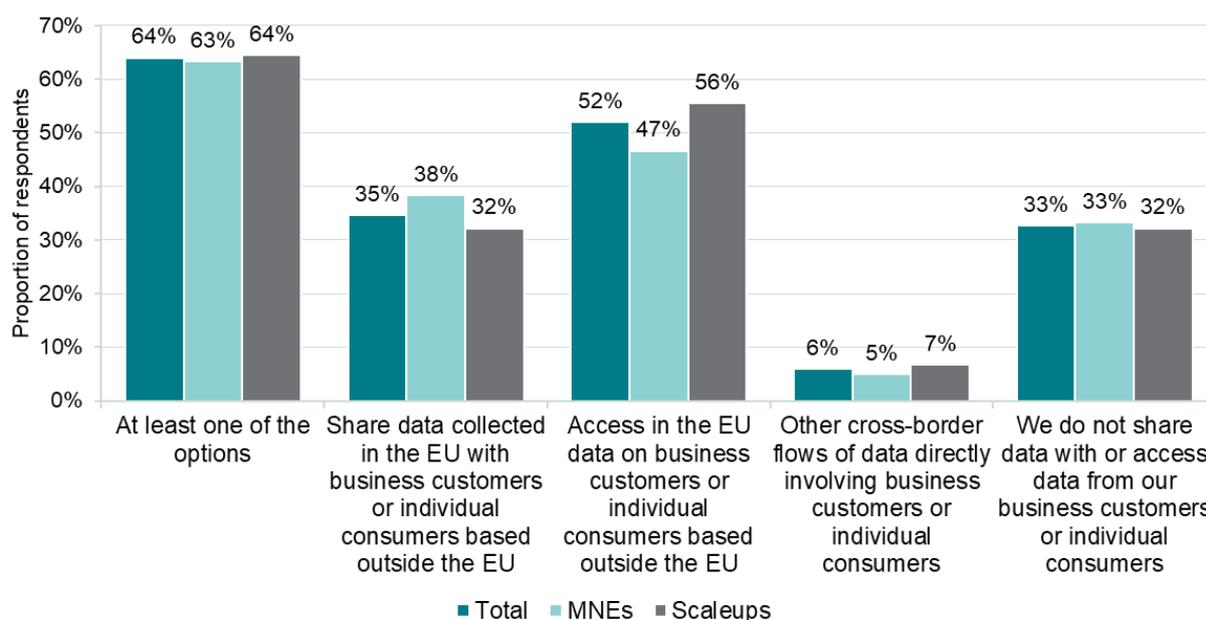
Considering the 65% of companies which share data with or access data from other non-EU organisations such as suppliers, collaborators and governments (see Figure 11), we see that this is to manage supply chains (37%) and for R&D/innovation purposes (25%). Overall, considering both in-company sharing between sites (shown above) and cross-organisation sharing (shown below), 43% of companies share data between EU and non-EU locations as part of their innovation activities.

FIGURE 11 SHARING DATA WITH AND ACCESSING DATA FROM SUPPLY CHAIN PARTNERS

Source: Frontier Economics analysis of survey data

Note: In response to the survey question Q5: "Do you share data with or access data from other non-EU organisations in any of the following ways? (Please select all that apply)"

As shown in Figure 12 below, 64% of companies share data with or access data from their customers. In the majority of cases (applying to 52% of companies), this is required in order to provide the company's core product or service.

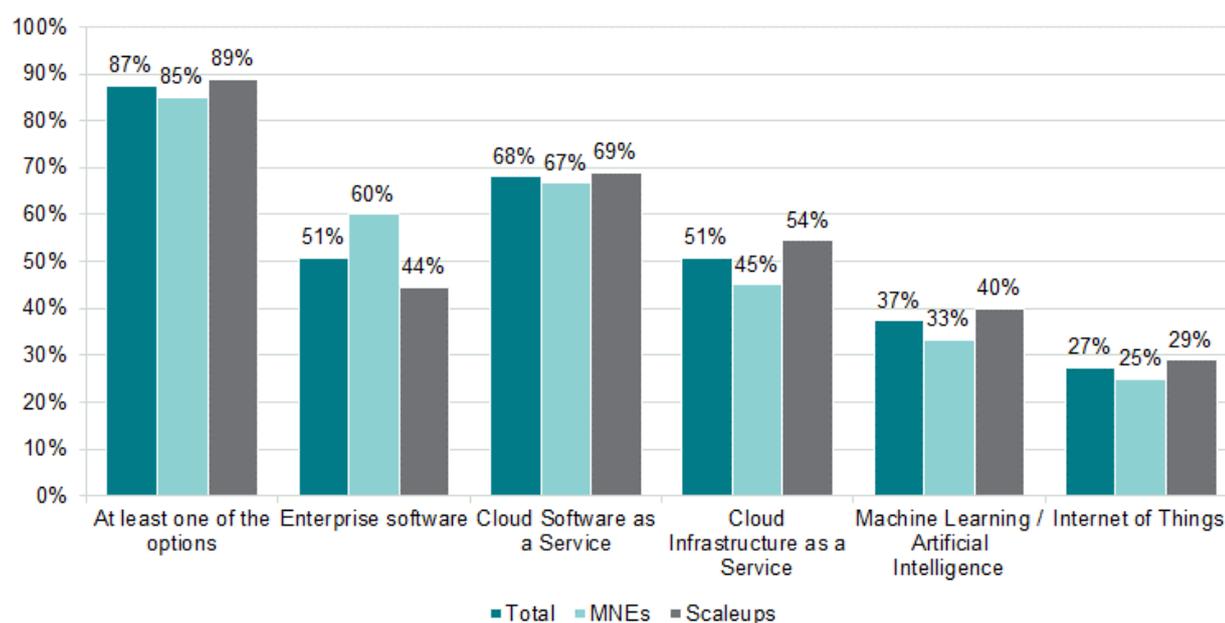
FIGURE 12 SHARING DATA WITH OR ACCESSING DATA FROM CUSTOMERS

Source: Frontier Economics analysis of survey data

Note: In response to the survey question Q6: “Do you share data with or access data from your customers in any of the following ways? (please select all that apply)”

The need for data sharing across borders within businesses is also reflected in business use of digital tools (Figure 13). For example, 51% of businesses use enterprise software that is accessible from non-EU sites (e.g. enterprise resource planning tools to manage production, sales, etc., private email network, IT outsourced solutions excluding cloud), 68% of businesses use cloud software as a service (e.g. customer relationship management software), and 51% of businesses use cloud infrastructure as a service (e.g. storage and computing power).

FIGURE 13 USE OF DATA SHARING INTENSIVE DIGITAL SOLUTIONS

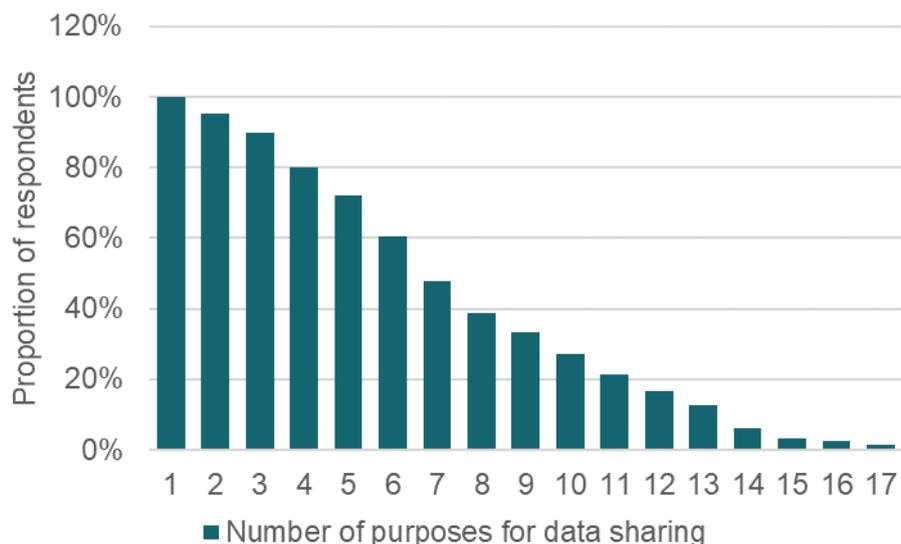


Source: Frontier Economics

Note: In response to the survey question Q3: “Does your company use or provide any of the following digital solutions? (Please select all that apply)”

As shown in Figure 14, almost all companies in our sample (95%, 143 out of 150) share data between the EU and non-EU for more than one purpose. Indeed, 60% of companies share data for six or more of the purposes described by the questions above, and 25% of companies share data for more than 10 purposes. These 25% “intensive data sharers” include both SMEs (40% of the group) and large companies. In the following section of the report, we investigate whether the impact of restrictions to data sharing would be particularly large for this group of companies.

