Study on Contracts for the Digital Economy

Final Report

Alboris Consortium

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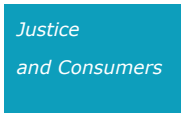

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List of Acronyms

ADM: Automated Decision-Making

AI: Artificial Intelligence

API: Application Programming Interface

B2B: Business-to-Business

B2C: Business-to-Consumer

CJEU: Court of Justice of the European Union

CPC: Consumer Protection Cooperation

DCD: Digital Content Directive

DDBM / DDBMs: Data-Driven Business Model(s)

DG GROW: Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs

DG JUST: Directorate-General for Justice and Consumers

DLT: Distributed Ledger Technology

DMA: Digital Markets Act

ECLA: European Company Lawyers Association

EDPB: European Data Protection Board

eIDAS: Electronic Identification, Authentication and Trust Services

EEN: Enterprise Europe Network

ELI: European Law Institute

EU: European Union

EUCFR: European Union Charter of Fundamental Rights

FRA: European Union Agency for Fundamental Rights

GDP: Gross Domestic Product

GDPR: General Data Protection Regulation

IACCM: International Association for Contract and Commercial Management

ICT: Information and Communication Technology

IoT: Internet of Things

JRC: Joint Research Centre

JURI: Committee on Legal Affairs (European Parliament)

KCPs: Key Contracting Principles

LLMs: Large Language Models

NACE: Statistical Classification of Economic Activities in the European Community

OS: Operating System

PDMS: Personal Data Management Systems

PIMS: Personal Information Management Systems

R&D: Research and Development

RPA: Robotic Process Automation

SFDR: Sustainable Finance Disclosure Regulation

SME / SMEs: Small and Medium-sized Enterprise(s)

SOM: School of Management

T&Cs: Terms and Conditions

UCPD: Unfair Commercial Practices Directive

UCTD: Unfair Contract Terms Directive

UK: United Kingdom

UNCITRAL: United Nations Commission on International Trade Law

ABSTRACT

This study examines how automated contracting and data-driven business models are reshaping contractual relationships in the EU. It focuses on two areas: automated contracting, including AI-enabled contract generation, negotiation and execution, as well as smart legal contracts; and data-driven business models, covering data contracts and data sharing linked to connected products.

Using desk research, surveys, interviews and expert focus groups, the study assesses market uptake, key benefits and the technical, legal, and organisational challenges that hinder wider deployment. Automated contracting can lower costs, speed up contract cycles and strengthen compliance, yet adoption remains limited due to legal uncertainty, integration challenges, information asymmetries and risks of unfair outcomes. Data-driven business models can improve decision-making, innovation and service personalisation, but are held back by legal fragmentation, transparency gaps, consumer reluctance, and unequal technical capacity. Across both areas, persistent contractual imbalances require policy attention to ensure fair and trustworthy use.

The study develops baseline scenarios and forward-looking estimates of economic impacts and identifies a set of binding and non-binding policy measures, which are assessed concerning their cost-effectiveness. The findings provide an evidence base to inform potential EU action to support a trustworthy, inclusive and competitive digital economy.

RÉSUMÉ

Cette étude examine comment les contrats automatisés et les modèles commerciaux basés sur les données remodèlent les relations contractuelles dans l'UE. Elle se concentre sur deux domaines: les contrats automatisés, y compris la génération, la négociation et l'exécution de contrats basés sur l'IA, ainsi que les contrats juridiques intelligents; et les modèles commerciaux basés sur les données, couvrant les contrats de données et le partage de données liés aux appareils connectés et aux produits connectés.

À l'aide de recherches documentaires, d'enquêtes, d'entretiens et de groupes de discussion d'experts, l'étude évalue l'adoption par le marché, les principaux avantages et les défis techniques, juridiques et organisationnels qui entravent un déploiement plus large. Les contrats automatisés peuvent réduire les coûts, accélérer les cycles contractuels et renforcer la conformité, mais leur adoption reste limitée en raison de l'incertitude juridique, des défis d'intégration, des asymétries d'information et des risques de résultats injustes. Les modèles commerciaux basés sur les données peuvent améliorer la prise de décision, l'innovation et la personnalisation des services, mais ils sont freinés par la fragmentation juridique, le manque de transparence, la réticence des consommateurs et l'inégalité des capacités techniques. Dans ces deux domaines, les déséquilibres contractuels persistants nécessitent une attention politique afin de garantir une utilisation équitable et fiable.

L'étude élabore des scénarios de référence et des estimations prospectives des impacts économiques et elle identifie un ensemble de mesures politiques contraignantes et non contraignantes. Chaque mesure est évaluée en termes d'efficacité et de rentabilité, qui sont évaluées en fonction de leur rapport coût-efficacité. Les conclusions fournissent une base factuelle pour éclairer les mesures que l'UE pourrait prendre pour soutenir une économie numérique fiable, inclusive et compétitive.

EXECUTIVE SUMMARY

Purpose and scope of the study

The Study on Contracts for the Digital Economy supports the European Commission DG JUST in assessing the development, use and challenges of emerging contracting technologies and data-driven business models (DDBMs) in the EU. It examines AI-enabled contracting, smart legal contracts, data contracts as defined by Article 3(1) sub-paragraph 2 of the Digital Content Directive (DCD), and data-sharing arrangements involving connected products and related services under Article 2(5) and (6) of the Data Act.

The study was implemented between January 2024 and January 2026, with the primary bulk of interviews and surveys being conducted in until September 2024, and the focus groups in May and June 2025. The analysis follows four components: (i) market analysis; (ii) problem identification and assessment; (iii) identification of possible policy measures; and (iv) assessment and comparison of these measures. This structure reflects the Better Regulation guidelines on EU Impact Assessments.. The study draws on extensive desk research, targeted interviews, surveys, and an Expert Panel delivered through four structured focus groups, which played a central role in validating problem statements and informing the assessment of policy measures.

Automated contracting

Market analysis

Automated contracting encompasses AI-enabled contracting and smart legal contracts. AI-enabled contracting includes tools that support contract negotiation, drafting, review, and execution. Smart legal contracts refer to legally binding contracts in which some or all terms and obligations are defined in and/or executed by code. The market analysis suggests that automated contracting remains at an early stage of development in the EU.

Our estimates based on available evidence suggest that approximately 0.7–1.5% of EU enterprises, roughly 235,000 to 475,000 firms, currently make use of AI solutions for contracting. This estimate is based on Eurostat's 2023 ICT Usage in Enterprises survey, complemented by insights from a recent JRC study. Adoption is strongest in sectors with high contracting volumes, where efficiencies can be achieved through standardised templates and repeatable structures.

Future uptake appears likely to grow. More than one-third of firms responding to the EEN survey plan to adopt AI contracting tools. Smart legal contracts show growing activity within blockchain ecosystems, as evidenced by increasing volumes of verified contracts on major blockchains in 2022. However, economic evidence on real-world commercial adoption within the EU remains limited, and legal uncertainty continues to hold back wider use.

Problem assessment

The report identifies two main problems with respect to automated contracting:

1. barriers hindering uptake of automated contracting; and
2. imbalances between contracting parties.

These are caused by five main types of drivers:

- **Legal and regulatory compliance costs**: These fall into administrative costs and legal review expenses. Administrative tasks (documenting implementation, monitoring use, and keeping compliance records) are generally minimal for adopters. By contrast, legal

reviews represent the larger burden, especially at the outset, as firms must ensure compliance with contract law, assess liability risks (including for malfunctions or third-party tools), and address differing interpretations and enforcement across jurisdictions in cross-border cases.

- **Integration with existing practices**: Automated contracting tools usually require substantial customisation, making integration resource-intensive and slow. They are not plug-and-play: significant preparatory and technical work is needed, raising upfront costs. Smart legal contracts face similar challenges, including selecting blockchain infrastructure and ensuring scalability. The absence of standardised frameworks and the continued need for human judgment in interpreting subjective terms or unstructured data further complicate integration and limit full automation.
- **Legal complexity, uncertainty and rigidity**: Automated contracting disrupts established practices for negotiating, concluding and executing contracts, creating uncertainty about alignment with current legal frameworks. Concerns include validity, liability for errors, and the allocation of legal responsibility. Smart legal contracts introduce additional issues due to immutability and pseudonymity, which hinder reversibility and authentication. Fragmented rules across jurisdictions heighten these risks.
- **Unpredictability and unreliable outcomes**: AI systems remain opaque, making it difficult for users to understand how decisions are made. This "black-box" nature reduces confidence and increases the risk of undetected errors, bias or unlawful behaviour embedded in algorithms. Large language models may hallucinate or misinterpret legal nuances (linguistic mismatches) particularly if they rely on non-EU training data. Risks such as "catastrophic forgetting" can further undermine reliability over time.
- **Information gaps and asymmetries**: The complexity of these technologies makes it hard for consumers to grasp how decisions are produced or what data is used, contributing to a loss of control and reduced trust. Many users are unaware automated systems are even involved, as companies seldom disclose their use, deepening information imbalances.

Identification of policy measures

The study develops 11 potential policy measures aligned with two specific objectives: (i) facilitating uptake of automated contracting by increasing legal certainty and reducing costs, and (ii) promoting fairness, balance and reliability.

- **M1 – Rules on the validity of automated contracts** clarifies that contracts concluded or performed by automated systems without human intervention are legally valid, thereby removing psychological and legal barriers to uptake, with low associated costs as it mainly confirms existing legal expectations;
- **M2 – Rules on attribution of actions** establishes that actions carried out by an automated system are legally attributable to the person using the system (natural or legal person), rather than the technology provider or the machine itself, reducing legal risks for third-party providers and providing clarity for counter-parties;
- **M3 – Rules on unexpected actions** addresses the risk of non-deterministic systems, such as AI, performing actions the user did not intend by proposing rules allowing users to disavow unexpected actions where the counter-party knew or should have known the action was unintended, creating a safety net that encourages uptake while maintaining fairness;
- **M4 – Specific rule on application of consumer law to contracts concluded by consumers using an automated system** clarifies that consumer protection laws apply

fully to contracts concluded via automated systems, ensuring automation is not used to bypass obligations under consumer law, for instance related to unfair terms or pre-contractual information;

- **M5 – Identifying and simplification of relevant information requirements** recognises that automated systems process data differently than humans and seeks to clarify and simplify information requirements, including by enabling machine-readable formats as an option, to avoid information overload while maintaining necessary disclosures;
- **M6 – Balanced contractual terms between AI provider and user** introduces a fairness standard for service contracts between the user of the automated system and the provider of that system, preventing providers from excluding liability for system flaws that cause unexpected contractual actions and ensuring a fairer distribution of risk;
- **M7 – Freedom to set parameters of the automated systems** ensures users can define key parameters of the automated system, such as spending limits or product criteria, to enhance customisability, user control, and ultimately trust in the technology;
- **M8 – Disclosure of using automated systems** creates a duty to disclose when a contracting party is using an automated system, such as a digital assistant, to interact with the other party, preventing them from being misled into thinking they are negotiating with a person;
- **M9 – 'Right of reversal' or right to object to actions of automated systems** grants users a right of reversal or the ability to object to an action taken by an automated system on their behalf before it takes legal effect, serving as a safety mechanism against unintended purchases or agreements;
- **M10 – Non-discriminatory treatment of consumers using automated systems** prohibits traders from discriminating against consumers who choose to use or not to use automated systems, for example, by either blocking a consumer's AI assistant from searching for the best deal or requiring customers to use an automated system, ensuring that consumers retain the choice of how they transact;
- **M11 – Protection from manipulation and conflicts of interests of automated systems and other prescriptive requirements** ensures systems disclose conflicts of interest, such as where a platform's integrated AI assistant favours products sold by the platform provider itself, and protects systems from external manipulation, including dark patterns designed to trick automated agents.

The report concludes that removing barriers through these measures is projected to increase uptake of automated contracting to varying degrees. Most measures are assessed as having low to moderate costs, primarily linked to familiarisation and one-off adjustments to contracts or interfaces. Regarding delivery, the report notes that while binding measures offer the highest legal certainty, many objectives could also be supported through non-binding initiatives, such as model contractual terms or voluntary standards, allowing flexibility as the technology matures.

Data-Driven Business Models

Market analysis

Data-driven business models (DDBMs) include (i) data contracts under the Digital Content Directive (DCD), where consumers provide personal data in exchange for digital content or services, and (ii) data-sharing arrangements involving connected products and related services under the Data Act. Our estimates based on evidence from Eurostat's 2020 and 2023 datasets, complemented by survey findings, indicate that approximately 1.8 million EU enterprises use

data analytics involving connected products[1]. In addition, up to 650,000 enterprises appear to make use of data contracts or related models (as per (i)).

Survey results of the surveys conducted in the framework of this study confirm an upward trend in adoption: 41.6% of Enterprise Europe Network (EEN) survey respondents use data contracts or product data generated through connected products, and 32% report plans to adopt such models. Evidence from the ECLA study[2] similarly shows growing interest in data-driven approaches. Firms increasingly recognise that customer-generated data supports more informed decision-making, personalised offerings, market analysis, and operational efficiency.

Despite this potential, uptake is constrained by widespread consumer reluctance to share personal data due to concerns regarding privacy, data protection, and cybersecurity. This reluctance extends to B2B contexts, where firms fear losing competitive advantage or exposing sensitive information. These behavioural patterns directly restrict the steady data flows needed for DDBMs to operate.

Problem assessment

Two principal problems affect the development and use of DDBMs:

1. barriers hindering uptake; and
2. imbalances between parties.

These are caused by three main types of drivers:

- **Legal challenges:** Organisations must navigate an evolving regulatory landscape, including GDPR, contract law, and sector-specific rules. Many stakeholders consulted during this study viewed this framework as burdensome, with interviews and focus groups identifying legal complexity as a major barrier. Compliance may require high upfront and ongoing costs for staff time, legal advice, and monitoring. Cross-border operations face additional uncertainty due to differing national interpretations of EU law, creating higher risks and costs. Beyond legal compliance, organisations that use algorithms and AI in DDBMs must also manage ethical risks, including transparency, fairness, and bias, which add further responsibilities, in particular for high-risk applications.
- **Information asymmetries:** Despite GDPR and consumer-law requirements for transparency and intelligibility, consumers often still lack clarity on how their personal data is collected, used, and monetised. Complex or opaque terms and conditions contribute to confusion about the value generated from data and what users receive in return. While awareness of data-protection rights has increased, this does not always translate into understanding of specific data uses, leading to persistent concerns. Interviews suggested that a standardised data-transparency label could help consumers quickly assess data practices and associated benefits.
- **Consumer reluctance:** Growing unwillingness to share personal data is a major obstacle for data-driven business models. Privacy and security concerns lead many consumers (and increasingly businesses) to avoid sharing data or using connected products, undermining the steady data flows these models depend on. The GDPR right to withdraw consent, though currently underused, could further restrict data availability if exercised more widely.

[1] To estimate the current uptake of DDBMs in the EU, Eurostat datasets (isoc_eb_bd for 2020 and isoc_eb_das for 2023), together with two supplementary surveys, were used. Methodological details are provided in Annex I.

[2] ECLA (2022). *Data-Driven Business Models: The role of legal teams in delivering success,* Osborne Clarke & European Company Lawyers Association, https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf

In addition, there are external factors such as significant technical investments in infrastructure, integration, and cybersecurity, coupled with skills shortages that limit the capacity of many organisations to develop effective data strategies. These constraints reduce firms' ability to adopt data contracts and data-sharing models as viable business opportunities.

Identification of policy measures

To address the key problems affecting data-driven business models, the study identifies a set of nine measures aimed at (i) increasing legal certainty and clarity in data-for-service exchanges, and (ii) improving transparency, user control and fairness in how data value is generated and shared.

- **M1 – Rules on the consequences of a withdrawal of consent on the contract** aims to close a legal gap in the Digital Content Directive (DCD) by harmonising Member State laws regarding the contractual effects when a consumer withdraws consent to data processing. Three options of this measure are considered, related to the policy choice of whether businesses may terminate the contract (option 1), may reduce the service or raise the price (option 2), or must maintain the contract unchanged (option 3) after the consumer has withdrawn consent;
- **M2 – Specifying the rights and obligations of data providers and data recipients** focuses on data provision contracts (often B2B), clarifying obligations regarding the mode, timing, conformity, and use of data. This measure is excluded from the assessment of impacts as it overlaps with an existing EU initiative;
- **M3 – Better information on the economic benefits from the data sharing** addresses information asymmetry by requiring companies to make transparent how they generate revenue or economic value from the data provided by the customer and potential benefits provided to the customer;
- **M4 – Standardised label on the existence, nature and timespan of the economic benefit in return for the shared data** proposes a visual label to inform customers about the specific benefits (e.g. discounts, free access) they receive in return for sharing their data;
- **M5 – Information on possibilities on use of products or services with limited or zero data sharing** ensures businesses provide clear information on whether and how customers can limit data sharing, or restrict it completely, to enable informed choices;
- **M6 – Promote the development of personal data management systems** supports the development of Personal Data Management Systems (PDMS) to act as central repositories for data sharing agreements, giving data subjects enhanced control and an access trail of their data;
- **M7 – Option to use products without data sharing** requires that providers allow consumers to use connected products or services without sharing data beyond what is strictly necessary for the product's functioning or contract performance;
- **M8 – Compensation for data access** envisions monetary or non-monetary compensation (e.g. additional services) from service providers or manufacturers to users for the data they generate and share;
- **M9 – Rules on the adequacy between the proposed goods or services and the collected data** defines rules for determining whether the value of the product or service provided is adequate relative to the value of the collected data, similar to proportionality tests found in some jurisdictions.

The report highlights that removing barriers to DDBMs could yield substantial economic and efficiency benefits, whereas measures impose different levels of compliance costs depending on the extent to which structural changes to business models are significant. Measures focusing

on transparency offer high trust-building benefits at moderate costs, while measures attempting to rebalance economic value impose higher structural costs on businesses.

RÉSUMÉ EXÉCUTIF

Objectif et portée de l'étude

L'étude sur les contrats dans l'économie numérique aide la Direction générale de la justice et des consommateurs (DG JUST) de la Commission européenne à évaluer le développement, l'utilisation et les défis des technologies contractuelles émergentes et des modèles commerciaux basés sur les données dans l'UE. Elle examine la contractualisation assistée par l'IA, les contrats juridiques intelligents, les contrats de données tels que définis à l'article 3, paragraphe 1, alinéa 2, de la directive sur les contenus numériques et services numériques, et les accords de partage de données impliquant des produits connectés et des services connexes au titre de l'article 2, paragraphes 5 et 6, du règlement sur les données (Data Act).

L'étude a été réalisée entre janvier 2024 et janvier 2026, la majeure partie des entretiens et des enquêtes ayant été menés jusqu'en septembre 2024, et les groupes de discussion en mai et juin 2025. L'analyse s'articule autour de quatre volets : (i) analyse de marché; (ii) identification et évaluation des problèmes; (iii) identification des mesures politiques possibles; et (iv) évaluation et comparaison de ces mesures. Cette structure reflète les lignes directrices « Mieux Légiférer » relatives aux analyses d'impact de l'UE.. L'étude s'appuie sur des recherches documentaires approfondies, des entretiens ciblés, des enquêtes et un groupe d'experts composé de quatre groupes de discussion structurés, qui ont joué un rôle central dans la validation des problématiques et l'évaluation des mesures politiques.

Contrats automatisés

Analyse de marché

La contractualisation automatisée englobe la contractualisation assistée par l'IA et les contrats juridiques intelligents. La contractualisation assistée par l'IA comprend des outils qui facilitent la négociation, la rédaction, la révision et l'exécution des contrats. Les contrats juridiques intelligents désignent des contrats juridiquement contraignants dans lesquels tout ou partie des conditions et obligations sont définies et/ou exécutées par un code. L'analyse de marché suggère que les contrats automatisés en sont encore à un stade précoce de développement dans l'UE.

Nos estimations, basées sur les données disponibles, suggèrent qu'environ 0,7 à 1,5 % des entreprises de l'UE, soit environ 235 000 à 475 000 entreprises, utilisent actuellement des solutions d'IA pour la contractualisation automatisée. Cette estimation est basée sur l'enquête 2023 d'Eurostat sur l'utilisation des TIC dans les entreprises, complétée par les conclusions d'une étude récente du CCR. L'adoption est la plus forte dans les secteurs où le volume de contrats est élevé, où des gains d'efficience peuvent être réalisés grâce à des modèles standardisés et des structures reproductibles.

L'adoption future devrait augmenter. Plus d'un tiers des entreprises ayant répondu à l'enquête EEN prévoient d'adopter des outils de contractualisation automatiséebasés sur l'IA. Les contrats juridiques intelligents connaissent une activité croissante au sein des écosystèmes blockchain, comme en témoigne l'augmentation du volume de contrats vérifiés sur les principales blockchains en 2022. Cependant, les données économiques sur l'adoption commerciale réelle au sein de l'UE restent limitées, et l'incertitude juridique continue de freiner une utilisation plus large.

Évaluation du problème

Le rapport identifie deux problèmes principaux liés à la contractualisation automatisée :

1. les obstacles qui entravent l'adoption de la contractualisation automatisée ; et
2. les déséquilibres entre les parties contractantes.

Ces problèmes sont causés par cinq types principaux de facteurs :

- **Coûts de conformité juridique et réglementaire** : ceux-ci se répartissent entre les coûts administratifs et les frais d'examen juridique. Les tâches administratives (documentation de la mise en œuvre, suivi de l'utilisation et tenue des registres de conformité) sont généralement minimes pour les utilisateurs. En revanche, les examens juridiques représentent une charge plus importante, en particulier au début, car les entreprises doivent s'assurer de la conformité avec le droit des contrats, évaluer les risques de responsabilité (y compris en cas de dysfonctionnements ou d'outils tiers) et traiter les différences d'interprétation et d'application entre les juridictions dans les cas transfrontaliers ;
- **Intégration aux pratiques existantes** : les outils de contractualisation automatisés nécessitent généralement une personnalisation importante, ce qui rend leur intégration coûteuse et lente. Ils ne sont pas prêts à l'emploi : ils nécessitent un travail préparatoire et technique important, ce qui augmente les coûts initiaux. Les contrats juridiques intelligents sont confrontés à des défis similaires, notamment le choix de l'infrastructure blockchain et la garantie de l'évolutivité. L'absence de cadres normalisés et la nécessité permanente de faire appel au jugement humain pour interpréter des termes subjectifs ou des données non structurées compliquent encore davantage l'intégration et limitent l'automatisation complète ;
- **Complexité, incertitude et rigidité juridiques** : la contractualisation automatisée perturbe les pratiques établies en matière de négociation, de conclusion et d'exécution des contrats, créant une incertitude quant à leur conformité avec les cadres juridiques actuels. Les préoccupations portent notamment sur la validité, la responsabilité en cas d'erreurs et la répartition des responsabilités juridiques. Les contrats juridiques intelligents soulèvent des questions supplémentaires en raison de leur immuabilité et de leur pseudonymat, qui entravent la réversibilité et l'authentification. La fragmentation des règles entre les juridictions accentue ces risques ;
- **Imprévisibilité et résultats peu fiables** : les systèmes d'IA restent opaques, ce qui rend difficile pour les utilisateurs de comprendre comment les décisions sont prises. Cette nature « boîte noire » réduit la confiance et augmente le risque d'erreurs non détectées, de biais ou de comportements illégaux intégrés dans les algorithmes. Les grands modèles linguistiques peuvent halluciner ou mal interpréter les nuances juridiques (inadéquations linguistiques), en particulier s'ils s'appuient sur des données d'entraînement non européennes. Des risques tels que « l'oubli catastrophique » peuvent encore compromettre la fiabilité au fil du temps ;
- **Lacunes et asymétries en matière d'information** : la complexité de ces technologies rend difficile pour les consommateurs de comprendre comment les décisions sont prises ou quelles données sont utilisées, ce qui contribue à une perte de contrôle et à une baisse de confiance. De nombreux utilisateurs ignorent même que des systèmes automatisés sont utilisés, car les entreprises divulguent rarement leur utilisation, ce qui aggrave les déséquilibres en matière d'information.

Identification des mesures politiques

L'étude développe 11 mesures politiques potentielles alignées sur deux objectifs spécifiques : (i) faciliter l'adoption des contrats automatisés en renforçant la sécurité juridique et en réduisant les coûts, et (ii) promouvoir l'équité, l'équilibre et la fiabilité.

- M1 – Les **règles relatives à la validité des contrats automatisés** précisent que les contrats conclus ou exécutés par des systèmes automatisés sans intervention humaine sont juridiquement valables, supprimant ainsi les obstacles psychologiques et juridiques à leur adoption, avec des coûts associés faibles, car elles confirment principalement les attentes juridiques existantes ;
- M2 – Les **règles relatives à l'attribution des actions** établissent que les actions effectuées par un système automatisé sont juridiquement attribuables à la personne qui utilise le système (personne physique ou morale), plutôt qu'au fournisseur de technologie ou à la machine elle-même, ce qui réduit les risques juridiques pour les fournisseurs tiers et apporte de la clarté aux contreparties ;
- M3 – Les **règles relatives aux actions inattendues** traitent du risque que des systèmes non déterministes, tels que l'IA, effectuent des actions non souhaitées par l'utilisateur en proposant des règles permettant aux utilisateurs de désavouer les actions inattendues lorsque la contrepartie savait ou aurait dû savoir que l'action était non intentionnelle, créant ainsi un filet de sécurité qui encourage l'adoption tout en maintenant l'équité ;
- M4 – Une **règle spécifique relative à l'application du droit de la consommation aux contrats conclus par les consommateurs à l'aide d'un système automatisé** précise que les lois sur la protection des consommateurs s'appliquent pleinement aux contrats conclus via des systèmes automatisés, garantissant ainsi que l'automatisation n'est pas utilisée pour contourner les obligations prévues par le droit de la consommation, par exemple en matière de clauses abusives ou d'informations précontractuelles ;
- M5 – **L'identification et la simplification des exigences en matière d'informations pertinentes** reconnaissent que les systèmes automatisés traitent les données différemment des humains et visent à clarifier et à simplifier les exigences en matière d'informations, notamment en autorisant les formats lisibles par machine en option, afin d'éviter la surcharge d'informations tout en conservant les divulgations nécessaires ;
- M6 – **L'équilibre des clauses contractuelles entre le fournisseur d'IA et l'utilisateur** introduit une norme d'équité pour les contrats de service entre l'utilisateur du système automatisé et le fournisseur de ce système, empêchant les fournisseurs d'exclure leur responsabilité en cas de défauts du système entraînant des actions contractuelles inattendues et garantissant une répartition plus équitable des risques ;
- M7 – La liberté de **définir les paramètres des systèmes automatisés** garantit que les utilisateurs peuvent définir les paramètres clés du système automatisé, tels que les limites de dépenses ou les critères relatifs aux produits, afin d'améliorer la personnalisation, le contrôle par l'utilisateur et, en fin de compte, la confiance dans la technologie ;
- M8 – La **divulgation de l'utilisation de systèmes automatisés** crée une obligation de divulgation lorsqu'une partie contractante utilise un système automatisé, tel qu'un assistant numérique, pour interagir avec l'autre partie, afin d'éviter que celle-ci ne soit induite en erreur en pensant qu'elle négocie avec une personne ;
- M9 – Le **« droit de rétractation » ou le droit de s'opposer aux actions des systèmes automatisés** permet aux utilisateurs de contester, avant qu'elle ne produise des effets juridiques une action entreprise en leur nom par un système automatisé, servant ainsi de mécanisme de sécurité contre les achats ou les accords non intentionnels ;
- M 10 – Le **traitement non discriminatoire des consommateurs utilisant des systèmes automatisés** interdit aux commerçants de discriminer les consommateurs qui choisissent d'utiliser ou de ne pas utiliser des systèmes automatisés, par exemple en empêchant l'assistant IA d'un consommateur de rechercher la meilleure offre ou en

obligeant les clients à utiliser un système automatisé, garantissant ainsi que les consommateurs conservent le choix de la manière dont ils effectuent leurs transactions;
- M11 – La **protection contre la manipulation et les conflits d'intérêts des systèmes automatisés et d'autres exigences normatives** garantit que les systèmes divulguent les conflits d'intérêts, par exemple lorsque l'assistant IA intégré à une plateforme favorise les produits vendus par le fournisseur de la plateforme lui-même, et protège les systèmes contre les manipulations externes, y compris les modèles obscurs conçus pour tromper les agents automatisés.

Le rapport conclut que la suppression des obstacles grâce à ces mesures devrait entraîner une augmentation plus ou moins importante du recours aux contrats automatisés. La plupart des mesures sont jugées peu coûteuses à modérément coûteuses, principalement en raison des frais liés à la familiarisation et aux ajustements ponctuels des contrats ou des interfaces. En ce qui concerne la mise en œuvre, le rapport note que si les mesures contraignantes offrent la plus grande sécurité juridique, de nombreux objectifs pourraient également être soutenus par des initiatives non contraignantes, telles que des clauses contractuelles types ou des normes volontaires, qui permettent une certaine souplesse à mesure que la technologie mûrit.

Modèles économiques basés sur les données

Analyse de marché

Les modèles commerciaux basés sur les données comprennent (i) les contrats de données relevant directive sur les contenus numériques et services numériques, dans le cadre desquels les consommateurs fournissent des données à caractère personnel en échange de contenus ou de services numériques, et (ii) les accords de partage de données impliquant des produits connectés et des services connexes relevant de la loi sur les données. Nos estimations, basées sur les données d'Eurostat pour 2020 et 2023 et complétées par les résultats d'enquêtes, indiquent qu'environ 1,8 million d'entreprises de l'UE utilisent l'analyse de données impliquant des produits connectés. En outre, jusqu'à 650 000 entreprises semblent utiliser des contrats de données ou des modèles connexes (conformément au point (i)).

Les résultats des enquêtes menées dans le cadre de cette étude confirment une tendance à la hausse en matière d'adoption : 41,6 % des répondants à l'enquête du réseau Enterprise Europe Network (EEN) utilisent des contrats de données ou des données sur les produits générées par des produits connectés, et 32 % déclarent avoir l'intention d'adopter de tels modèles. Les données issues de l'étude ECLA montrent également un intérêt croissant pour les approches fondées sur les données. Les entreprises reconnaissent de plus en plus que les données générées par les clients permettent une prise de décision plus éclairée, des offres personnalisées, une analyse de marché et une efficacité opérationnelle.

Malgré ce potentiel, l'adoption de ces modèles est freinée par la réticence généralisée des consommateurs à partager leurs données personnelles en raison de préoccupations liées à la confidentialité, à la protection des données et à la cybersécurité. Cette réticence s'étend aux contextes interentreprises, où les entreprises craignent de perdre leur avantage concurrentiel ou d'exposer des informations sensibles. Ces comportements limitent directement les flux de données réguliers nécessaires au fonctionnement des modèles commerciaux basés sur les données.

Évaluation du problème

Deux problèmes principaux affectent le développement et l'utilisation des modèles commerciaux basés sur les données :

1. les obstacles qui freinent leur adoption ; et
2. les déséquilibres entre les parties.

Ces problèmes sont causés par trois types principaux de facteurs :

- **Défis juridiques** : les organisations doivent s'adapter à un environnement réglementaire en constante évolution, notamment le RGPD, le droit des contrats et les règles spécifiques à leur secteur. De nombreux acteurs consultés dans le cadre de cette étude ont jugé ce cadre contraignant, les entretiens et les groupes de discussion ayant identifié la complexité juridique comme un obstacle majeur. La mise en conformité peut entraîner des coûts initiaux et récurrents élevés en termes de temps de travail du personnel, de conseils juridiques et de surveillance. Les opérations transfrontalières sont confrontées à une incertitude supplémentaire en raison des interprétations nationales divergentes du droit européen, ce qui entraîne des risques et des coûts plus élevés. Au-delà de la conformité juridique, les organisations qui utilisent des algorithmes et l'IA dans les modèles commerciaux basés sur les données doivent également gérer les risques éthiques, notamment la transparence, l'équité et les préjugés, ce qui ajoute des responsabilités supplémentaires, en particulier pour les applications à haut risque.
- **Asymétries d'information** : malgré les exigences du RGPD et du droit de la consommation en matière de transparence et de clarté, les consommateurs ne savent souvent pas clairement comment leurs données personnelles sont collectées, utilisées et monétisées. Des conditions générales complexes ou opaques contribuent à la confusion quant à la valeur générée par les données et à ce que les utilisateurs reçoivent en retour. Si la sensibilisation aux droits en matière de protection des données s'est accrue, cela ne se traduit pas toujours par une compréhension des utilisations spécifiques des données, ce qui entraîne des préoccupations persistantes. Les entretiens ont suggéré qu'un label standardisé de transparence des données pourrait aider les consommateurs à évaluer rapidement les pratiques en matière de données et les avantages qui y sont associés.
- **Réticence des consommateurs** : la réticence croissante à partager des données personnelles constitue un obstacle majeur pour les modèles économiques basés sur les données. Les préoccupations en matière de confidentialité et de sécurité conduisent de nombreux consommateurs (et de plus en plus d'entreprises) à éviter de partager des données ou d'utiliser des produits connectés, ce qui compromet la stabilité des flux de données dont dépendent ces modèles. Le droit de retirer son consentement prévu par le RGPD, bien que sous-utilisé à l'heure actuelle, pourrait restreindre davantage la disponibilité des données s'il était exercé plus largement.

À cela s'ajoutent des facteurs externes tels que les investissements techniques importants dans les infrastructures, l'intégration et la cybersécurité, associés à une pénurie de compétences qui limite la capacité de nombreuses organisations à élaborer des stratégies efficaces en matière de données. Ces contraintes réduisent la capacité des entreprises à adopter des contrats de données et des modèles de partage de données comme opportunités commerciales viables.

Identification des mesures politiques

Afin de remédier aux principaux problèmes affectant les modèles économiques basés sur les données, l'étude identifie un ensemble de neuf mesures visant à (i) accroître la sécurité juridique et la clarté des échanges de données contre des services, et (ii) améliorer la transparence, le contrôle des utilisateurs et l'équité dans la manière dont la valeur des données est générée et partagée.

- M1 – Des **règles relatives aux conséquences d'un retrait de consentement sur le contrat** visent à combler une lacune juridique dans la directive sur les contenus numériques et services numériques en harmonisant les législations des États membres concernant les effets contractuels lorsqu'un consommateur retire son consentement au traitement des données. Trois options sont envisagées pour cette mesure, liées au choix politique de savoir si les entreprises peuvent résilier le contrat (option 1), réduire le service ou augmenter le prix (option 2), ou doivent maintenir le contrat inchangé (option 3) après le retrait du consentement par le consommateur ;
- M2 – La **spécification des droits et obligations des fournisseurs et des destinataires de données** vise les contrats de fourniture de données (souvent interentreprises), clarifiant les obligations concernant le mode, le calendrier, la conformité et l'utilisation des données. Cette mesure est exclue de l'évaluation des impacts car elle fait double emploi avec une initiative existante de l'UE ;
- M3 – Une **meilleure information sur les avantages économiques du partage des données** permet de remédier à l'asymétrie d'information en exigeant des entreprises qu'elles rendent transparente la manière dont elles génèrent des revenus ou de la valeur économique à partir des données fournies par le client et les avantages potentiels offerts au client ;
- M4 – Une **mention standardisée sur l'existence, la nature et la durée de l'avantage économique en échange du partage des données** propose une mention visuelle pour informer les clients des avantages spécifiques (par exemple, remises, accès gratuit) dont ils bénéficient en échange du partage de leurs données ;
- M5 – Les **informations sur les possibilités d'utilisation de produits ou de services avec un partage de données limité ou nul** garantissent que les entreprises fournissent des informations claires sur la possibilité pour les clients de limiter le partage de données, ou de le restreindre complètement, et sur la manière de le faire, afin de leur permettre de faire des choix éclairés ;
- M6 – La **promotion du développement de systèmes de gestion des données à caractère personnel** soutient le développement de systèmes de gestion des données à caractère personnel qui servent de référentiels centraux pour les accords de partage de données, offrant aux personnes concernées un contrôle accru et une piste d'accès à leurs données ;
- M7 – La **possibilité d'utiliser des produits sans partage de données** exige que les fournisseurs permettent aux consommateurs d'utiliser des produits ou services connectés sans partager de données au-delà de ce qui est strictement nécessaire au fonctionnement du produit ou à l'exécution du contrat ;
- M8 – La **compensation pour l'accès aux données** prévoit une compensation monétaire ou non monétaire (par exemple, des services supplémentaires) de la part des fournisseurs de services ou des fabricants aux utilisateurs pour les données qu'ils génèrent et partagent ;
- M9 – Les **règles relatives à l'adéquation entre les biens ou services proposés et les données collectées** définissent les règles permettant de déterminer si la valeur du produit ou du service fourni est adéquate par rapport à la valeur des données collectées, à l'instar des tests de proportionnalité que l'on trouve dans certaines juridictions.

Le rapport souligne que la suppression des obstacles aux modèles commerciaux basés sur les données pourrait générer des avantages économiques et des gains d'efficacité considérables, tandis que les mesures imposent des coûts de mise en conformité variables en fonction de

l'ampleur des changements structurels apportés aux modèles économiques. Les mesures axées sur la transparence offrent des avantages importants en termes de renforcement de la confiance à un coût modéré, tandis que les mesures visant à rééquilibrer la valeur économique imposent des coûts structurels plus élevés aux entreprises.

1. INTRODUCTION

1.1. Context and objectives of this study

This study explores the use of emerging technologies in contractual matters, specifically focusing on Artificial Intelligence (AI) in contracting, smart legal contracts, and data-driven business models (DDBM). It builds on previous studies[3] and aligns with the broader efforts of the European Commission to leverage AI and data-driven approaches for innovation and growth. EU policymakers aim to create a regulatory framework that ensures trust, accountability, and protection of fundamental rights in AI applications. The European Commission is evaluating the feasibility and implications of deploying these technologies and data-driven business models across various sectors. This includes assessing benefits and identifying potential issues and obstacles to adoption. The primary objective of this study is to analyse the use of emerging technologies in contractual matters, and it aims to:

- **Evaluate current/projected usage of automated contracting and DDBM**: Assess current and anticipated use of emerging technologies, including market penetration and economic growth potential within the digital economy, and their relevance across the Single Market.
- **Analyse potential issues**: Identify and analyse issues and challenges associated with the utilisation of these technologies and business models within the Single Market.
- **Assess the impacts of potential policy measures**: Evaluate the impacts of potential measures that could effectively address and mitigate identified issues.

The study's findings will guide the European Commission in creating a policy environment that fosters innovation and protects individual rights.

1.2. Scope

During the Inception Phase of the study, it was agreed to maintain a broad scope but to define specific focus areas of automated contracting and data-driven business models for data collection and analysis, as presented below.

Automated contracting

- **AI contracting**: Situations where software programs based on AI are used by the parties or prospective parties to a contract at any stage of the contractual cycle, e.g., negotiating, drafting, or executing contracts, or by concluding contracts for legal and natural persons.[4] We use the AI Act's Article 3(1) to define an 'AI system' as "a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments;"
    - **Smart legal contracts**: Legally binding contracts in which some or all of the associated terms, conditions and rights under the contract are defined in and/or performed by code

[3] E.g. VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts; JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting . These studies have been published at the website of the European Commission: Innovative technologies and data in contracts - European Commission; Kantar Public (2023), Study to support the Commission's policy development on promoting repair of consumer goods and contracts in the data economy, https://commission.europa.eu/publications/study-support-commissions-policy-development-promoting-repair_en

[4] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.. The study defines AI in contracting as: "AI-enabled contracting: covers the situations where software programs based on AI are used by the contracting parties at different stages of contractual cycle, including pre- and contractual phases."

execution, including on a blockchain.[5] Smart legal contracts are a special case of smart contracts as defined in Article 2(39) of the Data Act: "'smart contract' means a computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and ensuring their integrity and the accuracy of their chronological ordering".