FIGURE 14 CUMULATIVE DISTRIBUTION OF RESPONDENTS, BY NUMBER OF PURPOSES FOR DATA SHARING



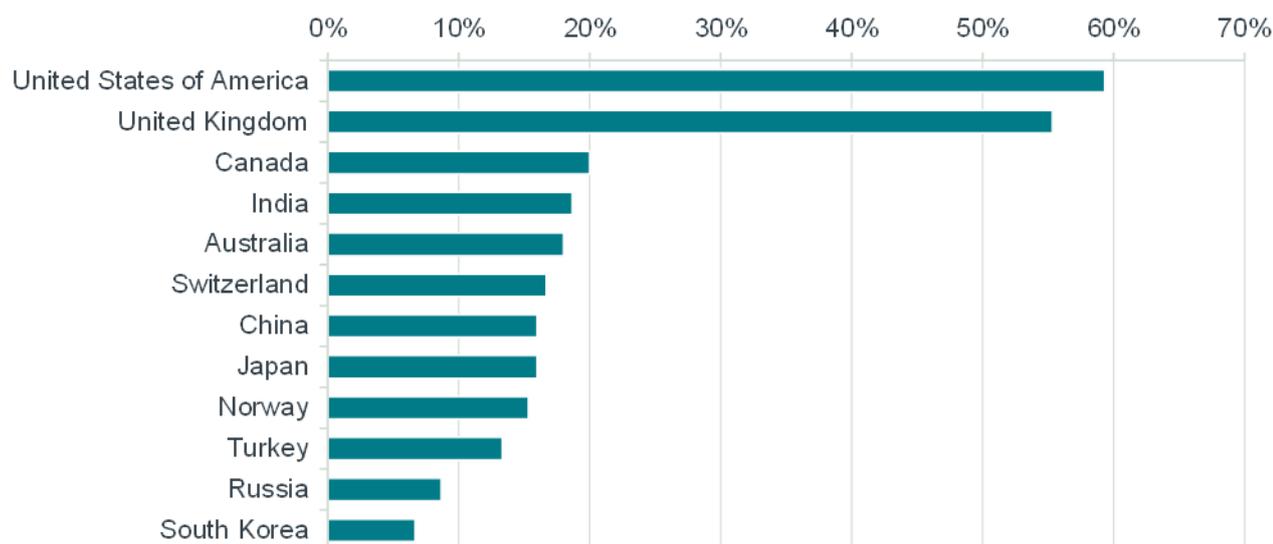
Source: Frontier Economics analysis of survey data

Note: Count of purposes of data sharing based on responses to survey questions Q3, Q4, Q5 and Q6

2.2.3 GEOGRAPHY OF DATA SHARING

When EU companies share or access data across borders this is most frequently with other sites or suppliers/collaborations/governments/customers based in the USA (59%) or the UK (55%), although such cross-border data sharing with other EU trading partners is also relevant for many EU businesses (see Figure 15).

FIGURE 15 SHARE DATA WITH OR ACCESS DATA FROM NON-EU COUNTRIES



Source: Frontier Economics

Note: In response to the survey question: "As part of the data sharing you have described so far, do your company's EU operations share data with or access data from the following non-EU countries? (check Please select all that apply)"

Of the companies that told us which countries they share data with, 75% share data with two or more non-EU countries. When companies share data with several countries, this is often with countries that are close geographically (for example, 8 out of 10 companies that share data with South Korea also share data with Japan) or that speak the same language (19 of the 29 companies that share data with Canada also share data with Australia).

3 FURTHER RESTRICTIONS TO CROSS-BORDER DATA FLOWS WOULD HAVE A SIGNIFICANT NEGATIVE IMPACT

3.1 DEFINING HYPOTHETICAL RESTRICTIONS TO CROSS-BORDER DATA FLOWS

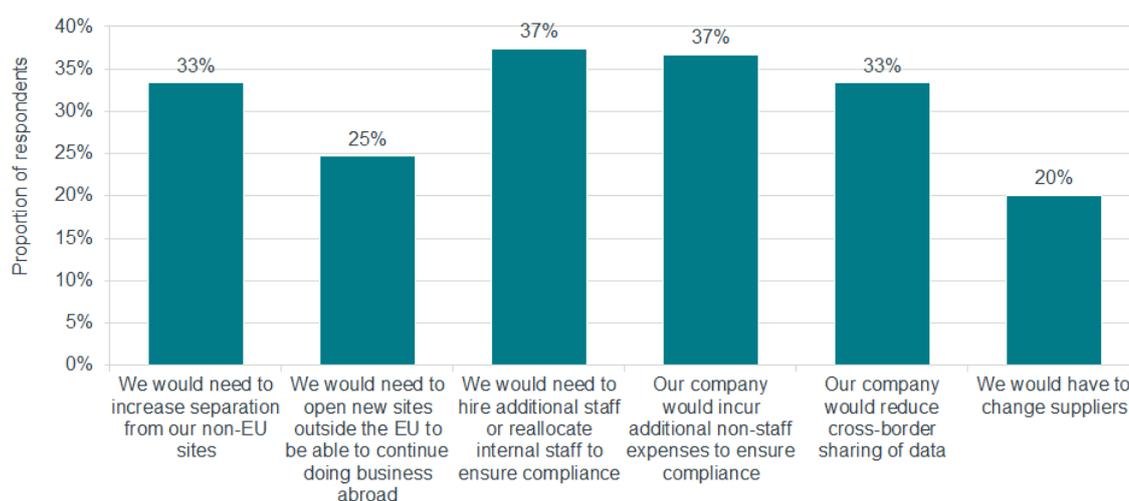
To investigate the impact of restrictions on non-personal flows of data, we asked respondents to consider the impact of a hypothetical ban on sharing commercially sensitive, non-personal data across borders (including mixed datasets that include such data along with other types of data).²¹

This is a very restrictive scenario, chosen for its clarity for respondents; however, regulations that impose high burdens on business may in practice be equivalent to outright bans. 40% of respondents told us that they would consider more realistic restrictions as being effectively equivalent to a ban.²² The remaining 60% also indicated similar effects of the restrictions on their business to the effects they reported when asked about the impact of a hypothetical ban. This is further discussed in section 3.2 below. Therefore these responses provide a realistic assessment impact of restrictions on the businesses we surveyed (at worst, an upper bound).

3.2 THE SHORT-TERM EFFECTS OF A BAN ON CROSS-BORDER DATA FLOWS

We first asked respondents about effects that are likely to materialise relatively quickly (“short-term effects”). **88% of companies** reported that a ban would have at least one of the short-term effects on their business shown in the figure below. Over a third of companies would have to increase separation from non-EU sites, reduce cross-border sharing of data, and hire staff or incur non-staff expenses to comply with the ban. These effects are consistent between scaleups and other MNEs, and across industries.

FIGURE 16 SHORT-TERM EFFECT OF A BAN ON CROSS-BORDER DATA FLOWS



²¹ Please see the Glossary section for a full description of this hypothetical scenario as shared with survey respondents.

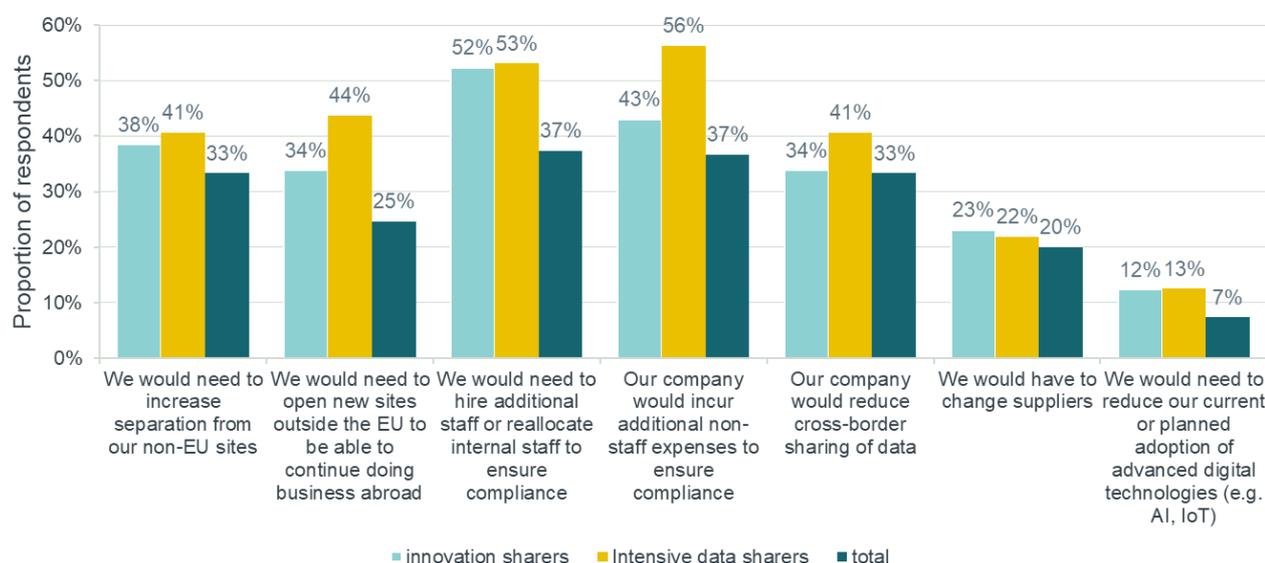
²² Restrictions which require companies that share data with non-EU locations to compare the laws and practices of non-EU countries to EU intellectual property and trade secret laws in order to assess whether the non-EU country provides an equivalent level of protection.

Source: Frontier Economics analysis of survey data
Sample size: 150 EU companies

The short-term effects of the ban would take place more frequently among firms that share data intensively and for companies that share data for innovation purposes (“innovation sharers”):

- 34% and 44% of innovation sharers and intensive data sharers respectively said they would need to open new non-EU sites, compared to 25% among all respondents to our survey;
- Just over half would need to hire or reallocate staff to ensure compliance with the ban, compared to 37% among all respondents; and
- 56% of intensive data sharers also expected they would incur additional non-staff expenses to ensure compliance with the ban, compared to 37% among all respondents.

FIGURE 17 SHORT-TERM EFFECT OF BAN, DEPENDING ON INTENSITY AND TYPE OF DATA SHARING



Source: Frontier Economics analysis of survey data
Sample size: 150 EU companies

Another short-term effect of restrictions to data sharing may be to hinder EU companies’ ability to use AI effectively. 35% of the companies in our sample use AI and, among these, **80% indicated that a ban on data sharing would limit the availability of data to use AI and their ability to develop new AI applications or to use third-party AI solutions.**

3.2.1 COMPARING A BAN TO OTHER RESTRICTIONS ON DATA SHARING

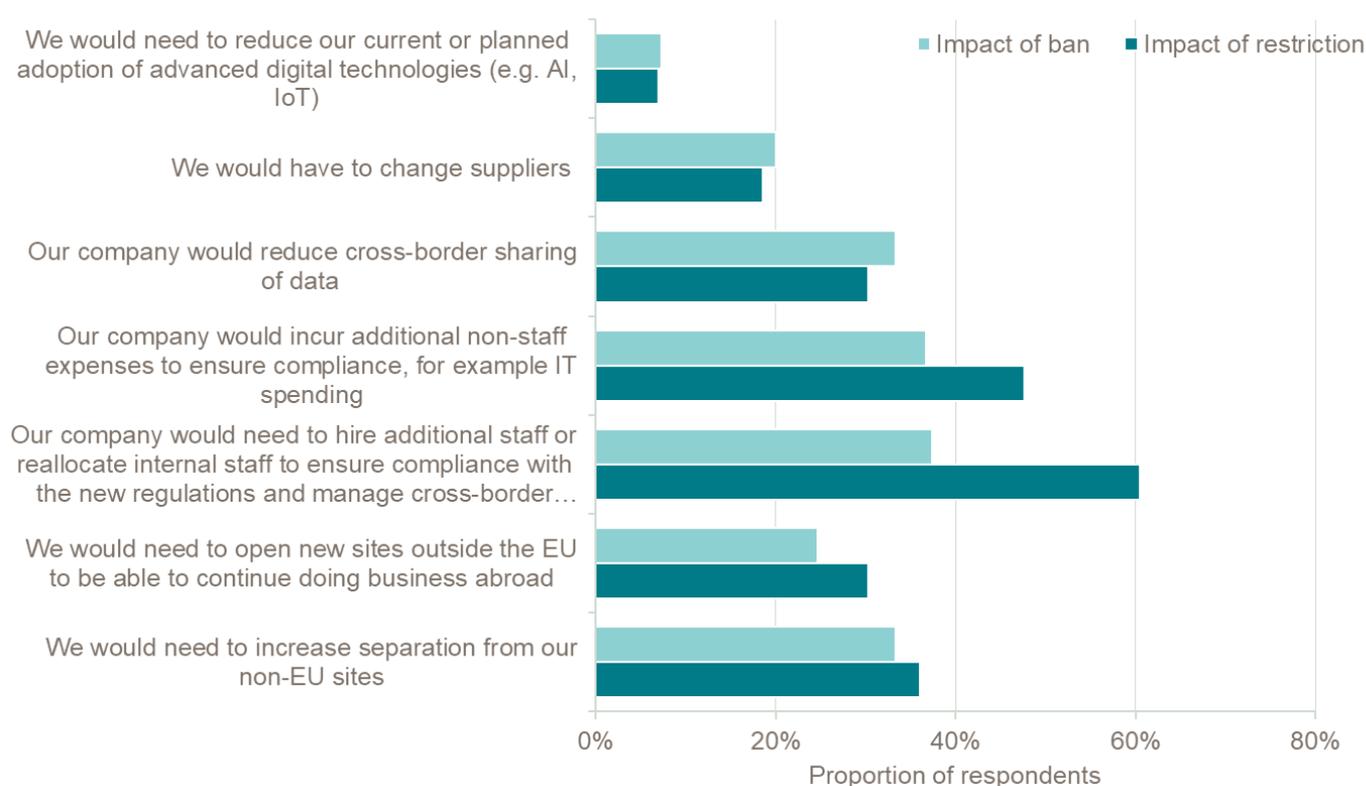
To check the extent to which our findings would differ if we investigated the impact of more realistic restrictions, we asked respondents to consider the following possible restrictions:

“Consider new EU regulations that would require your organisation to assess, in-house or in partnership with your vendors, if the laws and practices of the non-EU country where data is processed offer a level of protection that is equivalent to EU intellectual property and trade secrets laws. This assessment would apply to commercially sensitive non-personal data, and would need to

factor in legislation and practices by third-country law enforcement and national security agencies on an ongoing basis.”

40% of respondents told us that they would consider this more realistic scenario as effectively being equivalent to a ban.²³ The remaining 60% also indicated similar effects of the restrictions on their business to the effects they reported when asked about the impact of a hypothetical ban, as shown in the figure below. In fact, more respondents reported that they would need to hire staff or incur non-staff expenses to comply with the new restrictions, compared to complying with a ban. This could be because the restriction requires additional compliance activities compared to a ban – to understand and interpret the new regulation and assess non-EU countries’ laws and practices as required by the regulation. In other words, a ban on data sharing, while particularly restrictive, is nevertheless unambiguous.