Data-driven business models

- **Data contracts**: contractual relationships in which customers do not pay a price or only partially pay a price for a product or a service while providing to the business data for purposes going beyond what is necessary for the performance of the contract. The main focus under the study in this regard are data contracts regulated under Article 3(1) sub-paragraph 2 of the Digital Content Directive (DCD)[6]. The provisions of the DCD apply specifically to contracts for the provision of digital services/digital content to consumers.
- **Data sharing**: contractual relationship whereby businesses collect customers' personal and non-personal data and use that data for their own needs and purposes and not or not only for the performance of the contract or for the functioning of the product. The main focus of the study in this regard is on data co-generated through connected products and/or related services as defined in Article 2(5) and (6) of the Data Act.[7]

1.3. Structure of this report

This report provides a comprehensive synthesis of the project's data collection and analytical findings. It places particular emphasis on the assessment of the key problems identified, the evaluation of the impacts of potential policy measures designed within the project framework to address these problems, and the comparative analysis of these policy measures. The report is structured as follows:

- **Chapter 1 – Introduction:** This chapter outlines the context, objectives, and scope of the report. It also defines the study's core focus areas: automated contracting (AI-enabled contracting and smart legal contracts) and data-driven business models (data contracts, and data-sharing contracts).
- **Chapter 2 – Methodology:** This chapter provides an overview of the methodological approach, including the data collection strategy and consultation framework.
- **Chapters 3 and 4 – Automated Contracting and Data-Driven Business Models (DDBM):** These two chapters present the main findings for both focus areas. They include summaries of the market analyses, updated problem assessments and baseline scenarios, identification and comparative assessment of policy measures.
- **Annexes I, II, and III:** The annexes provide further details on the methodological framework (including data collection techniques and the approach for estimating uptake and future projections), the full assessment of the policy measures presented in the report and an analysis of the factors influencing the use and uptake of the technologies under consideration.

[5] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission. The study defines smart legal contracts similarly as: "A legally binding contract in which, either some or all of the associated terms, conditions and rights under the contract are defined in and/or performed by code execution."

[6] Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, https://eur-lex.europa.eu/eli/dir/2019/770/oj.

[7] Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act). http://data.europa.eu/eli/reg/2023/2854/oj.

2. METHODOLOGY

This chapter outlines the overall study approach, the data collection tools and techniques applied, and the analytical methods used throughout the project. The study adopted a mixed-methods design that integrates qualitative and quantitative evidence with scenario modelling to ensure triangulated, plausible findings.

The analysis was structured around four core components: **market analysis**, **problem identification**, **assessment of policy measures,** and **comparison of their expected impacts**. These components were designed to build on one another, enabling a coherent examination of automated contracting and data-driven business models (DDBM) from initial evidence gathering through to analysis of potential policy measures to address identified problem areas.

Data collection combined **primary and secondary sources**. Primary data was gathered through targeted stakeholder consultations, namely interviews, online surveys, and focus groups. Three online surveys for different target audiences were run between May and July 2024. An additional survey was conducted through the Enterprise Europe Network (EEN) from June to September 2024. Due to the rapid technological and market developments in the study areas, many results are quickly outdated. The focus groups, held in May and June 2025 as the last stakeholder consultation activity, therefore played a key role in validating problem statements, refining the description of technological and market developments and informing the assessment of potential policy measures. The market analysis and estimates of impacts were updated with newer data when available. Secondary data sources included academic literature, Eurostat data, market reports, regulatory documents, and previous studies relevant to the technological areas under consideration. The following sections summarise the findings from both primary and secondary data collection. Detailed references to the consulted literature are reported in the annexes.

The analytical approach followed the principles of the **European Commission's Better Regulation Toolbox** to the extent possible, while acknowledging that the study was not intended for any specific Impact Assessment at the time of drafting. To support evidence-based policymaking, each policy measure was assessed individually for its feasibility, effectiveness, costs, and potential impacts. This granular approach aims to enable the European Commission to consider specific measures in the context of ongoing policy discussions or to consider them in future standalone initiatives.

While the assessment treats policy measures individually, the study recognises that measures do not operate in isolation. Possible complementarities, synergies, and trade-offs among measures will need to be considered if a decision is taken to bundle them into a policy package. At this stage, the focus is therefore on understanding the characteristics and expected impacts of each policy measure and providing a solid evidence base and reflections for future decision-making.

3. AUTOMATED CONTRACTING

This chapter explores the current state and future outlook of automated contracting in the EU, focusing on the role of AI and smart legal contracts, and assesses key obstacles and potential solutions to address them. The chapter starts by analysing the market for automated contracting with a focus on AI in contracting and smart contracts and an assessment of the problems and a definition of the baseline for the future of automated contracting in absence of any EU intervention. Thereon, we identify policy measures to address key problem drivers and compare them in terms of effectiveness and efficiency.

3.1. Market analysis

The European enterprise market is characterised by its diversity and by the central role of SMEs as the engine of the economy. Indicators from 2024[8] show that SMEs in the EU 27 non-financial business sector account for 99.8% of all active enterprises, provide 65.1% of total EU employment (an increase of 0.9% compared with 2022), and generate 52% of total value added. According to data from September 2024[9], there are 26.1 million SMEs in the EU. The challenges these companies face are well recognised and range from difficulties in finding new customers, limited access to finance, and pressure to increase productivity while production and labour costs rise, to constraints related to financial resources, staffing, and compliance with frequently new and complex legislation. Reflecting these issues and based on an economy-wide assessment of the importance of the challenges encountered by SMEs in 2024[10], companies in the EU 27 report the availability of skilled staff or experienced management and the costs of production or labour as the most significant problems.

Streamlining regulatory frameworks and reducing bureaucratic hurdles is conducive for SMEs to focus on innovation, growth, and job creation. In addition, the green and digital transitions create opportunities for SMEs to develop new products, services, and business models that can enhance growth and competitiveness.

This chapter presents the conclusions from a market analysis of digital technologies such as AI in contracting and smart legal contracts to assess their uptake and market presence. The study places particular emphasis on AI-based solutions, reflecting the greater availability and reliability of data gathered during the desk research and data collection phases between January and September 2024.

No granular data sources specifically examining AI adoption in contracting within the EU were identified, a gap also highlighted in a recent Joint Research Centre study[11]. In the following sections, we therefore present findings derived from triangulating several sources. These include estimates of current AI uptake in contracting based on Eurostat data, the aforementioned JRC study, and where possible additional sources and insights gathered through the stakeholder consultation exercise to complement and corroborate the analysis.

3.1.1. AI trends in the EU

Based on Eurostat data, from 2021 to 2024[12] all EU enterprises have increased their use of AI technologies in the context of their businesses[13]. The share of enterprises using AI rose from 6.38% to 11.21% among small enterprises, from 8.03% to 13.48% among medium enterprises, and from 30.40% to 41.12% among large enterprises. The data also show that 41.17% of large companies have already implemented an AI-based solution, compared with 20.97% of medium companies and 11.21% of small companies. This indicates that the adoption pace is influenced

[8] Annual Report on European SMEs 2024/2025, *SME performance review*, Publications Office of the EU, Luxembourg, 2025, JRC Publications Repository - Annual Report on European SMEs 2024/2025, SME performance review

[9] Statista Research Department, *Number of small and medium-sized enterprises (SMEs) in the European Union from 2008 to 2024*, by number of enterprises, https://www.statista.com/statistics/878412/number-of-smes-in-europe-by-size/#statisticContainer

[10] Eurostat (2026), *Digital economy and society statistics – enterprises*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_enterprises

[11] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

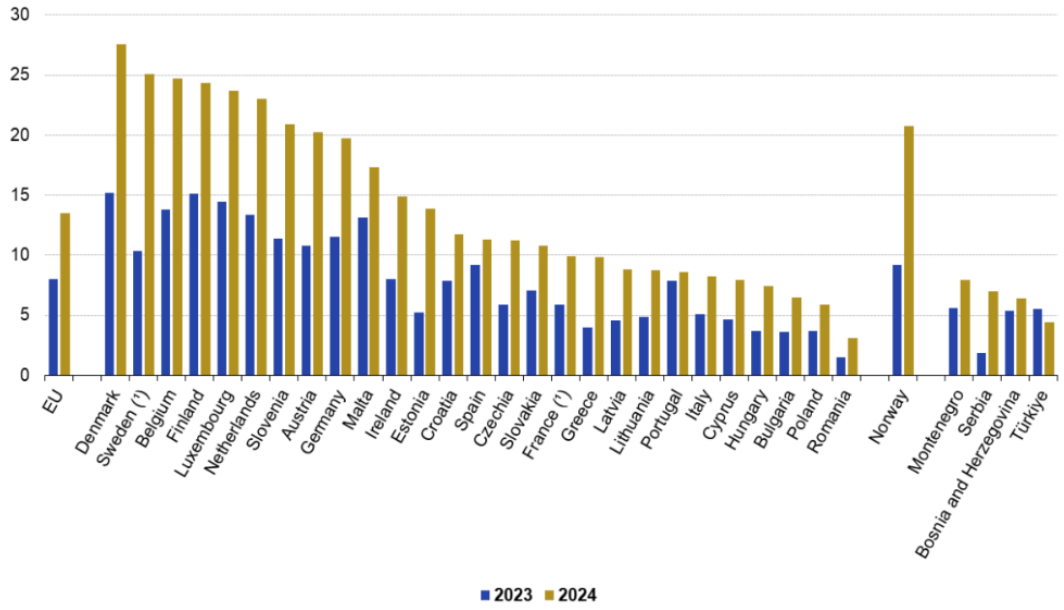
[12] Online publication: *Use of Artificial Intelligence in enterprises*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises

[13] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

by company size. Latest available Eurostat data published after the conclusion of this market analysis confirms the observed trends and a continued growth in AI adoption rates.[14]

When considering the EU average, the performance of countries such as Denmark (27.58%), Finland (24.5%), and Luxembourg (23.5%) contrasts sharply with lower levels of adoption in Romania (3.07%), Bulgaria (6.47%), Poland (5.9%), and Hungary (7.5%).

Figure 1. Enterprises (%) using AI technologies (EU), 2023 and 2024[15]



(¹) 2023: Break in the time series.
Source: Eurostat (online data code: isoc_eb_ai)

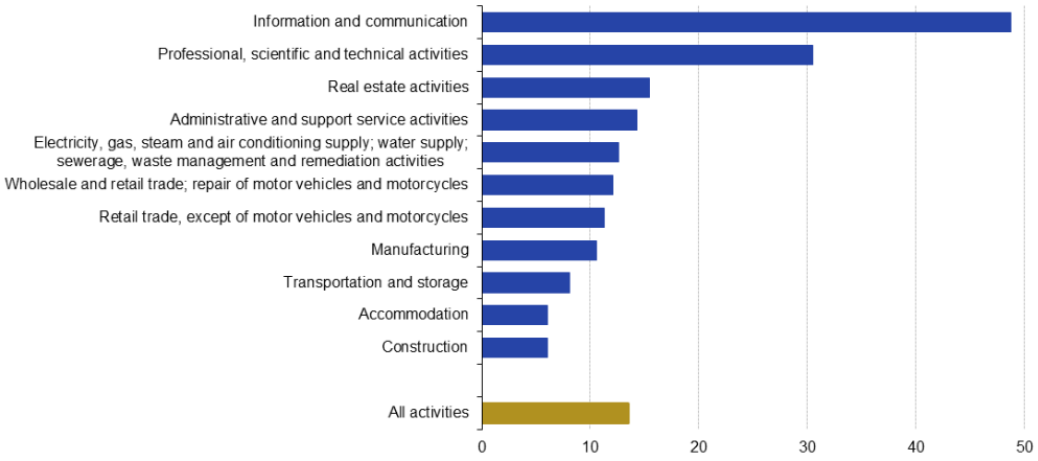
eurostat

In 2024, the information and communication sector, with 48.72%, and the professional, scientific and technical service activities sector, with 30.53%, recorded the highest shares of enterprises using AI. In all other economic activities, the share of enterprises using AI remained below 16%.

[14] Online publication: Use of Artificial Intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises

[15] The results for Sweden and France (¹) have break in the time series.

Figure 2 Enterprises (%) using AI technologies by economic activity, EU, 2024

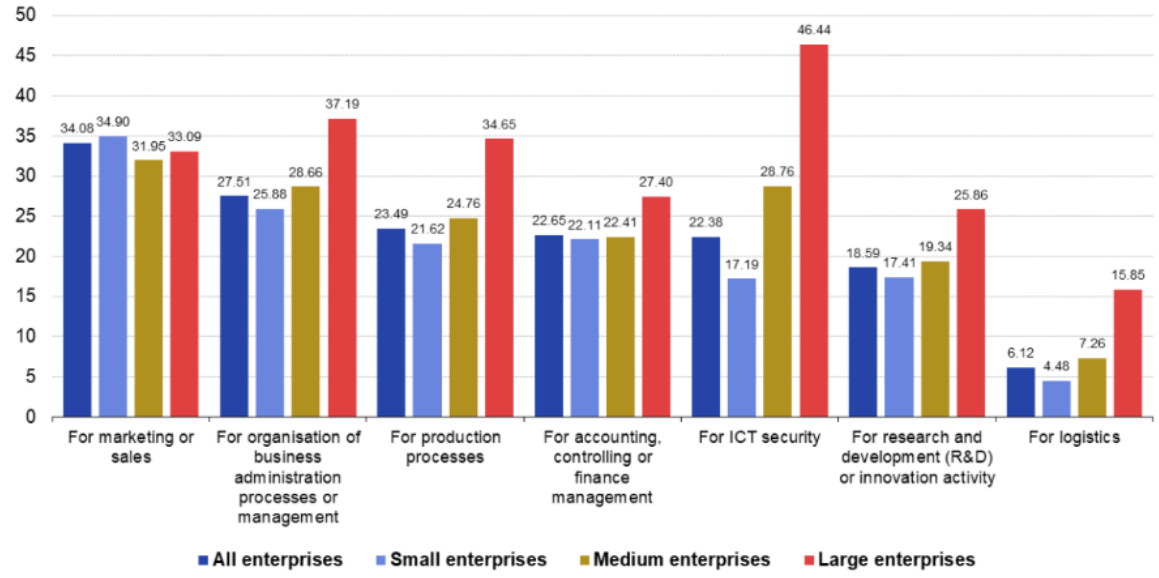


Source: Eurostat (online data code: isoc_eb_ain2)

Taking into account the focus of this study, the graph below presents insights on the use of AI technology by purpose, by company size, and by type of AI technology. In 2024, EU enterprises prioritised the use of AI especially for ICT security (46.44% of large enterprises and 17.19% of small enterprises), for accounting, controlling or finance management (27.40% of large enterprises and 22.11% of small enterprises), for production processes (34.65% of large enterprises and 21.62% of small enterprises), for the organisation of business administration or process management (37.19% of large enterprises and 25.88% of small enterprises), and for marketing and sales (33.09% of large enterprises and 34.09% of small enterprises), where contracting processes could also be included.

This indicates that enterprises are increasingly using automated technologies across a wide range of business activities. For more detailed information on the factors that may encourage (e.g. higher operational efficiency, fewer errors, reduced reliance on external intermediaries, improved relationships with customers, better information for decision-making etc.) or delay (e.g. high costs, legal complexity and regulatory uncertainty, data accessibility and privacy, lack of awareness and knowledge gaps, unpredictability and potential unreliability of outcomes etc.) the adoption of automated technologies specific to contracting, Annex III (section 7.1) should be consulted.

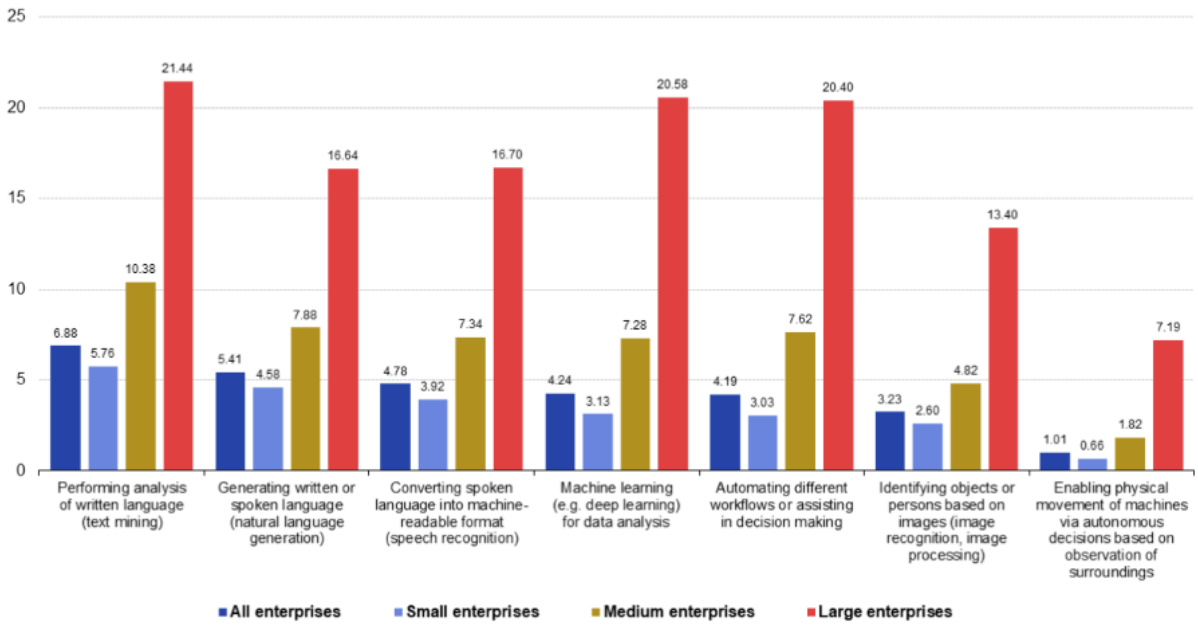
Figure 3 Enterprises (%) using AI technologies by type of purpose and size class, EU, 2024



Source: Eurostat (online data code: isoc_eb_ai)

When analysing the use of AI technologies by type in 2024, based on Eurostat data, large enterprises continue to lead in the use of all types of AI technologies. These include automating different workflows or assisting in decision making (20.40%), performing analysis of written language through text mining (21.44%), and converting spoken language into a machine-readable format through speech recognition (16.70%). The least used AI technologies were those that enable the physical movement of machines through autonomous decisions based on observing their surroundings (7.19%).

Figure 4: Enterprises (%) using AI technologies by type of AI technology and company size in the EU,2023.



Source: Eurostat (online data code: isoc_eb_ai)

3.1.2. AI in contracting[16]

Based on the available evidence and consistent with the conclusions of the JRC study[17], it appears that, apart from enterprises whose core business centres on contracting, most organisations adopt AI technologies primarily to support broader operational functions rather than contracting-specific processes. While direct evidence on the use of AI in automated contracting is limited, it is nevertheless possible to approximate the number of enterprises engaging in such practices using indirect indicators and related data sources.

Research suggests that businesses have a clear motivation to adopt automated contracting technologies. An increased uptake of automated contracting is not an end in itself, but a means to achieve broader strategic goals. In the European Union context, wider adoption of automated contracting tools is expected to deliver significant benefits[18]. Increasing the use of automated contracting, for instance, is anticipated to strengthen innovation and economic competitiveness by improving efficiency and reducing transaction costs for businesses. Automation of contractual processes can significantly speed up transactions and reduce administrative burdens. These efficiency gains can free up resources and time that firms can redirect toward innovation, product development, and other high-value activities. By removing transaction inefficiencies in areas like procurement and supply chain agreements, automated contracting has the potential to lower operational costs and increase productivity[19].At the same time, the market is still in the early stages and existing barriers continue to hinder wider adoption.[20] While EU enterprises are progressively embracing AI technologies, SMEs appear to face more barriers, resulting in slower adoption rates than larger firms. Nevertheless, the overall trend suggests continued growth in AI adoption.[21] The ICT sector is currently leading in the use of automated contracting technologies, particularly in applying AI to various contracting functions across its operations.[22] Among the types of technologies in use, it seems AI-driven contracting solutions are more commonly adopted or planned than smart legal contracts. These AI tools are typically commercial solutions available on the market, offering varying degrees of customisation to fit specific business needs.

The adoption of AI in contracting, however, is not yet widespread[23]. Available literature reveals limited evidence and statistics on the prevalence of AI in contracting and there are currently no data sources dedicated exclusively to this area. Eurostat data shows that 21.2% of EU enterprises using AI do so for business administration or process management, where contracting processes could be included[24]. However, this represents a broader category, encompassing a range of non-contract-specific administrative tasks (e.g., scheduling, human resources, and resource allocation), and is thus wider than the focus of our study. While this data serves as a general indicator of AI use in the different areas of business operations

[16] Definition proposed in this study: Automated technologies, namely AI in contracting covers situations where software programs using AI (AI systems) are involved in contracting, for example by negotiating, drafting or executing contracts, or by concluding contracts for legal and natural persons.

[17] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[18] See Section 3.2.1 on "*Advantages of the use of automated contracting"* for more details.

[19] Lexology, available here

[20] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en .

[21] Online publication: Use of Artificial Intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises

[22] Eurostat, Use of artificial intelligence in enterprises, https://publications.jrc.ec.europa.eu/repository/handle/JRC142263

[23] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[24]Automated contracts could be included in the category of business administration or process management because contracting is a fundamental part of business operations that directly impacts multiple administrative and process-related functions.

(including areas relevant for AI contracting, such as business administration process and management), it likely overestimates the use of AI for contract automation specifically.

It must be noted that the adoption of AI technologies in general may depend on different factors, including the enterprise size, age, and sector of activity in which enterprises operate. Available evidence suggests that ICT and professional services sectors tend to be leading AI adopters in Europe, as they are, on average, better prepared in terms of IT infrastructure, digitalisation and skilled labour to handle and integrate these technologies[25]. In other sectors, such as legal services, the uptake of automated contracting seems still relatively limited. Eurostat data shows that in 2023, 7.1% of business in legal and professional services[26] used AI technologies automating different workflows or assisting in decision-making. Other available statistics from the *World Commerce & Contracting*, a not-for-profit association dedicated to enhancing standards and capabilities in commercial and contract management, show that its members have already started to integrate AI into their contract processes to varying degree depending on the specific area, with 9% using AI features for contract analytics and automation[27]. As an additional point of comparison, our EEN survey reveals that approximately 13% of respondents across various sectors are already utilising AI-driven solutions for contracting[28].

This suggests that the automation of contracting processes represents one of various AI application fields for businesses and that the use of automated contracts is not yet widespread. However, the use of AI for contract automation may **still hold important potential for growth,** especially in some sectors that are natural candidates for contract automation. A recent report shows that among the top 100 law firms, 28% have invested in Robotic Process Automation for Contract Lifecycle Management[29]. Further evidence suggests that 26% of law firms use AI[30] and 23% of legal departments have automated more than half of their legal work processes[31]. In addition, the EEN survey shows that over 1/3 of respondents plan to use AI for contracting in the future.

As shown, data is scarce and scattered. Therefore, to estimate the current uptake of AI contracting within the EU, we rely on a combination of available cross-country datasets, including Eurostat's ICT Usage in Enterprises survey (2023)[32], and insights from the previously mentioned JRC study based on the Ipsos-iCite survey (2020)[33].

Methodologically, for each enterprise-size group the number of adopters is calculated by multiplying the business population by the AI adoption rate (Eurostat) and by the assumed share of AI-contracting users (JRC), with the weighted totals summed to produce an EU-wide estimate. In particular, we **estimate that approximately 0.7% to 1.5% of EU businesses**

[25] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[26] Legal and accounting activities; activities of head offices; management consultancy activities; architectural and engineering activities; technical testing and analysis

[27] Dang, Tony (2024), *AI in Contract Management: What Are the Benefits and Opportunities*? https://www.top.legal/en/knowledge/ai-contract-management-benefits

[28] While this figure highlights the potential role of AI in streamlining contract processes, it is important to note that this is not a fully representative estimate of overall adoption. The survey likely contains a response bias, as companies already interested or engaged in AI technologies are typically more inclined to participate. Consequently, this figure may overestimate actual adoption rates. Nonetheless, it provides valuable insight while underscoring the need for broader data to capture a more accurate market-wide picture

[29] PwC Law Firms' Survey 2021, Facing the future with confidence, https://www.pwc.co.uk/industries/law-firms/law-firm-survey-report-2021.pdf

[30] DocuEase statistics, *26 Key AI Statistics In the Legal Field*, https://docuease.com/statistics

[31] WifiTalents, Explore Our Data Insights, https://wifitalents.com/statistic/legal-technology/

[32] Eurostat, available here

[33] Given the limited and fragmented data, we used both conservative and flexible estimation approaches, as per the JRC study, accounting for enterprise size and the combined use of specific AI technologies. However, this approach bears an important caveat: as found by the JRC, study, the Ipsos survey reports a much higher percentage of AI adopters than Eurostat data. Therefore, applying the flexible and conservative estimates to Eurostat figures may lead to an inflated number of companies using AI contracting. For a detailed explanation of the estimation process and underlying data sources, see Annex I.

(235,000 to 475,000 enterprises) are likely using AI contracting technologies for automated contracting at this stage (see Annex I section 5.2.1 for more details).

3.1.3. Smart contracts[34]

Despite extensive literature on Distributed Ledger Technology/Blockchain and smart contracts, there is limited public statistical data for market analysis. This might reflect differing market perceptions and advancements of AI in contracting and smart contracts. According to the *study on civil law rules applicable to smart contracts*[35] the economic analysis to understand **the level of adoption of smart contracts in the EU is currently inconclusive** in terms of economic value and no solid information on the use of smart contracts in cross-border transactions was observed. Regarding the market and potential trends regarding the type of transactions, the report advanced the probability that an increase in the use of smart contracts is higher for B2B applications due to fewer constraints on contract formation.

Although the EU enterprises show interest in the use of automated contracting technologies such as smart contracts to improve and support their business activities, during the consultations, interviewees shared that they had been having concerns related to the unclear legal definition of their binding nature. This ambiguity on the technology-legal axes was analysed in a recent study[36] and it is recommended that law and technology should *reinforce each other rather than create a confrontation that harms the common good.* The analysis shows that the **number of smart contracts circulating is growing** and it is supported by the analysis of the monthly used smart contracts on the Ethereum [37].

Regarding the use of smart contracts, the European Blockchain Observatory Forum[38] presents more conclusive findings on the real state of adoption of smart contracts by analysing the state of adoption by the developer community, the total value of the protocol, and the daily active users. While the report does not elaborate in detail on the metrics to evaluate the total number of active users and number of transactions, Chapter 2 of the report should be consulted for more detailed and graphical representations of the daily frequency of verified smart contracts across different blockchains (e.g., Ethereum, Solana). The results show that there was an increase in the number of verified smart contracts across the various blockchains during 2022 in the EU, even with variations between them.

Recent market studies confirm that the trend of growing adoption of smart contracts continues into 2025.[39] The international organisations UNCITRAL and UNIDROIT are developing guidance for the use of smart contracts in international trade, further entrenching the technology in commercial practice.[40]

3.2. Problem assessment

In this section, we summarise the advantages and challenges faced when using automated contracting, followed by the identification and structuring of the problem definition, an

[34] Definition proposed by the contractor: Automated technologies, namely *Smart legal contracts* referring to legally binding contracts in which either some or all the associated terms, conditions and rights under the contract are defined in and/or performed by code execution. Smart legal contracts are a subset of a wider type of technology, called smart contracts. Therefore, the study may include smart contracts as defined in article 2(39) of the Data Act: 'Smart contract' means a computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and ensuring their integrity and the accuracy of their chronological ordering.

[35] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission.

[36] European Commission (2021), *Smart contracts and digital single market through the lens of a "law plus technology" approach*. https://digital-strategy.ec.europa.eu/en/library/smart-contracts-and-digital-single-market-through-lens-law-plus-technology-approach

[37] The study provides more detailed data on the number of smart contratcs, but with focus on Etheruem, hence not here replicated.

[38] EU Blockchain Observatory and forum (2022), *Smart Contracts*, https://blockchain-observatory.ec.europa.eu/system/files/2022-11/SmartContractsReport_Final.pdf

[39] INATBA (2025), *Building Trust in the Age of AI: INATBA's Report on Blockchain as an Enabler of Trusted AI,* see here

[40] Stefan Jovanović (2024), UNIDROIT Principles of International Commercial Contracts and New Frontiers of Blockchain, Smart Contracts and Digital Assets; UNCITRAL (2025), Draft guidance document on legal issues relating to the use of distributed ledger technology in trade.

assessment of the problem, and elaboration of the baseline in case of absence of any EU intervention.

3.2.1. Advantages of the use of automated contracting

This chapter summarises the main findings from Annex III, which provides the full analysis of the key factors influencing the use and uptake of automated contracting solutions, understood to encompass smart legal contracts and AI-driven contracting solutions. Drawing on literature, survey data, and interviews with businesses, technology providers, academia, and consumer associations, the annex shows that these technologies can deliver significant efficiency, cost, and strategic benefits, but that their wider adoption depends on specific enabling conditions and is hampered by several technical, legal, organisational, and ethical challenges.

A first group of factors concerns the conditions that enable organisations to exploit automated contracting solutions fully. These technologies are desirable where there are a **high volume of contracts and a sufficient degree of standardisation in structure and terms**, allowing the initial investment to be spread across many similar agreements and enabling automated workflows. Larger organisations are typically better placed than SMEs to benefit from such economies of scale. A **coherent and predictable regulatory environment** is also important: initiatives such as the EU Artificial Intelligence Act and international work on automated contracting reduce uncertainty and provide clearer guardrails for investment. Interview evidence further suggests that **declining technology costs and advances in AI, especially in natural language processing, facilitate uptake by making AI-driven contracting solutions better able to understand and generate** legal language, while lowering the barrier to entry over time.

On the benefits side, a central advantage is **cost reduction in the contracting process**. Literature and survey results indicate that many organisations using automated contracting solutions experience moderate to significant decreases in contracting costs, particularly where smart legal contracts are deployed[41]. These savings stem from shorter contracting cycles, reduced manual effort, fewer errors, and, in some cases, the partial removal of intermediaries. Smart legal contracts automate execution and enforcement based on pre-programmed conditions, thereby reducing delays between triggering events and performance. AI-driven contracting solutions accelerate the lifecycle at four key points: onboarding and data extraction (automated review and identification of key clauses), drafting (template-based generation aligned with company standards), execution (triggering actions based on predefined conditions or market data) and conclusion (identifying suitable offers based on dynamic price analysis in real time and, where applicable, selecting the best supplier and entering into contracts). Their language-agnostic capabilities also support the handling of cross-border portfolios without duplicating work across languages, reinforcing cost efficiency.

Another critical benefit concerns **customer relationships**. Evidence from reports and survey responses indicates that a significant share of organisations perceives improved customer relationships as a key outcome of automation, even though only a small minority explicitly cite increased trust[42]. The analysis suggests that smoother processes, reduced errors, and greater "ease of doing business" translate into more immediate and visible improvements in relationships. At the same time, trust functions as a more underlying driver. AI-driven contracting solutions build trust by improving contract accuracy and consistency and facilitating compliance monitoring. Smart legal contracts add a dimension by enabling "trust-less" transactions: once conditions are met, obligations are executed precisely as coded, and the

[41] See Benefit #1 "Cost reduction in the contracting process" in Annex III (p. 135-139)

[42] See Benefit #2 "Improved relationship with customers" in Annex III (p. 139-140)

underlying blockchain provides a transparent, immutable audit trail that counterparties and supervisors can use to verify behaviour and performance.

AI-driven contracting solutions further create value by **enabling enhanced market and customer analysis**. By monitoring and processing real-time market data and competitors' pricing and demand patterns, these tools support dynamic pricing and the drafting of contracts better aligned with evolving market conditions, as well as contract conclusion (e.g. through the identification of the best terms and conditions in real time). They also allow contracts to be tailored to specific customer profiles, including personalised pricing based on estimated willingness to pay. Survey results show that improved marketing and market analysis are recognised benefits, even if enhanced contract personalisation itself is cited less frequently[43]. At the same time, Annex III highlights that AI-driven contracting solutions can use both pre- and post-contract data, including feedback and reviews, to refine pricing strategies and understand how contractual terms affect satisfaction and loyalty.

Automated contracting solutions also **improve decision-making information**. Many organisations lack full visibility over contractual obligations and struggle with fragmented or inconsistent metadata. AI-driven contracting solutions can transform complex legal language into structured metadata and aggregate it across large portfolios, providing clearer oversight of obligations, deadlines, and performance. When combined with external data, this supports more strategic decisions on compliance, risk and contract performance. Survey evidence confirms that a notable share of users sees enhanced decision-making as a key advantage[44]. Interviews emphasise the role of AI-driven tools in supporting ongoing compliance analytics and risk profiling, for example, by flagging deviations from standard clauses, prompting legal review, and quantifying exposure to specific risks[45].

In data-sharing contexts, smart legal contracts provide an additional, more specific benefit: **automated data access**. Where access to datasets is central to the contractual relationship, these contracts can encode conditions in machine-readable form and automatically grant or restrict access once predefined criteria are met. This allows parties to standardise and enforce data-access arrangements - such as permissions for web scraping or access to particular datasets - without constant manual intervention. Interview evidence suggests that this can reduce the administrative burden of managing data access and help ensure that each interaction adheres to the agreed terms[46].

The image below summarises the above-mentioned benefits and highlights, for each of them, which technology (i.e. smart legal contracts and/or AI contracting solutions) enables them.

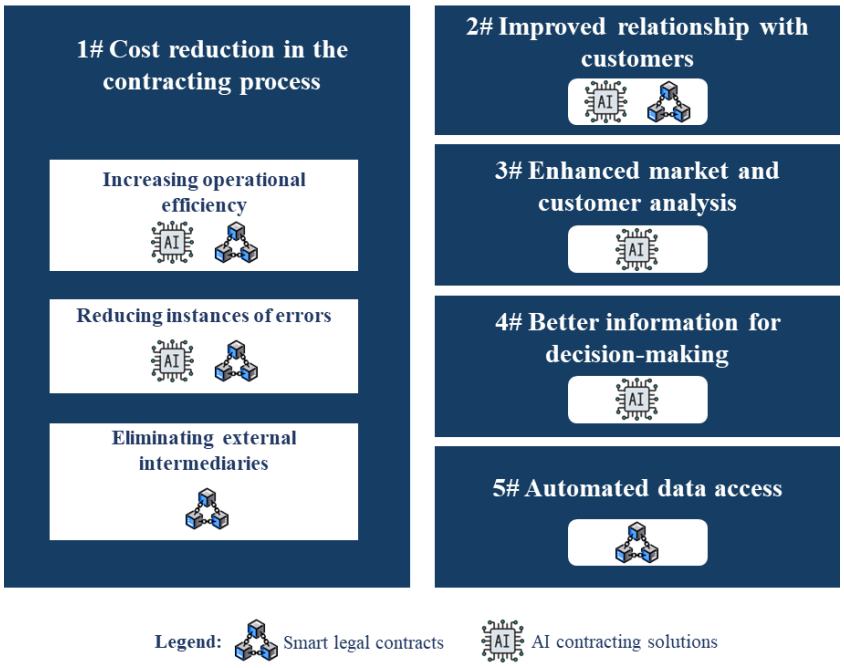
[43] Survey results showed that 20% of respondents (out of 114 respondents) identified improved marketing and market analysis as a key benefit of these AI-powered solutions. Only 10% of respondents (out of 114 respondents) highlighted contract personalisation as a key benefit.

[44] Survey results reveal that 18% of respondents (out of 114 respondents) viewed enhanced decision-making as a pivotal advantage of AI-driven contract solutions.

[45] See Benefit # 4 "Better information for decision-making" in Annex III (p.141-142).

[46] See Benefit #5 "Automated data Access" in Annex III (p. 142)

Figure 5. Benefits of automated contracting technologies



3.2.2. Challenges for the use of automated contracting

On the negative side, **high implementation and operating costs** remain a central barrier. Survey results show that both technical and legal costs are frequently perceived as considerable or significant challenges, in line with broader evidence on AI and blockchain adoption[47]. Technical costs arise from requirements specification, acquisition and customisation of software and infrastructure, integration with existing systems, user interface development, gas fees on public blockchains, and ongoing maintenance and support. For smart legal contracts, cost structures differ depending on whether organisations use public or proprietary blockchains, with integration into external systems and existing organisational tools often representing a significant expenditure. For AI-driven contracting solutions, off-the-shelf tools entail licensing and integration costs, whereas in-house development requires substantial investment in algorithms, training datasets, and long-term upkeep. A widespread lack of in-house expertise often leads to outsourcing or reliance on subscription-based platforms. Legal and regulatory compliance costs are mainly associated with legal reviews - conducted before adoption and sometimes repeated - to ensure compliance with contract law, clarify liability (including for malfunctions or errors), and address cross-border differences in interpretation and enforcement.

Beyond cost considerations, **integration with existing business practices and technological environments** poses a further obstacle. Evidence from the survey and external sources shows that integration difficulties and the need to adapt operational processes are widely perceived as barriers to adoption[48]. Automated contracting solutions are rarely plug-and-play; they typically require extensive preparatory work, customisation, and alignment with existing workflows and IT systems. For smart legal contracts, integration challenges include selecting an appropriate blockchain architecture, ensuring network robustness and scalability, and dealing with the lack of standardised integration frameworks. The need for human judgment in contracts involving subjective assessments or unstructured data further limits full automation. AI-driven contracting solutions face analogous issues and are constrained by current limitations in

[47] 46% of respondents (out of 89 respondents) who have experience with these technologies mentioned technical costs as a considerable or major challenge[47], while 52% (out of 86 respondents) pointed to legal costs in the same terms.

[48] See Challenge #2 “Integration of the automated contracting solution with existing practices” in Annex III (p. 146-147)

emotional intelligence and nuanced negotiation, limiting their suitability for more complex or bespoke contracts.

Legal complexity and uncertainty are another key concern. Automated contracting solutions rely on algorithms and pre-defined rules, raising questions about how they fit within established doctrines of contract formation, consent, and liability. Survey results indicate that legal uncertainty is one of the most significant obstacles to uptake[49]. Issues include whether concepts such as "meeting of minds" can be satisfied when contracting processes are automated, how liability should be allocated among technology providers, legal professionals, and users, and how existing doctrines apply in cases of mistakes or unintended consequences. For smart legal contracts, blockchain immutability can conflict with legal remedies that would normally require contracts to be voided or amended after execution, and pseudonymity can complicate the use of authenticated digital signatures. Cross-border transactions further exacerbate uncertainty, as national contract laws may diverge in application and interpretation despite EU-level harmonisation of consumer protection.