FIGURE 18 **COMPARING SHORT-TERM EFFECT OF BAN TO MORE REALISTIC RESTRICTIONS**



Source: Frontier Economics analysis of survey data

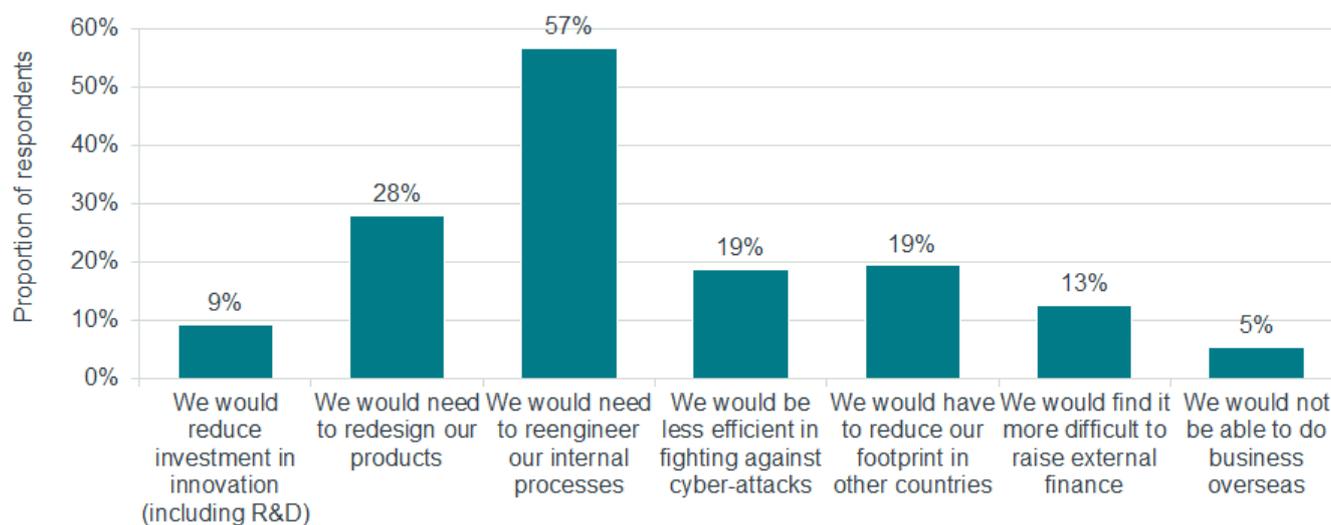
3.3 THE MEDIUM-TERM EFFECT OF A BAN ON CROSS-BORDER DATA FLOWS

We also asked respondents about the medium-term consequences of the ban. Around **65% of companies said they would need to either redesign their products or reengineer their processes as a result of a**

²³ Restrictions requiring companies that share data with non-EU locations to compare the laws and practices of non-EU countries to EU intellectual property and trade secret laws in order to assess whether the non-EU country provides an equivalent level of protection.

ban. This increases to 87% among companies that share data intensively.²⁴ Most respondents did not think that a ban would completely prevent them from being able to do business overseas, but nearly a third thought that they would be placed at a competitive disadvantage relative to foreign rivals, and 19% thought that they would have to reduce their footprint outside the EU. Again, the reported medium-term effects are consistent between scaleups and MNEs.

FIGURE 19 MEDIUM-TERM EFFECT OF A BAN ON CROSS-BORDER DATA FLOWS

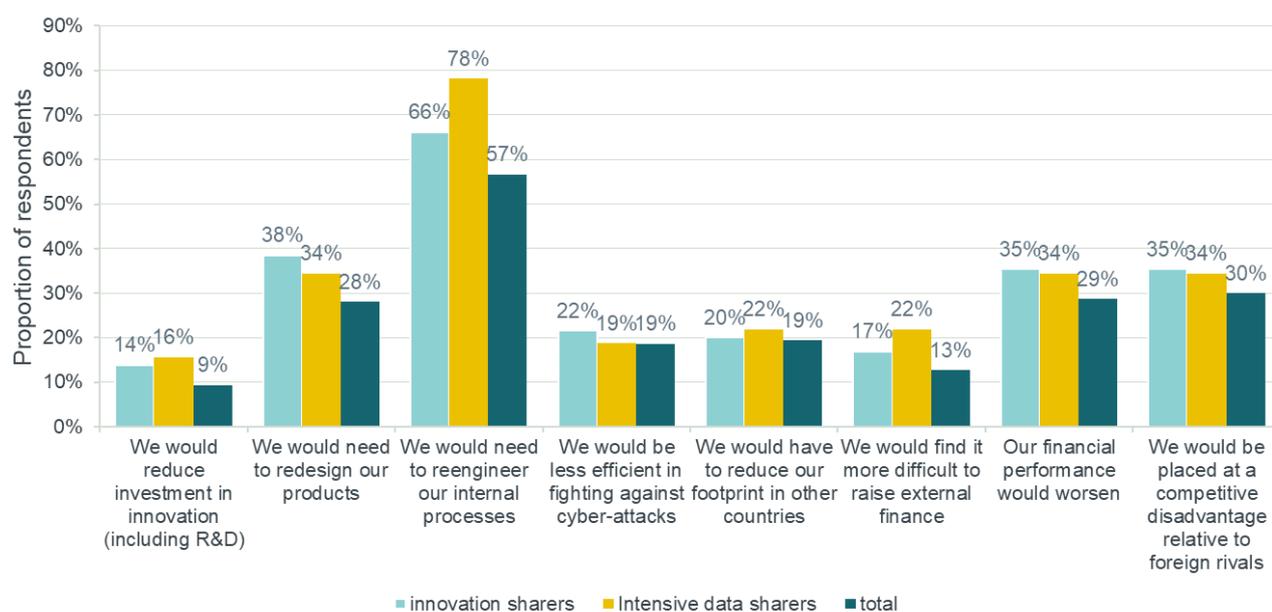


Source: Frontier Economics analysis of survey data

When looking at the effect of the ban on investment in innovation, it is worth noting that not all companies carry out this type of investment – and therefore not all companies have existing investment that could decrease as a result of a data sharing ban. We do not have information on how many companies in our sample invest in innovation but, across the EU, this is around 40% of companies.

Again, as for the short-term effects, some of the medium-term effects of the hypothetical ban would be more frequent among innovation sharers and intensive data sharers. Innovation sharers and intensive data sharers are particularly likely to report a need to redesign their products or reengineer their internal processes as a result of a hypothetical ban, as shown in Figure 20.

²⁴ Defined as companies that share data in at least 10 out of the 17 possible ways described in our survey questionnaire. Intensive data sharers account for around 20% of our sample.

FIGURE 20 MEDIUM-TERM EFFECT OF BAN, DEPENDING ON INTENSITY AND TYPE OF DATA SHARING


Source: Frontier Economics analysis of survey data

Around a third of companies responded to this question saying that their financial performance would worsen. However, looking at this question in isolation would underestimate the likely overall impact of a ban, which we explore further in the next section of this report. Indeed, 50% of the companies that did not say their financial performance would worsen when responding to this question nevertheless indicated that the impact of the ban would be comparable to sizeable fines on their company.

When respondents said they would need to redesign their products or reengineer their processes, we asked them how much work in terms of full-time equivalent (FTE) staff would be required to do so.

Respondents quantified **the amount of work that would be required to reengineer their processes or redesign their products at around 11 FTEs in a year**. This would be equivalent to at least around EUR 900,000 in additional annual costs.²⁵ In proportion to their overall employment, the effect is greater for SMEs than for large businesses: SMEs would need to dedicate around 9% of their current workforce to this adjustment. This difference is statistically significant.²⁶ This finding should be interpreted with caution as it is based on relatively small sample sizes, but it suggests that, in the short term, the burden of restrictions on data sharing would fall disproportionately on SMEs.