Data accessibility, privacy, and confidentiality pose further obstacles. Both smart legal contracts and AI-driven contracting solutions depend on access to sensitive data, which must be reconciled with strict data protection and confidentiality requirements. For smart legal contracts deployed on public blockchains, the transparency that underpins auditability can expose contractual details to a broad audience, including competitors, and deter adoption where confidentiality is crucial. For AI-driven contracting solutions, effective training and operation require large volumes of data, often extracted from confidential or proprietary contracts, raising concerns about data protection compliance and potential misuse. Survey and Eurostat data show that privacy and data protection issues are increasingly cited as reasons for not adopting AI-based technologies[50].

Adoption is also slowed by **lack of awareness, skills gaps and resistance to change**. Automated contracting solutions remain relatively novel for many organisations, and their benefits and limitations are not always well understood. Blockchain - and smart legal contracts in particular - is still frequently associated mainly with financial services and volatile cryptocurrency markets, limiting perceived relevance in other sectors. While AI is recognised as a key enabling technology and attracts substantial investment, there remains a significant funding gap for both AI and blockchain, primarily affecting SMEs, young firms, and early-stage projects. Across industries, enterprises report difficulties finding staff with the appropriate skills, and survey results confirm that the shortage of knowledgeable staff is a major challenge for implementing automated contracting solutions[51]. Interview evidence also suggests that legal professionals can be hesitant to adopt these tools, due to fears about job displacement, doubts about reliability and a preference for familiar practices, even as technology providers attempt to design more user-friendly solutions[52].

The precision and automation that characterise automated contracting solutions also give rise to a further difficulty: **rigid execution of contracts**. For smart legal contracts, blockchain immutability makes it hard to amend or reverse contracts once they are encoded and executed, requiring parties to anticipate and specify contingencies ex ante and increasing transaction costs at the negotiation stage. It is also challenging to translate vague or standard-like terms such as "good faith" or "reasonable period" into precise code, reducing adaptability in complex relationships. AI-driven contracting solutions similarly tend to execute instructions strictly once

[49] This legal uncertainty stands out as a major concern, with our survey results indicating that over 74% of respondents (out of 84 respondents) identified it as a considerable or major challenge to the use of automated contracting solutions.

[50] See Eurostat. Concerns regarding violation of data protection and privacy was indicated by almost half of enterprises that have ever considered using any of the AI technologies.

[51] Survey results showed that 46% of respondents (out of 86 respondents) identify the shortage of knowledgeable staff as a considerable or major obstacle in implementing automated contracting solutions.

[52] See Challenge #5 "Lack of awareness, knowledge gap, and resistance to change" (p. 145-146)

deployed, offering limited scope for renegotiation or contextual adjustment during the contract's lifecycle. This rigidity can generate consumer-protection risks: for smart legal contracts, it complicates the exercise of rights such as withdrawal in B2C contracts; for AI-driven contracting solutions, rapid, automated decisions - including contract termination - may leave consumers locked into unfavourable arrangements with limited possibilities for reversal. In both cases, automated enforcement risks shifting the burden of initiating legal action from businesses to consumers, increasing costs and hurdles for individuals, and limiting the consideration of extenuating circumstances.

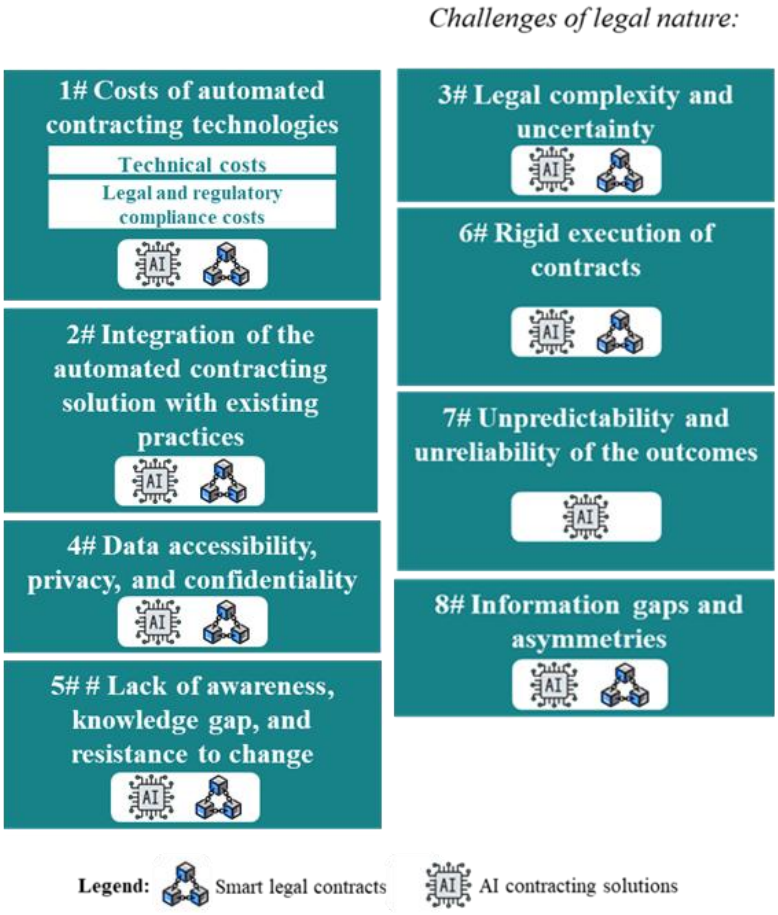
For AI-driven contracting solutions, additional challenges relate to the **predictability and reliability of outcomes**. Existing evidence shows that the complexity and opacity of many AI systems make them difficult to understand and trust, and survey results confirm that predictability and reliability are widely perceived as obstacles[53]. The "black-box" nature of complex algorithms hampers explanations of decisions and can allow fraud, discriminatory practices, or other unlawful behaviour to remain undetected. Non-deterministic behaviour and the risk of "hallucinations" in large language models introduce further uncertainty about performance. In contrast, "catastrophic forgetting" may lead systems to lose information from earlier tasks as they learn new ones. Interviews also highlight that many AI-driven contracting solutions are trained predominantly on US contracts, which can lead to legal and linguistic mismatches when applied in the EU, increasing the risk of errors and biases in domain- or jurisdiction-specific contexts.

Finally, automated contracting solutions may **exacerbate information gaps and asymmetries**, particularly vis-à-vis consumers. Interviews with consumer associations indicate that the complexity of these technologies and the lack of transparency about when and how they are used can leave consumers feeling unable to understand or challenge decisions. In many cases, consumers are not informed that automated contracting solutions are being used in negotiation, drafting, or execution. For AI-driven contracting solutions, there is a risk that businesses exploit big data and advanced analytics to gain a strong informational advantage, for example, in pricing, credit, or insurance, potentially leading to discriminatory practices and undermining consumer autonomy, even though the AI Act introduces safeguards against exploitative and manipulative uses. For smart legal contracts, the use of code rather than natural language can make it difficult for consumers to understand their rights and obligations, complicating compliance with requirements that contract terms be clear and intelligible in B2C transactions and reinforcing information asymmetries between parties.

The image below summarises the above-mentioned challenges and highlights, for each of them, which technology (i.e. smart legal contracts and/or AI contracting solutions) introduces them.

[53] Survey results show that 48% of respondents (out of 82 respondents) highlight predictability and reliability of the outcomes of automated contracting solutions as a considerable or major obstacle in implementing automated contracting solutions.

Figure 6. Challenges of automated contracting



3.2.3. Identification of problems

The deployment of automated contracting technologies has significant potential to improve efficiency, reduce transaction costs, and streamline business operations. However, despite these benefits, the uptake and implementation of such technologies remain limited due to challenges. This section identifies and assesses the two principal problems that currently undermine the broader adoption and application of automated contracting technologies:

1. **Barriers hindering uptake of automated contracting technologies**;
2. **Imbalances in automated contracting.**

These problems are **driven** (caused) **by five main groups of challenges** analysed in the previous section:

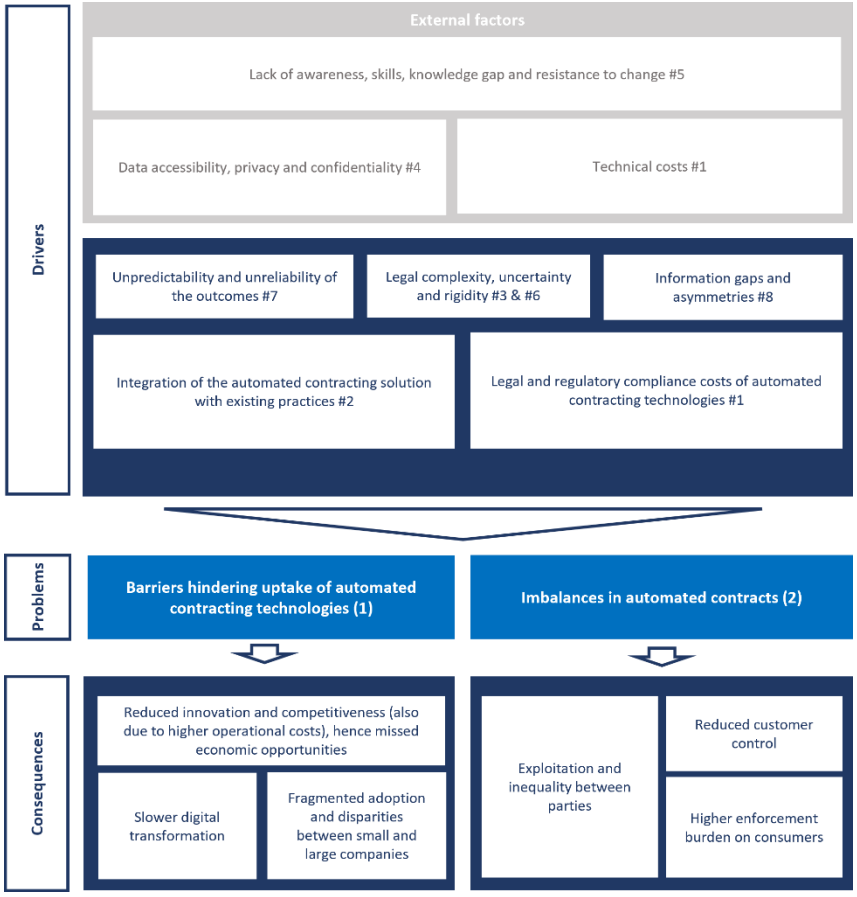
- **Legal and regulatory compliance costs**;
- **Complex integration with existing practices**;
- **Legal complexity, uncertainty, and rigidity**;
- **Unpredictability and risk of unreliable outcomes**;
- **Information gap and asymmetries**.

Furthermore, specific challenges or their aspects have been singled out as external factors (drivers or causes) due to the fact that they either provide contextual information and/or are not the core concern of the study. These are: 1) technological costs; 2) data accessibility, privacy, and confidentiality; and 3) lack of awareness, skills, knowledge gap, and resistance to change.

The focus groups confirmed the problem analysis, emphasising that legal uncertainty and fragmented rules are significant barriers to the uptake of automated contracting. Participants agreed that the absence of explicit legal recognition for automated actions in current contract law creates doubt about the legal validity of contracts concluded or performed by AI. This uncertainty discourages companies from investing in automated systems. The complexity and cost of ensuring compliance with contract and consumer law, particularly across EU member states where interpretations differ, creates a disproportionate burden on smaller firms, which often lack in-house legal capacity and are deterred by unclear compliance obligations.

The drivers mentioned above, in turn, affect both of the problems mentioned above. Problem 1 accentuates the issues with the uptake of automated contracting technologies, hence reflecting concerns around competitiveness and differing market power, and having implications on digital transformation. Problem 2 underlines rights-related implications. The following problem tree illustrates the drivers, problems and consequences identified.

Figure 7: Problem tree for automated contracting



Source: Author's own elaboration

The consequences of the **main problem 1 'Barriers hindering uptake of automated contracting technologies'** are expected to be far-reaching, affecting both market efficiency and competitiveness across the EU. They are the following: 1) slower digital transformation, 2) reduced innovation and competitiveness (also due to higher operational costs), hence missed economic opportunities; 3) fragmented adoption and disparities between small and large companies. As businesses continue to rely on traditional contracting processes, they face higher transaction costs and slower productivity gains, particularly in highly regulated sectors with sector-specific rules for contracts (e.g. finance, healthcare). This, in turn, limits the broader uptake of AI and blockchain technologies, leading to less competitive EU businesses globally and limiting their potential to leverage the cost and efficiency savings offered by automation. Furthermore, without addressing the barriers to uptake, the gap between larger enterprises with the resources to adopt automated systems and smaller firms can be expected to grow, creating inequalities in market access and stunting technological progress across sectors.

Participants in the focus group noted that the unclear legal framework makes automated contracting more complex, leading to missed opportunities for innovation and efficiency. In many cases, companies avoid deploying automation, even where it could improve performance, because the risks outweigh the perceived benefits. As a result, automation remains underused in areas such as repetitive contract drafting and execution, where it could reduce costs and enhance competitiveness. Moreover, adoption remains fragmented: while larger firms can afford to absorb legal risks and invest in compliance, smaller companies are left behind. This disparity risks widening the digital gap within the Single Market and undermining more uniform and inclusive digital transformation.

The consequences of the **main problem 2 'imbalances in automated contracting'** primarily affect weaker parties, such as customers and SMEs, leading to increased legal risks and

potential exploitation. They are the following: 1) exploitation and inequality between parties, 2) reduced customer control, and 3) higher enforcement burden on consumers. The opacity in AI-generated contracts creates information asymmetry, enabling stronger parties to take advantage of weaker ones, leaving them less able to challenge or negotiate contract terms. The rigidity of smart contracts creates a further issue in this respect as these contracts often lack the flexibility to adapt to unforeseen circumstances. Over time, these issues negatively impact trust in automated systems, discourage adoption, or enable adoption ways that systematically disadvantage some contracting parties, for instance, due to imbalanced or potentially unfair terms. This perpetuates imbalances, limiting the benefits of automation for broader societal groups (especially consumers and smaller companies) and potentially prompting legal challenges.

3.2.4. Economic consequences

Methodological note: *the forward-looking estimates presented in this study represent plausible scenarios based on data available at the time of data collection between January and September 2024. However, they entail essential caveats. Emerging technologies - particularly artificial intelligence - evolve rapidly, and phenomena such as the AI hype cycle are inherently difficult to predict over a multi-year horizon. As evidence of this volatility, projections based on EUROSTAT data through 2023 yield markedly different outcomes compared to those incorporating data from 2024 (whether developments will follow a relatively linear or exponential growth path will depend on a variety of factors, which are uncertain at this stage). This underscores the high year-to-year variability and sensitivity of such estimates to new information. Consequently, these estimates should not be interpreted as precise forecasts. The projected possible ranges are not definitive upper or lower bounds, as future developments - especially breakthroughs that ease AI adoption (e.g., tools that streamline AI contracting) - could significantly shift the landscape. More details on the methodology used can be found in Annex I (section 5.2).*

The challenges outlined in the previous sections are expected to affect market efficiency and competitiveness across the EU, creating substantial obstacles for businesses seeking to adopt automated contracting technologies. To assess the potential future uptake of these technologies under conditions where current barriers are removed, we model adoption trajectories using two complementary analytical approaches. These approaches enable us to estimate the scale and pace of adoption in a barrier-free scenario:

1. **Proxy technology approach**[54]: this uses the adoption curves of broadly comparable technologies like e-signatures and e-invoicing, which saw significant growth following regulatory support. These technologies experienced a **122% increase** in adoption over the decade following the removal of legal barriers. Applying this growth rate, automated contracting could see an increase of **290,000 - 580,000 new users in ten years among companies**.
2. **Desired uptake approach**[55]: this approach estimates potential adoption using Eurostat data on both current and expected future interest in AI, reflecting enterprises' underlying willingness to adopt these technologies. This approach reflects the potential demand for such technologies if barriers were minimised or removed. By taking into account the potential evolution of interest levels and the share attributable to AI contracting, we

[54] This approach uses e-signatures and e-invoicing as proxy technologies, comparing their post-regulatory adoption trends to infer how automated contracting might evolve once similar legal and technical barriers are reduced. Methodologically, projected uptake is derived by applying the observed +122% growth in e-invoicing adoption over ten years to the current estimated range of AI-contracting users, providing an indicative approximation of future adoption rather than a direct forecast.

[55] This approach estimates potential future uptake by analysing Eurostat data on businesses that considered adopting AI but refrained due to barriers (Eurostat), and by translating current interest levels into potential automated-contracting adoption using assumptions aligned with existing AI workflow-automation shares. Methodologically, the estimate derives potential adopters by applying the observed proportion of "interested but non-adopting" firms to the current AI-contracting baseline and scaling it using recent AI-usage growth trends as a proxy for evolving demand, producing indicative static and dynamic uptake ranges rather than precise forecasts.

estimate between **up to 1.3m (+280%) potential new users among companies** over ten years, if barriers are removed.

Both approaches highlight the significant potential for automated contracting in the EU, indicating **opportunity costs associated with existing barriers**. Building on these estimates, we can assess the missed benefits by considering the businesses that could adopt AI contracting over the next 10 years but are currently prevented from doing so.

Table 1. Comparison of approaches – AI Contracting

	Proxy technology approach	Desired uptake approach (Static)	Desired uptake approach (dynamic)
Number of total business users in 10 years time	530,000 – 1,050,000	420,000 – 850,000	920,000 – 1,850,000
Additional business users (compared to current uptake)	+ 290,000 – 580,000	+ 185,000 – 370,000	+ 685,000 – 1,370,000
% increase (compared to current uptake)	+ 122%	~+ 80%	~+ 280%

Source: Study team's estimates based on Eurostat and JRC study (see Annex I for more details, esp. sections 5.2.4 and 5.2.6)

Adopting automated contracting solutions offers businesses a range of economic benefits, including faster contract processing, reduced costs, improved capacity to manage larger contract volumes, and fewer errors. These efficiency gains highlight the significant potential of such technologies to streamline operations and reduce overhead, particularly if current adoption barriers are addressed.

Our EEN survey results (N=131) indicate that businesses can accelerate contractual processes by up to 37% with automated contracting technologies. This level of improvement translates into substantial time and cost savings for legal teams, allowing them to focus on higher-value tasks and manage workloads more effectively. Additionally, businesses report being able to handle up to 1/3 more contracts than with traditional methods, signalling a notable boost in operational capacity.

Sectors with high contract volumes and complex regulatory environments - such as legal services, finance, and procurement - stand to benefit the most, as also noted in the JRC study. These industries rely heavily on efficient, accurate contract management for compliance and risk mitigation. Larger companies, with more resources and established digital infrastructure, are likely to adopt these technologies earlier. They are better positioned to absorb upfront investment costs and scale implementation, whereas smaller businesses may continue to face challenges due to limited capacity and higher relative entry cost.

3.2.5. Baseline

In the absence of targeted policy intervention, the adoption of automated contracting technologies is expected to remain somewhat limited and uneven across sectors and business sizes. While there is growing interest in these technologies, several persistent barriers - such as legal uncertainty, legal and regulatory compliance costs, limited awareness, information gaps, and asymmetries, etc. - continue to hinder widespread uptake, as described above.

Under this baseline scenario, adoption would likely progress at a slower pace, driven primarily by large enterprises in digitally advanced sectors such as ICT, finance, and legal services. These firms have the resources, technical capacity, and motivation to adopt such solutions without

external support. However, SMEs, which form the backbone of the EU economy, are expected to lag due to higher relative costs, lack of legal and technical expertise, and more limited access to scalable digital infrastructure.

Moreover, without coordinated regulatory clarity across the EU, uncertainty regarding the legal validity, attribution, and responsibility for contractual actions, particularly for unexpected actions, and the enforceability of automated contracts will likely persist. This could further discourage investment and slow cross-border adoption, particularly in sectors that involve complex or highly regulated transactions.

To estimate the likely pace of growth in this baseline scenario, we use Eurostat data on AI adoption among EU enterprises as a proxy. Based on trends observed in actual use from 2021 to 2023, a linear projection suggests a 29.2% increase in overall AI adoption over the next 10 years. However, automated contracting represents only a niche application within the broader AI landscape. Drawing on available data, including the JRC study, we estimate that only some 8% to 16% of AI adopters currently apply AI specifically for contracting purposes. Accordingly, we use a more conservative baseline growth estimate, projecting that the number of adopters (businesses) of AI contracting will increase by **10% to 20% over the next decade**, compared to current uptake. This range reflects the limited current uptake, continued barriers to entry, and the slower pace of adoption expected without targeted policy support. Applying this range to the current estimated number of enterprises using AI for contracting – between **235,000 and 475,000** – the total number of adopters after 10 years would increase to approximately **260,000 to 570,000 enterprises** EU-wide.

As a result, the baseline scenario indicates incremental growth in adoption, likely concentrated in specific industries and regions. The potential for broader economic and efficiency gains associated with more extensive use of automated contracting technologies would likely not be fully realised unless current barriers are effectively addressed.

3.3. Assessment of policy measures

The general and specific objectives for a policy intervention are directly derived from the analysis of problems and their drivers as mapped in the problem tree above. The intention is to ensure a coherent, traceable intervention logic, in which each objective is explicitly linked to the resolution of one or more identified problem drivers.

3.3.1. General objective

The general objective expresses the overarching ambition of EU action in the long term, in line with existing Union priorities. For automated contracting, we define the general objective as such: to **facilitate a trustworthy, inclusive, and efficient uptake of automated contracting technologies across the EU**, contributing to the objectives of the EU Digital Decade, the SME Strategy, and the Single Market. This objective supports the EU's overarching digital policy goals:

- It aligns with the Digital Decade Policy Programme 2030, which aims to ensure that over 90% of SMEs achieve at least a basic level of digital intensity, and to enhance digital skills and digital transformation across sectors.[56]
- It contributes to the objectives of the SME Strategy for a Sustainable and Digital Europe by addressing key barriers to digital adoption, such as legal complexity and integration costs, thereby empowering SMEs to compete and innovate in a digital environment.[57]

[56] European Commission (2025), *Europe's Digital Decade*, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

[57] European Commission (2020), *SME strategy launched by European Commission*, https://digital-strategy.ec.europa.eu/en/news/sme-strategy-launched-european-commission and https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0103

- It reinforces the goals of the Digital Single Market Strategy by supporting interoperability and removing regulatory and technical barriers to cross-border automated contracting, enhancing market access and consumer trust within the EU's internal market.[58]
- It is consistent with the Apply AI Strategy, which proposes a forum for developing legal guidance on the use of AI contracting and reducing risks for users, especially SMEs.[59]

3.3.2. Specific objectives

The specific objectives articulate more targeted goals that address the problem's underlying causes and set the direction for developing potential policy options. To further structure this analysis, sub-objectives are introduced under each specific objective, reflecting more granular dimensions of the identified challenges. These sub-objectives inform option design and subsequent impact analysis while avoiding premature assumptions about the means of delivery. In line with the problem assessment, we identify two central specific objectives:

Specific objective 1: Facilitate the uptake of automated contracting technologies

This specific objective aims to address barriers that hinder the adoption of automated contracting solutions across sectors and Member States. To this end, the initiative seeks to achieve the following sub-objectives (SOs):

- **SO1.1 - Ensure legal certainty and regulatory clarity**: address issues of legal uncertainty, complexity, and rigidity, tackling problem drivers #3 and #6 (Legal complexity, uncertainty, and rigidity).
- **SO1.2 - Reduce legal and compliance costs related to automated contracting to facilitate compliance:** tackle the commercial and regulatory burden of implementing automated contracting technologies addressing problem driver #1 (Legal and regulatory compliance costs of automated contracting technologies) and support seamless integration into current contractual and IT environments addressing problem driver #2 (Integration of the computerized contracting solution with existing practices).

By achieving this specific objective, the initiative aims to increase the uptake of automated contracting to enhance innovation and competitiveness across the EU, accelerate the digital transformation of private actors, and promote more even technological adoption among Member States and enterprises (especially SMEs).

Specific objective 2: Promote more balanced, fair, and reliable automated contracting solutions

This specific objective focuses on ensuring that automated contracting systems operate in a transparent, explainable, and equitable manner, particularly from a consumer and SME perspective. To this end, the initiative seeks to achieve the following sub-objectives (SOs):

- **SO2.1 - Ensure predictability, reliability, and explainability of automated outcomes**: focuses especially on legally sensitive use cases addressing problem driver #7 (Unpredictability and unreliability of the outcomes);
- **SO2.2 - Address information asymmetries and promote transparency and safeguarding of customer rights**: ensure consumers and small actors can understand and influence the operation of automated contracts addressing problem driver #8 (Information gaps and asymmetries).

[58] European Commission (2015), *A Digital Single Market Strategy for Europe*, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015DC0192

[59] European Commission (2025), *Apply AI Strategy*, COM(2025) 723 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0723

By achieving this specific objective, the initiative aims to increase fairness in automated contracting and, consequentially, to reduce inequality between contracting parties, particularly where there are power imbalances (e.g. large platforms vs. consumers or SMEs), enhance consumer control and the ability to make informed choices, and reduce enforcement burdens on consumers by ensuring that automated contracting systems respect their rights as consumers.

3.3.3. Policy measures

In the following section, several measures are described that could be implemented to achieve one or more of the objectives. The policy measures are generally not dependent on each other, although some interactions are acknowledged in the assessment below. Their cumulative effects and potential synergies should nevertheless be considered in the context of potential future policy intervention.

The analysis draws on triangulation of literature, insights from the focus groups, and a set of reasonable assumptions. It is presented in a manner that enables a structured qualitative comparison of measures and to the extent possible, measures are assessed using a set of comparable indicators, allowing for a consistent examination of their relative impacts across key dimensions. However, the quantitative estimates of impacts should be interpreted as illustrative scenario models based on observed evidence and informed judgement. They are not forecasts, but rather an attempt to provide measurable substance to plausible outcomes. While the quantification helps highlight the potential relevance of different policy choices, the figures should be seen as supporting inputs to the discussion, not as predictive estimates.

It is also important to note that there are objective limitations to the comparison methodology. Due to data availability and methodological constraints, not all costs[60] and benefits associated with each measure could be quantified on a robust evidence base. As a result, the analysis does not capture the full range of impacts, and the figures should be understood as supporting inputs to the assessment, rather than comprehensive or predictive estimates. In particular, the quantitative analysis of benefits focuses on a single type of potential efficiency gain: cost savings derived from estimated time savings linked to increased uptake of AI-based contracting tools[61]. Other possible benefits that could generate monetary value for companies, such as cost avoidance through reduced errors, lower litigation risk, or positive impacts on turnover, are acknowledged but could not be quantified in a reliable way. They are therefore only presented qualitatively in the report. The assessment is limited to the scope of the study and does not assess broader or indirect benefits from the general use of AI.

M1 – Rules on the validity of automated contracts

Policy measure M1 aims to create certainty about the legal validity of automated contracts. Several elements of automated contracts currently give rise to such uncertainty, including actions of automated systems, terms defined in computer code, or dynamic indicators (e.g., oracles used in smart contracts).

The measure clarifies that actions, like contract conclusion or performance, taken by automated systems can, in principle, be valid contractual actions. This means that an automated contract should not be denied validity or enforceability on the ground that it was concluded or is

[60] The cost assessment quantifies recurring cost items by relying on benchmarks from comparable impact assessments, updating them to current prices using Eurostat's labour cost index and applying average labour costs for professional, scientific and technical activities. Methodologically, total costs are derived by multiplying standardised unit costs (e.g. hourly labour, audits, transposition effort) by the estimated number of affected stakeholders, calculated from Eurostat business population data and prior uptake estimates in order to ensure consistent, comparable orders of magnitude across policy measures. See Annex I, section 5.2.6, and Annex II for more details

[61] The quantitative assessment estimates efficiency gains by linking projected future uptake of AI contracting (based on the median proxy-technology scenario) with assumptions on yearly contract volumes, average contract duration and time savings per contract. Methodologically, yearly benefits are calculated by multiplying projected new adopters by assumed contracts per firm, applying an estimated one-hour time saving per contract (derived from EEN survey evidence), converting saved hours into monetary values using average labour costs and cumulating these annual savings over a ten-year period to provide indicative, not exhaustive, orders of magnitude. See Annex I, section 5.2.7 for more details.

performed by an automated system without human review or intervention. Likewise, terms expressed in code language or terms using dynamic indicators can be valid just like traditional contractual terms. Their inclusion is as such no ground for denying the validity of the contract. Other – traditional – reasons for denying validity or enforceability of the contract may still apply.

Articles 5 and 6 of the UNCITRAL Model Law on Automated Contracting[62] present a model of relevant provisions that could be introduced to realise this measure. The panel noted that the approach proposed by UNCITRAL creates the necessary enabling framework for the use of automated contracting without imposing additional obligations on the contracting parties. This helps the parties to integrate automated contracting seamlessly into their established contractual operations, thereby supporting specific objective SO1 (facilitating the uptake of automated contracting technologies).

Policy measure M1 applies to any type of contract, including B2B and B2C relationships. However, in the context of businesses dealing with consumers, additional rules may apply regarding the intelligibility of contractual terms. In particular, where the terms of a consumer contract are in writing, they must be drafted in plain, intelligible language.[63] Computer code does not fulfil this requirement and thus may not comply with the applicable rules to a consumer contract. In a B2C context, the policy measure may therefore not be sufficient to ensure validity of terms written in code.

Benefits

Policy measure M1 provides explicit legal recognition of the validity of automated contracts, particularly for those systems without human intervention. This is seen as a critical enabler for the broader uptake of automated contracting technologies. A sectoral analysis of smart contracts in the construction sector as an example, identifies legal uncertainty as a key barrier to adoption: it states that without clear rules on enforceability, businesses are reluctant to adopt or invest in smart contracting tools. Such uncertainty is an even bigger challenge when acting across borders due to the complication of jurisdictional differences.[64] M1 provides stakeholders with more confidence that such agreements will be upheld in court. This leads to efficiency gains, reducing transaction costs, and building trust.

These conclusions from the literature are validated by the expert panel on automated contracting. The panel underscored that the absence of such clarity imposes significant compliance burdens and creates a psychological and legal barrier that deters firms (especially SMEs) from adopting these technologies. They emphasised that legal ambiguity disproportionately affects smaller actors lacking in-house legal capacity, thus exacerbating digital divides within the Single Market. Moreover, the group stressed that only an EU-wide solution can prevent continued fragmentation and legal risk across Member States.[65]

Costs

According to the Expert Panel, the costs of the measure can be considered to be low. Participants agreed that the measure would involve legislative adjustments, akin to past legal clarifications like those under the UNCITRAL Model Law on Electronic Commerce. The panel members unanimously agreed that automated contracts are, in principle, expected to be valid, despite the existing legal uncertainties. Policy measure M1 was therefore viewed as primarily

[62] UNCITRAL (2025), Model Law on Automated Contracting with Guide to Enactment.

[63] Article 5 UCTD.

[64] Agapiou, A. *Overcoming the Legal Barriers to the Implementation of Smart Contracts in the Construction Industry: The Emergence of a Practice and Research Agenda*. Buildings 2023, 13, 594. https://doi.org/10.3390/buildings13030594

[65] Two Expert Panel sessions on automated contracting organised in the framework of this study

confirming existing principles rather than creating entirely new regulatory regimes.[66] The adjustment costs for businesses are consequently very low. Even if businesses may need to adapt some of their contracts to the changed legal framework, the measure is not expected to alter their business practices in substance.

With the available data, it is not possible to predict precisely how businesses react to changes in the law related to automated contracting. Since policy measure M1 only presents a confirmation of expectations, we estimate that current (business) users of automated contracting need very little time for familiarisation with the new rule. Businesses that do not currently use automated contracting do not incur additional costs as they need to familiarise themselves with the applicable rules in any case once they start using the technology. Likewise, the measure is not expected to create costs for citizens as it does not impose any obligations on them.

Table 2. Costs and benefits of the policy measure M1 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Legal certainty for the use of automated contracting, leading to additional use	Estimated 950k – 7m additional consumers	No significant costs	
Businesses	Legal certainty for the use of automated contracting, leading to additional use	Estimated 100k – 850k additional business users, resulting in €660m – €1.3b in cost savings[67]	Familiarisation with new legal rule for businesses already using automated contracting	Estimated €11m – €22m (one-off)
Authorities	No significant benefits relating to private contracts		Implementation of legislative changes (in case of binding measures)	Estimated €0.2m (one-off)

Source: Calculations in Annex II, Table 28

M2 – Rules on attribution of actions

Policy measure M2 addresses specific objective SO1.1 (legal and regulatory clarity) by establishing a framework for the attribution of automated contractual actions to the persons involved. The measure clarifies that an action carried out by the automated system in a contractual context is legally attributable to the person who uses the system for this purpose, i.e. the action of the system is considered as though it were carried out by that user. The measure therefore attributes the actions of an automated to a legal or natural person, based on the approach that the automated system or AI in general, should not be given a legal personality. It also reduces legal risks for third parties involved in the provision or hosting of the automated system which may otherwise be considered at the origin of an automated action.

The focus group pointed out that there is an established legal framework for agency, i.e. the capacity of a (human) agent to act on behalf of another person. However, there was no clear consensus in the group on whether agency law can be applied by analogy to automated systems.

Article 7 of the UNCITRAL Model Law on Automated Contracting proposes a provision that does not refer to agency law and that can be applied to automated systems regardless of their

[66] Two Expert Panel sessions on automated contracting organised in the framework of this study

[67] This relates exclusively to time-related cost savings.

level of autonomy. Importantly, given the broad scope of the Model Law, the provision does not interfere with the expected behaviour and legal framework for deterministic systems.

Non-deterministic systems may behave in a manner that the user did not expect, raising questions about their contractual intent and whether the action can still be attributed to that party. The UNCITRAL Model Law proposes to resolve the problem of unexpected actions partially on the level of attribution (unexpected actions are still attributed to the responsible person) and specifically, in a dedicated provision, which is discussed in policy measure M3.

Policy measure M2 applies to all types of contracts, whether in a consumer or professional context. This ensures that consumers can also use automated systems to act on their behalf without relying on either a pre-existing framework contract with the trader or an intermediary who acts as a contractual party. The measure also potentially ensures that a contract concluded by an automated system on behalf of a consumer qualifies as a consumer contract, because it is attributed to a consumer. It therefore should afford the appropriate protections.[68]

Benefits

Similar to M1, providing explicit legal rules on the attribution of actions carried out by automated systems emerges as a critical enabler for the uptake of automated contracting technologies. Attribution rules are foundational to legal certainty. User confidence in the actions of their automated systems as legally theirs, are more likely to integrate these tools into everyday operations. This attribution certainty reduces the risk of contract disputes, builds trust between contracting parties, and allows businesses to streamline operations without sacrificing legal clarity.

These conclusions were validated by the Expert Panels on automated contracting. Participants from the legal, industry, and consumer domains supported the introduction of a clear EU-level rule affirming that actions carried out by an automated system are attributable to the party that uses it. Several participants stressed that without attribution certainty, companies face difficulty in determining liability and are exposed to disputes that undermine trust in automated contracting. Furthermore, the panel noted that divergent national interpretations would persist unless EU-wide rules are established. Attribution rules were viewed as essential to ensuring cross-border harmonisation in the Single Market.[69]

Costs

Implementing policy measure M2 entails relatively modest costs, primarily linked to legal reform rather than technological overhaul. Much of the conceptual groundwork has already been developed in UNCITRAL's Model Law on Automated Contracting (Article 7), which defines attribution as resting with the party using the automated system for contractual purposes, not its provider.[70] According to the Expert Panel, adapting EU-level legislation to incorporate these principles would be a low-cost intervention. Experts noted that operational implementation would involve limited updates to contractual templates and risk management procedures, with no significant IT infrastructure costs. The adjustment costs only concern businesses insofar as they are already using automated contracting; otherwise, the familiarisation would be part of their business as usual.

Users may potentially bear contractual liability for actions of an automated systems that were attributed to them. However, this does not present an additional societal cost as the liability would at most be shifted from another party (e.g. the provider). In addition, as the Expert Panel

[68] ELI (2023), *EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM*?, Interim Report, p. 23.

[69] Two Expert Panel sessions on automated contracting organised in the framework of this study

[70] UNICITRAL (2025), UNCITRAL *Model Law on Automated Contracting With Guide to Enactment*, https://uncitral.un.org/sites/uncitral.un.org/files/2424674e-mlautomatedcontracting-ebook.pdf

confirmed, attributing contractual actions taken by an automated system to the user of the system is in line with the general expectation of users and contracting parties.

Table 3. Costs and benefits of the policy measure M2 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Legal certainty by clarifying responsibilities and lowers perceived risk for users.	Estimated 950k – 7m additional consumers using automated contracting	Potential shift of contractual liability to automated contracting users due to changed attribution.	Not quantified
Businesses	Legal certainty by clarifying responsibilities. Simpler use of automated contracting by relying on default rules. Lower risk for providers of automated contracting systems of being held responsible for contractual actions.	Estimated 100k – 850k additional business users, resulting in €660m – €1.3b in cost savings[71]. Additional benefits not quantified	Familiarisation by current automated contracting users and adaptation of contracts. Potential shift of contractual liability to automated contracting users due to changed attribution.	Estimated €60m – 120m (one-off)
Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures)	Estimated €0.2m (one-off)

Source: Calculations in Annex II, Table 29

M3 – Rules on unexpected actions

Policy measure M3 aims to clarify the consequences if the automated system carries out actions that are not in line with the expectations of the user. This makes the legal risks related to unexpected actions – particularly relevant for AI systems with a high degree of autonomy – more foreseeable and thus contributes to specific objectives SO1.2 (reduce legal and compliance costs) and SO2.1 (ensure predictability, reliability, and explainability). The measure clarifies under which circumstances an action of an automated system can be disavowed by the user on the grounds that it was unexpected. In connection with measure M2, the user of an automated contracting system is in principle bound by its actions. UNCITRAL proposes two cumulative conditions under which a user can claim non-reliance on an unexpected automated action[72]:

> (a) The party to which the action is attributed could not reasonably have expected the action; and
>
> (b) The other party knew or could reasonably be expected to have known that the party to which the action is attributed did not expect the action.

[71] This relates exclusively to time-related cost savings.

[72] Article 8 UNCITRAL Model Law on Automated Contracting.

The measure can apply to B2B and B2C contracts.

As an additional protection, in particular for consumers, we consider the user's right to recover damages from the automated system provider.[73] This is discussed in measure M6, which addresses the fairness of the service contract for the provision of the automated system (see below).

Benefits

Providing clear legal rules on the consequences of unexpected actions by automated systems (such as unanticipated payments or unintended orders) is as an important enabler for the adoption of automated contracting. The measure is therefore expected to increase the uptake of automated contracting. The literature identifies that unexpected or erroneous actions by a system, if not legally remediable, introduce significant risk. For example, a study in the *Beijing Law Review* notes that smart contracts, while reducing the risk of human error in the execution, may nevertheless produce incorrect or unexpected results due to coding errors or external shocks. [74] Without legal gateways to address these, businesses remain hesitant to rely on full automation. Mechanisms allowing users to exclude liability or void actions which were not reasonably anticipated, and to seek redress, are thus critical for building confidence.