²⁵ Assuming an average salary of EUR 80,000 for each FTE. This is in line with the average salary for data protection officers used in the European Commission's [Impact Assessment](#) of the GDPR. While the reengineering and redesign involved may not directly involve data protection officers, they would likely require staff with similar levels of seniority.

²⁶ On average, large businesses reported that they would need to devote about 1% of their workforce to reengineering processes and redesigning products, compared to 9% of the workforce among SMEs.

Our evidence indicates that this burden would be only a relatively small part (around 10%) of the overall cost of restrictions on businesses that share data across borders, as shown in the next section of this report.

3.4 THE OVERALL ECONOMIC IMPACT OF RESTRICTIONS TO CROSS-BORDER DATA FLOWS

3.4.1 IMPACT ON BUSINESSES IN OUR SAMPLE

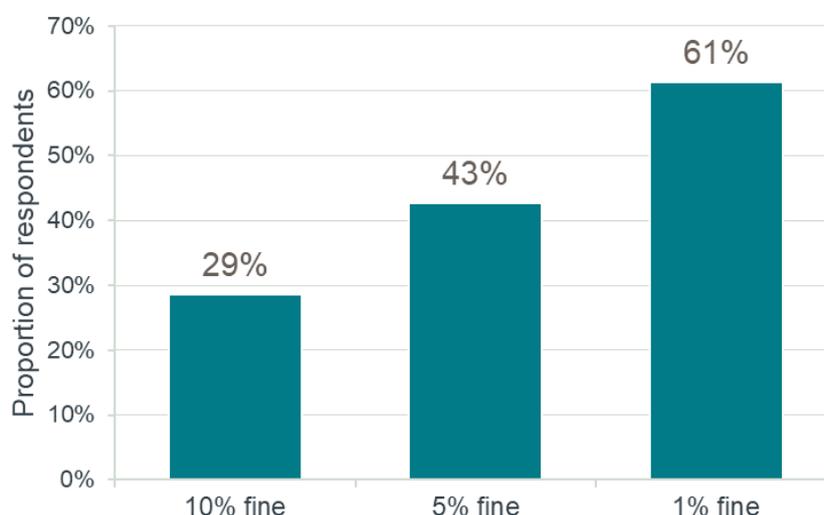
To quantify the overall impact of restrictions on cross-border data flows, we asked two questions:

- We asked both scaleups and MNEs to compare the impact of a ban on these flows to other events, including fines (due, for example, to hypothetical antitrust violations or violations of regulatory requirements).
- We asked scaleups directly to quantify the impact of a ban on their employment growth.

We asked two separate questions because quantifying the impact of the ban was likely to be difficult for most respondents particularly for respondents employed by larger, more complex organisations. This is also the reason for providing a comparison first, before asking more directly for an estimated impact on employment. Findings from the two questions show a consistent significant impact of the ban on business prospects. As described in section 3.2, this analysis provides evidence on the impact of restrictions to cross-border data flows beyond the specific illustrative case of an explicit ban.

Considering the two questions in order, 29% of respondents told us that for their business a ban would be as bad as or worse than a fine of 10% of their global annual revenues. This proportion increases to 43% for a 5% fine and to 61% for a 1% fine, as shown in the figure below.

FIGURE 21 COMPARING A BAN ON DATA SHARING TO HYPOTHETICAL FINES ON THE BUSINESS

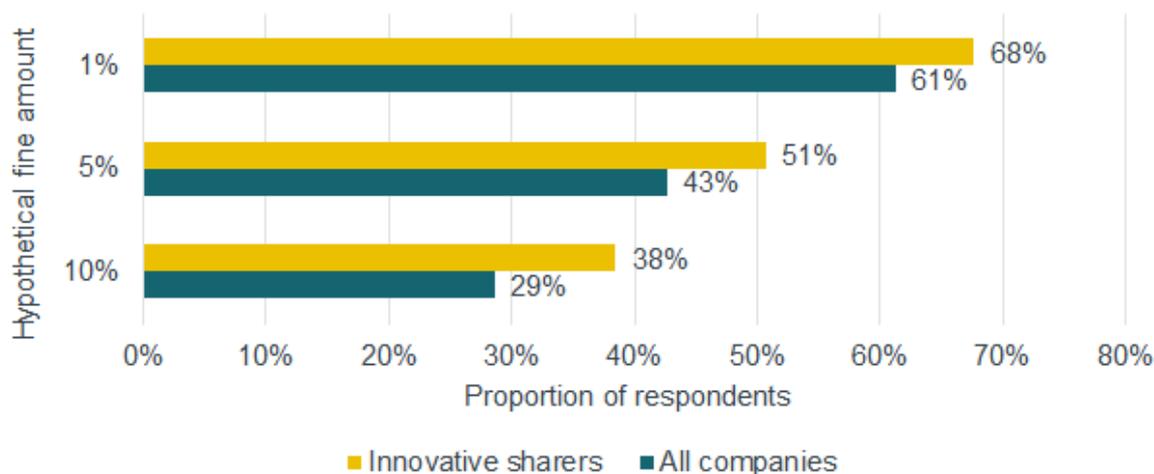


Source: Frontier Economics analysis of survey data

A significant minority of respondents, just under 30% (43 respondents) were not able to assess how a ban on data sharing would compare to hypothetical fines. However, 8 of the 43 told us in the survey that their company's financial performance would worsen as a result of the ban, and a further 6 told us that they would need to redesign their products. Therefore it is likely that the ban would have a significant impact on these 43 businesses even if it is not quantified in their response.

In line with findings on the short-term and medium-term effect of the ban, innovative sharers thought the ban would have a worse impact on their business than other respondents. This is also the case for intensive data sharers.

FIGURE 22 COMPARING A BAN ON DATA SHARING TO HYPOTHETICAL FINES, BY TYPE OF DATA SHARING



Source: Frontier Economics analysis of survey data

This overall impact is not statistically different for SMEs compared to larger businesses, in contrast to our finding on the redesign of products and processes likely resulting from a ban. This discrepancy may be explained by the fact that, while redesigning processes or products involves fixed costs, broader effects of data sharing restrictions on business' ability to coordinate across sites and with suppliers and to serve customers effectively scale with the size of the business. It is also possible that the broader impact of restrictions is particularly uncertain, which would make estimates less precise and therefore make it harder to discern differences between different business size classes.

Using data on the average revenues of the businesses surveyed, we estimate that curtailing cross-border data flows would reduce their annual revenues by **around EUR 11m on average, a decrease of 4%. This is a conservative estimate** as it assumes 10% as the maximum possible impact. This estimate is nevertheless consistent with findings from our second question asking respondents to quantify the impact of a hypothetical ban.

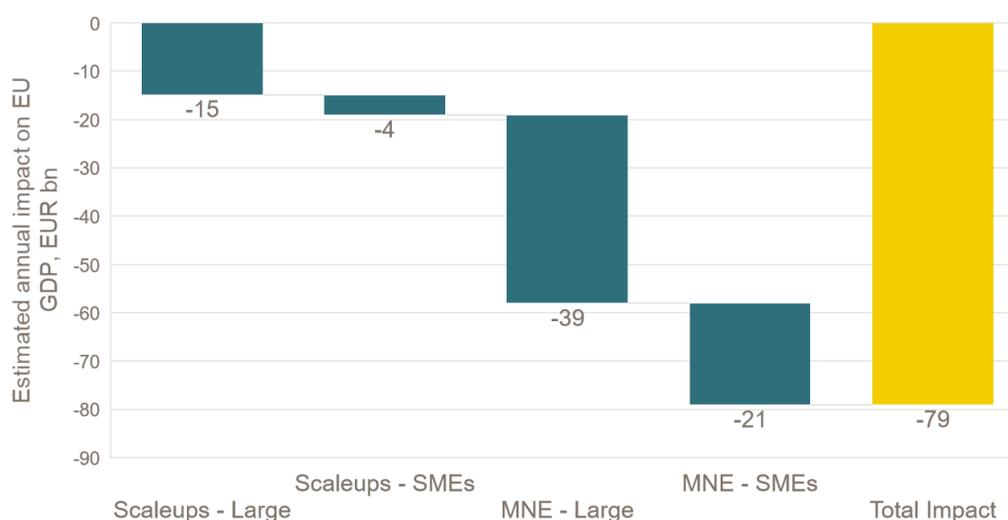
When we asked scaleups directly to tell us how much their employment growth would be impacted, 68 out of 90 businesses surveyed provided a response. The average effect among these respondents is a decrease in employment of **about 6%**.