The Expert Panel on automated contracting supported these conclusions. Participants endorsed the introduction of rule-based frameworks that allow users to invalidate unexpected automated actions, contingent upon conditions such as a reasonable lack of expectation and awareness by the counterparty. They agreed this remedy would significantly reduce firms' need for manual oversight or costly risk mitigation strategies. The Panel also highlighted that SMEs benefit disproportionately from this clarity, as it shields them from legal exposure they cannot afford to monitor continuously. The Panel favoured making such rules binding and EU-wide, citing that voluntary or national-level frameworks would not suffice to create uniform trust or prevent jurisdictional uncertainty.

M3 is expected to be moderately effective in enhancing fairness in automated contracting, particularly in scenarios where systems operate with a high degree of autonomy. The two-part test proposed by UNCITRAL (centred on foreseeability and mutual awareness) provides a legally sound and internationally recognised mechanism for genuinely unexpected actions. This framework is set out in Article 8 of the *UNCITRAL Model Law on Automated Contracting* (2024).[75] While the provision was only included as optional in the Model Law, it addresses a pertinent issue which is broadly acknowledged. Mik (2022) warns that smart contract code is incapable of guaranteeing performance or eliminating the need for trust, emphasising that foreseeability must guide liability rather than blind reliance on immutable systems.[76] Fairfield and Selvadurai (2022) similarly contend that enforceability should rest on the agreement parties reasonably intended, and that courts should require the authority to override automated outcomes that are misaligned with those expectations.[77]

The Expert Panel confirmed that the measure strengthens fairness, especially for consumers who typically cannot anticipate the full range of system actions. However, they highlighted that proving the second condition (whether the counterparty was aware of the unexpected nature of the action) may pose practical enforcement challenges. The Panel further suggested that the measure's effectiveness increases when paired with complementary mechanisms such as M6

[73] ELI (2023), EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?, Interim Report, p. 46.

[74] Ballaji, N. (2024). Smart Contracts: Legal Implications in the Age of Automation. Beijing Law Review, 15, 1015-1032. https://doi.org/10.4236/blr.2024.153061

[75] UNCITRAL (2025), UNCITRAL Model Law on Automated Contracting with Guide to Enactment.

[76] Mik (2022), *Smart Contracts: Tales of Trust and Certainty*, https://doi.org/10.71265/z0xrj502

[77] Fairfield and Selvadurai (2022): Governing the Interface between Natural and Formal Language in Smart Contracts, see: https://uclajolt.com/wp-content/uploads/2022/04/Fairfield_Selvadurai_Final-4.15.pdf

(Balanced contractual terms between AI provider and user), which allows users to claim damages from system providers.[78] In practice, the measure's success will depend on consistent judicial interpretation of "reasonable expectation" and its application in complex technical environments. Courts and regulators must develop guidance and possibly rely on expert evidence, particularly in cross-border or high-stakes cases.

Costs

Implementing policy measure M3 would involve limited legislative adjustments, aligning with UNCITRAL Model Law Article 8.[79] Even though it does not necessitate technical infrastructure investment, business will need to get familiar with the changed rules and make an assessment whether to change their contracting practices accordingly. This only concerns businesses that already use automated contracting as the familiarisation otherwise can be considered business-as-usual costs.

Table 4. Costs and benefits of the policy measure M3 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Legal certainty and risk mitigation mechanism may reassure risk-averse consumers.	Estimated 450k – 3.5m additional consumers	Potential liability for unexpected actions shifted from another party	Not quantified
Businesses	Legal certainty and risk mitigation mechanism may reassure risk-averse users. Limits potential exploitation or unintended outcomes to the disadvantage of weaker parties.	Estimated 50k – 400k additional business users, resulting in €330m – €660m in cost savings[80] (10 years) for users. Savings from voiding costly unexpected actions are not quantified. These savings may however in any case be met with equivalent losses of the other contracting party who bears responsibility instead.	Familiarisation by current automated contracting users and adaptation of contracts. Potential liability for unexpected actions shifted from another party.	Estimated €170m – €350m (one-off)
Authorities	Likely to results in lower litigation costs due to disputes arising from unexpected outcomes		Implementation of legislative changes (in case of binding measures)	Estimated €0.2m (one-off)

Source: Calculations in Annex II, Table 30

[78] Two Expert Panel sessions on automated contracting organised in the framework of this study

[79] UNCITRAL (2025), UNCITRAL Model Law on Automated Contracting with Guide to Enactment.

[80] This relates exclusively to time-related cost savings.

M4 – Specific rule on application of consumer law to contracts concluded by consumers using an automated system

Policy measure M4 clarifies that consumer law applies to an automated contract regardless of whether the party who is a consumer uses an automated system to take certain actions on their behalf. The application of consumer law has significant consequences for the interpretation and legal effect of the contract as well as for the rights and obligations of the parties. This includes the obligation of the trader to provide extensive pre-contractual information as well as the prohibition of unfair contract terms and unfair commercial practices – cornerstones of the EU's consumer protection policy.

The participants of the focus group have unanimously supported the notion that the application to consumer law should not be drawn into question by the use of an automated system. This approach prevents a differential legal treatment between consumers who use an automated system and those who do not. It therefore not only pursues specific objective SO1.1 on legal certainty, but also SO2.2 on alleviating asymmetries, promoting transparency, and safeguarding consumer rights.

The key criterion for the application of consumer law is that a consumer is a party to the contract in question. The application of consumer law directly follows if the conclusion of a contract by an automated system is attributed to a consumer in line with measure M2.[81] If M2 is implemented in a B2C scope, a specific rule on the application of consumer law is hence not necessary. Alternatively, measure M4 could clarify the application of consumer law according to objective criteria, namely where the user of an automated system is a consumer and the other contracting party a business.

The Unfair Contract Terms Directive has an additional criterion for its application, namely that the terms in question are not individually negotiated.[82] The directive introduces fairness control for terms and conditions that are offered to consumers on a 'take it or leave it' basis. The introduction of AI systems that negotiate individual terms may undermine the application of the directive and thus remove a central element of EU consumer protection. Measure M4 could therefore, in addition to clarifying attribution to consumers, also clarify whether rules on general terms and conditions are extended to automated contracts.

If not the conclusion but other relevant actions in relation to a contract are automated, the application of consumer law is certain since the attribution of the conclusion to the consumer is clear.

Some specific consumer law issues may arise in the use of smart contracts technology in contracting. For instance, there are questions around the practical exercise of the right of the consumer to withdraw from a distance contract concluded by means of smart contracts on a blockchain, in particular due to the immutability of transactions on the blockchain.[83] This, however, is not a question of the applicability of consumer law as such but rather its application and exercise of consumer rights in a concrete setting.

Benefits

Policy measure M4 addresses the risk that consumer protections might not be respected if a contract is concluded via an automated system. The European Law Institute (ELI) has cautioned

[81] ELI (2023), EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?, Interim Report, p. 26.

[82] Article 3 of the UCTD.

[83] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission.

that, without clear rules, consumers using automation may unintentionally forfeit their rights, such as withdrawal or transparency, under the Consumer Rights Directive.[84]

M4 is expected to be effective in reinforcing fairness in B2C automated contracting by ensuring that EU consumer rules continue to apply when consumers use automated systems (including obligations on pre-contractual information, prohibition of unfair terms, and protection against misleading practices). It closes potential loopholes that could otherwise disadvantage consumers relying on digital assistants. The *European Law Institute's Guiding Principles and Model Rules on Algorithmic Contracts* affirm that existing consumer law protections remain relevant irrespective of automation and must be preserved to maintain legal certainty and fairness in digital contexts. [85] Gijrath (2021) applies the role of consumer law specifically to transactions managed by AI systems on digital platforms. The author underlines the importance of existing consumer law in ensuring trustworthy use of AI.[86] As for smart contracts, some commentators warn that immutable smart contracts may conflict with key consumer protection principles. D'Onfro (2020), for example, analyses the use of smart contract in financial contracts and argues that fully automated enforcement is structurally incompatible with the flexibility that is mandatory for consumer contracts, as laws mandate exceptions in particular for bankruptcy. She concludes that smart contracts must allow for human override and post-formation modification to remain legally viable in the consumer finance market.[87]

The Expert Panel insights align with these views. Participants stressed that failing to apply consumer law to automated systems would fragment protection across Member States, eroding trust and creating uneven outcomes, and would on top of that most likely be contrary to the expectations of the contracting parties.

Costs

The costs of M4 can be estimated to be lower than those for M2. Since measure M4 does not address the substance of attribution, it does not require adaptations to existing contracts. The Expert Panel confirmed that neither business representatives nor academic experts expect that the use of an automated system should alter the legal classification of a contract when the using party is a consumer. The participants emphasised that legal protections must follow the party, not the interface.[88]

In implementation terms, M4 is straightforward to enact through explicit provisions affirming that automation does not alter consumer law applicability. The administrative effort is low, though regulators and platforms will need to ensure compliance (particularly regarding unfair terms and automated commercial practices; enforcement via existing consumer authorities and courts can proceed under current frameworks).

The Expert Panel confirmed that the application of consumer law should not be drawn into question by the use of an automated system. In particular, traders that expect to deal with consumers already follow consumer law. Thus, the clarification brought by measure M4 is not expected to change business practices or introduce new obligations for stakeholders. What is

[84] European Law Institute (2024): *Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts* ISBN: 978-3-9505495-4-6, https://europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf

[85] ELI: *EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?,* Interim Report, see: https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Interim_Report_on_EU_Consumer_Law_and_Automated_Decision-Making.pdf

[86] Gijrath, Serge (2021): *Consumer Law as a Tool to Regulate Artificial Intelligence*, see: https://www.cambridge.org/core/books/constitutional-challenges-in-the-algorithmic-society/consumer-law-as-a-tool-to-regulate-artificial-intelligence/56E19456FC48B1235F2F0CB894C24FF1

[87] D'Onfro, Danielle (2020): *Smart Contracts and The Illusion of Automated Enforcement*

[88] Two Expert Panel sessions on automated contracting organised in the framework of this study

more, most businesses selling to consumers over the internet may not even know whether their consumers are using automated systems or not.

Only traders that connect to their customers through specialised interfaces for automated contracting, i.e. traders that are themselves already using automated contracting of some form, may be affected by the clarification rule. However, given the general expectation confirmed by the Expert Panel that consumer law applies in these situations, most traders would only need to familiarise themselves with the newly introduced rule.

Table 5. Costs and benefits of the policy measure M4 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Brings legal certainty and a consumer confidence boost. Strengthens consumer protection across the EU, narrowing protection gaps	Estimated 950k – 7m additional consumers	No significant costs	
Businesses	Increased consumer trust may indirectly increase attractiveness of automated contracting for traders.	Not quantified	Familiarisation with the new legal rule by current users of automated contracting	Estimated €11m – €22m (one-off)
Authorities	Reduced enforcement complexity of consumer protection	Not quantified	Implementation of legislative changes (in case of binding measures)	Estimated €0.2m (one-off)

Source: Calculations in Annex II, Table 31

M5 – Identifying and simplification of relevant information requirements

Policy measure M5 clarifies and potentially simplifies the information requirements that a trader needs to fulfil before the conclusion and during the lifetime of an automated consumer contract. An automated contract may fall under a range of EU harmonised rules in the digital area and consumer protection law, depending on how the contract was concluded, whether the parties are businesses or consumers, and what the object of the contract is. Some of these laws, such as the eCommerce Directive[89] and the Consumer Rights Directive,[90] impose obligations on the parties to provide certain information to the other, in particular before the conclusion of the contract.

The use of automated systems changes how information is received and processed by the recipient. For instance, an automated system may process large amounts of information quicker than a human user could, and it is less likely to overlook information "hidden" in the fine print. On the other hand, information may be presented in a manner that is easily understood by human users but which the system is not designed to process, for instance images or PDF. Furthermore, the system is likely to act before the user even had the chance to take note of any

[89] Directive 2000/31/EC.

[90] Directive 2011/83/EU.

of the provided information. This can render information obligations designed for human users less effective.

Measure M5 aims to promote specific objectives SO1.2 of reducing integration costs and SO2.1 of increasing reliability of automated contracting systems by clarifying which information has to be provided in which format in this context.

While the measure can apply both in a B2B and B2C context, the latter is especially relevant since the information obligations in consumer contracts tend to be more extensive and detailed, for instance as they are spelled out in Article 6 of the Consumer Rights Directive. Furthermore, in this scope, information overload is recognised as a particular problem for consumers and businesses alike, as was underlined by the focus group. The use of an automated system may alleviate this problem provided that the information is provided in a machine-readable format. The required format of the information could be specified as an extension of Article 8 of the Consumer Rights Directive, which lays down the formal requirements of distance contracts.

As an alternative approach, measure M5 could adapt information requirements where these are not necessary for consumers who use an automated system. But not all information requirements could be suitable for simplification as some may remain highly relevant when automated systems are used, such as the obligation of a contract confirmation for distance contract on a durable medium. This assumes that the automated system can analyse information more effectively than the average consumer and close the information gap that an average consumer would otherwise have against the business. For instance, certain standardised information obligations, such as the clear labelling of the order confirmation button, could be considered for simplification, since they represent standard requirements not specific to the contract at hand. However, the focus group called for caution when reducing consumer law requirements so as not to undermine their protective function, which is also recognised in the objectives of measure M4. Similarly, the European Law Institute formulated the principle that information obligations should continue to apply.[91]

Furthermore, to achieve an effective simplification of requirements, it must be ensured that the measure does not create a second standard of information requirements that traders have to follow in parallel to the existing one. Therefore, the measure should be targeted at businesses that deal with customers using automated contracting or that have special, separate channels of communication with those customers. In these separate channels, the businesses could thus implement the simplified information requirements without creating a double standard. Secondly, the simplification should be designed in such a way that, if a business in an automated transaction choses to comply with the existing full set of information requirements, they are also compliant with the simplified rules.

Benefits

M5 provides simplified and context-relevant- pre-contractual information requirements for consumer contracts concluded via automated systems. The literature highlights that over-prescriptive or fragmented information regimes (such as outdated obligations under the Consumer Rights Directive) create unnecessary complexity and costs for both businesses and consumers. For instance, the European Commission's Fitness Check on the Consumer Rights Directive points out that removal of obsolete requirements (like fax numbers) and modernisation of communication channels can reduce compliance burdens and costs for traders, while enhancing consumer clarity.[92]

[91] ELI (2023), EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?, Interim Report, p. 27.

[92] European Commission (2018: SWD(2018) 96, see: eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A52018SC0096&utm

The Expert Panel confirmed that the line between comprehensive pre-contractual information and information overload is thin and can be difficult to tread. An automated system may be able to process core contractual information (rights, prices, functionality) without burdening consumers or platforms with outdated or redundant obligations.[93]

M5 is also expected to improve fairness and usability in B2C automated contracting by adapting pre-contractual information duties to the realities of digital interactions. The Expert Panel confirmed that lengthy, generic disclosures are ineffective in automated contexts and supported a shift towards embedded, real-time information delivery.[94]

Costs

Aligning automated information provision with modern channels can reduce regulatory burdens, particularly by removing obsolete obligations. SMEs in cross-border digital services already face costs to address divergent requirements. Streamlining these can cut compliance costs while bolstering consumer confidence.

Despite cutting recurrent costs, the measure entails one-off costs for familiarisation and adaptation by e-Commerce businesses that align their templates for contracts and pre-contractual information with the new regulatory framework. As discussed above, the measure would be targeted only at businesses that have specific channels of communication reserved for automated contracting or that only deal with clients using automated contracting. It thus concerns businesses that are currently using automated contracting and any companies that decide to do business only with consumers who use AI agents.

Table 6. Costs and benefits of the policy measure M5 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Improves relevance of pre-contractual information provided to consumer systems for automated contracting.	Estimated 850k – 6.5m additional consumers	No significant costs	
Businesses	Reduces compliance burdens and complexity related to pre-contractual information obligations.	Estimated 100k – 750k additional business users, resulting in €600m – €1.2b in cost savings[95].	Familiarisation and potential adaptation of contracts. Technical adjustments are not mandatory and thus do not create additional costs.	Estimated €11m – €22m (one-off)
Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures)	Estimated €0.2m (one-off)

Source: Calculations in Annex II, Table 32

[93] Two Expert Panel sessions on automated contracting organised in the framework of this study

[94] Two Expert Panel sessions on automated contracting organised in the framework of this study

[95] This relates exclusively to time-related cost savings.

M6 – Balanced contractual terms between AI provider and user

Policy measure M6 introduces a fairness standard for the terms of the service contract between the user and provider of an automated contracting system. The service contract is in principle a traditional contract. Existing contract law rules may therefore impose requirements prohibiting unfair contract terms between the user and the provider.

What sets the contract for the provision of the automated system apart is its impact on another, the automated contract. The user of the system is potentially exposed to contractual liability due to actions taken by the automated system on which they had little to no influence, in particular if the system does not behave as expected due to design features or flaws. If the system provider fully excludes their liability for all unexpected actions, this has the potential to create an imbalance. In some circumstances such a term could be deemed as unfair, especially where it creates a significant imbalance in consumer contracts.

In existing consumer law, there are no clear rules on the liability of the provider in the described scenario, with the exceptions mentioned below. In consumer contracts that are not individually negotiated, fairness controls already apply in accordance with the Unfair Contract Terms Directive.[96] However, the indicative list of unfair terms contained in the directive currently does not clearly cover unfair exclusions of liability except for bodily harm, as was also noted by a study of the Parliament's JURI Committee on digital services.[97] If the automated system is provided to a consumer as a self-standing digital service, the Digital Content Directive[98] lays down rules on its conformity. The trader is liable for the delivery of the service in conformity with the contract, but the DCD leaves liability for damages caused by the service to national law.[99] If the automated system is a digital element of a physical good sold to the consumer under the same contract, the Sale of Goods Directive applies with similar rules.[100]

In contracts between businesses, the parties enjoy far-reaching contractual freedom. On the one hand, this increases the risk of imbalances in contracts further, especially when smaller firms acquire off-the-shelf automation solutions from larger technology providers.[101] On the other hand, limiting the contractual freedom of businesses is a more far-reaching intervention that requires strong evidence that market actors do not achieve a desirable balance through competition and individual negotiation.

Benefits

M6 is expected to reduce legal and economic imbalances inherent in the service contracts between users and providers of automated contracting systems. A study requested by the European Parliament's JURI Committee has flagged that liability-exclusion clauses for digital services often escape scrutiny under the Unfair Contract Terms Directive, despite distorting contractual balance to the consumer's detriment, recommending the introduction of black and grey lists for harmful terms and stronger transparency obligations.[102] The European Law Institute's Model Rules reinforce this call by proposing fairness and risk-sharing mechanisms

[96] Council Directive 93/13/EEC.

[97] European Parlament (2021), Executive Summary, Requested by the JURI committee: *Update the Unfair Contract Terms directive for digital services*, https://www.europarl.europa.eu/RegData/etudes/STUD/2021/676006/IPOL_STU(2021)676006(SUM01)_EN.pdf

[98] Directive (EU) 2019/770

[99] Recital 73 DCD

[100] Directive (EU) 2019/771.

[101] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[102] European Parliament (2021*): study requested by the JURI committee 'Update the Unfair Contract Terms directive for digital services'* , see: Update the unfair contract terms directive for digital services

in provider–consumer contracts, ensuring users are adequately informed and can rely on the conformity of the system.[103]

Costs

Implementation would require legal adjustments (such as amending Annex I of the Unfair Contract Terms Directive[104]) to include automated-system exclusions and updating guidance to consumer authorities on enforcement. Providers of automated contracting systems would face increased compliance costs.

The obligation to bear liability for damages caused by unexpected actions in consumer transactions is likely to entail significant costs for providers of automated systems. However, on a total account, this only shifts costs from system users (businesses and consumers) to providers and hence does not increase costs overall. However, this may deter providers from developing automated contracting systems in the first place, lowering the number of systems on the market. The economic impact of reduced competition and potentially lower uptake of automated contracting depends on too many variables to be accurately quantified as costs.

Table 7. Costs and benefits of the policy measure M6 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Fairer conditions incentivise users.	Estimated 850k – 6.5m additional consumers	No significant costs	
Businesses	Providers overall gain from increased user trust and demand for their products. Reduces structural imbalance in negotiating power between AI providers and smaller users. Small businesses may also benefit from fairer conditions for using off-the-shelf automated contracting systems offered to consumers.	Not quantified	Familiarisation, adaptation of contracts and potentially revenue models by providers of automated contracting systems, establishment of compliance structures.	Estimated €60m – €120m (over 10 years)
Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures)	Estimated €9m – €18m (over 10 years)

[103] European Law Institute (2024): *Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts* ISBN: 978-3-9505495-4-6, see: https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf

[104] European Commission: Unfair contract terms directive, https://commission.europa.eu/law/law-topic/consumer-protection-law/consumer-contract-law/unfair-contract-terms-directive_en

			Added workload for supervisory authorities.	

Source: Calculations in Annex II, Table 33

M7 – Freedom to set parameters of the automated systems

Policy measure M7 ensures that users remain in control of key settings that govern an automated system's behaviour. This means that the provider of an automated contracting system designs it so that the user can define important parameters – for example, what products or services to target, which sellers or platforms to consider, and spending limits or other conditions for closing a deal. By allowing users to adjust these settings, the system's actions better reflect the user's intentions, and the user retains ultimate control over outcomes. Importantly, the European Law Institute has noted that such user control is a precondition for treating the automated system's actions as the user's own (rather than the provider's) – it is only reasonable to attribute the system's actions to that user, if the user can set the system's parameters.[105]

Allowing users to understand and set parameters therefore pursues the specific objective SO1.1 of increasing legal certainty for the user as regards the outputs of the system. Furthermore, this gives users control and enhances predictability, reliability, and explainability of automated outcomes (SO2.1). There are several ways to implement this measure. One approach is a voluntary standard, where providers agree on best practices to build flexible, user-configurable systems. A more formal approach is introducing information requirements whereby providers would be legally obliged to inform users about what parameters they can set and which ones are fixed before the user adopts the system. Existing EU consumer law already moves in this direction – the Consumer Rights Directive[106] requires traders to inform consumers of the main characteristics of a service, which would likely include fundamental automated-contracting parameters. In addition, the Unfair Commercial Practices Directive[107] establishes a positive obligation to provide all the information which the average consumer needs to make an informed purchasing decision.

An additional option is to mandate the disclosure of pre-set parameters that the user *cannot* change, so users at least know the system's fixed constraints. The strongest variant is a direct obligation on providers to ensure that users can adjust crucial parameters themselves.

In B2C contracts, this measure could be a requirement to protect individuals. Consumers often have no bargaining power to negotiate how an automated system operates, so regulation would ensure they can understand and control the system's settings. This builds on existing consumer protection laws, which implements information obligations regarding the product's main characteristics. It could also be complemented by design requirements requiring that key parameters of the system are user-adjustable. A soft-law alternative is recommending or acknowledging such features as user-friendly functionalities.

In B2B settings, companies might have more freedom to contract and define parameters by agreement. Thus, a softer approach might suffice. General guidelines or standards could encourage enterprise users to demand and providers to offer customizable automated contracting systems. However, even in B2B contexts, a baseline of transparency (disclosing any fixed, non-adjustable parameters) can help businesses integrate such tools into their workflows with full knowledge of any limitations.

[105] ELI (2023), EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?, Interim Report, p. 31.

[106] Directive 2011/83/EU.

[107] Directive 2005/29/EC.

Benefits

Parameter customisation of automated systems aligns the system's operation with user-specific needs and thus improves trust in the technology. Better alignment with the user's needs may also make automated contracting systems more attractive. The Expert Panel participants emphasised that without parameter flexibility, automated tools feel like "black-boxes" that may misalign with internal policies or compliance needs.[108]

M7 is expected to improve fairness and user control in automated contracting systems by ensuring users can define the key parameters driving system behaviour. The European Law Institute also emphasises that user freedom to set parameters is essential to attributing system actions to the user, thus safeguarding both trust and legal clarity.[109]

Costs

Implementing measure M7 would involve legal adaptation, such as embedding a right to configure critical system parameters into EU automated contracting rules. Developers would need to enable these settings in the interfaces of automated contracting systems. This requires that the providers of automated contracting systems adapt both their technical systems as well as the service contracts to the legal requirements.

Overall, both the literature and the Expert Panel consider measure M7 to be a low-cost, high-impact measure that enhances system trust and legal alignment, thereby supporting uptake.

Table 8. Costs and benefits of the policy measure M7 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Enhances control over and trust in automated contracting systems Diminishes the imbalance where system default settings favour providers or certain traders	Estimated 950k – 7m additional consumers Benefits for existing users not quantified	No significant costs	
Businesses	Enhances control over and trust in automated contracting systems Fairer competition as providers of automated contracting systems have fewer possibilities to favour themselves or affiliated companies	Estimated 100k – 850k additional business users, resulting in €660m – €1.3b in cost savings[110]. Benefits for existing users and competition not quantified	Familiarisation, adaptation of interface design and compliance monitoring by automated contracting providers	Estimated €33m – €65m (over 10 years)

[108] Two Expert Panel sessions on automated contracting organised in the framework of this study

[109] European Law Institute (2024): Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts ISBN: 978-3-9505495-4-6, https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf

[110] This relates exclusively to time-related cost savings.

Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures) Monitoring and enforcement by supervisory authorities	Estimated €9m – €18m (over 10 years)

Source: Calculations in Annex II, Table 34

M8 – Disclosure of using automated systems

Policy measure M8 ensures that when one party unilaterally relies on an automated contracting system, the other party is made aware of this. In practice, it creates a duty to clearly disclose the automated nature of the interaction. If a digital assistant is acting on behalf of a user, it should announce itself as such at the start of the interaction. This transparency lets the other party know they are dealing with an algorithmic system, not a human, and thus promotes specific objective SO2.2 of addressing information asymmetries and increasing transparency.

The use of a digital assistant can generally be disclosed, ideally through a built-in automated notice, whether the system user is a business or a consumer (as recommended by the European Law Institute).[111] The Expert Panel, however, added that a policy intervention should be targeted to automated systems for which there is strong evidence that they pose transparency problems. The group noted that many consumer-facing businesses already manage their contracts algorithmically due to the large number of contracts involved. Likewise, the conclusion of a contract in eCommerce is often fully automated at least from one party's side, which does not as such present challenges to established contract law. Furthermore, the parties may both be users of the system that manages their contractual relationship for their common benefit, for instance a smart contract that automates execution of the terms. In that case, a unilateral disclosure is not necessary.

This policy measure therefore targets situations in which one party unilaterally uses an automated system to interact with the other in a way that could be confusing as to whether a human or a machine is triggering the relevant contractual actions. The implementation furthermore differs depending on whether the user of the system is a consumer or a business. In the case of a consumer user, the most practical approach is that the system automatically discloses its nature to any third party it deals with. This accounts for the fact that a consumer cannot manually notify each business their system transacts with, especially if the system autonomously contacts potential contracting parties.

If a disclosure is applied in a B2B context, a similar approach would be most practical. If the user of the automated system is a business, they could be required to ensure that the system is designed and used in accordance with a disclosure requirement. In practice though most business users access off-the-shelf rather than bespoke systems and may not be able to modify the system on their own.[112]

Benefits

M8 is expected to improve fairness and transparency in automated contracting, particularly in B2C settings where consumers may not realise that they are interacting with an automated

[111] ELI (2023), EU Consumer Law and Automated Decision-Making (ADM): Is EU Consumer Law Ready for ADM?, Interim Report, p. 30.

[112] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

system rather than a human. The European Law Institute explicitly states that parties deploying automated systems should disclose this fact to the other party.[113] Academic commentary also supports disclosure to uphold informed consent to the contract and prevent misleading practices. A recent OECD study on "dark patterns" highlights how algorithmic opacity can deceive users and erode autonomy, underscoring the importance of transparency in automated interactions.[114] Disclosure becomes essential once a system acts autonomously or replaces human agency.

Costs

M7 would entail costs for the developers of automated systems, who need to implement a mechanism for the automatic disclosure into their system. The introduction of a dedicated system of product requirements for automated contracting systems also means that both businesses and authorities need to establish appropriate structures for compliance monitoring and enforcement.

Table 9. Costs and benefits of the policy measure M8 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Reassures consumers and promotes trust Reduces information asymmetries and potential consumer disadvantage.	Estimated 850k – 6.5m additional consumers Additional consumer benefits not quantified	No significant costs	
Businesses	Reassures business users and promotes trust Fairer competition for providers of automated contracting systems due to enhanced transparency	Estimated 100k – 750k additional business users, resulting in €605m – €1.2b in cost savings[115]	Familiarisation, adaptation of contracts and system design, by providers of automated contracting systems, setting up compliance structures	Estimated €33m – €65m (over 10 years)
Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures) Enforcement of system requirements adds workload for supervisory authorities.	Estimated €9m – €18m (over 10 years)

[113] European Law Institute (2024): Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts ISBN: 978-3-9505495-4-6, https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf, p. 11.

[114] OECD (2022): *Dark Commercial Patterns*. OECD Digital Economy Papers, No. 331, OECD Publishing, Paris. Available at: https://www.oecd-ilibrary.org/docserver/44f5e846-en.pdf ,DOI: 10.1787/44f5e846-en

[115] This relates exclusively to time-related cost savings.

Source: Calculations in Annex II, Table 35

M9 – 'Right of reversal' or right to object to actions of automated systems

Policy measure M9 ensures that the user retains a level of control over the actions taken by the automated system by giving them the possibility to reverse the actions or object to them before they take legal effect, which aims to promote specific objective SO2.1 of predictability and reliability.

For consumer contracts, this option is complementary to the right of withdrawal under the Consumer Rights Directive, which allows consumers to withdraw from a distance contract within 14 days, although with a number of exceptions.[116] Due to the higher risk of unintended purchases via automated systems, the parties may incur higher costs for processing reimbursements and sending undesired goods back when using automated systems.

An option which minimises the consequences of unintended purchases for both parties is where the system does not take the action until approved by the user or the right to object expires. This could be realised as a design feature of the automated system, for instance to inform the user via a push notification, wait for their approval, or set a time limit for objection. This behaviour could also be subject to the parameters determined by the user as described in measure M7. Such a design requirement can be implemented both in a B2B and B2C context, either as a binding requirement or part of a voluntary standard.

Benefits

M9 is expected to reinforce fairness and user autonomy in B2C automated contrac

ting by granting users a right to reverse or object to system-initiated actions. The European Law Institute argues that automated decisions affecting consumers should not become final before users have had a meaningful chance to review or contest them within a certain time frame, particularly in light of the increased risk of errors or unintended commitments in digital environments.[117]

This view is echoed in academic literature. Yeung (2018) emphasises the importance of contestability in algorithmic decision-making systems, highlighting that digital autonomy must include the possibility of human override to ensure fairness and prevent systemic errors.[118] The Consumer Rights Directive already provides a general right of withdrawal (Directive 2011/83/EU, Article 9)[119], but it is limited in scope and includes exceptions. M9 would complement this right by introducing a more immediate mechanism tailored to the operational logic of automated systems before the conclusion of the contract. Therefore, it would also avoid the costs associated with withdrawal from unintended contracts.

The Expert Panel strongly supported the concept of a right of reversal, particularly for systems operating without real-time human supervision. However, they also warned that if poorly designed, such mechanisms could create friction or delay that diminishes the perceived benefit

[116] Article 9 and 16 of the Consumer Rights Directive.

[117] European Law Institute (2024): Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts ISBN: 978-3-9505495-4-6, see: https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf.

[118] Yeung, K. (2018). *Algorithmic Regulation: A Critical Interrogation*. Regulation & Governance, 12(4), 505-523. DOI: 10.1111/rego.12158

[119] Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council Text with EEA relevance, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32011L0083.

of automation. Hence, the effectiveness of M9 is conditional on clear design standards and user-friendly implementation.[120]

Costs

Legal implementation would likely require moderate effort, with costs borne primarily by system providers to ensure built-in objection mechanisms. These costs are justified by the consumer protection benefits and alignment with broader EU goals on trustworthy AI and digital fairness.

Table 10. Costs and benefits of the policy measure M9 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Encourages hesitant consumers by increasing their control.	Estimated 600k – 4.6m additional consumers	No significant costs	
Businesses	Prevents costs for returns of unwanted purchases.	Not quantified. The costs for unwanted purchases are potentially significant depending on the design and use of automated contracting systems.	Familiarisation, adaptation of contracts and system design, by providers of automated contracting systems, setting up compliance structures	Estimated €33m – €65m (over 10 years)
Authorities	Likely to result in less enforcement costs due to lower numbers of disputes arising from unintended purchases and unexpected outcomes, although the overall benefits are expected to be limited		Implementation of legislative changes (in case of binding measures) Enforcement of system requirements adds workload for supervisory authorities.	Estimated €9m – €18m (over 10 years)

Source: Calculations in Annex II, Table 36

M10 – Non-discriminatory treatment of consumers using automated systems

Policy measure M10 ensures that consumers have the choice of using (or not using) an automated system without being treated differently by traders. This means that traders should not offer differential treatment based on whether consumers use an automated contracting system. The measure aims at specific objective SO2.2 of addressing information asymmetries, promoting transparency, and safeguarding customer rights.

An automated system used by the consumer should be able to accept terms and conditions and conclude a contract just like the consumer themselves could. The system should also be able to take other contractual actions on behalf of the user, such as triggering a payment or invoking certain contractual rights. The trader should not deny the validity of these actions, nor should they offer different terms to the automated system than they would to the user directly.

[120] Two Expert Panel sessions on automated contracting organised in the framework of this study

The measure could be framed in different ways:

1. Traders should not use legal means to limit the consumer's choice of whether to use an automated system. The following contractual terms would therefore be considered unfair:
    - a term prohibiting the use of digital assistants by a consumer to conclude a contract;
    - a term requiring the use of digital assistants by a consumer to conclude a contract;
    - a term permitting the use of only a restricted set of available digital assistants as determined by the trader;
    - a term providing for different conditions depending on whether a consumer uses or does not use a digital assistant, except if those conditions are purely technical to account for different ways of interaction with the consumer directly or their automated system, and if they have no impact on the consumer's interests.

2. Traders should not use technical means to prevent the use of an automated system. For instance, this could include technical measures that block purchases by digital assistants even if technically feasible.

3. Traders should design their interfaces in a way that enables the use of automated systems such as digital assistant. In particular, this entails that the contract terms should be in a machine-readable format and that contractual actions can be communicated through machine-readable data messages. Since this third option would introduce positive obligations for a large number of traders, it would entail very high adaptation costs. It is therefore not considered as a policy measure for the purpose of this report. The assessment of impacts only relates to variants 1 and 2.

It is important to consider exceptions that may apply to this policy measure in order to avoid negative consequences of automation. In particular for scarce goods, such as concert tickets, there is a risk that automated bots buy up the available supply before any consumer has the possibility to benefit from the offer. In fact, the use of bots for circumventing limits on the number of event tickets acquirable by a single person and later reselling those tickets is already prohibited by the Unfair Commercial Practices Directive (Annex I Point 23a) since 2022.

Measure M10 should not contradict this legislative choice. More generally, the measure should not enable harmful 'scalping practices', even beyond the provision of the Unfair Commercial Practices Directive. The measure, therefore, would have to draw a careful line between traders that may restrict the use of automated systems and those that must not.

Benefits

The measure increases the fairness of business-consumer relationship by ensuring that consumers retain a free choice whether to use an automated system or not. This is in line with Article 3 of the European Law Institute's *Model Rules on Digital Assistants* states that traders must not refuse, restrict, or penalise transactions simply because the consumer uses an automated system, unless legitimate grounds to do so are recognised by the law.[121] Consumer-advocacy research likewise stresses the importance of free and informed choice by consumers in the face of automated decision-making and AI.[122]

The Expert Panel agreed that sellers may quietly block, throttle or price-differentiate digital-assistant traffic, creating hidden barriers and eroding trust. They endorsed an EU-level

[121] European Law Institute, *Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts* (2025), Principle 4: non-discrimination – https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf

[122] BEUC, Automated Decision Making and Artificial Intelligence – A Consumer Perspective (position paper, Jun. 2018), beuc-x-2018-058_automated_decision_making_and_artificial_intelligence.pdf.

prohibition of such discriminatory practices, subject to narrowly framed exceptions for scarce goods, to avoid a patchwork of national rules.[123]

Costs

For an effective implementation, the measure requires a clear legal obligation, along with guidance for platforms and traders. Enforcement can run through existing consumer-protection authorities, using mystery-shopping or traffic-analysis techniques to detect blocking or differential terms. However, a legal obligation of non-discrimination of automated system users may require changes to digital interfaces on a technical level, such as removing CAPTCHAs while maintaining automated fraud detection (e.g. to prevent ticket scalping or placement of orders without the intention to buy). This could increase costs for eCommerce traders even if the measure does not directly require adherence to specific technical standards. However, development costs for technically compliant eCommerce platforms are likely to be pooled by service providers.

Furthermore, many traders currently do not make a distinction of whether their customers use automated contracting or not and are hence not concerned by a prohibition of discrimination on this basis. For estimating the costs of the measure, we therefore assume that only a low percentage of eCommerce businesses bears additional costs.

Table 11. Costs and benefits of the policy measure M10 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Increases fairness perceptions and uptake. Better usability of automated contracting for a broader range of products and services. Directly addresses discriminatory practices, levelling access to offers and services.	Estimated 700k – 5.2m additional consumers	No significant costs	
Businesses	Better market access for providers of automated contracting systems.	Not quantified	Compliance costs for eCommerce traders that may deal with consumers using automated contracting. Costs are substantial for a small share of traders that have a reason to block/incentivise the use of automated contracting by customers	Estimated €1.1bn (over 10 years)

[123] Two Expert Panel sessions on automated contracting organised in the framework of this study.

Authorities	No significant benefits		Implementation of legislative changes (in case of binding measures) Market surveillance and enforcement for a large number of potential targets.	Estimated €32m (over 10 years)

Source: Calculations in Annex II, Table 37

M11 – Protection from manipulation and conflicts of interest of automated systems and other prescriptive requirements

Policy measure M11 ensures that automated systems disclose conflicts of interest and are protected against external manipulation. This pursues specific objectives SO2.1 of predictability, reliability, and explainability of the systems as well as SO2.2 of reducing imbalances, promoting transparency, and safeguarding consumer rights. Ultimately, the measure promotes systems which act in the best interest of the user.

Manipulation and conflicts of interest are two related but separate issues regarding automated systems. The latter comes into play in constellations where the provider of the automated system has a relationship with the contracting party who is *not* the user on whose behalf the system acts. That contracting party may even be the provider themselves, for instance if the automated system is provided as part of an online platform that also figures as the trader. In that case, the trader may provide an automated system that acts in their own interest rather than that of the user. Measure M11 requires the disclosure of such conflicts of interest and, potentially, an information to explain to the user how the system takes its decisions. A more far-reaching prohibition of situations with a potential conflict of interest could affect legitimate business models and is therefore not considered here.

Even if the other contracting party has no relationship with the system provider, they may try to manipulate the system's behaviour by designing their interface in a way that misleads automated systems (analogous to 'dark patterns' that exploit human behaviour). As was pointed out by the focus group, optimising online interfaces for customer engagement is a common and legitimate practice, but it is limited by the requirements of fairness and the prohibition to mislead customers. In particular, the Unfair Commercial Practices Directive prohibits a presentation of information in a way that "deceives or is likely to deceive the average consumer".[124] The interpretation of this prohibition is uncertain in the context of automated contracting since it is not clear if a consumer using an automated system would be considered an "average consumer", especially in the early phase of adoption of automated contracting. Information could be presented in a way that does not deceive the average (human) consumer but does deceive an automated system. Measure M11 clarifies the application of the prohibition of misleading actions to automated systems and could define more specifically how misleading actions can be identified in this context.