3.4.2 IMPACT ON ALL SCALEUPS AND MNEs ACROSS THE EU

Scaling the effects described so far to the total number of relevant businesses in the EU, we estimate that the cost of new restrictions to MNEs and scaleups would be around **EUR 79bn per year**, of which 20bn would be from impact on scaleups and 60bn from impact on other MNEs. This is around **0.6% of EU GDP**

and equivalent, for example, to six times the total annual budget of EU Horizons – the EU framework for research and innovation – over the 2021-27 period.²⁷

FIGURE 23 ESTIMATED ANNUAL IMPACT OF RESTRICTIONS ON GDP



Source: Frontier Economics calculations and analysis of survey data

SMEs account for a minority of the overall impact, around 40% (EUR 26bn). This is because large enterprises are more likely than SMEs to have an international presence and therefore to share data across borders. However, for each SME that shares data, the average impact of restrictions would be similar to the impact on large firms (a 4% decrease in sales, as shown in Table 1 below). Moreover, these figures do not include the potential loss in economic activity from companies (in particular SMEs) which may be discouraged from starting to operate and/or share data across borders as a result of the restrictions.

TABLE 1 CALCULATION OF IMPACT ON SCALEUPS

SIZE CLASS	NUMBER OF SCALEUPS	NUMBER OF SCALEUPS ACTIVE OUTSIDE EU	AVERAGE REVENUE OF SCALEUPS ACTIVE OUTSIDE EU	% IMPACT OF RESTRICTIONS ON REVENUES	AGGREGATE IMPACT OF RESTRICTION ON REVENUES
10-19	40,510	5,525	EUR 2m	4%	EUR 450m
20-49	21,530	2,899	EUR 5m	4%	EUR 630m
50-249	9,400	3,450	EUR 23m	4%	EUR 3.16bn
SMEs - subtotal					EUR 4.2bn
250+	1,880	1,180	EUR 316m	4%	EUR 14.87bn
All	73,000	13,054			EUR 19.1bn

²⁷ Also roughly equivalent to the total gross value added (GVA) of France's ICT sector, which is EUR 87bn according to the latest available Eurostat data, and accounts for around 40% of the entire EU's ICT sector in terms of GVA.

Source: Frontier Economics analysis of survey data and Eurostat data

Note: Figures may not add up to exact amounts due to rounding

TABLE 2 CALCULATION OF IMPACT ON MNES

SIZE CLASS	NUMBER OF MNES	NUMBER OF MNES ACTIVE OUTSIDE EU	AVERAGE REVENUE OF MNES ACTIVE OUTSIDE EU	% IMPACT OF RESTRICTIONS ON REVENUES	AGGREGATE IMPACT OF RESTRICTION ON REVENUES
10-19	96,790	53,800	EUR 2m	3.3%	EUR 3.66bn
20-49	50,790	28,200	EUR 5m	3.3%	EUR 5.09bn
50-249	22,460	16,100	EUR 23m	3.3%	EUR 12.2bn
SMEs - subtotal					EUR 21bn
250+	4,490	3,080	EUR 316m	3.3%	EUR 39bn
All	174,530	101,180			EUR 60bn

Source: Frontier Economics analysis of survey data and Eurostat data

Note: Figures may not add up to exact amounts due to rounding

More broadly, the total cost of new restrictions is likely to be even higher than the figures presented above. This is because the total cost would also include effects that have not been quantified through this study, including:

- The effect on companies that do not directly share data across borders, for example those that purchase services from those directly affected, which may experience higher costs or lower quality of services as a result of restrictions;
- The effect of potential retaliation from non-EU countries, which may impose restrictions on their data flowing to the EU in response to new restrictions introduced by the EU; and
- The effect on competition in EU markets which may decrease due to EU SMEs struggling to scale up as a result of restrictions.

CONCLUSIONS

This report has provided new original evidence on the role and economic impact of cross-border data flows between the EU and countries outside the EU, with a particular focus on commercially sensitive, non-personal data.

Our results show that companies share data between EU and non-EU locations for a wide range of purposes, including as part of their innovation activities. Restrictions to these data flows would have a significant negative economic impact on both large and small enterprises that operate across borders. This impact would be particularly significant for businesses that share data across borders for innovation purposes, which are crucially important for the EU's future growth.

Therefore, restrictions on sharing commercially sensitive data between EU and non-EU locations poses a significant risk of unintended consequences for the EU's economic growth and to the EU's objectives to transition towards an increasingly digital and sustainable economy. Further regulation of the use of data may be useful to provide businesses and consumers with confidence in the security and integrity of their data. However, additional regulations will need to be considered carefully in light of the evidence provided by this report and related research on the risk of negative unintended consequences.

ANNEX A - TECHNICAL ANNEX

A.1 - ADDITIONAL DETAIL ON CALCULATIONS

A.1.1 - ESTIMATING THE NUMBER OF EU FIRMS THAT ARE SCALEUPS

To estimate the number of scaleups in the EU, we first take the number of active enterprises in the EU with 10+ employees. The number was 1,450,292 in 2019.²⁸ For a subset of EU countries, the OECD provides statistics on the proportion of and number of businesses with 10+ employees that are scaleups.²⁹ It must be noted that these statistics do not cover all EU countries and, for most of the countries covered, the data runs only to 2012. Eurostat uses an alternative definition of a “high-growth firm” which sets the minimum threshold for growth at 10% rather than 20%, as in our definition. Eurostat data shows that the proportion of high-growth firms in the EU increased from 8.6% in 2014 (earliest data available) to 11.8% in 2018 (latest data available). Therefore, it is possible that using the 2012 OECD data implies underestimating the number of scaleups in the EU. However, as the Eurostat data is based on a different definition and time period, we use the OECD data without additional adjustments.

To estimate the proportion of EU businesses with 10+ employees that are scaleups, we take a weighted average of the OECD by country proportions in 2012, weighting by the number of scaleups in that country. This gives an estimate of 5.01% as the proportion of EU enterprises that are scaleups. Applying this proportion to the number of active enterprises with 10+ employees above, we estimate a total of 72,655 scaleups in the EU.

A.1.2 - ESTIMATING THE NUMBER OF LARGE SCALEUPS REPRESENTED BY THE SURVEY

Our survey only covers scaleups with sites outside the EU and over-represents large companies compared to small and medium enterprises (SMEs). Therefore, to estimate the number of scaleups among the 72,655 that are represented by the survey, we need the following figures:

1. The proportion of scaleups that are “large”; and
2. The proportion of scaleups that have sites outside of the EU.

For the proportion of scaleups that are large, we consider Eurostat data on all active enterprises, by size class.³⁰ The numbers of firms in the largest size classes are rounded in this data, but it does still provide an indication of the distribution of EU businesses by size. The data indicates that in 2018 approximately 2.57% of active businesses with 10 or more employees in the EU had 250 or more employees. We therefore assume that 2.57% of businesses are “large”. This is likely to be a conservative assumption as, by definition, scaleups have achieved fast growth and therefore are more likely to have reached a large scale compared to other businesses. We adjust this assumption as part of the sensitivities outlined in Section A.2.8.