Benefits

Measure M11 helps to prevent unfair or deceptive practices, often referred to as "dark patterns", and to maintain user trust, which is needed to unlock uptake. In the literature, a growing concern can be identified about how interface design and algorithmic decision-making can exploit cognitive biases. Brenncke (2023) suggests that such manipulative techniques exacerbate

[124] Article 6 Unfair Commercial Practices Directive.

consumer vulnerabilities and underscore the need for regulatory frameworks to preserve autonomy.[125]

The European Law Institute argues that traders should not attempt to mislead automated contracting systems used by consumers. On the other hand, the automated contracting system should not manipulate consumers or distort their ability to make free choices or decisions. Practices such as biased system defaults or hidden steering mechanisms constitute unacceptable manipulation, especially where one contracting party (e.g. a platform operator or trader) has a commercial relationship with the provider of the system used by the other party (the consumer).[126] When platforms have an economic interest in promoting certain products, conflicts of interest may arise, especially if the system is designed to favour proprietary or affiliated options.

The Expert Panel considered M11 a backstop against systemic unfairness in automated contracting. Participants cited real-world examples of systems promoting biased outcomes under the guise of personalisation. The Panel welcomed both disclosure requirements of conflicts of interest and clearer prohibitions against manipulative system behaviour, suggesting that this could be embedded in existing unfair commercial practice law.[127] The measure also aligns with broader regulatory trends under the Digital Services Act[128] and AI Act[129]. Ultimately, protecting users from hidden biases or incentives within contracting tools reduces the likelihood of trust erosion and legal disputes, thus fostering uptake, especially among consumer-facing SMEs.

Costs

Implementing M11 would involve legal adjustments to incorporate existing EU protections, such as the Unfair Commercial Practices Directive[130] and Article 5 of the AI Act[131] against manipulative uses, into the automated contracting domain. Operationally, developers would need to incorporate safeguards and disclosure obligations, as detailed in the ELI interim report on consumer law and automated decision-making.[132] While disclosure rules would be straightforward to apply, the identification of manipulative system design may require technical audits and updated guidance for enforcement authorities.

For automated contracting providers, the disclosure obligation of conflicts of interest may entail cost if they must adjust their compliance documentation and maintain compliance structures. The disclosure is only relevant for providers that do indeed have a conflict of interest, for example if they are also the operator of an online platform in which the automated contracting system is integrated. While there is no available data on the precise number of providers that

[125] Brenncke, M. (2023): *Regulating Dark Patterns*, https://arxiv.org/abs/2310.00340

[126] European Law Institute, *Guiding Principles and Model Rules on Digital Assistants for Consumer Contracts* (2025), Principle 4: non-discrimination – https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Projects/Algorithmic_Contracts/Guiding_Principles_and_Model_Rules_on_Digital_Assistants_for_Consumer_Contracts.pdf

[127] Two Expert Panel sessions on automated contracting organised in the framework of this study

[128] Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act), https://eur-lex.europa.eu/eli/reg/2022/2065/oj/eng

[129] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act, https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng

[130] European Commission, *Unfair commercial practices directive*, https://commission.europa.eu/law/law-topic/consumer-protection-law/unfair-commercial-practices-and-price-indication/unfair-commercial-practices-directive_en

[131] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng

[132] ELI: EU Consumer Law and Automated Decision-Making (ADM): *Is EU Consumer Law Ready for ADM?,* Interim Report, https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Interim_Report_on_EU_Consumer_Law_and_Automated_Decision-Making.pdf

have a conflict of interest, the measure likely affects a small but not insignificant share of providers. For the purpose of estimating the costs of the measure, we assume a share of 10%.

For other eCommerce businesses, the addition to the UCPD in relation to misleading interfaces should only entail negligible costs for eCommerce businesses, assuming that their current interfaces are not purposefully misleading automated contracting systems. The increased use of automated system could draw the attention of consumer protection and market surveillance authorities, which may enforce the prohibition of misleading interfaces with targeted checks on eCommerce websites.

Table 12. Costs and benefits of the policy measure M11 per stakeholder group (automated contracting)

Stakeholder group	Main benefits	Quantification of benefits	Main costs	Quantification of costs
Citizens/consumers	Reduces risk of exploitation and unfavourable outcomes of automated contracting Promotes trust in the technology	Estimated 700k – 5.2m additional consumers	No significant costs	
Businesses	Higher uptake of automated contracting due to increased trust and decreased risk of manipulation	Estimated 80k – 615k additional business users, resulting in €500m – €990m in cost savings[133].	Disclosure of conflicts of interest by concerned providers of automated system providers, setting up of compliance structures	Estimated €28m – €55m (over 10 years)
Authorities	No significant benefits		Monitoring and enforcement by supervisory authorities	Estimated €32m (over 10 years)

Source: Calculations in Annex II, Table 38

3.3.4. Binding vs. non-binding policy measures

As an alternative way of implementing the binding policy measures described above, non-legislative policy initiatives could be considered. While non-legislative action may not be as effective in achieving the objectives stated above, it offers various advantages. In particular, they impose lower adjustment costs on stakeholders than introducing new legal requirements would. Furthermore, soft law approaches leave room for experimental policy approaches to automated contracting, the success of which can be monitored as the technology advances and gets gradually more established in the market.

Measures M1, M2, and M3, which address foundational legal uncertainties regarding the use of automated contracting, could be recommended to the Member States of the European Union. The Model Law on Automated Contracting adopted by UNCITRAL takes the form of a recommendation to national lawmakers, which the EU Commission could endorse or adapt with model rules specifically for the European context.

Other policy measures could be implemented with improved guidance on the interpretation of existing laws in the context of automated contracting, for instance guidance on the validity of

[133] This relates exclusively to time-related cost savings.

automated contracts in line with the eCommerce Directive (M1) or on the prohibition to mislead automated contracting systems in accordance with the Unfair Commercial Practices Directive (M11). More broadly, interpretative guidance on the applicability of consumer law to automated contracting could support the objective of measure M4.

Alternatively, many of the legal questions surrounding automated contracting could be clarified in model contractual terms that contracting parties can implement in their contract to pre-empt potential risks arising from the use of automated systems. These model contractual terms could include rules on the attribution of actions (M2) or on the consequences of unexpected actions (M3). Model contractual terms for provider-user relationships could concern limitations of liability (M6) or the possibility for the user to set the parameters of the system (M7).

Lastly, as an alternative to binding design requirements for automated contracting systems, the European Commission could support the development of voluntary standards or code of conduct for such systems, their behaviour, or interfaces. Standards could, for instance, cover the possibilities for users to determine system parameters (M7), the way in which the system discloses itself to the other contracting party (M8), or the implementation of a right to object (M9). Directed at eCommerce traders' online interfaces rather than the automated systems themselves, a standard could cover the machine-readable formats used in these interfaces that enable the use of automated contracting systems by consumers (M10).

3.3.5. Considerations on potential bundling of policy measures

The measures discussed above present individual components that may be bundled to develop a coherent and effective policy intervention. The bundling should account for the logical connections and synergies between the different measures. Several factors should be considered for choosing measures that together are considered as a policy option.

The first factor to consider is the choice of a binding or non-binding instrument to implement each of the measures. As noted above, most of the measures offer the opportunity for a non-binding intervention, which may be preferable to a binding one due to the early stage of automated contracting in which there is still a considerable amount of uncertainty as to the direction of the technological development. Nevertheless, all policy measures can also be implemented as a variant with binding rules.

The second factor to consider is the scope of the policy measures. Some measures specifically target automated contracting between consumers and businesses, while other measures are most effective when they are implemented for all automated contracts regardless of who the parties are. The measures that specifically address business-to-consumer relationships are M4 (Specific rule on application of consumer law to contracts concluded by consumers using an automated system - which can be seen as a B2C variant of M2), M5 (identifying and simplification of relevant information requirements), M10 (Non-discriminatory treatment of consumers using automated systems), and M11 (Protection from manipulation and conflicts of interest of automated systems and other prescriptive requirements - in particular as regards conflict of interest). In addition, M8 (Disclosure of using automated systems) and M9 ('Right of reversal' or right to object to actions of automated systems) could be limited to consumer contracts.

The third factor relates to the specific problem area that the policy measure aims to address. A potential future policy intervention could focus on one or multiple problem drivers considered particularly urgent, which is reflected in the specific objectives of each policy measure. The specific objectives related to uptake of automated contracting and those related to imbalances may conflict with each other, in particular when fairness measures impose compliance costs on businesses. To avoid negative consequences, measures supporting uptake and those ensuring fairness could thus be bundled together.

Lastly, it should be noted that many of the measures addressing specific problems of automated contracting, in particular its fairness aspects, assume that this is indeed a valid form of contracting. To ensure legal certainty regarding any of the measures M5 to M11, it may be appropriate to adopt M1 to M3 as well, or M4 if a consumer-specific initiative is chosen.

4. DATA-DRIVEN BUSINESS MODELS

This chapter explores the current state and future outlook of data-driven business models (DDBMs) in the EU, and assesses key obstacles, and potential solutions to address them. The chapter starts by analysing the market for DDBM followed by and assessment of the problems and a definition of the baseline for the future of DDBM in absence of any EU intervention. Thereon, we identify policy measures to address key problem drivers and compare them in terms of effectiveness and efficiency.

4.1. Market analysis

As evidenced in the section above, new technological developments are transforming business and their activities. Big data and analytics also have a transformative aspect in many of today's business models (BMs)[134]. Capitalising on this data explosion is increasingly becoming a necessity for a business to remain competitive[135]. The literature singles out this trend, noting that a notable number of organisations have already begun investing in innovations based on data and analytics[136]. This section will first outline an overview of the EU enterprise market uptake of these models, based on a pan-European study performed by the European Company Lawyers Association (ECLA). Then, the main takeaways from the survey conducted for the purposes of this study will be reviewed, to lastly conclude with an estimation of these models' current uptake based on Eurostat indicators. Triangulating these three sources is relevant because the report, while very niche, primarily targets bigger companies, which could potentially bias the estimations. The data from Eurostat has been added at the end of the section to provide an overall view of all the European markets on data-driven business models.

The ECLA study on DDBMs (2022)[137] outlines the state of play in the use and implementation of DDBMs across the European landscape. The study distinguishes between companies currently offering data-driven products and services and those planning to do so, hence companies with no plans for data-driven activities did not participate in its entirety, as they could not provide relevant information too all questions. The results originate from a pan-European survey answered by 419 companies across more than 20 countries from the EU Single Market (main contributions: Germany 18.1%, Italy 12%), where **61.1% of responding companies across Europe already offer data driven products/services in some form** and 26.3% have plans to introduce such models to their businesses soon. Of these businesses combined, 31% consider their data-related activity to be auxiliary.

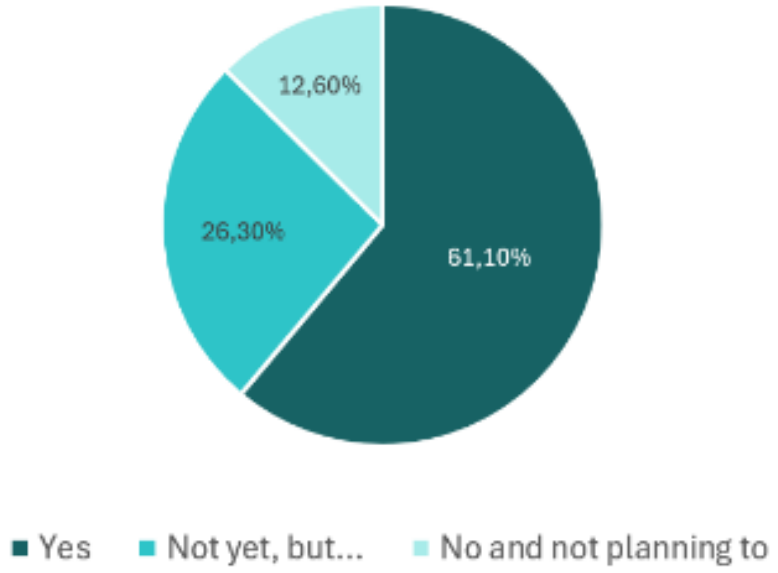
[134] Loebbecke and Picot 2015, *Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda*, see here: https://www.sciencedirect.com/science/article/pii/S0963868715000372 ;t Woerner and Wixom 2015, *Big Data: Extending the Business Strategy Toolbox,* see here: https://journals.sagepub.com/doi/10.1057/jit.2014.31.

[135] https://cambridgeservicealliance.eng.cam.ac.uk/system/files/documents/2015MarchPaperTheDDBMInnovationBlueprint.pdf

[136] Gottlieb, J., Rifai, K. et al., *Fueling growth through data monetization, 2017, https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Analytics/Our%20Insights/Fueling%20growth%20through%20data%20monetization/Fueling-growth-through-data-monetization.pdf.*

[137] ECLA (2022), DATA-DRIVEN BUSINESS MODELS: The role of legal teams in delivering success https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf

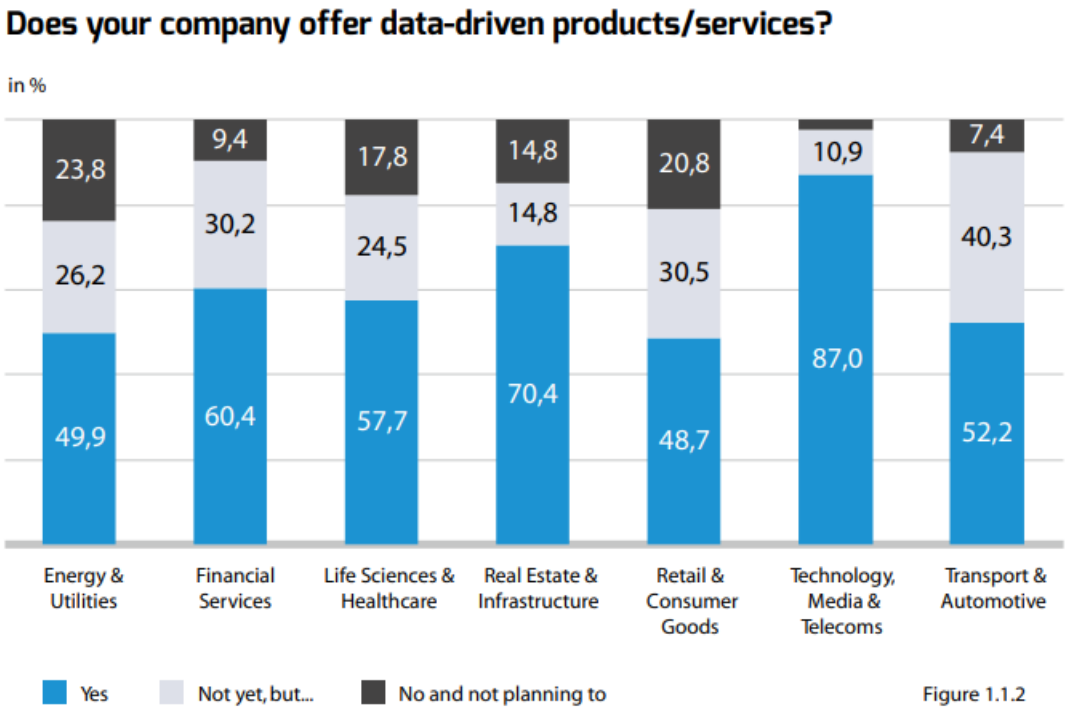
Figure 8. Percentage of respondent companies offering data-driven products/services (Source: ECLA study)



Source: ECLA (2022)

The survey shows that all sectors surveyed (see the Figure below) are embracing data-driven business models and using them in a wide variety of ways.

Figure 9. Current uptake of data-driven products/services in the EU landscape by sector



The study highlights that there is a mixture of outcomes following the adoption of data-driven business models. Sometimes existing products and services can be enhanced or delivered in new ways. Other times, completely new offerings and even markets emerge from data-driven innovation. Furthermore, 34.7% of responding companies have found ways to use data to enable them to offer new products/services.

Despite their small sample size making them unrepresentative, the two surveys conducted in this study offer an additional and still interesting point of comparison. The long survey counted with a more limited contribution of 11 replies from 8 countries from the EU single Market and the EEN with 113 responses from 10 countries in the EU Single Market (EEN - Spain 30%, Poland 25%, Italy 14%). Both surveys appear to support an **increasing of the uptake of the use of data-driven business models** – data contracts and use of data generated by the use of the company's product sold at a standard price. Considering the EEN survey, while 18.6% of the respondents (21 replies out of 113[138]) indicated that *in the past* they had experience with data contracts and/or with the use of product data, already 41.6% of the respondents (47 out of 113[139]) stated that they *are currently using* both or at least one of the data models analysed – data contracts and use of data generated by the use of the company's product sold at a standard price. There are other figures **backing the assumption that there is and will be an increase of the uptake of the use of data-driven business models**. As mentioned earlier, the ECLA study showed that in 2022, a 26.3% of the companies surveyed had plans to introduce these models to their businesses soon. Our surveys, and here mentioning specifically the EEN survey, 32% of the respondents (36 out of 113 replies[140]) affirmed having *plans to use data contracts and/or use of product data in the future*. Furthermore, these plans could be associated to the realisation of what could be the value of the customers' data generated for the companies in a 5-year period. While 29.2% of the respondents indicated having no clear knowledge of what the impact would be, 45.1% of the companies surveyed (51 out of 113) stated that the customers' data generated for the company will have a significant or moderate value, hence it seems there is an **increase of the valuation of these models** as well. These results seem to confirm that businesses are increasingly recognising and capitalising on the significant advantages provided by data-driven business models. They understand that leveraging data can lead for instance to more informed decision-making, greater operational efficiency, and enhance customer experiences. By effectively harnessing the inherent value of data, businesses can uncover new insights, identify trends, predict market behaviour or customise the offerings to better meet customer's needs. This strategic use of data not only helps in optimising current business processes but also in driving innovation and gaining a competitive edge in the market.

To estimate the current uptake of DDBMs in the EU, we rely on Eurostat datasets (isoc_eb_bd for 2020 and isoc_eb_das for 2023) and two supplementary surveys (see Annex I, section 5.3). This suggests that an estimated **1.8 million businesses in the EU** (5.5% of total EU businesses) **are likely engaging in data analytics involving connected products**. Further, we **estimate that up to 650k EU enterprises may be using data contracts**, based on data analytics activities related to customer and social media data.

4.2. Problem assessment

In this section, we summarise the advantages and challenges faced when using DDBMs, followed by the identification and structuring of the problem definition, an assessment of the problem, and elaboration of the baseline in case of absence of any EU intervention.

4.2.1. Advantages of the use of data-driven business models

This chapter summarises the main findings from Annex III, which presents the full analysis of the factors influencing the use and uptake of data-driven business models in the EU. The assessment covers both data contracts and business models based on connected products and related services, and looks at their benefits as well as the legal, technical and organisational challenges they face. Compared to automated contracting solutions, the analysis of DDBMs is more constrained by the evidence base, in particular due to more limited survey responses; the

[138] 92 entries have not indicated a valid answer.

[139] 66 entries have not indicated a valid answer.

[140] 77 entries have not indicated a valid answer.

results should therefore be interpreted with some caution and seen as indicative rather than exhaustive.

The analysis first examines the main benefits associated with DDBMs and then discusses the key challenges that may hinder their deployment and broader uptake.

From an organisational perspective, data-driven business models can significantly **improve decision-making and overall business performance**. By collecting and analysing data on individual consumer behaviour and aggregating it at scale, organisations gain granular and population-level insights into preferences, habits, and demand patterns. These insights can be used to refine products and services, optimise processes and supply chains, and improve the efficiency with which offerings are delivered. Literature and interviews with data legislation experts indicate that organisations that successfully embed data-driven strategies tend to achieve higher product and service quality, increased efficiency, and, ultimately, higher profitability. Empirical findings from external studies support this view: businesses that extensively use customer analytics are substantially more likely to outperform competitors in acquiring and retaining customers, report higher sales growth, and record notable increases in operational profit. However, these gains depend not only on IT investments, but also on fostering skills and leadership capable of interpreting and acting on data, and on cultivating a broader "data-driven culture" within organisations.

DDBMs also enable additional revenue streams **by monetising data externally,** where permitted by applicable law. Organisations can sell data to third parties, which not only increases profitability but can open pathways to new partnerships and markets beyond their direct line of business. Interviews with data legislation experts highlight that this kind of diversification is an integral part of the perceived business case for DDBMs. At present, however, data selling appears relatively underused, especially among SMEs. Eurostat data on big data suggests that only a very small proportion of SMEs currently sell or purchase big data, with large enterprises far more active on both the buying and selling side. This reflects the greater resources and infrastructure large organisations have for handling and monetising data, but also points to untapped potential if more businesses, including SMEs, can overcome the barriers to entering these markets as the digital economy continues to expand.

Another organisation-related benefit is the **competitive advantage that can result from exclusive control over data**. Businesses that collect large volumes of data can choose to withhold it from competitors and third parties, thereby strengthening their market position. This can be particularly pronounced for data-driven business models based on connected products, where the manufacturer or service provider is the data holder for the data generated by the device. While the Data Act is intended to ensure that users of connected products and related services can access the raw and pre-processed data they co-generate, interviews and literature suggest that organisations may still attempt to maintain exclusive access in practice (e.g. through narrow scope of data being made available). At the micro level, this could be advantageous for the individual organisation, reinforcing its position vis-à-vis potential competitors. At the macro level, however, these dynamics could raise concerns about competition, as exclusive data control may contribute to monopolistic tendencies and market distortions. In this sense, the "benefit" of exclusive data access needs to be viewed with caution, as it may entail broader risks to market functioning. In any case, it is important to note that the issues outlined in this section are already addressed by the Data Act, which entered into application on 12 September 2025 at the time of writing and before the final publication of this report. Any potentially outstanding issues should be assessed in the light of the application and future evaluation of the Data Act.

While most benefits accrue to organisations deploying DDBMs, customers can also enjoy some advantages. A central customer-related benefit is the **improvement and personalisation of products and services**. By analysing behavioural data and usage patterns, organisations can

tailor and refine their offerings to better respond to consumer needs and interests, resulting in higher product quality, more relevant features, and a more personalised customer experience. This can translate into higher satisfaction and loyalty: evidence from external studies shows that organisations considered leaders in data utilisation report substantially higher gains in customer satisfaction than their peers. Interviews with data legislation experts underline that, when used responsibly and in compliance with the GDPR (including the requirement of a valid legal basis for processing personal data), these practices can deliver tangible value to customers by ensuring that products and services evolve in line with real-world usage and expectations.

A more indirect and contingent benefit for customers concerns the possibility that **increased profitability from DDBMs results in lower prices**. The specific impact would require further, dedicated research on DDBMs; however, economic theory provides some guidance. In perfectly competitive markets, firms under pressure to maintain or expand market share have an incentive to pass on at least part of any cost savings - such as those generated by more efficient use of data - through lower prices. Even in non-perfectly competitive markets, such as oligopolies, theoretical and empirical work suggests that cost savings pass-on can occur, driven less by individual demand elasticity or market share and more by the nature of competition and the number of competitors. In this perspective, passing on cost savings can be a profit-maximising strategy: lower prices may attract new customers and increase volumes sufficiently to offset reduced margins per unit. To the extent that firms follow this logic, cost savings derived from DDBMs can lead to indirect benefits for customers in the form of lower prices, even if firms do not deliberately "give up" gains for the sake of consumers.

The image below summarises the key benefits associated with DDBMs.

Figure 10: Benefits of data-driven business models

4.2.2. Challenges for the use of data-driven business models

Alongside these benefits, DDBMs face a number of significant challenges. A first cluster of obstacles concerns **legal complexity, regulatory fragmentation, and associated legal and compliance costs**. The European regulatory landscape for the digital economy is perceived by many organisations and legal practitioners as highly complex, involving multiple horizontal and sector-specific instruments. Literature, survey results, and interviews all converge on this point[141]. Organisations must navigate and comply with the GDPR, contract law, digital

[141] See Challenge #1 "Legal challenges: complexity, fragmentation, legal and compliance costs" in Annex III, p. 161-162.

legislation, and industry-specific rules, often simultaneously, and cross-border operations add another layer of complexity due to differences in national transposition, service classification, and enforcement practices. Studies indicate that a substantial share of companies allocate dedicated staff time and resources to adjust business processes to comply with EU digital fairness and related legislation, incurring both one-off adjustment costs and recurring administrative costs each year. For firms operating across Member States, additional costs arise from divergent national requirements and interpretations. These burdens can discourage the adoption of DDBMs, particularly for smaller firms. SMEs are disproportionately affected because many legal costs - such as engaging external experts or establishing internal compliance structures - are fixed and thus weigh more heavily on limited budgets. Larger organisations can spread such costs across a broader activity base, while SMEs may be forced to forgo specific data-driven opportunities. On top of this, the use of AI and algorithms in DDBMs brings specific legal and ethical expectations linked to transparency, fairness, and bias mitigation. While these ethical duties may not directly block adoption, they add to the complexity of the regulatory environment and require organisations to put in place robust governance frameworks that go beyond mere formal compliance.

Information asymmetries between businesses and customers represent a second key challenge. Literature, interviews with consumer associations, and evidence from experimental studies all suggest that customers often lack a clear understanding of the purposes for which their data are collected and how they are processed in practice[142]. Terms and Conditions and privacy policies tend to be long, complex, and written in specialised legal language, which discourages thorough reading and makes it difficult for users to grasp that, in data contracts, personal data may effectively function as a form of payment. Experiments conducted outside the EU show that very high shares of users accept terms containing clearly unreasonable provisions, illustrating the extent of inattention[143]. In parallel, many digital services require users to accept data-intensive terms and conditions as a condition of access; those who refuse are simply excluded. This combination of limited transparency and "take-it-or-leave-it" conditions amplifies the imbalance of power, giving organisations deploying DDBMs a disproportionate degree of control over consumer data. The GDPR has improved general awareness of data rights - surveys show that a majority of EU citizens know about the regulation and their right to access personal data - but concern about how data are used and shared remains high. Interviews carried out for this study suggest that increased awareness does not necessarily translate into a detailed understanding of each specific service, as this depends on the accessibility and clarity of individual T&Cs.

Closely linked to these asymmetries is a third challenge: **customers' reluctance to share data.** Statistics and interview findings indicate that significant portions of the population are unwilling to share personal data with private companies, and a non-negligible share avoids using connected products due to concerns about privacy, data protection, and security[144]. This reluctance affects not only individual consumers but also manifests in B2B contexts, where firms can be hesitant to share data with third parties. Since the functioning and innovation potential of DDBMs depend on a steady flow of data, such reluctance directly constrains their economic potential. The possibility for users to withdraw consent under data protection law, though still underused, could further amplify these effects in the future if exercised more widely. On the one hand, withdrawal is a crucial safeguard for consumer autonomy and an essential counterweight to imbalances in bargaining power; on the other, large-scale withdrawal could limit service development and increase the legal and administrative burdens associated with managing consent, ensuring compliance, and maintaining transparent customer

[142] See Challenge #2 "Imbalances between businesses and their consumers" in Annex III, p. 163-164.

[143] Obar, J. & Oeldorf-Hirsch, A. (2020). *The biggest lie on the Internet: ignoring the privacy policies and terms of service policies of social networking services*, Information, Communication & Society, 23:1, 128-147. https://doi.org/10.1080/1369118X.2018.1486870

[144] See Challenge #3 "Customers' reluctance towards data sharing" in Annex III, p. 164-165.

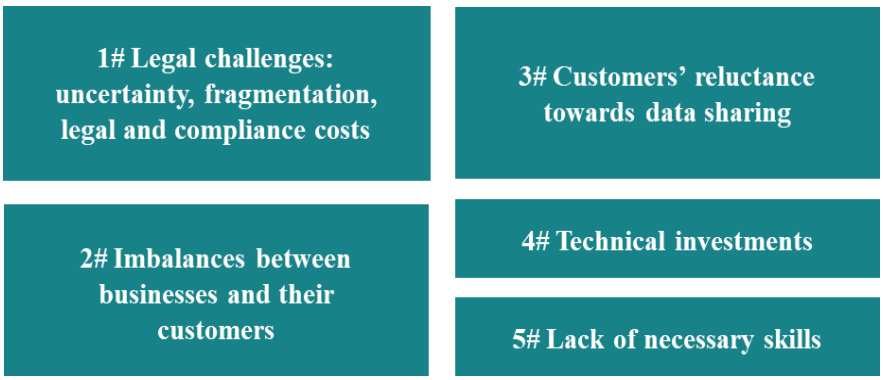
relationships. Interviewed experts emphasise that addressing this challenge requires focusing on the root causes of reluctance - namely, low trust and insufficient transparency - by ensuring robust data protection rules, strict enforcement and proactive efforts to build accountability and trust.

Technical investments represent a fourth barrier to the adoption and operation of data-driven business models. Evidence from desk research, interviews, and survey responses indicates that DDBMs require substantial and sustained investments in IT infrastructure and data management capabilities[145]. Set-up costs include acquiring or developing systems for data collection, storage, monitoring, and analysis, and, where relevant, integrating these systems with connected products or other platforms. Without such infrastructure, it is not feasible for organisations to run a DDBM in practice. Once implemented, recurring costs arise from ongoing data processing, integration, and management, which are necessary to ensure that data are usable, interoperable, and correctly interpreted. Survey respondents explicitly identified the investments required for data integration as a barrier to adopting DDBMs. Cybersecurity is another major recurring cost: the collection and processing of large volumes of data creates security risks that must be addressed through technical measures, compliance with relevant regulations and the establishment of internal policies. Studies suggest that a significant share of company lawyers view cybersecurity as a key obstacle to implementing DDBMs, reflecting the financial and organisational demands associated with maintaining adequate security over time.

Finally, a **shortage of necessary skills** further constrains the use and uptake of data-driven business models. Desk research and stakeholder feedback show that many organisations lack the expertise required to design and implement a robust data strategy and to manage and analyse data effectively in day-to-day operations[146]. This skills gap exists at both the executive level - where it affects the ability to set a clear strategic direction for DDBMs - and at the operational level, where it limits the effective use of data for analysis and decision-making. Acquiring qualified staff in areas such as data science, engineering and data-centric management is costly and competitive, and interviews conducted for this study indicate that this challenge is particularly acute for SMEs, which struggle to attract and retain scarce talent. Larger organisations are in a better position to offer competitive remuneration and career prospects, reinforcing their advantage in exploiting DDBMs and widening the gap between large and small firms in their capacity to benefit from data-driven approaches.

The image below summarises all the key challenges linked to the implementation of DDBMs, as discussed in the previous paragraphs.

Figure 11. Challenges data-driven business models



[145] See Challenge #4 "Technical investments" In Annex III, 165-166.

[146] See Challenge #5 "Lack of necessary skills" in Annex III, p. 166-167.

4.2.3. Identification of problems

The use of DDBMs offers considerable potential to unlock innovation, generate new revenue streams, and deliver more personalised and efficient services. By leveraging the value of data, businesses can optimise operations, enhance customer relationships, and explore alternative, often non-monetary, value exchanges. However, despite these opportunities, the adoption and equitable application of DDBMs remain limited due to persistent challenges.

This section identifies and assesses the two principal problems currently affecting the development and use of data-driven business models:

1. **Barriers hindering uptake of DDBMs**;
2. **Imbalances between the parties involved in DDBMs**.

The problem tree in the Figure below visualises the relationship between challenges related to data-driven business models, the applicable legal framework, and the identified problems. Our analysis shows that the challenges related to both types of data-driven business models are similar, as they both concern the collection and distribution of customer data, and their use is influenced by contract law, data protection, commercial, and technical factors. The problem tree also visualises the consequences of the observed problems.

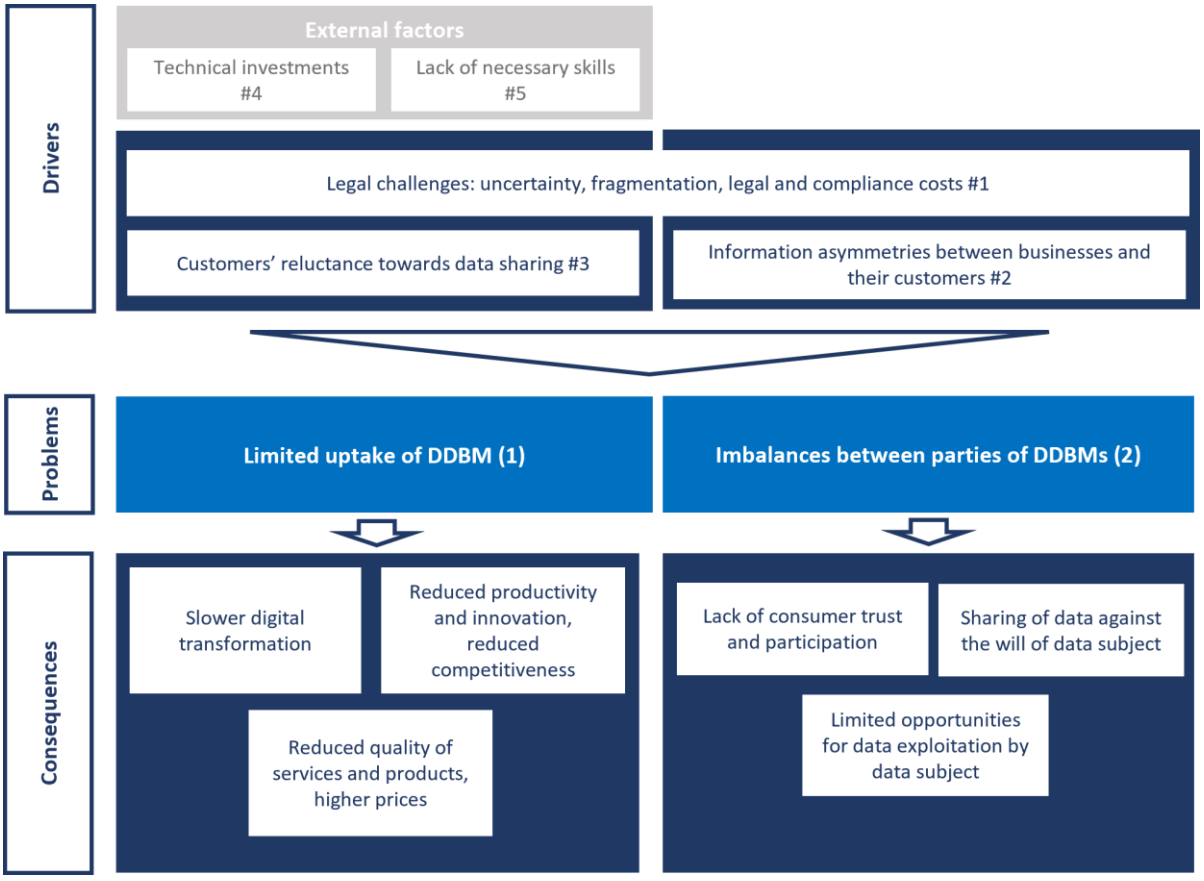
Three main groups of challenges, which are analysed in the previous section, drive these problems:

- **Legal challenges**;
- **Information asymmetries**;
- **Reluctance of customers to engage with data-driven business models**.

In addition to factors related to the legal framework, there are external factors beyond the scope of the current study. Namely, the need for significant **technical investments**, such as robust infrastructure, system integration, and security measures, presents a barrier. Coupled with a **lack of experience** at both the technical and strategic levels, especially smaller businesses struggle to implement effective data strategies. This hinders their ability to leverage data contracts and data sharing as a viable business model.

The following problem tree illustrates the drivers, problems and consequences identified.

Figure 12. Problem tree for DDBM



Source: Authors' own elaboration

Main problem 1 'barriers hindering uptake of DDBMs' may have significant economic consequences. For businesses, difficulties in using data contracts and data sharing may lead to reduced revenue streams and thus forgone opportunities for economic added value. It is expected that difficulties, in particular those arising from legal uncertainty and fragmentation, disproportionally impact SMEs due to their reduced capacity to absorb legal costs and risky investments. Obstacles to the use of data in contracts may thus stifle innovation and competition by hindering the development of alternative business models by new market entrants (organisation-related benefits presented in the previous section). At the same time, businesses may revert to more paywalls and/or higher prices for their services, increasing costs for consumers (customer-related benefits presented in the previous section).

Main problem 2 'imbalances between the parties of DDBMs' also has negative economic consequences, in particular for the customers. While customers may receive important benefits from DDBMs (customer-related benefits presented in the previous section), they may forgo these benefits if the DDBM is imbalanced. Furthermore, when customers repeatedly experience imbalances in DDBMs, they may lose trust and become less willing to engage with businesses.[147] As a third consequence, effective protection of the rights to data protection and privacy are not respected when customers share data against their will or without their knowledge. Imbalances arise from, on the one hand, lack of transparency and awareness and, on the other hand, from a pressure to share data in order to be able to participate in modern

[147] One concrete reaction by customers may be to prevent the collection of meaningful data through technical means, for instance tools that introduce noise into their shared data. While not per se illegitimate, such tools undermine data quality and would not be necessary if customers felt that their data was used in a fair way. See e.g. TrackMeNot, which sends random queries to search engines on behalf of the user, Nissenbaum, H. & Daniel, H. (2015), *Trackmenot: Resisting Surveillance in Web Search*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2567412.

society. In both cases, data subjects' autonomy to choose to share their data would be undermined.

4.2.4. Assessment of the problems: economic consequences

As noted above[148], evidence points to a growing adoption of data-driven business models, with around 5% of EU enterprises (approximately 1.8m) estimated to analyse data from connected products and about 2% (around 650k) using data contracts (see Annex I for more details on the methodology[149]). These findings highlight a clear trend toward increased recognition of the strategic value of data in enhancing decision-making, operational efficiency, innovation, and customer experience.

However, as discussed in the previous section, several barriers remain that hinder broader adoption. To assess the economic consequences, we applied a proxy technology and a desired uptake approach to project the uptake of data-driven business models (DDBMs) in a barrier-free scenario:

- **Proxy technology approach**: This approach uses e-commerce as a proxy to estimate DDBM adoption. E-commerce adoption in the EU has increased by 33% over the last 10 years. Applying the same growth rate to DDBMs, we estimate a 33% increase in uptake over the next 10 years. This translates to an additional 0.6m enterprises using data from connected products and up to 0.215m additional enterprises using data contracts.
- **Desired uptake approach**: The EEN survey conducted as part of this study provides data on the desired uptake of DDBM. Among the companies that do not currently use data generated by the products they sell at a standard price, and have not done so in the past, 14.3% indicate that they plan to do so in the future. This represents a potential 32.4% increase[150] in the use of data from connected products in our sample. Applying the potential 32.4% increase in the share of EU enterprises using data generated through connected products, we derive an estimated number of EU enterprises that is broadly consistent with the results of the previous approach.

Using the European Data Market Study, we estimated that **removing barriers could add EUR 311 billion over a ten-year period in revenue**, increasing the EU GDP by 1.7% (please see methodological Annex I for more details). These estimates are upper ceilings. The surveys (EEN and long survey) illustrate that 24.6% of respondents currently obtain significant value from customer data, a share expected to rise to 37.7% in five years. DDBMs are more prevalent in larger companies and in specific sectors such as information and communication. In contrast, they are less common in sectors like construction.

4.3. Assessment of policy measures

In accordance with Better Regulation Tool #15 (How to set objectives),[151] we develop the general and specific objectives directly matching the problem assessment above.

4.3.1. General objective

The general objective articulates the overarching ambitions to facilitate data-driven innovation in line with the Union's digital, economic, and internal market priorities. In the context of data-

[148] In the EEN survey, while 18.6% of the respondents indicated that *in the past* they had experience with data contracts and/or with the use of product data, already 41.6% of the respondents stated that they *are currently using* both or at least one of the data models analysed – data contracts and use of data generated by the use of the company's product sold at a standard price. Moreover, 32% of the respondents affirmed having *plans to use data contracts and/or use of product data in the future*.

[149] Please see Annex I "*Estimation of technology uptake"*

[150] 11 potential users out of 34 current users in our sample.

[151] European Commission (2023), Better regulation' toolbox 2023, https://commission.europa.eu/document/download/c0561a9c-d112-4d20-b1ec-145748e2c61c_en?filename=BRT-2023-Chapter%202-How%20to%20carry%20out%20an%20impact%20assessment_0.pdf

driven business models (DDBMs), we define the general objective as to promote a fair, trustworthy, and innovative data economy by fostering the uptake of data-driven business models across the EU. This objective aligns with several of the EU's strategic policy frameworks:

- It supports the **Digital Decade Policy Programme 2030** by facilitating the use of data in digital transformation, particularly among SMEs and sectors that lag in data intensity.[152]
- It advances the goals of the **SME Strategy for a Sustainable and Digital Europe** by addressing data access, legal fragmentation, and trust barriers that hinder small firms from adopting data-driven business models.[153]
- It reinforces the aims of the **Digital Single Market Strategy** by removing market fragmentation, reducing data monopolies, and enabling cross-border digital services through improved data governance and legal clarity.[154]
- It supports the **European Data Union Strategy** by setting clear rules about data-driven business models. The increased legal certainty should also unlock the potential of increased availability of high-quality data in the EU.[155]

By aligning with these strategies, the measures put forward aim to support the development and adoption of DDBMs, thereby enhancing the EU's digital economy and ensuring equitable access to data-driven opportunities across Member States.

4.3.2. Specific objectives

In line with the problem assessment, we identify two central specific objectives:

Specific objective 1: Facilitate the uptake of data-driven business models

This objective addresses the barriers that prevent businesses (especially SMEs and startups) from effectively using data as a core asset in their business models. These barriers include legal and technical complexity, reluctance to share data, and high compliance costs. To tackle these issues, the initiative would aim to achieve the following sub-objectives:

- **SO1.1 - Reduce legal uncertainty, fragmentation, and compliance burdens:** addresses problem driver #1 (Legal challenges: uncertainty, fragmentation, legal and compliance costs);
- **SO1.2 – Build trust and incentives for customers to share data**: tackles problem driver #3 (Customers' reluctance towards data sharing) by addressing users' concerns about data use, such as offering transparency and consent mechanisms.

By achieving this specific objective, the initiative aims to increase uptake of DDBMs in order to speed up and broaden digital transformation across sectors, increase productivity and innovation, with positive effects on competitiveness, and enable a higher quality of products and services, together with improved cost efficiency.

Specific objective 2: Address imbalances between parties in data-driven business models

This specific objective focuses on addressing power asymmetries and fairness issues between economic operators collecting and using data for various purposes (e.g. companies) and data

[152] European Commission (2025): Digital Decade - Policy programme, https://digital-strategy.ec.europa.eu/en/policies/digital-decade-policy-programme

[153] European Commission (2020), SME strategy launched by European Commission, https://digital-strategy.ec.europa.eu/en/news/sme-strategy-launched-european-commission and https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0103

[154] European Commission (2015), COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Digital Single Market Strategy for Europe, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447773803386&uri=CELEX:52015DC0192

[155] European Commission (2025), European Data Union Strategy, https://digital-strategy.ec.europa.eu/en/policies/data-union

subjects or providers (e.g. consumers and companies, notably SMEs). These imbalances undermine trust, limit participation, and reduce equitable opportunities to benefit from the data economy. To this end, the specific objective aims to strengthen transparency, control by data subjects, and consent mechanisms, addressing problem driver #2 (Information asymmetries between businesses and their customers).

By achieving this specific objective, the initiative aims to increase fairness in DDBMs to contribute to increased consumer trust and willingness to engage in data-sharing, increased control by customers over data access and use by businesses, more equitable access to value creation opportunities from data, especially for underrepresented actors (e.g. SMEs, individuals).

4.3.3. Policy measures

The policy measures outlined in this section aim to achieve the specific objectives outlined above. They were identified through an analysis of the existing legal framework related to data-driven business models and the identification of elements that give rise to the problem drivers. The measures also draw from academic writing on the topic, and they are refined through the deliberations of the focus groups.

The impacts of the policy measures are assessed qualitatively on a double scale indicating, on the one hand, the number of stakeholders likely to be affected and, on the other hand, the magnitude of the benefit or cost in question. This means that each impact receives two scores from 1 (very low) to 5 (very high), meaning:[156]

- For the number of affected stakeholders, a 1 means that the impacts are concentrated on a single or very small number of stakeholders, while a 5 means that practically all stakeholders in the respective category are affected.
- For the magnitude of the benefit or cost, a 1 indicates an almost insignificant benefit or cost and a 5 a very substantial one for each individual stakeholder affected. The qualitative scoring acknowledges that the magnitude of a benefit or cost depends on the stakeholder in question, meaning for instance that a large company can absorb a higher cost than a small company or a consumer. The scores therefore estimate to what extent the relevant stakeholders are affected relative to their capacity and do not present absolute monetary benefits or costs.

M1 – Rules on the consequences of a withdrawal of consent on the contract

Policy measure M1 closes a legal gap in the Digital Content Directive (DCD)[157] with the objective of reducing legal uncertainty and fragmentation in relation to data-driven business models. The Directive, which harmonises aspects of contracts for the provision of digital content and digital services, also applies to data contracts, i.e. situations in which the consumer provides personal data to the trader beyond what is necessary for the performance of the contract. However, the DCD does not specify the consequences for the contract if the consumer withdraws their consent to the processing at a later time. It explicitly leaves this matter to the laws of the Member States.[158]

The General Data Protection Regulation (GDPR) gives the data subject rights, including the right to withdraw their consent to processing at any time.[159] The Expert Panel on data-driven business models was careful to point out that a data contract is not necessarily based on consent,

[156] See also detailed cost assessments in Annex II.

[157] Directive (EU) 2019/770.

[158] Recital 40 of the DCD.

[159] Article 7(3) GDPR.

but could also rely on the legitimate interest of the trader.[160] In that case, the consumer still has the right to object to the processing under certain conditions,[161] giving rise to the same legal uncertainty regarding the consequences for the contract.

The majority view among academics and policymakers appears to be that the provision of data in that case is not a contractual counter-performance.[162] The withdrawal or objection can therefore not be considered a breach of contract by the consumer.[163] Nevertheless, the question arises whether the withdrawal or objection give rise to a special ground for the termination or modification of the contract. Measure M1 closes this legal gap in the DCD by harmonising the laws of the Member States on this matter.

There are three options as to the effect of a withdrawal of consent on the contract, which are discussed below.

Option M1.1: The trader may terminate the contract

This option allows the service provider in principle to terminate the contract. The transpositions of the DCD in German[164] and in Estonian[165] law follow this approach. Both transpositions acknowledge that the termination should follow a balancing of the interests of both parties. Overriding interests of the consumer may therefore prevent the (immediate) termination. Other legal rules may also require the business to continue the service, potentially with modifications (see point b. below). Germany and Estonia are the only Member States that have explicitly filled the gap left by the DCD, meaning that the only national legislators that addressed this question have chosen option M1.1.

However, the focus group participants were split on whether this option is compliant with the GDPR. The participating consumer representatives insisted that it is contrary to the requirement that consent be freely given. Indeed, the GDPR states that "[w]hen assessing whether consent is freely given, utmost account shall be taken of whether, *inter alia*, the performance of a contract, including the provision of a service, is conditional on consent to the processing of personal data that is not necessary for the performance of that contract."[166]

The business representatives, on the other hand, considered it vital for traders that rely on data-driven business models to be able to terminate a contract when its economic foundation is withdrawn.

Option M1.2: The trader may modify the contract

This option allows the trader to change the terms of the conditions of the contract in a way that prevents it becoming unreasonable to maintain for the trader. Instead of providing data, the consumer could be required to pay a fee or a higher fee than before. Alternatively, the change could relate to the extent of the service provided, meaning that certain functions or features are no longer offered to the consumer.

This approach is similar to the one followed by the CJEU, which obliged Meta to offer an equivalent alternative of their digital service without processing of personal data that is not necessary for the performance of the contract.[167] What is more, data protection authorities have

[160] Article 6(1)(f) GDPR.

[161] Article 21 GDPR.

[162] Uni Wien (2022), *Dienst gegen Daten – die Umsetzung aktueller EU-Richtlinien in deutsches Recht,* https://stiftungdatenschutz.org/fileadmin/Redaktion/DatenTag/DatenTag_Daten_gegen_Dienstleistung_25052022/DatenTag_Bezahlen-mit-Daten_250522/Wendehorst_DatenTag_2022-05-25.pdf

[163] Confirmed by the representatives of most Member States responding to a questionnaire on data-driven business models

[164] BGB § 327q, https://dejure.org/gesetze/BGB/327q.html

[165] LOA § 62[18], https://www.riigiteataja.ee/en/eli/ee/507022018004/consolide/current

[166] Article 7(4) GDPR.

[167] Case C-252/21 *Meta v Bundeskartellamt*, para 150. On the ad-free offer see also Meta, About subscription for no ads.

criticised the 'Consent or Pay' model by large online platforms and is currently working on guidelines to clarify how this model can be used by other economic actors.[168]

As part of option M1.2, it may be necessary to determine whether a change in terms is proportionate to the withdrawal of consent. A reduction of the service or the increase of a fee should not be so extreme as to be an unreasonable detriment for the consumer. Otherwise, businesses could effectively terminate the contract by demanding prohibitive fees. The case of Meta has shown the difficulty of determining an adequate fee for the ad-free version, as the company almost halved it after its first introduction.[169]

Option M1.3: The contract continues to bind the trader without modification

This option obliges the trader to continue providing the service without changes in terms of quality, features, and price. Out of the three considered options, this is the most burdensome on businesses who potentially lose revenue when consumers withdraw consent. In addition, it should be noted that it is stricter than what the CJEU required from Meta, which holds a powerful position in the data economy. Option M1.3 would thus create more stringent requirements even for smaller businesses than Meta.

On the other hand, the consumer representatives present at the focus group insisted that the consent to data processing should in no way be bundled with conditions such as the performance of a contract. In their opinion raised during the focus group, M1.3 is thus the only option that complies with the GDPR. Some Member State representatives also stated this view in response to a questionnaire on data-driven business models.[170]

Assessment of benefits and costs

M1 aims to reduce legal uncertainty and fragmentation in B2C digital content contracts by establishing a uniform EU rule on the consequences of a consumer's withdrawal of consent to data processing. Under current law (GDPR Article 7(3)), consent withdrawal is allowed. Still, Member States differ on whether this should justify contract termination, service reduction, or continuation in altered form. National models vary: Germany and Estonia permit termination after a balancing of interests, Meta's case introduced reduced-service models, while France supports service continuation without change.

Each variant offers a different balance between legal certainty and protection of data subjects. Harmonised rules would remove fragmentation and reduce compliance burdens. The termination model (M1.1) provides clear consequences, but risks discouraging consumers who fear losing access to paid services; effectiveness may be limited without additional safeguards. The reduction approach (M1.2), which permits continued access with fewer features or higher fees, as endorsed by the CJEU in *Meta v Bundeskartellamt* (C-252/21)[171], offers a more balanced solution, retaining services while respecting autonomy. The service continuation option (M1.3) offers maximal consumer protection but may impose inappropriate costs on providers, potentially dampening adoption of data-centric models. A 2024 working paper

[168] Edpb (2024), EDPB: '*Consent or Pay' models should offer real choice*, https://www.edpb.europa.eu/news/news/2024/edpb-consent-or-pay-models-should-offer-real-choice_en

[169] Reuters (2024), *Meta offers to almost halve Facebook and Instagram monthly fees*, https://www.reuters.com/technology/meta-offers-cut-facebook-instagram-monthly-fees-599-euros-2024-03-19/.

[170] The representative of France responded that "[…] it appears that the withdrawal of consent […] should not have an impact on the contract […] since their objects are different and relate to different legal bases."

[171] CJEU, Case C-252/21, Meta Platforms and Others v Bundeskartellamt, Judgment of 4 July 2023. Available via EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:62021CJ0252

analysing Meta's pay-or-okay model argues that excessive blockage of access undermines user trust and disproportionately penalises consumers.[172]

These findings echo Expert Panel feedback emphasising the need for clear, proportionate rules that protect consumers while avoiding over-complex obligations for SMEs.[173] At the same time, civil society representatives in the Expert Panel strongly opposed both policy measures M1.1 and 1.2. Any proposal that allows for negative consequences of a withdrawal of consent by the consumer will likely be met with resistance from consumer and data protection organisations. However, as noted by the Panel, consent is not the only legal basis for processing personal data under the GDPR. In the context of DDBM, businesses may in particular base the processing of personal data on legitimate interest instead of consent, if they must otherwise fear that consumers could withdraw their consent without consequences for the contract.

Adopting the service level reduction model would require moderate legislative amendments to the DCD, possibly accompanied with guidelines clarifying permissible changes (e.g., feature removal, pricing). Providers would need to update contracts and interfaces, but these are manageable IT adjustments. The alignment with CJEU precedent reduces legal risk. Enforcement can leverage existing consumer authorities. Greater burdens arise under the continuation model, which could necessitate compensation frameworks, raising costs broadly for business. The termination variant may lower costs for business but could reduce consumers' freedom to withdraw consent due to the risk of service loss.

A harmonised service level reduction model is likely to be the most effective, striking a reasonable balance of clarity and consumer empowerment at a moderate cost. It supports uptake by providing legal certainty without undermining user trust or imposing steep burdens on providers. Once chosen, this rule should be accompanied by guidance on implementation and communication to ensure transparency and predictability in data-driven contracts.

At the same time, it should be noted that the consequence for withdrawing consent could vary depending on the purpose for which the consent was given, such as consent to provide personalisation or consent to access service without monetary remuneration. Therefore, further analysis would be necessary to understand the appropriateness of the proposed measures in each case.

The detailed assessment of costs depends on the chosen sub-measure, as detailed in the table below. In addition, the policy measure harmonises an aspect of consumer contracts that is currently regulated differently in different Member States, meaning that stakeholders in some countries may be more affected if the chosen solution departs significantly from the current regulatory choice in that country. From this perspective, policy sub-measure M1.1 would affect the smallest number of stakeholders since it is already explicitly implemented by two Member States, unlike the other two sub-measures.

Table 13. Costs and benefits of the policy measure M1.1-M1.3 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	M1.1: No significant benefits		M1.1: Loss of access to digital content or services	M1.1 Number of stakeholders affected: High (4)

[172] Cf. D'Amico, A. S., Pelekis, D., Santos, C., & Duivenvoorde, B. (2024), Meta's Pay-or-Okay Model: An Analysis Under EU Data Protection, Consumer and Competition Law, RENFORCE Working Paper, Utrecht University, p. 11-13. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4787609 .

[173] Two Expert Panel sessions on DDBM organised in the framework of this study.

				Average cost: Very high (5)
	M1.2: Legal and contractual certainty about the consequences of withdrawal of consent	M1.2 Number of stakeholders affected: High (4) Average benefit: Low (2)	M1.2: Loss of access to certain features	M1.2 Number of stakeholders affected: High (4) Average cost: Moderate (3)
	M1.3: Legal and contractual certainty Possibility to withdraw consent without negative contractual consequences	M1.3 Number of stakeholders affected: High (4) Average benefit: Very high (5)	M1.3: No additional costs	
Businesses	M1.1: Legal and contractual certainty Possibility to terminate the contract if consent is withdrawn	M1.1 Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	M1.1: No additional costs	
	M1.2: Legal and contractual certainty about the consequences of withdrawal of consent	M1.2 Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	M1.2: No substantial loss of revenue, but potentially costs from offering several service variants	M1.2 Number of stakeholders affected: Moderate (3) Average cost: Low (2)
	M1.3: No significant benefits		M1.3: Potentially substantial loss of revenue	M1.3 Number of stakeholders affected: Moderate (3) Average cost: Very high (5)
Authorities	M1.1–1.3: Legal certainty leading to lower enforcement complexity	M1.1–1.3 Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	M1.1–1.3: Implementation of legislative changes and market surveillance	M1.1–1.3: Number of stakeholders affected (e.g. DPAs and consumer protection authorities): Low (2) Average cost: Very low (1)

Source: Detailed assessment in Annex II, Table 39

M2 – Specifying the rights and obligations of data providers and data recipients

Policy measure M2 addresses data *provision* contracts, i.e. contracts where the provision of data is the main contractual performance, for instance, when industrial data is bought from a data provider. While an overlap with data contracts, as defined above, is possible, the scenarios differ and raise distinct problems.

To address some of the legal uncertainties related to the provision of data, the UNCITRAL working group on electronic commerce is developing default rules for those contracts, clarifying the rights and obligations of the parties in relation to:[174]

- Obligation to provide data
- Mode of provision of the data
- Timing of the provision of data
- Conformity of the data
- Use of the data
- Derived data

In the context of the Data Act,[175] the European Commission has developed model contractual terms which give businesses, particularly SMEs, a template to develop their data-driven business models with greater legal certainty.[176] The draft recommendation published by the European Commission includes model contractual terms for mandatory data sharing under the Data Act, but also for voluntary agreements which may cover a wide range of DDBMs. Given that this initiative largely covers the objectives of policy measure M2, it will be excluded from the further assessment of impacts in this report.

M3 – Better information on the economic benefits from the data sharing

Policy measure M3 addresses the informational asymmetry between parties to data contracts and data sharing contract, by ensuring that the customer is well informed about the economic benefits generated from the sharing and use of the data they provide or co-generate. This is distinct from the obligation to provide information on the purposes of the processing of personal data under the GDPR, which does not require information on how much value the data controller generates from the processing and potentially shares with the data provider.

Data providers have little clarity on how the recipient derives value from them and whether they get any benefit in exchange, which is essential for a data-driven business model. The guideline on transparency by the Article 29 Working Party, endorsed by the European Data Protection Board (EDPB), does not enter into detail on whether the information on the purposes of data processing contains details on its economic role in the controller's business model.[177] It is addressed in the context of Cookies Pledge, which lists among its best practice principles: "When content is financed at least partially by advertising it will be explained upfront when users access the website/app for the first time." However, the final summary of the project acknowledged that it is a topic of further reflection how information on the monetisation of personal data can be communicated more effectively to consumers.[178] The EDPB recommended that information on the advertising-financed business models should be given even when the advertising does not rely on the processing of data provided by the consumer but is rather contextual to the accessed content.[179]

[174] UNCITRAL, Report of Working Group IV (Electronic Commerce) on the work of its sixty-seventh session (Vienna, 18–22 November 2024), https://docs.un.org/en/A/CN.9/1197.

[175] Regulation (EU) 2023/2854.

[176] European Commission, Draft Recommendation on non-binding model contractual terms on data access and use and non-binding standard contractual clauses for cloud computing contracts, https://digital-strategy.ec.europa.eu/en/library/draft-recommendation-non-binding-model-contractual-terms-data-access-and-use-and-non-binding.

[177] Article 29 Working Party, Guidelines on transparency under Regulation 2016/679,: https://www.edpb.europa.eu/system/files/2023-09/wp260rev01_en.pdf.

[178] European Commission (2024), *Cookies pledge project summary and annexes*, https://commission.europa.eu/publications/cookies-pledge-summary-project_en

[179] European Commission (2024), *Cookies pledge project summary and annexes*, https://commission.europa.eu/publications/cookies-pledge-summary-project_en.

The GDPR requires that the data subject be informed of the existence of the processing operation and its purposes.[180] Where the personal data are collected from the data subject, the data subject should also be informed whether they are obliged to provide the personal data based on a contractual requirement and of the consequences if they do not provide such data. A similar obligation also exists in relation to data sharing contracts (through IoT associated services) under Article 3(3)(c) of the Data Act.[181] To the extent possible, this information should be presented in the pre-contractual phase. However, the focus group acknowledged that, despite existing information duties, the explanation of purposes often remains generic (such as, "to improve the services") and does not really allow the data provider to understand how the data are processed.

The policy measure clarifies the aspect of economic benefits by defining how companies conducting data-driven business models should make transparent how they generate revenues from the data. It thereby pursues the specific objectives SO1.2 of building trust in data-driven business models as well as SO2 of addressing information asymmetries and imbalances. While M3 focuses on the value generated from data on the side of the data recipient (business), it also clarifies the question whether the data provider (the user of a service or good) gets a benefit from sharing data. Measure M4 (Standardised label on the existence, nature and timespan of the economic benefit in return for the shared data) described below fully focuses on the latter aspect, namely the value that the data provider (the user of a service or good) receives in return for sharing data. It also focuses on a specific approach to the presentation by visualising it in a standardised label.

Assessment of benefits and costs

Measure M3 aims to reduce power imbalances in data sharing by emphasising of economic benefits for both the data provider and data recipient. Although the GDPR and Data Act already mandate transparency, in practice, disclosures are often generic and do not address the question of what the underlying data-driven business model is. Expert panel feedback corroborates these findings. Panel members noted that without structured, easily comparable disclosures and visual clarity, purpose statements merely fuel perceived opacity rather than diminishing it.[182] That is why the benefit for citizens and consumers is likely to be moderate.

The measure would entail moderate implementation costs for businesses that would need to integrate the information regarding economic benefits into their compliance documentation, potentially combined with other information on the purposes of processing currently required by the GDPR.

Table 14. Costs and benefits of the policy measure M3 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Increased decision autonomy when providing personal data	Number of stakeholders affected: Very high (5) Average benefit: Moderate (3)	No significant costs	

[180] Articles 5(1)(a), 12, and 13 GDPR.

[181] "Before concluding a contract for the provision of a related service, the provider of such related service shall provide at least the following information to the user, in a clear and comprehensible manner: … c) whether the prospective data holder expects to use readily available data itself and the purposes for which those data are to be used, and whether it intends to allow one or more third parties to use the data for purposes agreed upon with the user;".

[182] wo Expert Panel sessions on DDBM organised in the framework of this study.

Businesses	Increased customer trust through clear, purpose-specific disclosures	Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	Adaptation and compliance costs	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
Authorities	No significant benefits		Implementation of legislative changes (in case of a binding measure), market surveillance	Number of stakeholders affected: Low (2) Average cost: Very low (1) to low (2)

Source: Detailed assessment in Annex II. Table 40

M4 – Standardised label on the existence, nature and timespan of the economic benefit in return for the shared data

Policy measure M4 introduces a standardised label to inform customers in a data-driven business model of the benefits they incur in return for sharing their data. The form of a visual label helps to convey this information quickly and intuitively.

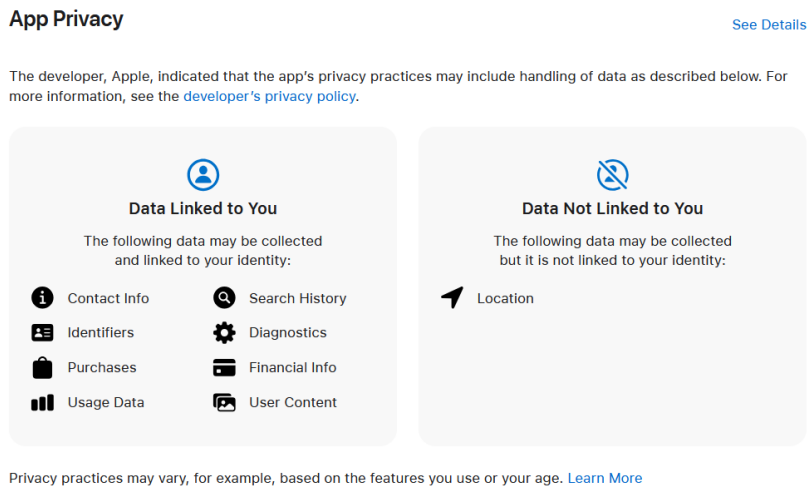
For each benefit incurred by the user, the service provider should provide information on its nature and timespan. The nature of the economic benefits can vary and consist for instance in personal benefits to the data provider, such as free access to services, discounts, or personalised features that rely on the processing of data. The timespan of the benefit could be specified as:

- one-off, for instance if the customer gets a discount on a sales price;
- recurring, for instance if the customer has repeated opportunities to obtain discounts; or
- continuous, for instance when the customer can access a service free of charge for the entire duration of the contractual relationship.

On the other hand, the benefits derived from data may be indirect for a given data provider and distributed among a broader group, for instance through improved services for all users, or only to future customers through improved future iteration of a product. This makes it challenging to single out the specific economic benefit for an individual data provider. The label can only cover a limited amount of complexity and would thus have to be targeted at the most relevant types of data-driven business models where it is likely that the information on economic benefits is important for customers when entering into a contractual relationship. It could at least specify if there is direct benefit to the individual user sharing data or an indirect one.

An example of a standardised label conveying data protection and privacy-related information is implemented by Apple. Here, the label supports customers' informed choice of an application provider and may promote competition on data protection and privacy in the app market. The label does currently not address benefits in return for the shared data. A standardised label proposed could be complemented in such a way.

Figure 13. Example standardised data-sharing labels



Source: https://www.apple.com/privacy/labels/

Assessment of benefits and costs

The goal of measure M4 is to rebalance power asymmetries by making the economic benefits for the data subject transparent and comparable before entering into agreements. Evidence from privacy-label research supports the effectiveness of such labels. Kelley et al. (2009) showed that "nutrition-style" labels for privacy notably increased users' comprehension, enabling more informed decision-making.[183] Similarly, Emami-Naeini et al. (2020) employed expert-stakeholder consensus to identify key features (such as one-time versus ongoing benefits) that should appear on IoT product labels to provide transparency and build trust.[184] These studies affirm that clear, standardised labelling reduces the advantage of data-rich parties by empowering users with easy-to-compare information.

Expert Panel feedback echoed these findings. It emphasised that conducting data-sharing without explicit awareness of benefit structures perpetuates a value imbalance, especially in "freemium" or indirect monetisation models.[185] The panel suggested that familiar icons could quickly signal one-off or recurring benefit formats.[186]

Implementation costs are moderate. Businesses would face updates to their apps or interfaces to display the label appropriately. Competent authorities, including consumer protection authorities, would oversee compliance, aligning with their current enforcement duties under consumer law.

Table 15. Costs and benefits of the policy measure M4 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Increased decision autonomy when providing personal data	Number of stakeholders affected: Very high (5)	No significant costs	

[183] Kelley, P. G., Bresee, J., Cranor, L. F., & Reeder, R. W. (2009). *A "nutrition label" for privacy*. Proceedings of SOUPS 2009. https://cups.cs.cmu.edu/soups/2009/proceedings/a4-kelley.pdf, virtual page 10-11.

[184] Emami-Naeini, P., et al. (2020). *Ask the Experts: What Should Be on an IoT Privacy and Security Label?* arXiv:2002.04631. https://arxiv.org/abs/2002.04631.

[185] Freemium is a blend of two words – free and premium – and it signifies a service whose basic characteristics are free of charge, whereas more advanced ones are payable. Indirect monetisation is a business model that, in the data-related context, makes use of the acquired data internally, to capture benefits from doing so, i.e. monetise.

[186] Two Expert Panel sessions on DDBM organised in the framework of this study.

	Easy comparability of offers through standardised labels	Average benefit: High (4)		
Businesses	Increased customer trust through clear, purpose-specific disclosures Clear disclosure mechanism provided by the label	Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	Adaptation costs, as well as raising active awareness of the label	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
Authorities	No significant benefits		Implementation of legislative change (in case of a binding measures), potentially awareness-raising	Number of stakeholders affected: Low (2) Average cost: Moderate (3)

Source: Detailed assessment in Annex II, Table 41

M5 – Information on possibilities on use of products or services with limited or zero data sharing

Policy measure M5 ensures that businesses conducting a data-driven business model provide clear information to customers on how they can limit the sharing of their data or even restrict it completely. This reduces informational asymmetries and enables the user to make an informed choice in deciding to what extent they share their data with which businesses. As the service provider gives information on the different service variants, *where applicable*, the user can assess and compare the benefits associated with sharing different volumes of data and its impact on service quality.

Measure M5 does not mandate the creation of service variant with limited or zero data sharing (this is considered as measure M7). If the service provider does not offer such a variant, they should clearly state that using the service or product requires data sharing.

Assessment of benefits and costs

M5 aims to address imbalances in data-driven business models by ensuring users are clearly informed about non-sharing and privacy-preserving options, such as alternative service modalities or privacy-preserving features. By presenting these choices prominently, the measure empowers users to make informed decisions rather than being nudged into accepting default, data-intensive terms.

Evidence suggests that enabling user choice over data sharing enhances trust and participation. Yale SOM research highlights that pairing strong data-security commitments with user control mechanisms fosters environments where individuals are more willing to share data selectively.[187] Similarly, ID5 stresses that giving visibility to minimal-data service options increases consumer trust and legal certainty.[188] According to Deloitte's 2023 Connectivity and Mobile Trends survey, only 41% of consumers trust that providers adequately protect their data, and over 60% express anxiety about how their personal data is used. Importantly, 66% said they would feel more confident if providers made it easier to access privacy controls and understand

[187] Madhusoodanan, J. (2021). *Create trust online by pairing user control and data security*. Yale Insights. https://insights.som.yale.edu/insights/create-trust-online-by-pairing-user-control-and-data-security.

[188] ID5 (2024). *Minimal data, maximum impact: Leading the privacy-first revolution*. https://id5.io/news/minimal-data-maximum-impact-leading-the-privacy-first-revolution.

data practices.[189] These findings confirm that clear communication of privacy-respecting alternatives directly supports user empowerment and informed consent.

Industry representatives participating in the Expert Panel considered M5 a promising starting point to support free and informed user choice. However, they cautioned that some users may already be overwhelmed by the mandatory compliance information they receive from traders, which may hamper the effectiveness of the measure. One representative supported the implementation as a non-legislative variant, namely an industry code of conduct, potentially in connection with measure M7.

Implementation costs of M5 are expected to be low. They mostly involve interface updates and consumer guidance. Oversight by existing data protection authorities is sufficient.

Table 16. Costs and benefits of the policy measure M5 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Greater transparency and decision autonomy, supporting privacy-preserving service uptake	Number of stakeholders affected: High (4) Average benefit: Moderate (3)	No significant costs	
Businesses	Increased customer trust	Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	Adaptation and compliance costs for businesses	Number of stakeholders affected: Moderate (3) Average cost: Low (2)
Authorities	No significant benefits		Implementation of legislative changes (in case of a binding measure), market surveillance	Number of stakeholders affected (e.g. Data and consumer protection authorities): Low (2) Average cost: Low (2)

Source: Detailed assessment in Annex II, Table 42

M6 – Promote the development of personal data management systems

This measure consists of targeted public support to accelerate the development and market uptake of user-friendly personal data management systems (PDMS) through promotion, training, awareness raising, or targeted funding (e.g. project grants). The Commission and Member States have already supported related data intermediation and personal data management approaches through research and innovation funding over the past decade. This measure would build on those developments by accelerating deployment and user uptake.

PDMS act as a central repository for information about data sharing agreements, allowing consumers to access details about who their data is being shared with, for what purposes, the duration of the agreement, and the specific categories of data involved.[190] These systems provide data subjects with enhanced control over their data, as well as an access trail in the form

[189] Deloitte (2023). *Data privacy and security worries are on the rise, while trust is down*,https://www.deloitte.com/us/en/insights/industry/telecommunications/connectivity-mobile-trends-survey/2023/data-privacy-and-security.html.

[190] EDPS (2021), Personal Information Management Systems, TechDispatch #3/2020, https://www.edps.europa.eu/data-protection/our-work/publications/techdispatch/techdispatch-32020-personal-information_en.

of an overview of who may access their data. The use of PDMS is referred to in Recital 33 of the Data Act[191] and they may qualify as a data intermediation service within the meaning of Article 2(11) of the Data Governance Act and thus could benefit from a designation as 'data intermediation services provider recognised in the Union'.[192]

Measure M6 pursues the specific objective SO2 of addressing the imbalances between parties in data-driven business models, as it provides consumers with a tool to centralise and streamline the management of their data sharing and the exercise of their rights.

While PDMS may emerge as a viable business model without policy intervention, this section analyses the benefits and costs of introducing public support to accelerate the development and adoption of PDMS and ensure that they are in line with the objective of reducing imbalances in practice. Public support could for instance be in the form of financial support, such as project grants to encourage the development of user-friendly PDMS. Depending on its design, financial support to PDMS providers or companies introducing PDMS may constitute State aid within the meaning of Article 107(1) TFEU. Its implementation would need to ensure compliance with EU State aid rules.. While the measure promotes the practical development and uptake of PDMS on a wider scale,[193] it does not introduce new legal obligations for contracting parties. Administrative requirements would be limited to beneficiaries of any public support (e.g., reporting obligations linked to grant funding).

Assessment of benefits and costs

PDMS can significantly enhance fairness by shifting control and transparency back to individuals. For privacy-aware users, PDMS can simplify the control over their personal data sharing by centralising the controls and keeping track of which data the user shared with which other parties. Expert Panel members welcomed M6, emphasising that meaningful control is only achieved when PDMS are usable, widely interoperable, and integrated into familiar services (e.g. browsers or mobile OS). They concurred that standalone tools rarely shift power due to limited adoption and steep learning curves. The panel recommended policy support for standardisation initiatives (e.g. consent API frameworks) and integration incentives for service providers to make PDMS-compatible features standard.[194]

Currently, PDMS adoption remains limited. Crabtree et al. (2018) describe how existing commercial solutions do not offer an adequate level of control.[195] Critics argue that such systems still operate on a privacy self-management model, expecting individuals to manage complex data landscapes actively; an unreasonable burden that may reinforce rather than reverse existing power asymmetries[196]. Viswanathan (2022) points out what they call the 'ostrich effect', where certain users prefer to ignore privacy issues altogether and to avoid engaging with data sharing settings altogether, even when offered implemented in a user-friendly and interactive way.

Implementing M6 primarily involves moderate research and development (R&D) costs and coordination efforts. Policymakers can support pilot projects, certification schemes, and open-source development, while regulators can endorse interoperability standards. As the measure does not introduce binding legal obligations, no compliance or monitoring costs for businesses or oversight bodies would ensue. Indirectly, increased privacy awareness and user control may

[191] Regulation (EU) 2023/2854.

[192] Regulation (EU) 2022/868.

[193] JRC (2024), The landscape of consent management tools, https://op.europa.eu/en/publication-detail/-/publication/64c63928-89db-11ef-a67d-01aa75ed71a1/language-en.

[194] Two Expert Panel sessions on DDBM organised in the framework of this study.

[195] Crabtree, A. & Mortier, R. (2017). *Personal data, privacy and the Internet of Things: The shifting locus of agency and control*. Available via SSRN: https://ssrn.com/abstract=2874312, p. 2, 8.

[196] Narayanan, A., Toubiana, V., Barocas, S., Nissenbaum, H., & Boneh, D. (2012). A critical look at decentralized personal data architectures. ArXiv, https://arxiv.org/abs/1202.4503.

limit businesses in the use of personal data of consumers. Legitimate data-driven business models should nevertheless remain viable.

Table 17. Costs and benefits of the policy measure M6 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Increased control over shared data Centralised interface for managing data sharing	Number of stakeholders affected: Moderate (3) Average benefit: High (4)	No significant costs	
Businesses	Structured access to data by consenting customers Increased interoperability	Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	Developing, purchasing, integrating and maintaining software solutions	Number of stakeholders affected: Moderate (3) Average cost: Low (2)
Authorities	Practical support for the mission of consumer and data protection authorities	Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	Development and maintenance of the PDMS with support from public funds	Number of stakeholders affected: Very low (1) Average cost: Moderate (3)

Source: Detailed assessment in Annex II, Table 43

M7 – Option to use products without data sharing

Policy measure M7 concerns connected products, digital content, and services. It requires that providers allow consumers the option to use such products and services without having to share their data beyond what is necessary for the performance of the contract or the functioning of the product. This could be a requirement, to the extent technically and economically feasible to provide users with the option to disconnect the data sharing features or functionalities. This obligation would present a rather severe intervention and, if introduced, should therefore be precisely targeted at products or services where there is strong evidence for a market failure.

Depending on the service or product, it may not be possible to avoid sharing data with the provider or manufacturer, as this would compromise functionalities or lead to compatibility issues. For instance, the appeal of IoT products generally stems from their connected features, as traditional, non-connected products continue to be available on the market. Policy measure M7 therefore only addresses data processing beyond what is necessary for the functioning of the service or product.

The outcome would be similar to the situation where a user withdraws their consent to the processing of their personal data after the conclusion of a data contract and the contract is not terminated by the trader (see measure M1). The CJEU judgment in Case C-252/21 *Meta v Bundeskartellamt* also states that a user should be free to refuse the processing of personal information when such processing is not necessary for the performance of the contract and may be charged an appropriate fee instead. The calculation of the fee is linked to measure M9 (Rules on the adequacy between the proposed goods or services and the collected data).

A mandatory option to enable consumers to use their IoT devices with zero (or minimal) data sharing, unless data sharing is necessary for the functioning of the product such as a smart device, provides users with increased control over their data, decreasing power imbalances between the parties in line with specific objective SO2.

Assessment of benefits and costs

M7 empowers users by ensuring they have the option to use products or services without sharing personal data beyond what is necessary for the performance of the contract or the functioning of the product. This alignment with principles of autonomy and fairness counters the common practice of default data-intensive products that rely on user inattention or passive acceptance. Expert Panel feedback supports these findings. Panellists emphasised the importance of making zero-data or minimal-data options as visible as the default ones (for example, by placing them side-by-side in product selection interfaces). Panellists representing consumer and digital rights organisations noted that consumers should not face potential price or quality penalties for choosing more privacy-oriented alternatives, or such options risk being merely symbolic.[197]

Implementation costs and impact can be high for the affected businesses. Introducing alternative service options might require an adjustment not only of compliance documentation, but potentially of the underlying business models. Businesses may need to change their pricing models or service bundles. Enforcement through market surveillance and digital rights watchdogs may increase the workload for these stakeholders. The number of affected stakeholders could be reduced by limiting the scope of the measure to specific types of products or services.

Table 18. Costs and benefits of the policy measure M7 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Increased data autonomy and control Availability of genuine privacy-oriented products and services	Number of stakeholders affected: High (4) Average benefit: High (4)	No significant costs	
Businesses	Increased demand for privacy-preserving products and services	Number of stakeholders affected: Moderate (3) Average benefit: Low (2)	Adaptation and compliance costs for businesses	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3) to high (4)
Authorities	No significant benefits		Implementation of legislative changes (in case of a binding measure), market surveillance	Number of stakeholders affected: Low (2) Average cost: Moderate (3)

Source: Detailed assessment in Annex II, Table 44

M8 – Compensation for data access

Policy measure M8 envisions compensation by service providers or manufacturers of connected products to users for the data they generate and share. Compensation could be monetary or non-monetary, for instance in the form of additional services or product features. The measure aims to make data-driven business models more legally certain and to address potential imbalances in the distribution of data value between parties, promoting specific objectives SO1.1 and SO2.