²⁸ https://ec.europa.eu/eurostat/databrowser/view/bd_9bd_sz_cl_r2/default/table?lang=en

²⁹ <https://stats.oecd.org/index.aspx?queryid=70735>

³⁰ https://ec.europa.eu/eurostat/databrowser/view/SBS_SC_SCA_R2__custom_905984/bookmark/table?lang=en&bookmarkId=2b85609f-993e-48a4-9930-b595f5ef96e6

We found limited evidence on the international presence of scaleups. As a proxy for the proportion of scaleups which operate outside the EU, we consider the proportion of EU firms with 250+ employees that export outside of the EU. Both the data on the number of firms with 250+ employees that export outside the EU and the total number of firms with 250+ employees come from Eurostat.^{31 32}

From this data, the estimated proportion of firms with 250+ employees that export outside the EU is 62.9%. We use this figure as a proxy for the proportion of large scaleups that have sites outside of the EU. Again, we adjust this assumption as part of the sensitivities outlined in Section A.2.8. Therefore, for the number of scaleups represented by the survey, we estimate using the following calculation:

$$72,655 \times 2.574\% \times 62.9\% = \mathbf{1,176 \text{ scaleups}}$$

A.1.3 - ESTIMATING THE EQUIVALENT LOSS IN REVENUE ANTICIPATED, FOR LARGE SCALEUPS REPRESENTED BY THE SURVEY

Within the survey, respondents were also asked to quantify the impact of data sharing restrictions in terms of an equivalent fine on global revenues. Out of all survey respondents that were scaleups, 34% said the impact would be worse or similar to a 10% fine, 8% said the impact would be worse or similar to a 5% fine and 20% said the impact would be worse or similar to a 1% fine.

We estimate the average turnover per firm in the EU with 250+ employees to be approximately EUR 316m.³³ We use this average turnover to calculate the equivalent of a 10% fine (EUR 32m), a 5% fine (EUR 16m) and a 1% fine (EUR 3.2m). The average impact on turnover is approximately 4%.

Adding up the total impact for all large scaleups gives an estimated impact of approximately EUR 14,874m, or 0.11% of EU GDP in 2019,³⁴ for firms represented by the survey.

A.1.4 - ESTIMATING THE EQUIVALENT LOSS IN REVENUE ANTICIPATED, FOR ALL SCALEUPS

The next step involves estimating the impact of restrictions on small and medium scaleups that have sites outside the EU.

We estimate the number of firms in each size class that would be affected by the restrictions by taking the proportion of firms in these size categories that export outside of the EU. This produces an estimate that there are 19,887 scaleups with 10+ employees that export outside the EU. The estimated number of businesses is given in the table below. All data used to estimate these figures comes from Eurostat:

The next step is to estimate the average turnover in each size class, again using Eurostat data as shown below.

³¹ <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

³² https://ec.europa.eu/eurostat/databrowser/view/SBS_SC_SCA_R2__custom_905984/bookmark/table?lang=en&bookmarkId=2b85609f-993e-48a4-9930-b595f5ef96e6

³³ Source: Eurostat

³⁴ https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind/default/table?lang=en

TABLE 3 ESTIMATED NUMBER OF AFFECTED SCALEUPS, BY SIZE

	ESTIMATED PROPORTION OF ALL BUSINESSES	ESTIMATED PROPORTION IN SIZE CLASS THAT EXPORT OUTSIDE THE EU	ESTIMATED NUMBER OF AFFECTED SCALEUPS
10-19 employees	55.5%	13.7%	5,525
20-49 employees	29.1%	13.7%	2,899
50-249 employees	12.9%	36.9%	3,453
250+ employees	2.6%	62.9%	1,176

Source: Eurostat, Frontier Economics

Note: Breakdown on the number of businesses that export outside the EU was not available separately for 10-19 and 20-49, hence these categories have the same proportion

TABLE 4 TURNOVER IMPACT SCALING FACTORS

	TOTAL TURNOVER (EUR BN)	NUMBER OF FIRMS (THOUSANDS)	TURNOVER PER FIRM (EUR M)
10-19 employees	1,768	862	2
20-49 employees	2,454	452	5
50-249 employees	4,580	200	23
250+ employees	12,653	40	316

Source: Eurostat

This then allows us to apply the impact of restrictions on revenues indicated by survey respondents to the total revenues of scaleups in each class size, as shown in the table below. We estimate that the total equivalent loss of revenue for all scaleups is EUR 19,120m, or 0.14% EU GDP, in 2019.³⁵

TABLE 5

SIZE CLASS	NUMBER OF SCALEUPS	NUMBER OF SCALEUPS ACTIVE OUTSIDE EU	AVERAGE REVENUE OF SCALEUPS ACTIVE OUTSIDE EU	% IMPACT OF RESTRICTIONS ON REVENUES	AGGREGATE IMPACT OF RESTRICTION ON REVENUES
10-19	40,510	5,525	EUR 2m	4%	EUR 450m
20-49	21,530	2,899	EUR 5m	4%	EUR 630m
50-249	9,400	3,450	EUR 23m	4%	EUR 3.16bn

³⁵ https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind/default/table?lang=en

SIZE CLASS	NUMBER OF SCALEUPS	NUMBER OF SCALEUPS ACTIVE OUTSIDE EU	AVERAGE REVENUE OF SCALEUPS ACTIVE OUTSIDE EU	% IMPACT OF RESTRICTIONS ON REVENUES	AGGREGATE IMPACT OF RESTRICTION ON REVENUES
SMEs – subtotal				EUR 4.2bn	
250+	1,880	1,180	EUR 316m	4%	EUR 14.87bn
All	73,000	13,054			EUR 19.1bn

Source: Eurostat, Frontier Economics

A.1.5 - SENSITIVITIES AROUND SCALEUP IMPACTS

We consider the following two sensitivities around our results for scaleups:

- Increasing the proportion of scaleups that have 250 or more employees from 2.57% to 5%. The estimated proportion of scaleups that have 50-249 employees is adjusted to account for this change; and
- Setting the estimated proportion of all scaleups that operate outside of the EU to the estimated weighted average proportion of firms with more than 10 employees that export outside the EU of 28%.

Under the first alternative scenario, assuming the proportion of scaleups in the EU that have 250+ employees is 5%, the impacts calculated are the following:

- The equivalent revenue impact for scaleups in our survey increases from EUR 14,874m to EUR 29,054m. The scaled revenue impact increases from EUR 19,120m to EUR 32,723m.

Under the second alternative scenario, assuming the proportion of scaleups that operate outside of the EU is 28%, the impacts calculated are the following:

- The equivalent revenue impact for scaleups in our survey decreases from EUR 14,874m to EUR 6,658m. The scaled revenue impact decreases from EUR 19,120m to EUR 11,291m.

A.1.6 - ESTIMATING THE NUMBER OF MNES REPRESENTED BY THE SURVEY

Eurostat indicates that there were approximately 174,531 MNE groups operating in the EU in 2019.³⁶ Of these, approximately 112,000 had their “global decision centres” inside the EU.³⁷

Our sample includes only large firms operating outside the EU, and thus we want to estimate the proportion of the 174,000 MNEs that operate outside of the EU (regardless of the location of their global decision centre). In our central scenario, we use as a proxy the proportion of exporting firms that export

³⁶ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Structure_of_multinational_enterprise_groups_in_the_EU

³⁷ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Structure_of_multinational_enterprise_groups_in_the_EU

outside of the EU, given firm size. Using data from Eurostat, we estimate this to be around 82.5% for firms with more than 250 employees.³⁸

Given that the survey only involves large firms, to estimate the number of MNEs represented by the survey, we also have to scale down the estimated number of MNEs by the number of firms that are large. As before, we assume that 2.57% of firms are large, based on Eurostat data on the distribution of firms by size class. Applying these two proportions to the total number of EU MNEs (174,531) gives us an estimated 3,708 MNEs across the EU that are represented by the survey.

A.1.7 - ESTIMATING THE EQUIVALENT LOSS IN REVENUE ANTICIPATED, FOR MNEs REPRESENTED BY THE SURVEY

The equivalent revenue impact is calculated using the same methodology as set out in section A.1.3 - above. Out of all survey respondents that were MNEs, 20% said the impact would be worse than or similar to a 10% fine, 23% said the impact would be worse than or similar to a 5% fine and 17% said the impact would be worse than or similar to a 1% fine.