[197] Two Expert Panel sessions on DDBM organised in the framework of this study.

It is important to consider the difficulty in assessing the economic value of data, which depends on the purposes for which it is processed amongst others. When data from several contractual relationships is aggregated, it may become even more difficult to single out the value generated by a single customer. Furthermore, there is need for more economic evidence on the actual value distribution in such business models. In some business models, manufacturers may derive value from the data from their connected products and thus gain benefits in addition to the monetary price. It is also possible however, that there is a mixed calculation on the manufacturer side where purchase price does not cover full costs and a margin. Furthermore, manufacturers may incur additional costs when fulfilling requirements on data access for the users of their products. The related costs may also outweigh the benefits they may derive from the data, as discussions around the entry into application of the Data Act revealed.[198] More economic evidence and practical insights on the relevant business practices is necessary. They can be gathered in the context of the implementation of the Data Act.

The policy measure should therefore be carefully considered in the context of the legal framework where it is implemented. Furthermore, it should determine the parameters according to which the compensation is provided. One possible approach is determining compensation relative to the costs incurred for the provision of data. In the case of data co-generated through the use of connected products or digital services, users usually do not face monetary costs, but could face privacy risks. A cost-based approach thus could relate compensation to the extent and sensitivity of shared data. Another approach is to determine compensation based on the value generated from the data by the recipient. A value-based approach can be found in the Californian Consumer Privacy Act described in measure M9.

The focus group on data-driven business models expressed concerns with this policy measure as monetary compensation for personal data is at odds with the fact that protection of personal data is a fundamental right (Article 8 EUCFR) and legal doctrine that frowns upon its commoditisation.[199] On the other hand, the DCD acknowledges that consumers can and do in practice receive value in the form of digital content or services in exchange for the data they share; however, it explicitly states that personal data is not a commodity (recital 24).

Assessment of benefits and costs

M8 aims to support the uptake of data-driven business models by allowing customers to request compensation for the data they provide in the context of the contractual relationship. The measure seeks to address asymmetries in data exchanges by enabling data providers (customers in the context of DDBM) to request compensation for sharing data. This aims to foster equitable, sustainable data ecosystems by mitigating both free-riding and exclusionary pricing strategies.

The measure may make the value exchange around data more transparent.

Implementation costs are very high for affected stakeholders: data holders must update existing pricing frameworks and document cost bases, while regulators and the European Data Innovation Board will need to publish guidance or standard clauses. Enforcement can be managed through existing mechanisms, with national monitors reviewing non-discrimination and cost transparency. Ongoing costs would scale with the extent of data sharing.

[198] See for instance DIGITALEUROPE (2024), Digital simplification package: Our data recommendations, https://cdn.digitaleurope.org/uploads/2025/06/Digital-simplification-package-Data.pdf.

[199] EDPB, Opinion 08/2024 on Valid Consent in the Context of Consent or Pay Models Implemented by Large Online Platforms, https://www.edpb.europa.eu/system/files/2024-04/edpb_opinion_202408_consentorpay_en.pdf.

Table 19. Costs and benefits of the policy measure M8 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Increased value for providing access to data	Number of stakeholders affected: High (4) Average benefit: Moderate (3)	No significant costs	
Businesses	Additional revenue for granting access to data (depending on scope of the measure)	Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	Compensation for data access presents repeated costs Implementation of legislative changes (in case of a binding measure)	Number of stakeholders affected: High (4) Average cost: Very high (5)
Authorities	No significant benefits		Implementation of legislative changes (in case of a binding measure), market surveillance	Number of stakeholders affected: Low (2) Average cost: Moderate (3)

Source: Detailed assessment in Annex II, Table 45

M9 – Rules on the adequacy between the proposed goods or services and the collected data

Measure M9 defines rules for determining whether the product or service provided in the context of a data-driven business model is adequate to the collected data. As mentioned above, assessing the value of data is complex because it fluctuates based on the context. For each party involved, the value they can generate from the same data may be different as it significantly depends on its intended use but also whether it is combined with other data.

Californian law has established a provision which prevents discrimination between consumers sharing and those not sharing their data, unless differences are 'reasonably related to the value provided to the business by consumer's data'.[200] While the provision explicitly enables businesses to charge a higher price from consumers that do not share their data, it also limits the extent of the practice. By relating the differential price to the value that the business derives from the customer's data in practice, the law makes an explicit choice of the standard according to which differences between consumers sharing and those not sharing their data may be justified.

The policy measure could complement other measures addressing the customer's choice between a data-driven business model and a privacy-friendly alternative, such as M1.2, M5, or M7.

Assessment of benefits and costs

M9 seeks to reduce imbalances in DDBMs by ensuring that the proposed goods or services are adequate for the data collected. This measure extends beyond current legislative requirements by establishing a direct connection between the types of data collected and the value delivered

[200] Section 1798.125 of the California Consumer Privacy Act, https://www.sidley.com/en/sidley-pages/ccpa-text.

to customers in the promised services or goods. Mandating a proportionality test between data collected and service utility, accompanied by transparent documentation of the rationale and context, would help redress informational and control imbalances.

Implementing M9 entails moderate effort in updating development frameworks and improving internal compliance checks. Businesses, however, may face significant costs for adjusting their data-driven business models to comply with the adequacy standard. While one-off adjustment costs would be highest, ongoing monitoring and compliance costs also accrue.

Table 20. Costs and benefits of the policy measure M9 per stakeholder group (DDBM)

Stakeholder group	Main benefits	Qualification of benefits	Main costs	Qualification of costs
Citizens/consumers	Fair distribution of value of data provided Mitigated information imbalance about data value	Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	No significant costs	
Businesses	Clear and legally certain standards for assessing data value	Number of stakeholders affected: Moderate (3) Average benefit: Moderate (3)	Development and monitoring of compliant business models	Number of stakeholders affected: High (4) Average cost: High (4)
Authorities	No significant benefits		Implementation of legislative changes (in case of a binding measure), market surveillance	Number of stakeholders affected: Low (2) Average cost: Moderate (3)

Source: Detailed assessment in Annex II, Table 46

4.3.4. Binding vs. non-binding policy measures

While binding legislative measures offer the highest degree of legal certainty for the implementation of the policy measures, some of the objectives may also be achievable through non-binding policy initiatives. This could build on existing laws in the area of data-driven business models or set new, voluntary incentives for market players.

A non-legislative approach could involve issuing recommendations or guidance documents to businesses that pursue data-driven business models. These guidelines could include disclosure templates for explaining how economic value is generated from data (M3) and model wording for informing customers about options to limit data sharing (M5). Such guidance would provide clarity and consistency without imposing mandatory obligations, allowing companies to adopt best practices voluntarily.

Voluntary codes of conduct, similar to the Cookies Pledge, could encourage businesses to commit to transparency and fairness in data-driven models. This approach would be suitable for measure M3, which seeks disclosure of economic benefits, and M5, which focuses on informing users about data-sharing choices. A code of conduct could also incorporate principles relevant to M9, promoting proportionality between data collected and services provided.

For M4, a voluntary labelling scheme could be introduced to visually communicate the benefits users receive in exchange for sharing data. This would make complex information accessible and intuitive, supporting informed consumer choices.

The aims of M9, providing an adequacy test between data sharing and the contractual benefits in return, could be supported through a voluntary standard. This standard would define benchmarks for adequacy between data collected and the service offered, enabling businesses to demonstrate compliance, potentially through certification.

M6 already falls within a non-legislative framework and could be further promoted through awareness campaigns, interoperability guidelines, and public-private partnerships. Encouraging the uptake of Personal Data Management Systems would strengthen consumer control and transparency without creating new compliance burdens.

4.3.5. Considerations on potential bundling of policy measures

The measures discussed above present individual components that may be bundled to develop a coherent and effective policy intervention. The bundling should account for the logical connections and synergies between the different measures. Several factors should be considered for choosing measures that, together, are considered a policy option.

The first factor concerns whether the intervention should be binding or non-binding. Certain measures, such as M1, must be binding as they complement existing harmonisation legislation and cannot function effectively otherwise. On the other hand, measures M3 (better information on the purposes of the use of the data), M4 (standardised label on the economic benefit in return for the shared data), M5 (information on possibilities on use of products or services with limited or zero data sharing), M7 (option to use products without data sharing), M8 (compensation for data access), and M9 (rules on the adequacy between the proposed goods or services and the collected data) could be implemented through voluntary standards or industry self-regulation. Some focus group participants expressed concern that non-binding approaches are less effective for ensuring a level playing field in the digital market, especially when dominant market actors have an interest in maintaining their advantageous position. M6 (promote the development of personal data management systems) stands apart as it does not involve legislative changes and would function purely as a supportive measure.

The second factor relates to the scope of the policy measures. Measures M1, M6, and M7 are specifically designed to target DDBMs between consumers and businesses, while M3 (better information on the purposes of the use of the data), M4 (standardised label on the economic benefit in return for the shared data), M5 (information on possibilities on use of products or services with limited or zero data sharing), M8 (compensation for data access), and M9 (rules on the adequacy between the proposed goods or services and the collected data) can be applied in B2B and B2C contexts. If a policy initiative is taken within the context of consumer law, these latter measures can nevertheless also be targeted to B2C relationships. An additional scope distinction is the type of data covered by each policy measure. The analysed measures address both personal and non-personal data, except measures M1 and M6, which relate to personal data.

The third factor relates to the type of product or service subject of the data-driven business model that the policy initiative addresses. Since M1 (rules on the consequences of a withdrawal of consent on the contract) is complementary to the DCD, it focuses specifically on digital content and digital services within the meaning of that directive. The other measures can be applied more broadly, for instance, to connected products within the meaning of the Data Act. It can be considered to target these measures on market sectors where the identified problems are especially pressing, e.g. because customers face limited product choices and limited control over the use of their data.

5. ANNEX I – METHODOLOGY

5.1. Data collection

5.1.1. Key data collection tools and approaches

The data collection strategy for Phase I of this study comprised **four main tools**, ensuring the collection of the necessary quantitative and qualitative data. Most data collection activities for Phase I were concentrated during the first months of the study, until the end of July 2024[201] and aimed at covering as many tasks as possible. The specific thematic focus and level of detail of the questions of each tool used gradually aligned with the analytical evolution of the study tasks. This approach maximised the information gathered from each stakeholder while reducing the risk of stakeholder fatigue by contacting them only once.

Phase II (January 2025 – December 2025) builds on the groundwork laid by the data collected and analysed in Phase I. Moreover, it is paired with additional targeted literature and legal review. The findings are then further deepened and interpreted through an iterative engagement approach with two dedicated Expert Panels. These were consulted in the context of four focus groups (two per thematic area) including two background documents, a follow-up questionnaire and ad-hoc interviews. The findings were triangulated in this report.

5.1.2. Desk research

The desk research was conducted from January 2024 to March 2024 with the purpose of collecting relevant background information and building the theoretical frameworks; to gain a better understanding of the topics and to map stakeholders contacted for the other data collection tools (e.g. surveys).

5.1.3. Exploratory interviews

A total of 9 exploratory interviews with experts and technology providers were conducted from February to April 2024, including 6 academic experts and 3 technology providers. Of these, 6 interviews were focused on automated contracting technologies, such as AI in contracting (3) and smart legal contracts (3), and 3 on data-driven business models.

The list of experts for the interviews has been identified via desk research and by leveraging the existing network of contacts at the disposal of our consortium, together with the European Commission services (DG JUST). The conclusion of the exploratory interviews helped consolidate initial findings from the desk research, identify evidence gaps, and gather inputs to fine-tune surveys (Tool 3) and interview questionnaires (Tool 4).

The interviews had a duration of approximately one hour and were scheduled and conducted by the consortium, who also prepared agendas with an overview of the study's objectives and scope as well as the main questions, which were later shared with the participants in advance to the meeting, which facilitated the preparation, together with a consent form to be signed by the interviewee. All interviews started with the project team delivering a brief presentation of the study, encompassing its goals, scope, and activities, as well as a precise explanation of the key topics to be explored during the interview, i.e. AI in contracting, smart legal contracts, or data-driven business models. This step was intended to ensure that all participants have a clear and common understanding of the topic to be discussed.

Due to the exploratory nature of the interviews, the questions were broad, allowing for a flexible discussion during the interviews. Finally, the data collected from 9 interviews, especially from the experts, was used to fine-tune the text of the long survey (described below).

[201] The planning of the data collection activities has been changed from the initial planning in upon request from DG JUST during progress reports.

5.1.4. Surveys

The initial planning and approach for this study included disseminating structured questionnaires to two main groups of stakeholders: businesses using automated contracting technologies or data-driven business models, and technology providers. However, during the planning phase of the project, it was identified that collaboration with DG GROW's European Enterprise Network (EEN) could benefit the study by using this network's pool of contacts, notably among SMEs, to increase the survey response rate, improve the statistical representation of the sample, and ultimately enhance the results and conclusions. As a result, the following subsections present the long surveys and the EEN survey separately.

Long surveys

The consortium prepared three separate structured questionnaires under the guidance of DG JUST: one for businesses using automated contracting technologies, one for businesses using data-driven business models, and one for technology providers. The objective was to collect quantitative insights from businesses engaging with innovative automated technologies and data in contracts and providers of automated contracting solutions.

It was decided that the survey aimed at businesses should be split into two structured surveys: one focusing on businesses using automated technologies and another on businesses using data-driven business models. The main objective of these surveys was to collect quantitative and structured insights regarding the advances, application, and adoption of emerging technologies or data-driven business models, as well as the current and future use, costs, benefits, enabling factors/incentives, risks, barriers, drivers of identified problems from the perspective of providers and users. All three questionnaires were designed to explore the two key dimensions of our analysis, namely, technology (for automated contracting solutions) and data (encompassing data-driven business models) in contracts.

The two primary survey audiences—technology providers and business users—were given surveys designed to take less than 15 minutes to complete, with a submission window from the 8th of May 2024 until 31 July 2024.

Regarding the survey preparation and dissemination, Alboris ensured that:

- A set of screening questions was included to filter out respondents who were not relevant to the study subject**.** Moreover, conditional logic was used to present relevant questions to each stakeholder group and direct them to the appropriate questionnaire when necessary.
- A high number of technology providers and businesses were identified, considering the need for representation, which was sought to the best extent possible in the following dimensions: B2B/B2C, sector, geography (regions), and businesses' size. The identification of technology providers was primarily achieved with desk research and enriched during the exploratory interviews.

For both dimensions (technology and DDBMs) and for the stakeholders targeted with this tool, Alboris considered as *core target* businesses that use AI contracting/smart legal contracts/or have a data-driven business model. The consortium considered as *additional target* businesses that i) tried implementing the solution but failed, ii) know the technology but are not interested in implementing the solution or iii) that are considering implementing technology.

Regarding the scope in terms of industries, the focus was on areas where AI in contracting, smart contracts, and DDBM were applied or may be applicable. During the data collection phase, all businesses from any industry sector were welcome to share their input via the questionnaires. The data collected was analysed during the analysis phase.

All consultation activities, and in this case the dissemination of the surveys by Alboris, were complemented with an Introduction letter and a Privacy Statement in agreement with DG JUST.

All questionnaires were organised in a similar structure, as presented below:

Survey questionnaire for businesses (contracting technologies)

Information about the enterprise (all surveys)

- Section 1 – Your company's experience with automated contracting in the past, present, and future
- Section 2: Use cases of automated contracting
- Section 3: Benefits of using automated contracting solutions
- Section 4: Costs of using automated contracts
- Section 5: Challenges and barriers to implementation

Survey questionnaire for businesses (data-driven business models)

- Section 1: Your experience with the use of customer's data
- Section 2: Use cases for collecting customers' data
- Section 3: Costs derived from data-driven business models
- Section 4: Challenges and barriers to implementation

Survey questionnaire Technology providers

- We provide AI contracting/smart legal contracts solutions
- About your solution
- About your clients
- About your market and your experience

Enterprise Europe Network (EEN) Survey

The preparation of this fourth survey was suggested by the Commission Services, in particular in view of reaching a larger number of businesses across Member States, including SMEs. The EEN is one of the largest support networks for SMEs in Europe. It facilitated the dissemination of the survey via their own channels and national points of contact. This decision was based on the estimated benefits of this survey, such as reaching a wider range of respondents across the EU Member States and involving SMEs representing more than 99% of all companies in Europe. Alboris was responsible for the preparation of the survey text, while the translation, encoding of the EU Survey, and dissemination of the link were under the EEN's responsibility. Limitations internal to the processes of the EEN survey had impacts on the study, namely:

- Limit of the number of questions: the survey was limited to 15 questions; therefore, the data collected was limited to very specific areas of the analysis;
- Translations to all EU official languages: the survey was translated into all EU official languages, which aimed at increasing the number of responses from members/SMEs that only speak the national language. All required procedural steps, including translations, delayed the dissemination of the survey to June 2024. It stayed open until the 13th of September 2024.

Alboris was granted access to the raw data (Excel format) to begin the data analysis. In agreement with DG JUST, the data collected via the EEN survey is analysed and presented in this Report.

5.1.5. In-depth interviews

A total of 15 in-depth-interviews were steered by the project team[202].

As a follow up to the received questionnaire replies, the research team conducted 7 in-depth interviews with businesses and 1 with a technology provider. The aim of these interviews was to obtain a better understanding of the information provided in the questionnaire replies, and to complement it with additional information.

In-depth interviews targeted also stakeholders that have not been consulted by means of questionnaire such as legal professionals (3 interviews) and consumer organisations (4 interviews).

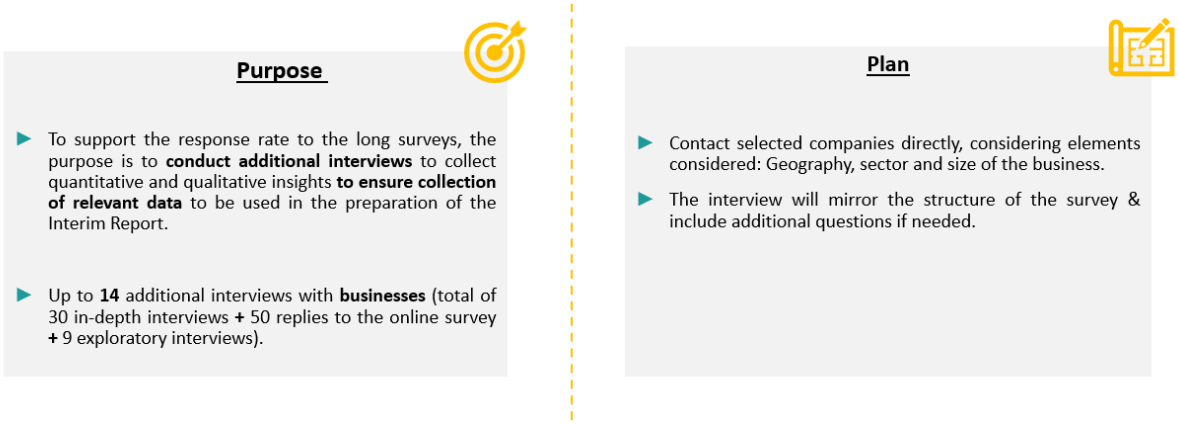
The interviews were conducted remotely via Microsoft Team with an overall duration of 1 hour.

Plan B – Mitigation plan and activities (to the long survey)

After the first two weeks with the surveys live, the risk of a low response rate as identified in the beginning of the study was confirmed. Alboris promptly put in place a mitigation plan that included the following activities:

- Finding stakeholder's personals e-mails (630 contacts identified);
- Sending stakeholder's reminders via e-mail;
- Extending the surveys' deadline until 31st of July 2024;
- 33 Business and Industry associations and 3 technology providers have been asked to disseminate the survey;
- Publishing social media posts using our companies' accounts and posting in LinkedIn relevant groups.;
- Reaching stakeholders identified via LinkedIn private messages;
- EEN survey to reach additional stakeholders;
- 2 contractors from Alboris network and working for DG GROW have been contacted;
- Links to the surveys shared with DG JUST for dissemination through internal and formal channels;
- Activate plan B - Conduct up to 14 additional interviews.

Figure 14 Plan B – Purpose and Plan



The Plan B aimed at improving the response rate to the long surveys. The purpose was to conduct additional interviews to collect quantitative and qualitative insights to ensure collection of relevant data to be used in the preparation of this Report. For this plan, Alboris identified 82 companies, also directly on LinkedIn, considering elements such as geography, sector and size of the business. These interviews were fully organised by the consortium and mirrored the

[202] A total of 16 interviews were planned, but one interview with a legal professional was cancelled close to the end of the consultations period. Alboris tried to reach out to other contacts, yet due to the holidays period, scheduling the last interview was not possible.

structure of the survey. When needed, they included additional questions. DG JUST also activated its network for this initiative and confirmed that the members of the Commission's expert group on data-sharing agreements responded positively, with some even committing to disseminating the survey.

DG JUST also raised awareness of the survey with business associations.

Unfortunately, these measures fell short in the expected impact as only a total of 50 replies were gathered and only 3 additional interviews were conducted. This confirmed the lack of user engagement and fatigue observed by Alboris towards these data collection tools.

5.1.6. Focus groups

The focus groups served the purpose of gathering insights from experts and stakeholders (representing business and consumers) on problems and policy measures in each of the two focus group rounds. Each round consisted of a focus group for automated contracting and another for data-driven business models. For each round, the project team invited the same participants, although eventually, there was some variation in participants across the sessions. Before each round, participants were sent a concept note and a background document that included preliminary research, elaborating on the purpose of the expert panel, key definitions, and the focus of the focus group. The focus groups were held online and extended over two hours. The first round of the focus groups took place on 27 May 2025 (automated contracting) and on 28 May 2025 (data-driven business models). The second round of the focus groups, respectively for automated contracting and DDBM, was held on 17 and 18 June 2025.

The first focus groups on automated contracting addressed the issues of legal uncertainty and contractual imbalances associated with the use of automated contracting for the conclusion, performance, or termination of legally binding contracts. There was a discussion on the following problem aspects: A: Validity and attribution of actions; B: Unexpected actions and lack of control; C: Transparency and pre-contractual information; D: Fair treatment of users. For each of the problem aspects, the panel was asked the following questions:

1. How does the problem aspect influence the risk assessment and eventual uptake and use of the automated contracting systems in practice?
2. Which measures should be taken to address the problem aspect?
3. How should an intervention best be implemented? Binding or non-binding? For which types of automated contracts?
4. Given the suggested policy measures (described in Section 3.3) would they effectively address the problem aspect? Which other impacts would they have?

After the first focus group, participants were contacted with a dedicated questionnaire to further specify their opinions. This set the base, together with additional desk research, for the inputs provided to the second focus group. The second focus group on automated contracting built on the discussions of the first focus group and focused on the identification of the causal chain between proposed policy measures and objectives, their expected effectiveness and costs and benefits of their possible implementation and modalities. Key questions to reflect upon before and during the expert panel meeting were the following:

1. Do you agree with the allocation of measures with respect to the objectives?
2. Which of the measures do you expect to be most effective in achieving the objectives? How is the interdependence between the measures?
3. How do the costs and benefits of measures change if their implementation form (binding vs non-binding, scope limitation...) changes?
4. What unintended impacts of significance come with the implementation of policy measures listed?

5. What indicators can be used to measure the impacts? Are you aware of data sources for such indicators?

The first focus group on DDBM gathered insights from experts and stakeholders on a range of problems identified during the study. The expert panel engaged in discussions on problem aspects in three parts: A: Legal gap in the DCD; B: Information on the economic benefits from data processing; and C: Use of products and services without mandatory processing of data. For each of those, the expert panel was asked to answer the following questions:

1. How does the problem aspect influence the risk assessment and eventual uptake and use of data-driven business models in practice?
2. Which measures should be taken to address the problem aspect?
3. How should an intervention best be implemented? Binding or non-binding? For which types of data-driven business models?
4. Given the suggested policy measures, would they effectively address the problem aspect? Which other impacts would they have?

After the first focus group, participants were contacted with a dedicated questionnaire to further specify their opinions and led to one additional interview. This set the base together with additional desk research for the inputs provided to the second focus group. The second focus group on DDBM built on discussions from the first round and focused on the identification of the causal chain between proposed policy measures and objectives, their expected effectiveness and costs and benefits of their possible implementation and modalities. The questions that the participants were asked to reflect upon before and during the expert panel meeting were the following:

1. Do you agree with the allocation of measures with respect to the objectives?
2. Which of the measures do you expect to be most effective in achieving the objectives? How is the interdependence between the measures?
3. How do the costs and benefits of measures change if their implementation form (binding vs non-binding, scope limitation...) changes?
4. What unintended impacts of significance come with the implementation of policy measures listed?
5. What indicators can be used to measure the impacts? Are you aware of data sources for such indicators?

5.2. Estimation of technology uptake

Methodological note: the forward-looking estimates presented in this study represent plausible scenarios based on data available at the time of data collection between January and September 2024. However, they entail essential caveats. Emerging technologies - particularly artificial intelligence - evolve rapidly, and phenomena such as the AI hype cycle are inherently difficult to predict over a multi-year horizon. As evidence of this volatility, projections based on EUROSTAT data through 2023 yield markedly different outcomes compared to those incorporating data from 2024 (whether developments will follow a relatively linear or exponential growth path will depend on a variety of factors, which are uncertain at this stage). This underscores the high year-to-year variability and sensitivity of such estimates to new information. Consequently, these estimates should not be interpreted as precise forecasts. The projected possible ranges are not definitive upper or lower bounds, as future developments - especially breakthroughs that ease AI adoption (e.g., tools that streamline AI contracting) - could significantly shift the landscape.

5.2.1. Automated contracting

To estimate the current uptake of AI contracting within the EU, we rely on a combination of cross-country comparable data sources, including the Eurostat ICT Usage in Enterprises survey

(2023)[203] and estimates from the JRC study based on the "*European enterprise survey on the use of technologies based on artificial intelligence*" (Ipsos-iCite survey, 2020).

Eurostat's dataset covers various AI technologies potentially relevant to automated contracting, such as natural language generation, text mining and workflow automation. In particular, among the various AI applications tracked in this dataset, a relevant proxy for the uptake of AI contracting is represented by **AI *technologies automating different workflows or assisting in decision-making (AI-based software robotic process automation).***

This sub-indicator is particularly important for its relevance to the automation of repetitive, rule-based processes, similar to those managed by AI-powered robotic process automation (RPA)[204]. RPA simulates human actions to handle routine tasks that are well-suited for automated contracting, including highly manual and repetitive administrative tasks, a high volume of transactions and processes that can be easily broken down into clear, unambiguous rules. Moreover, AI-based contracting often incorporates automated decision-making, such as triggering contract clauses based on predefined inputs (e.g., delivery confirmation). AI systems that facilitate decision-making are particularly suited to automated contracts, where terms can be executed autonomously once specific conditions and criteria are met, aligning well with the goals of automated contracting. In this context, RPA could streamline tasks such as contract drafting, execution, and enforcement[205].

According to Eurostat data[206], in 2023, **3% of all EU businesses with 10 persons employed or more[207] across all sectors[208] use *AI technologies automating different workflows or assisting in decision-making (AI-based software robotic process automation)***, an increase from 2.8% in 2021. However, it is important to note that this sub-indicator encompasses a wide range of AI applications, beyond automated contracting. RPA and AI-based decision-making automation are broad categories used across many business functions and processes, including customer service, data management and compliance, among others. These tools are widely used to streamline workflows, enhance decision-making and automate tasks like invoice processing, customer service chatbots, data entry, and report generation, which extend far beyond contract automation. As a result, while this sub-indicator provides a useful estimate, it likely overstates the actual adoption of automated contracting, which is a subset of the broader category. In conclusion, while this sub-indicator serves as a suitable proxy for the uptake of automated contracting, the data should be interpreted with caution.

In fact, other AI technologies, such as machine learning and natural language processing, can be used to support specific components of automated contracting, such as analysing or generating contract. While these technologies are relevant, they may be less directly tied to the overall process of contract automation compared to RPA, and their usage likely also overestimates the adoption of AI for contracting.

As also found in the previously quoted JRC study, understanding how many companies use these different technologies in conjunction could provide a clearer picture and more reasonable estimates of the number of enterprises using AI for automated contracting. However, the Eurostat dataset bears the limitation of providing only aggregated data, without any indications

[203] Eurostat (2025), *Use of artificial intelligence in enterprises*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#Types_of_AI_technologies_used.

[204] IBM, *What is RPA?,* available here.

[205] KPMG (2024), Quality, speed and functionality - *Implementing robotic process automation in contract management,* available here: https://assets.kpmg.com/content/dam/kpmgsites/au/pdf/2021/robotic-process-automation-in-contract-management.pdf.

[206] Eurostat (2025), Use of artificial intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#Types_of_AI_technologies_used.

[207] Data on micro enterprises with less than 10 employees is available only for 2 countries (Spain and Portugal).

[208] All activities (except agriculture, forestry and fishing, and mining and quarrying), without financial sector.

on the percentage of enterprises using jointly two or more AI technologies relevant to AI contracting.

To overcome this methodological limitation, the JRC study relies on the Ipsos-iCite survey to estimate the share of AI adopters in contracting among the total respondents using AI. The study assumes that while the use of individual AI technologies does not necessarily indicate AI in contracting, the combined use of certain AI technologies necessary for AI in contracting can serve as a meaningful proxy. The study adopts two different approaches:

- **A flexible approach**, assuming that, to be identified as adopters of AI in contracting, an enterprise must use AI decision-making in combination with just one other technology relevant for AI in contacting
- **A conservative approach**, assuming that, to be identified as adopters of AI in contracting, an enterprise must use at least three relevant AI technologies for contracts.

The study finds that, based on the survey's sample, approximately 8% (conservative approach) to 16% (flexible approach) of AI adopters are assumed to be adopters of AI in contracting. While the Ipsos-iCite survey relies on a smaller sample than the Eurostat ICT survey, it offers some advantages in terms of sectoral coverage (all sectors) and respondent expertise (specifically requesting that the questionnaire be completed by someone with a good knowledge of the technologies used in the enterprise).

By combining the available information from Eurostat (including newly available data from 2024) and the JRC study, we can make a rough estimate: we can reasonably assume that approximately **8% to 16% of the 13.5% of businesses using AI** (Eurostat, 2024)[209] may be using it for automated contracts. However, we cannot apply such flat rate (8% or 16%) to the overall business population; instead, we need to consider enterprise sizes, since, as found in the JRC study, the likelihood of adopting AI contracting increases with the size of the enterprise.

Therefore, the estimated proportion of EU businesses using AI for automated contracting, is calculated according to the table below. Following this approach, approximately **235k and 475k businesses (0.7% to 1.5% of EU businesses) are likely using AI technologies specifically for automated contracting.**

[209] Eurostat (2025), Use of artificial intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises; While Eurostat 2025 data indicate a further increase in overall AI uptake among businesses, there is currently no evidence suggesting that this growth would disproportionately affect the specific use of AI for automated contracting. In the absence of more granular data, it is therefore reasonable to assume that this ratio is likely to remain broadly stable as AI adoption increases, although this assumption remains subject to uncertainty.

Table 21. Estimated AI contracting adopters, EU, 2024

Business size	Business population[210]	AI adopters (%) out of total business population[211]	AI contracting adopters out of total AI adopters (conservative approach, %)[212]	AI contracting adopters out of total AI adopters (flexible approach, %)[213]	Estimated number of AI contract adopters (conservative)[214]	Estimated number of AI contract adopters (flexible) [215]
0 to 9	30,061,684	11.2%[216]	6.5%	12.9%	217,360	434,719
10 to 19	1,037,362	11.2%	8%	16%	9,303	18,606
20 to 49	525,387	11.2%	8%	16%	4,712	9,423
50 to 249	242,842	21%	8.5%	16.9%	4,303	8,606
250 or +	52,454	41.2%	10.9%	21.7%	2,343	4,686
Total	31.919.729	13.5%	8%	16%	~235.000	~475.000

Source: Study team based on Eurostat and JRC

5.2.2. Data driven business models

To assess the current uptake of DDBM in the EU, we examined Eurostat data on data analytics in enterprises. Specifically, we use the *isoc_eb_bd* and *isoc_eb_das* datasets for data on the years 2020 and 2023 respectively. We also incorporate insights from two relevant surveys (EEN survey[217] and long survey on DDBM).

Data sharing

From the *isoc_eb_bd* dataset[218], which only included data for the year 2020, we identified two indicators that can serve as a proxy for data sharing: *Analyse big data from smart devices or sensors* (E_BDASDS) and *Analyse big data from geolocation of portable devices* (E_BDALOC). Smart devices, sensors, and portable devices correspond to 'connected product' under the Data Act.[219] Nevertheless, it is important to note that companies may report on data analytics performed on smart devices, sensors, and portable devices that they do not sell to their clients in the form of connected products, but rather use in-house. For example, this indicator most likely includes enterprises that perform data analytics on sensors installed in their own manufacturing plant, which is outside the scope of our research. Therefore, it is likely that this indicator overestimates the share of enterprises that use DDBM in the sense of the present study.

[210] Eurostat, Business demography statistics

[211] Eurostat (2025), Use of artificial intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises

[212] Own calculation based on JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en

[213] JRC (2025), based on Ipsos-iCite, , Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en

[214] Own calculation based on Eurostat and JRC

[215] Own calculation based on Eurostat and JRC

[216] Data not available in Eurostat for micro enterprises. We applied the same percentage as for small enterprises.

[217] Extracted on 02/09/2024

[218] Eurostat (2024), *Big data analysis by size class of enterprise,* https://ec.europa.eu/eurostat/databrowser/view/isoc_eb_bd__custom_12954766/default/table?lang=en.

[219] Article 2(5) of Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828.

The data shows that in 2020, 3.3% of EU enterprises analysed big data from smart devices or sensors, while 6.8% analysed big data from the geolocation of portable devices. It is important to note that there may be an overlap between enterprises that engage in both activities. So, we can estimate that approximately 5% of enterprises **analysed data from connected products in 2020**[220], subject to the limitation described above. Given the total business population in the EU equal to 32.5m,[221] we estimate that ~**1.6m enterprises in the EU in 2020 analysed data from connected products**. This data suggests a lower uptake than the ECLA study cited above because the latter looks at data-driven products and services, which is a term with a wider scope[222].

The *isoc_eb_das* dataset[223], which only includes data for the year 2023, includes two similar indicators: Enterprises perform data analytics on data from smart devices or sensors (E_DASSDS) and Enterprises perform data analytics on location data from the use of portable devices or vehicles (E_DASLOC). The limitation described above applies to these indicators as well. Further, in 2023, vehicles were added along with portable devices to the latter indicator. We use data on enterprises with 10 persons employed or more due to the availability of data.

The data shows that in 2023, 4.8% of EU enterprises performed data analytics on data from smart devices or sensors, while 5.7% did so on data from the use of portable devices or vehicles. Once again, we can calculate an upper and lower boundary of the range to account for the possibility that there is overlap between enterprises engaged in both activities. Thus, subject to the caveats described above, **we can estimate a median value of approximately 5.5% of EU enterprises analysed data from connected products in 2023**.[224] Given the total business population in the EU equal to 32.5m,[225] we estimate that ~**1.8m enterprises in the EU in 2023** analysed data from connected products. Because the data for 2023 is most recent, we will take this data as the best point of reference.

While not representative, the EEN survey conducted as part of this study provides another point of comparison. The survey shows that 12.4% of companies (14 out of 113) stated that they have used in the past data generated by the use of their products sold at a standard price, and 30.1% (34 out of 113) state that they currently use such data. It is important to note that the survey likely features a sampling bias as companies familiar with DDBM are more likely to have participated in the first place. This should explain the higher shares when compared to Eurostat data.

In our assessment of current uptake, we rely on 2023 Eurostat data since it is representative for enterprises in the EU, despite the fact that the overlap between available indicators and the scope of our project is likely not perfect.

[220] Assuming full overlap between the two groups, we calculate a lower bound by taking the higher of the two numbers, i.e. at least 6.8%. Inversely, if we assume no overlap between the two groups, we can obtain the upper bound by summing the two numbers together, i.e. a maximum of 10.1%.

[221] Eurostat (2022), *Methodological note: Data for Belgium, Bulgaria, Ireland and Poland are from 2021,* https://ec.europa.eu/eurostat/databrowser/view/bd_l_form__custom_13007572/default/table?lang=en.

[222] A data-driven product or service can exist within a traditional business models, not only DDBMs.

[223] Eurostat (2026), *Data analytics by size class of enterprise,* https://ec.europa.eu/eurostat/databrowser/view/isoc_eb_das__custom_12954651/default/table?lang=en.

[224] Assuming full overlap between the two groups, we calculate a lower bound by taking the higher of the two numbers, i.e. at least 5.7%. Inversely, if we assume no overlap between the two groups, we can obtain the upper bound by summing the two numbers together, i.e. a maximum of 10.5%.

[225] Eurostat (2022), *Methodological note: Data for Belgium, Bulgaria, Ireland and Poland are from 2021,* https://ec.europa.eu/eurostat/databrowser/view/bd_l_form__custom_13007572/default/table?lang=en.

Data contracts

The *isoc_eb_das* dataset[226] includes two indicators that may be correlated with the prevalence of data contracts in the digital economy: *Enterprises perform data analytics on data about customers* - e.g. purchasing information, location, preferences, customer reviews, searches (E_DASCRM) and *Enterprises perform data analytics on data from social media, including from enterprises' own social media profiles* (E_DASSM). Due to data availability constraints, we use data only for the year 2023 and for enterprises with 10 persons employed or more. The data shows that in 2023, **14.3% of EU enterprises performed data analytics on data about customers, while 9.3% perform data analytics on data from social media, including from their own profiles.**

While these indicators are correlated with data contracts, they are likely to be overestimated and should be treated with care. Companies that use data contracts fall within the scope of the first indicator. However, that indicator also likely encompasses enterprises that obtained customer data through other means. For example, enterprises that sell physical goods and perform demand forecasting based on patterns in customer behaviour would be accounted for in this indicator. Similarly, the second indicator likely overstates the prevalence of data contracts since it includes enterprises that analyse data from their own social media accounts. For example, an enterprise offering physical goods may have a social media account and analyse the impressions that its posts generate – this would be accounted for in the second indicator, even though the enterprise does not use data contracts. While not representative as claimed above, the EEN survey conducted as part of the present study nevertheless provides a useful point of comparison. The survey shows that 10.6% (12 out of 113) of companies surveyed stated that they have used data contracts in the past, while 20.4% (23 out of 113) currently do so.

Based on the available data and the stated limitations, we can reasonably assume that only a fraction of the shares discussed above pertain to data contracts. In the absence of direct data, this assumption is derived from proxy indicators discussed above, which represent clear upper bounds and overstate the use of data contracts. Assuming data contracts constitute a minority of these activities, a conservative estimate of **1% to 2% of EU enterprises using data contracts in 2023** is applied for analytical purposes. Given the total business population in the EU equal to 32.5m,[227] **this would correspond to up to 650k enterprises**.