Estimating the implied impact for large MNEs, using the same methodology as for scaleups, we get a total impact of EUR 38,939m or 0.28% of EU GDP in 2019.³⁹

Again, we use the same methodology as for scaleups to estimate the impact of restrictions on smaller firms. We estimate that the total equivalent loss of revenue for all MNEs is EUR 59,929m, or 0.43% GDP, in 2019.⁴⁰

A.1.8 - SENSITIVITIES AROUND MNE IMPACTS

As our sensitivities around the impacts for MNEs, we vary our assumption around the proportion of EU MNEs that operate outside of the EU. We consider the following alternative assumptions:

- We assume that the proportion of MNEs affected is constant across size class and is equal to the average proportion of all exporting firms that export outside of the EU, i.e. 61%.
- We assume that the proportion of MNEs affected is constant across size class and is equal to 90%.

Under the first alternative scenario, using an assumption of 61%, the impacts calculated are the following:

- The equivalent revenue impact decreases from EUR 38,939m to EUR 28,781m. The scaled revenue impact decreases from EUR 59,929m to EUR 48,804m.

Under the second alternative scenario, using an assumption of 90%, the impacts calculated are the following:

- The equivalent revenue impact increases from EUR 38,939m to EUR 42,456m. The scaled revenue impact increases from EUR 59,929m to EUR 71,992m.

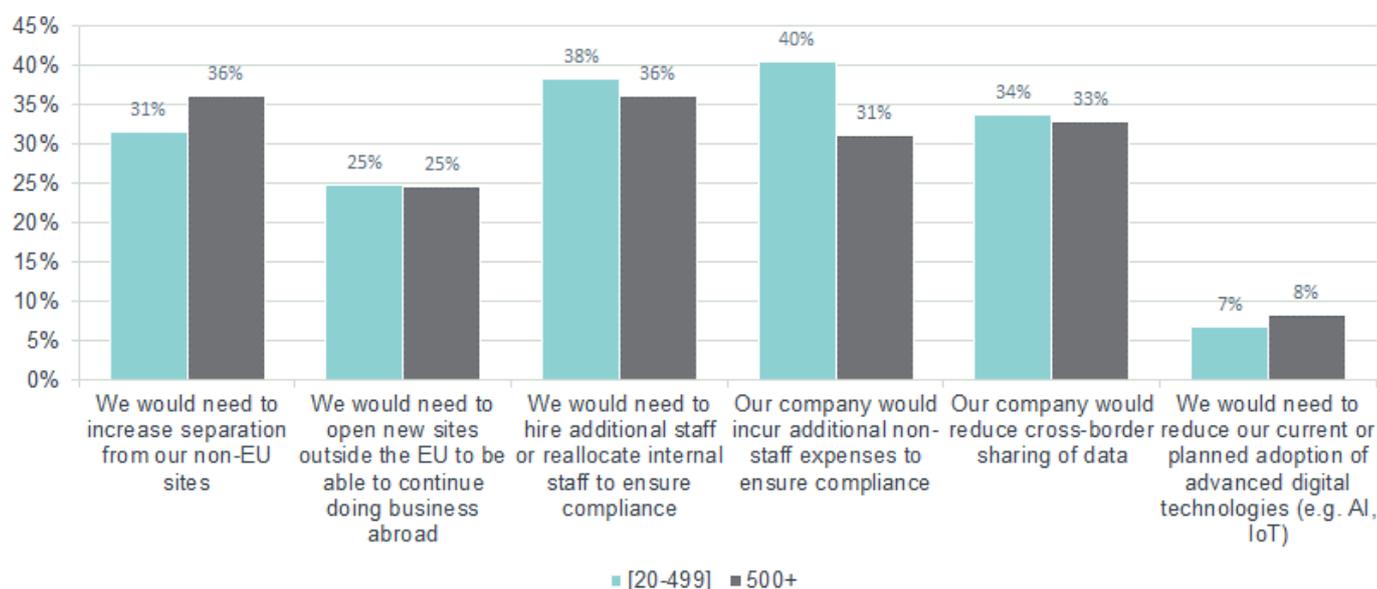
³⁸ https://ec.europa.eu/eurostat/databrowser/view/EXT_TEC01__custom_1479350/default/table?lang=en

³⁹ https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind/default/table?lang=en

⁴⁰ https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind/default/table?lang=en

A.2 - FURTHER RESULTS FROM THE SURVEY

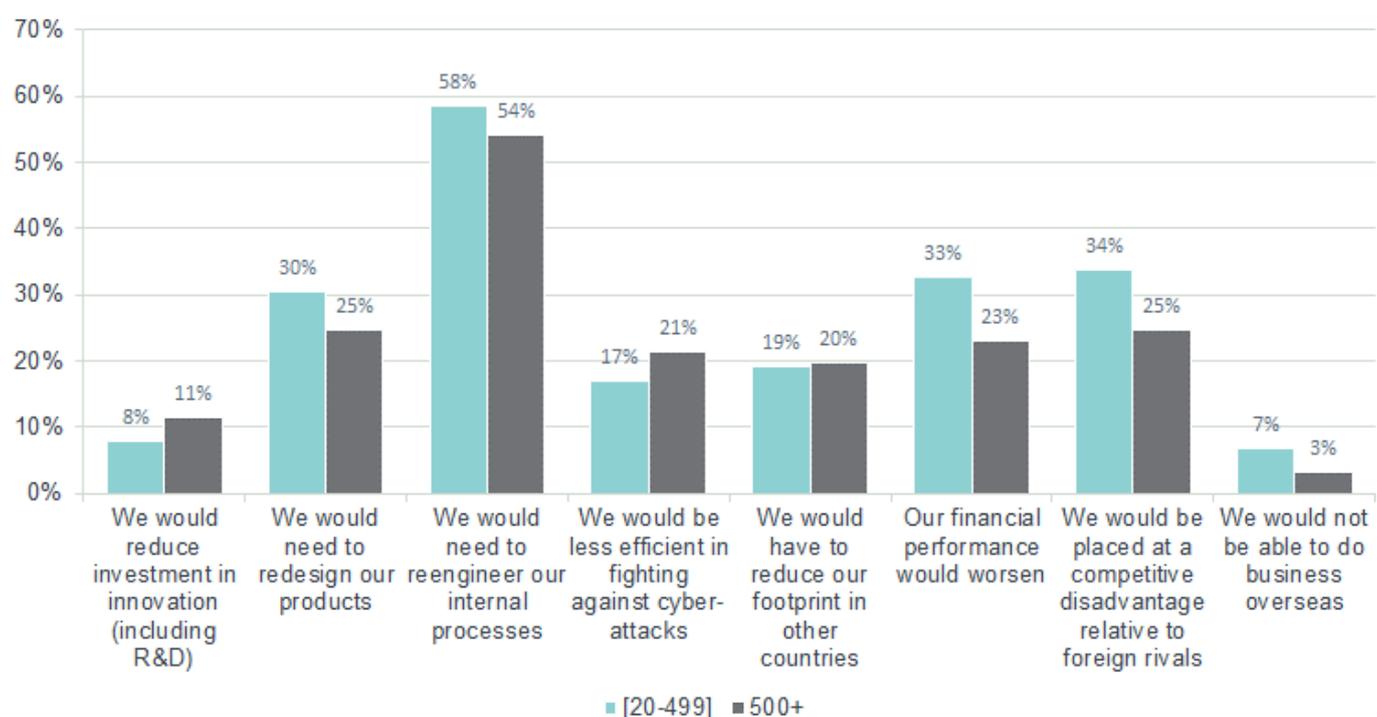
FIGURE 24 SHORT-TERM EFFECT OF BAN, BY FIRM SIZE



Source: Frontier Economics analysis of survey data

Note: Based on responses to the question: "How would your business respond to a ban on sharing commercially sensitive, non-personal data with countries outside the EU?"

FIGURE 25 MEDIUM-TERM IMPACT OF BAN, BY FIRM SIZE



Source: Frontier Economics analysis of survey data

Note: Based on responses to the question: "What would be the impact of these changes on your business?"

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