5.2.3. Detailed approach to assessing economic consequences related to automated contracting technologies

The issues described in this report are anticipated to have wide-reaching impacts on market efficiency and competitiveness across the EU. While some consequences, such as market inequality and increased legal risks for weaker parties, are hardly quantifiable and are best described qualitatively, our focus is on measurable economic impacts. Specifically, we examine the fragmented adoption and missed economic opportunities to assess the scope and implications of the identified problems. An indirect consequence of the limited uptake is also the slower digital transformation.

A recurring obstacle in studies of this nature is the scarcity of comprehensive and detailed data on the use of innovative technologies and data in contracts. This analysis is no exception. Given the limitations in data availability and granularity, we rely on a combination of scattered data and carefully constructed working assumptions, ensuring that our findings, though based on

[226] Eurostat (2026), *Data analytics by size class of enterprise,* https://ec.europa.eu/eurostat/databrowser/view/isoc_eb_das__custom_12955758/default/table?lang=en.

[227] Eurostat (2022), *Methodological note: Data for Belgium, Bulgaria, Ireland and Poland are from 2021*, https://ec.europa.eu/eurostat/databrowser/view/bd_l_form__custom_13007572/default/table?lang=en

incomplete data, offer a benchmark framework for understanding the broader implications of the identified problems.

In particular, we follow a step-by-step approach providing a structured framework to assess the opportunity costs resulting from the identified problems linked to automated contracting in the EU:

- **Estimate the current uptake of automated contracting in the EU:** the first step involves estimating the current adoption rate of automated contracting technologies. This involves analysing available data sources, such as Eurostat data, on the usage of relevant technologies by enterprises across the EU. Given the data scarcity in this specific area, reasonable assumptions and proxies are required to approximate the current uptake. This is detailed in the previous section and market analysis.
- **Estimate the potential evolution of uptake without barriers** to project how the uptake of automated contracting could evolve in the absence of barriers, we explore two distinct approaches:
    - **Desired uptake**: By examining data from Eurostat, we estimate the level of desired uptake among businesses that express interest in AI. This approach reflects the potential demand if barriers were minimised or removed.
    - **Proxy technology**: This involves analysing the uptake curves of similar technologies that have experienced widespread adoption following the removal of barriers and projecting them as scenarios in our assessment. **E-signatures** and **e-invoicing** are examples of proxy technologies, as both faced similar challenges but saw significant growth once regulatory and technical hurdles were addressed.
- **Translate the potential uptake into missed benefits (opportunity costs):** once the potential future uptake is estimated, the next step is to calculate the benefits foregone due to limited adoption:
    - **a.** One approach to calculating opportunity costs is to estimate how many companies are currently not using AI contracting due to existing barriers. Building on the previous step, we can estimate the number of potential additional users who are deterred from adopting AI due to these barriers**.**
    - **b. Calculate benefits for a typical company**: another approach is to estimate the **cost and time savings** per contract using automated contracting, triangulating results from our surveys and available literature. This includes savings in legal fees, administrative processing time, and improved efficiency. These benefits will then be applied to the estimated number of future users over a 10-year timespan, derived from the uptake projections, allowing us to quantify the total potential savings across the EU economy in the absence of adoption barriers.
- **Breakdown of estimates:** where feasible, we attempt to provide a breakdown of the opportunity cost by sector and firm size, though this is more qualitative due to data limitations. Certain sectors—such as finance, legal services, and supply chain management—may experience more significant benefits from automated contracting due to the nature of their workflows, while other sectors might have lower usage.

This approach and related results are further detailed below.

Estimate the potential evolution of uptake without barriers

As outlined above, a rough estimate indicates that approximately **0.7% to 1.5% of EU businesses** could be using AI technologies specifically for automated contracting. This translates into some **235k and 475k businesses using AI technologies specifically for automated contracting (Eurostat 2024).**

To project how the uptake of automated contracting could evolve in the next years in the absence of existing barriers, we explore two distinct approaches. These approaches aim to provide insight into the potential demand and adoption rate if regulatory, technical, and awareness-related hurdles were minimised or removed.

This dual approach allows us to explore both the demand side (desired uptake) and the adoption patterns of comparable technologies (proxy approach) to form a comprehensive projection of how automated contracting may develop in a barrier-free environment.

5.2.4. Proxy technology approach

This approach involves using proxy technologies for which data are available to draw parallels between automated contracting and other technologies that faced similar barriers. Comparing the adoption curves of these technologies, we can estimate how automated contracting could potentially evolve under similar conditions.

Both **e-signatures and e-invoicing** experienced regulatory, legal, and technical challenges but saw significant growth once these obstacles were addressed. Their widespread adoption in the EU was facilitated by the eIDAS regulation (Regulation 910/2014) and the EU Directive on e-invoicing in public procurement, both adopted in 2014, which provided legal certainty and a regulatory framework for electronic signatures and invoicing across member states. The former in particular, established the legal equivalence of e-signatures to handwritten signatures, encouraging businesses to adopt them. Similarly, **automated contracts** face, amongst others, legal barriers related to the uncertainty concerning the validity of smart contracts or AI-generated contracts.

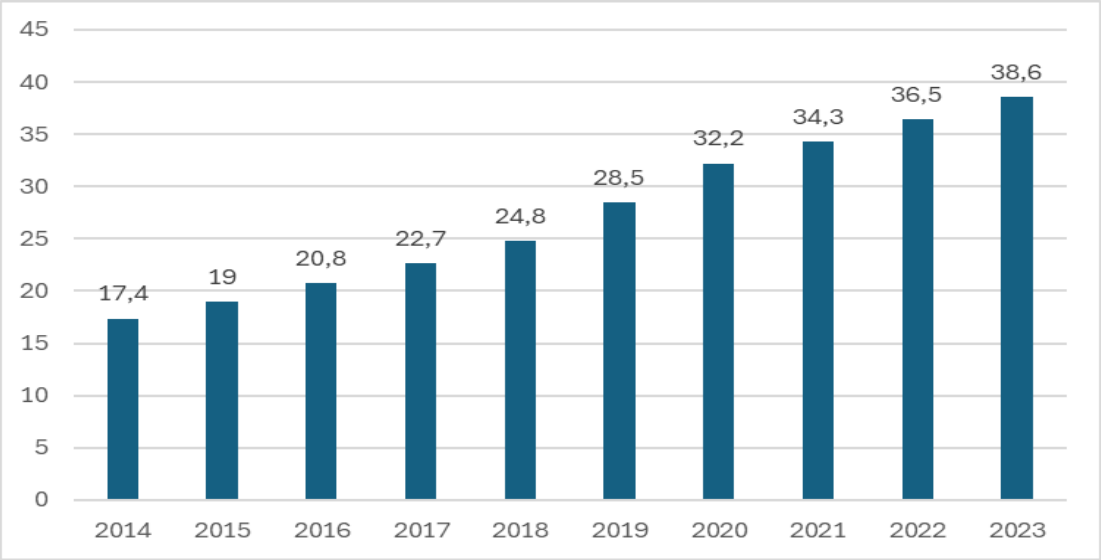
All these technologies require a clear legal foundation for businesses to trust and adopt them. The legal acceptance of e-signatures and e-invoicing provides a precedent for how regulatory support can boost the adoption of innovative digital contract processes.

For this reason, e-invoicing and e-signatures can serve as a proxy for automated contracting because they share several similarities in terms of their use in electronic transactions, implementation, and the barriers they face. These similarities make them a useful comparison for estimating the potential benefits and uptake of automated contracting if the same barriers were removed.

Eurostat offers more granular data for e-invoice statistics. Available data[228] allow us to track the growth of e-invoicing adoption from 2014 to 2023, highlighting the trend following the implementation of the EU Directive on e-invoicing. The table below presents the available data for 2018, 2020, and 2023. Missing values for 2019, 2021, and 2022 have been filled using linear interpolation, assuming a steady increase. For earlier years (2014–2017), missing values were estimated using the average annual growth rate observed between 2018 and 2023.

[228] Specifically, the dataset on *Integration with customers/suppliers, supply chain management by size class of enterprise* [isoc_eb_ics__custom_12790484]

Figure 15. Share of EU Enterprises sending eInvoices, suitable for automated processing



Source: Eurostat for years 2018, 2020 and 2023. Other years are based on own calculations based on available data

Over the 10-year period following the removal of legal barriers, the share of EU enterprises sending e-invoices suitable for automated processing more than doubled, increasing by +122%.

It is important to note, however, that the factors driving this increase are diverse and that this significant growth in adoption most likely reflects not only the removal of regulatory hurdles but also advancements in technology, growing awareness, and increasing demand for process automation. As such, applying the same growth rate to the adoption of AI-based automated contracting provides only an approximation of potential trends. Additionally, it is important to recognise that the growth rate of e-invoicing cannot be directly applied to automated contracting due to fundamental differences between the two. Therefore, this projection is only indicative and should be interpreted with caution.

If we apply this **122% increase** to the estimated – in rough terms – ~235,000 and 475,000 EU businesses currently using AI technologies specifically for automated contracting, the potential number of users could reach ~**530,000 to 1.05m** in a 10-year timeframe (or ~ **290,000-580,000 additional users**)[229]. This projection should be viewed as an approximation, recognizing that the evolution of automated contracting uptake may be influenced by additional factors such as evolving business needs, further technological advancements, and ongoing regulatory developments**.**

5.2.5. Desired uptake approach

In this step, we estimate the potential future uptake of automated contracting by examining Eurostat data on businesses that have expressed interest in adopting AI technologies but have not yet implemented them due to various barriers. Specifically, we rely on the indicator that tracks companies that considered using AI but decided against it for reasons such as legal uncertainty, high perceived cost, lack of relevant expertise, incompatibility with existing

[229] This analysis is based on Eurostat data from 2024 (isoc_eb_ai), *Use of artificial intelligence in enterprises*. Data from 2025 (see: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#:~:text=The%20highest%20share%20of%20enterprises%20that%20had%20considered%20using%20AI,and%20technical%20activities%20(24.92%25) indicate a continued increase in the adoption of artificial intelligence, which suggests that these figures may rise further in the short term. However, projections over a ten-year horizon remain highly uncertain, as the pace of technological change - particularly in AI development, regulation and diffusion across sectors - makes long-term outcomes difficult to predict.

equipment, concerns about data protection and privacy, availability and quality of data as well as ethical considerations[230].

By focusing on this data, we can better understand the potential demand for automated contracting technologies in a scenario where these barriers are reduced or removed. The businesses represented in this indicator are likely to adopt automated contracting if issues such as legal uncertainty, cost, and data privacy concerns are addressed, amongst others. This approach provides an estimate of the desired uptake based on current interest levels, reflecting the untapped potential for automated contracting across different sectors and enterprise sizes if all barriers were removed.

According to the latest Eurostat data[231], in 2024, 10% of EU businesses[232] with 10 persons employed or more considered to use one of the AI technologies tracked in the dataset, including AI technologies automating different workflows or assisting in decision-making. While no specific breakdown by AI technology is available, we can assume that the proportion of businesses interested in AI technologies for workflow automation and decision-making is likely to mirror the current share of businesses already using these technologies within the broader category of AI adoption (based on JRC study, see Market analysis section).

This translates into an estimated 185,000 - 370,000[233] EU businesses potentially interested (currently) in up-taking AI for automated contracting, which are currently not doing so due to existing barriers. This would result in an increase of **~80% compared to current levels**.

However, it should be noted that this estimate is based on current interest rates for uptake, which are likely to increase over time as AI continues to develop and become more affordable and widely recognized for its benefits. Therefore, we rely on the actual increase in AI usage as a proxy for the growing interest among enterprises (i.e. +77% over the period 2021-2024[234]). This would result in ~685,000 to 1.3 million EU businesses potentially interested in taking up AI for automated contracting over a 10-year period, which are currently not doing so due to existing barriers **(+~280% compared to current levels).** It should be noted, however, that this assessment reflects general interest in AI rather than interest specifically related to AI contracting, and is influenced by hype cycles. As a result, it is likely to overestimate the potential uptake and demand for AI contracting.

Translate the potential uptake into missed benefits (opportunity cost)

Building on the previous step, we can estimate the missed uptake by considering the potential businesses that could adopt AI contracting over the next 10 years but are currently prevented from doing so due to existing barriers.

[230] (isoc_eb_ai), Eurostat (2025) Use of artificial intelligence in enterprises: Enterprises considering using AI software or systems, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#:~:text=The%20highest%20share%20of%20enterprises%20that%20had%20considered%20using%20AI,and%20technical%20activities%20(24.92%25).

[231] Eurostat (2025), Use of artificial intelligence in enterprises, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises#:~:text=The%20highest%20share%20of%20enterprises%20that%20had%20considered%20using%20AI,and%20technical%20activities%20(24.92%25).

[232] All activities (except agriculture, forestry and fishing, and mining and quarrying), without financial sector.

[233] The estimate is calculated by multiplying the percentage of EU businesses interested in using AI (Eurostat, 2024) by the estimated share of companies that use AI contracting (assumed to be either 8% or 16%), and then by the total number of EU businesses (Eurostat, 2024). This calculation is performed separately for each company size category and the resulting figures are then aggregated to obtain the overall estimate.

[234] Data from 2025 indicate a further rise in enterprise interest, representing an increase of 11% compared to 2024.

Table 22. Comparison of approaches – Estimated potential uptake of AI Contracting, EU

	Proxy technology approach	Desired uptake approach (Static)	Desired uptake approach (dynamic)
Number of total users in 10 years' time	530,000 – 1,050,000	420,000 – 850,000	920,000 – 1,850,000
Additional users (compared to current uptake)	+ 290,000 – 580,000	+ 185,000 – 370,000	+ 685,000 – 1,370,000
% increase (compared to current uptake)	+122%	~+80%	~+280%

We can also use a set of key metrics that capture the economic benefits businesses have experienced through the adoption of these technologies compared to traditional contracting practices. Our survey data provides valuable insights into the tangible advantages companies have gained by using automated contracting solutions, including:

- Faster contractual processes, such as quicker conclusion, performance, and management of contracts.
- Overall reduction in costs associated with the entire contracting process, including legal fees, administrative overhead, and manual processing costs.
- Increased volume of contracts managed, enabling businesses to scale their operations more effectively without requiring additional resources.
- Reduction in contract-related errors, resulting in fewer disputes, better compliance, and lower risk of costly mistakes.

Breakdown of estimates

As also found in the previously quoted JRC study, the benefits of automated contracting solutions are likely to be felt more strongly in certain sectors, particularly those with high contract volumes or complex regulatory requirements, such as legal services, finance, and procurement. These industries rely heavily on accurate, efficient contract management to ensure compliance, mitigate risks, and manage large transaction volumes.

Moreover, larger companies are expected to adopt these solutions earlier due to their greater resources, existing infrastructure, and the scalability of such technologies within their operations. Larger firms often have more complex contract needs, which makes the time and cost savings even more pronounced. They also tend to have the capital to invest in innovative technologies and the ability to integrate these solutions into their workflows more seamlessly compared to smaller businesses, which may face higher upfront barriers.

5.2.6. Assessment of costs

This section details considerations relevant to the cost assessment of various policy measures. In particular, it calculates repeated cost items that appear under several policy measures. The quantification of these costs is based on existing impact assessments or evaluations of comparable initiatives.

Since costs mostly consist in labour costs, for instance due to administrative burden, numbers cited from previous studies were adjusted for inflation using the labour cost index. As cut-off

date for the adjustment, we used the labour cost index for Q4 2024.[235] The relevant labour primarily consists in work by legal professionals and software developers of automated contracting systems. We therefore apply the average labour cost for professional, scientific, and technical activities.

Table 23. Assessment of costs for repeated cost items (automated contracting)

Cost item	Average cost per stakeholder	Detailed calculation
Hourly labour cost	€45.30	Hourly wages plus taxes according to Eurostat's 2024 labour cost index for professional, scientific, and technical activities.[236]
Market surveillance audit	€6,000	An Impact Assessment from early 2020 reports the results of a survey among market surveillance authorities, according to which auditing software in a connected product costs €5,000–20,000.[237] Assuming the lower end of costs for a pure software tool and adjusting by the labour cost index for Q4 2019, this corresponds to: €5,000 / 0.8308 = €6,018.30
Adoption and transposition of a Directive	€217,440	A 2017 Impact Assessment estimates the total time spent by civil servants on adopting and transposing a Directive, without additional flexibility for Member States, at 60 person-days at EU level and another 20 person-days per each Member State.[238] This amounts to: 60 + 27 x 20 = 600 Multiplied with the average labour cost (see first row) for an 8-hour workday, this creates costs of: 600 x 8h x €45.30/h = €217,440

[235] Eurostat, Labour cost index by NACE Rev. 2 activity - nominal value, quarterly data [lc_lci_r2_q]. (Selectors: Statistical classification of economic activities in the European Community (NACE Rev. 2): Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreation; other service activities. Labour costs structure: Labour cost for LCI (compensation of employees plus taxes minus subsidies).)

[236] Eurostat, Labour cost levels by NACE Rev. 2 activity [lc_lci_lev]. (Selectors: Statistical classification of economic activities in the European Community (NACE Rev. 2): Professional, scientific and technical activities. Labour costs structure: Labour cost for LCI [compensation of employees plus taxes minus subsidies]).

[237] European Commission (2022), Impact Assessment Report accompanying the document Proposal for a Regulation of the European Parliament and of the Council on horizontal cybersecurity requirements for products with digital elements and amending Regulation (EU) 2019/1020, SWD(2022) 282 final.

[238] European Commission (2017), Impact Assessment accompanying the document Proposal for a Directive of the European Parliament and the Council on combating fraud and counterfeiting of non-cash means of payment and replacing Council Framework Decision 2001/413/JHA, SWD(2017) 298 final.

As for the number of affected stakeholders, we estimate the following for different stakeholder groups:

Table 24: The number of affected stakeholders per stakeholder group (automated contracting)

Stakeholder group	Estimated number (rounded)	Detailed calculation
Businesses currently using automated contracting	238,000–476,000	The estimation of current uptake of automated contracting by businesses is explained in the previous sections. Updating the calculation with Eurostat's latest numbers for AI use by companies (11.2%–41,2% depending on company size) gives an estimate between 238,020 and 476,041 current adopters.
Businesses providing automated contracting solutions	1,500–3,000	Following an analogous approach to the estimation of automated contracting users, we apply the upper and lower estimates for the share of users to the number of IT providers in the EU:[239] 202,348 x 0.75% = 1,517.61 202,348 x 1.49% = 3,014.99
Businesses selling to consumers over the internet	5,362,500	Eurostat reports the share of enterprises with web sales to consumers as 16.80% in 2024. Multiplied with the entire business population, this amounts to: 31,919,729 x 16.80 % = 5,362,514

5.2.7. Assessment of cost savings (through time savings)

As outlined in the report, while uptake of AI in contracting is not a benefit per se, it is a precondition for generating substantial benefits for users, such as enhanced operational efficiency, cost avoidance through reduced errors, lower litigation risk, stronger customer relationships, positive impacts on turnover, and improved decision-making through better information. Simplified information requirements, for instance are expected to generate monetary benefits for businesses by reducing the amount and frequency of information they must provide. Similarly, measures allowing for the reversal of actions are likely to lower recurring administrative and, in many cases, transport costs by reducing instances where goods are dispatched only to be returned following the consumer's exercise of withdrawal rights.

However, due to limited data availability and methodological constraints, not all benefits associated with each measure under assessment could be quantified. In particular, the quantitative analysis of benefits focuses on a single type of efficiency gains from AI-based contracting tools (cost savings derived from estimated time savings linked to increased uptake) and provides indicative estimates. Other possible benefits that could generate monetary value for companies (e.g. cost avoidance through reduced errors, lower litigation risk, positive impacts on turnover etc.) are acknowledged as also contributing to the overall impact and are presented qualitatively in the report. As a result, the quantitative analysis does not capture the full range of impacts, and the figures should be understood as supporting inputs to the assessment, rather than comprehensive or predictive estimates. The estimates presented are based on assumptions about both the average number of contracts companies handle each year

[239] Companies with at least 2 employees providing ICT services in 2023 (Eurostat, Enterprise statistics by size class and NACE Rev. 2 activity (from 2021 onwards) [sbs_sc_ovw]).

and the typical duration of a contract lifecycle. These parameters vary significantly across sectors and firm sizes and are subject to uncertainty and volatility.

Therefore, the estimates are conditional on the assumptions described in the following sections and should be understood as providing an illustrative order of magnitude of efficiency gains, not as definitive measurements.

As a starting point, the assessment relies on the projected future uptake outlined in the preceding section. For the sake of simplicity and consistency, the median scenario (proxy technology) is used as the reference for subsequent calculations. Furthermore, the assessment assumes a constant annual increase in uptake over a ten-year horizon.

Table 25. Potential future uptake of AI contracting (number of enterprises) by approach, EU

Approach	10 years uptake (lower bound)	10 years uptake (lower bound)	Yearly uptake[240] (lower bound)	Yearly uptake (lower bound)
Desired uptake (static)	185k	370k	18.5k	37k
Proxy technology	**290k**	**580k**	**29k**	**58k**
Desired uptake (dynamic)	685k	1.37m	68.5k	137k

Source: Study team based on Eurostat and JRC

To account for differences across sectors and company sizes, the estimates were disaggregated by sector of activity and firm size. The breakdown by size is based on Eurostat data on enterprise size distributions, while the allocation by sector draws on the JRC study[241] on the sectoral profile of potential adopters of AI contracting (see table below). Combining these sources makes it possible to reflect structural variations in the business population and to provide a more realistic distribution of expected uptake across the EU economy.

To operationalise this breakdown, two simplifying assumptions were applied:

- Constant sectoral shares: the relative distribution of uptake across sectors is assumed to remain stable over the projection period.
- Size-proportional uptake: future uptake by firm size is assumed to be proportional to the current distribution of enterprises in the business population.

These assumptions allow for a transparent allocation of projected uptake, while acknowledging that actual dynamics may diverge as technologies mature and adoption patterns evolve.

[240] Calculated as the 10 years uptake divided by 10.

[241] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

Table 26. Sector of activity among assumed adopters of AI contracting

Sector	Share
Agriculture	2.4%
Manufacturing	21.0%
Construction	12.5%
Trade	37.8%
IT/ Finance	18.1%
Education/HH	8.2%
Total	100%

Source: JRC

Subsequently, we estimated the average yearly contract volume per company by sector and firm size. Several considerations guided this step:

- Scaling with size: contract volumes increase systematically with enterprise size in all sectors. Larger firms employ more staff, engage with a greater number of suppliers and clients, and thus generate more contracts.
- Sectoral variation: absolute numbers vary by the nature of the business. Sectors with complex supply chains or extensive B2B relationships (e.g. manufacturing, construction, trade) typically record higher contract counts, while sectors oriented primarily toward consumers or simpler service provision (e.g. agriculture, education) tend to have fewer formal contracts on average.
- Order of magnitude estimates: the values used are approximate and should be interpreted as typical orders of magnitude. Actual figures can vary widely. In particular, the largest corporations may handle contract volumes that far exceed the averages shown, sometimes by orders of magnitude.
- Definition of contracts: for this exercise, we did not treat every transaction as a "contract." Instead, we focused on formal agreements that require drafting, negotiation, or structured management (e.g. procurement contracts, employment contracts, service agreements). Routine transactions governed by standard terms (e.g. individual consumer purchases) were excluded.

This approach ensures that the contract volumes reflect the agreements most relevant to the potential efficiency gains from AI-assisted contracting. It is important to stress that the **assumed contract volumes are indicative only**. Reliable statistics on the number of contracts handled by firms do not exist, and actual volumes are subject to **high variability and volatility** across sectors, firm sizes, and even individual companies. The figures used in this assessment should therefore be understood as **purely approximate orders of magnitude**, intended to provide a reasonable basis for quantifying potential time savings rather than precise measurements

Table 27. Assumed yearly contract volume per company, by sector

Company size (employees)	Agriculture	Manufacturing	Construction	Trade	IT/finance	Education
0 to 9	5	10	10	10	10	5
10 to 19	20	40	50	50	40	20
20 to 49	50	80	150	150	80	50
50 to 249	100	200	300	300	200	100
250 or more	300	800	800	800	800	300

Source: Study team

Based on these figures, we then calculated the assumed yearly contract volume handled by new adopters of AI contracting. This was derived by multiplying the estimated yearly contract volume per company by the projected yearly uptake of AI contracting. Applying this method results in a total of approximately **440,000 to 880,000 contracts per year being managed by new adopters**.

Estimating the average time spent on a contract is also highly uncertain, as precise statistics are not available and existing data are scarce. The effort required varies widely, ranging from very simple, template-based contracts that can be completed in minutes to highly complex agreements in multinational corporations that may take days or weeks to draft and negotiate. For this assessment, we adopted a **conservative estimate of three hours per typical contract**. This value is intended as a mid-point: it balances the prevalence of simple contracts with the existence of more complex ones, while recognising that the latter represent a smaller share of overall contract volumes given the predominance of small and medium-sized enterprises in the business population.

Moreover, our EEN survey results[242], show that, on average, businesses can accelerate contractual processes by up to 37%[243]. On this basis, we estimate that approximately one-third of the time required per contract can be saved, corresponding to approximately one hour per contract. Multiplying this saving by the 2024 average hourly labour cost and the total yearly contract volume yields an **estimated €20–40 million in savings in the first year[244]**.

These annual benefits were then **accumulated over a ten-year horizon, leading to a potential total of €1.1–2.2 billion in cost savings**. It should be noted, however, that the policy measures under consideration can only address a share of the overall problem, and this share has been adjusted based on the results of stakeholder consultations.

[242] Extracted on 02/09/2024.

[243] In the survey businesses were asked to indicate the economic benefits experienced through the adoption of these technologies compared to traditional contracting practices, among one of the following options: No change; Slight improvement (up to 25%); Moderate improvement (25% to 50%); Significant improvement (50% to 75%). To calculate the average improvement, we used the median value within each range as a representative figure. For example, for the "slight improvement" option, we assigned a value of 12.5% (the midpoint of the 0-25% range). We then calculated a weighted average based on the share of respondents selecting each option.

[244] The estimate is calculated by multiplying the contract volume (approximately 440,000 contracts) by the average hourly cost of professionals (€45.3 per hour; ISCO, 2025) and by the assumed number of hours per contract (1 hour).

Finally, it must be stressed that this assessment was conducted in an agnostic manner with respect to potential bundling of measures. As such, the estimates presented cannot be simply added together across measures. Possible synergies, overlaps, or interdependencies between measures would need to be assessed separately, once final policy bundles have been defined.

5.3. Detailed approach to assessing economic consequences related to data-driven business models

To project how the uptake of DDBM could evolve in the next years in the absence of existing barriers, we explore two distinct approaches. These approaches aim to provide insight into the potential demand and adoption rate if regulatory, technical, and awareness-related hurdles were minimised or removed. This dual approach allows us to explore both the demand side (desired uptake) and the adoption patterns of comparable business models (proxy approach) to form a comprehensive projection of how automated contracting may develop in a barrier-free environment.

5.3.1. Proxy technology approach

This approach involves using a proxy business model for which data are available to draw parallels with DDBM. By comparing the adoption curves of these technologies, we can estimate how DDBM could evolve under similar conditions. E-commerce is a business model that provides a good benchmark for DDBM[245], and on the prevalence of which robust data over time is available. Since the adoption of the E-commerce Directive in 2000, the Commission has taken actions to break down barriers to cross-border e-commerce, including by restricting unjustified geo-blocking, implementing new rules on parcel deliveries, and strengthening consumer protection in the digital economy.[246] Thus, analysing the use of e-commerce by EU enterprises over time provides a plausible comparison to the likely uptake of DDBM if existing barriers are addressed.

The dataset *isoc_ec_eseln2*[247] includes an indicator of the share of EU enterprises with e-commerce sales. Due to data availability, we only consider enterprises with 10 or more people employed, and the timespan is 2010 – 2023.

The data visualised in the Figure below shows that over the last 10 years, the share of EU enterprises with e-commerce sales increased by more than 5 percentage points. This represents an increase of approximately 33% over 14 years.

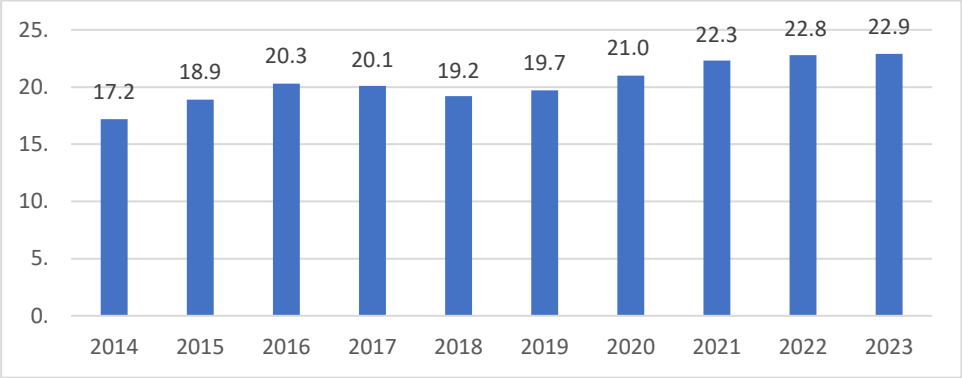
[245] E-commerce provides a useful benchmark for DDBM adoption because both represent cross-cutting digital business transformations that rely on data, digital infrastructure and organisational change. While adoption levels may differ, the observed diffusion pattern of e-commerce offers a reasonable reference for modelling the potential evolution of DDBM in the absence of direct historical data.

While e-commerce provides a useful benchmark for modelling DDBM adoption, important differences remain. DDBM may require more advanced data governance, higher analytical capabilities and greater organisational maturity than e-commerce, potentially slowing. In addition, regulatory, ethical and data protection considerations may play a more prominent role for DDBM than they did during the diffusion of e-commerce. As a result, the proxy-based estimates should be interpreted as indicative rather than predictive, and primarily intended to illustrate plausible adoption dynamics rather than precise forecasts.

[246] European Commission (2026), e-Commerce rules in the EU, https://digital-strategy.ec.europa.eu/en/policies/e-commerce-rules-eu

[247] Eurostat (2026), E-commerce sales of enterprises by NACE Rev. 2 activity, https://ec.europa.eu/eurostat/databrowser/view/isoc_ec_eseln2__custom_12956552/default/table?lang=en

Figure.16 Share of EU enterprises with e-commerce sales



Source: Eurostat (2024). E-commerce sales of enterprises by NACE Rev.2 activity

It is important to note, however, that the factors driving this increase are diverse and that this significant growth in adoption most likely reflects not only the removal of barriers but also advancements in technology, growing awareness, and others, such as demand. In addition, e-commerce may be a viable business model for a larger share of enterprises than DDBM. While a wide variety of products and services can be sold through e-commerce channels, the DDBM we investigate relate to digital content and connected products, and as such may have an inherently lower limit in potential uptake as compared to e-commerce under similar conditions. Thus, applying the same growth rate to the adoption of DDBM provides only an approximation of potential trends.

To make a projection of the potential uptake over the next 10 years, we use the increase in uptake over the last 10 years (2014-2023) **which is 33%.** We can apply this 33% increase to the estimated current uptake of DDBM. There, we estimated that approximately 1.8m enterprises in the EU analysed data from connected products in 2023. If we apply a 33% increase, we find that **around 2.4m** EU enterprises could use data from connected products in 10 years **(0.6m additional users)**. Similarly, we estimated that up to 650k enterprises in the EU use data contracts in 2023. If we apply the 33% increase, we find that **up to 865k EU enterprises** could use data contracts in 10 years (**215k additional users**). This projection should be viewed as an approximation, recognising that the evolution of DDBM uptake may be influenced by additional factors.

5.3.2. Desired uptake approach

In this step, we estimate the potential future uptake of automated contracting by examining data on businesses that have expressed interest in adopting DDBM but have not yet implemented them due to various barriers. By focusing on this data, we can better understand the potential demand for DDBM uptake in a scenario where barriers are reduced or removed. This approach provides an estimate of the desired uptake based on current interest levels, reflecting the untapped potential for DDBM across different sectors and enterprise sizes.

The EEN survey conducted as part of this study provides data on the desired uptake of DDBM. Among the companies that do not currently use data generated by the products they sell at a standard price, and have not done so in the past, 14.3% (11 out of 77) indicate that they plan to do so in the future. This represents **a potential 32.4% increase[248] in the use of data from connected products in our sample**. Out of the companies that do not use data contracts, and have not done so in the past, 8.0% (7 out of 87) plan to do so in the future. This represents **a potential 30.4% increase in the use of data contracts in our sample**.[249]

[248] 11 potential users out of 34 current users in our sample.

[249] 7 potential users out of 23 current users in our sample.

Using our estimates of current uptake presented in Section 4, and applying the potential 32.4% increase in the share of EU enterprises using data generated through connected products and the 30.4% increase in enterprises using data contracts, we derive an estimated number of EU enterprises that is broadly consistent with the results of the previous approach**.**

The limitations of the EEN survey discussed previously, i.e. sampling bias, low sample, etc. – apply here as well. In addition, there may be reasons other than the barriers we have identified that account for the fact that companies want to implement DDBM but have not done so yet. Nevertheless, the EEN survey provides another point of comparison, and the results broadly correspond to the results obtained through the proxy technology approach.

Further, the estimates above are based on current interest levels, which are likely to increase over time as DDBMs continue to develop and becomes more widely known for their benefits. We have no relevant longitudinal data, so we cannot account for this in our calculations, but it should be taken into consideration when interpreting the results.

Translating the potential uptake into missed benefits (opportunity cost)

Estimating the opportunity cost of increased uptake of DDBMs is a difficult task that can only result in reasoned approximations. The approach that we take relies on the European Data Market Study[250], which estimates that in 2022 there were 218,340 data suppliers[251], generating ~ EUR 85bn in revenue.[252] This number is lower than our estimates, because the term 'data suppliers' has a different, and narrower scope than enterprises engaged in DDBM as defined in the present study.[253] Nevertheless, we can calculate the average revenue generated by a data supplier and multiply it by the number of potential users of DDBMs who are held up by barriers to arrive at an approximation of the opportunity cost of limited uptake. There is one key caveat to keep in mind which relates to those companies making highest revenues with DDBM most likely remaining market leaders and as such a diminishing marginal revenue per additional data supplier would have to be assumed. Therefore, the below estimates should be interpreted rather as upper ceilings than most likely estimates.

Based on 2022 data, we can estimate that the average revenue generated by a data supplier is approximately **EUR 389,164 per year[254]** (total annual revenue of EUR 85bn divided by 218,340 data suppliers)**.** We can then apply this value to the number of enterprises that could potentially take up DDBMs. In the previous subsection, using a proxy approach, we estimated that **0.6m additional enterprises** could use data from connected products if relevant barriers are removed. We also estimate that up to **0.2m additional enterprises** could take up data contracts under the same conditions. We will rely on the proxy approach for the quantification as it is based on robust longitudinal data, while the desired uptake approach is based on the surveys conducted as part of this study which have certain limitations, as discussed above. Thus, we estimate that approximately **0.8m** additional enterprises could take up DDBMs in the next 10 years if relevant barriers are removed. This translates to a potential for enterprises to generate an additional **EUR 311 billion.[255]** As outlined above, we do believe that these estimates

[250] See the discussion in Section 7.3.3 of European Commission (2022). Study on model contract terms and fairness control in data sharing and in cloud contracts and on data access rights. Available here.

[251] Defined as organizations that have as their core business the production and delivery of digital data-related products, services, and technologies

[252] European Commission (2024). European Data Market Study 2021–2023. Available here: https://digital-strategy.ec.europa.eu/en/library/results-european-data-market-study-2021-2023.

[253] Data suppliers are defined as companies that have as their main activity the production and delivery of digital data-related products, services, and technologies. See ibid., p.38.

[254] If we divide the total revenue per year, of 85 bn EUR by the number of data suppliers (218,340) we get ~EUR389k.

[255]This estimate is calculated by multiplying the number of additional enterprises that could adopt DDBMs over the next ten years (approximately 0.8 million) by the average revenue generated per enterprise (around €389,000). After ten years, this corresponds to an annual value at full uptake.

represent rather an upper ceiling estimate than a best guess, given that the estimate assumes for future DDBM the same return on investment as for the average of existing ones.

The two surveys completed as part of this study, while not representative, provide a further illustration of the value of data and the opportunity cost of the limited uptake of DDBMs. The two figures below depict the perceived current value of customer data and the expected value of customer data in 5 years.

Figure 17: Value of customer data

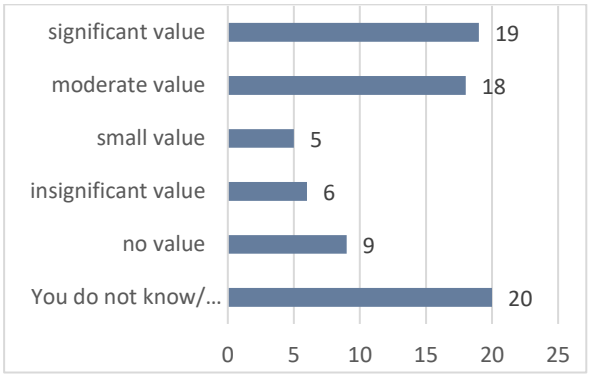
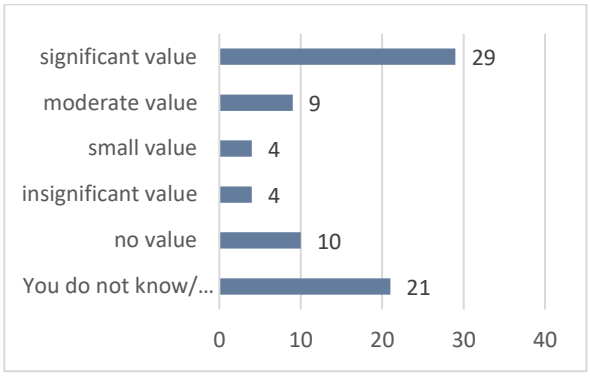


Figure 18: Expected value of customer data in 5 years



Source: EEN and long survey. The questions in the EEN and surveys were equivalent, so we present the combined results (n=77).

24.6% of respondents (19 out of 77) report that they obtain significant value from customer data. This percentage is expected to grow in the future: 37.7% of respondents (29 out of 77) expect that they will generate significant value from customer data in the next five years. If we account only for the respondents who currently use DDBMs, we can obtain further insights into the value of customer data. 43.3% (13 out of 30) of respondents to the EEN survey who currently use DDBMs obtain significant value from customer data, while 50% (15 out of 30) expect to do so in the next 5 years. The results of the surveys illustrate the value that businesses can obtain from data if barriers to the adoption of DDBMs are successfully removed.

Breakdown of estimates

The benefits of increased uptake of DDBMs are likely to be different depending on the size of the enterprises and the sectors of activity. All Eurostat indicators that we use as proxy for the prevalence of DDBMs in the Market Analysis exhibit a positive correlation with company size.[256]For example, while only 3% of enterprises with 10 – 49 persons employed analyse data from smart devices or sensors, 26.5% of enterprises employing more than 250 persons do so. Thus, it is likely that DDBMs are more prevalent in larger companies.

Similarly, all proxy indicators show that DDBMs are more prevalent in certain sectors of the economy than others.[257] The highest share of enterprises that engage in proxies of data contracts are in the information and communication sector, while enterprises in the electricity, gas, steam, and air conditioning supply sector feature the highest shares in proxies of gathering data from connected products. On the other end of the spectrum, proxies for DDBMs are rarely used in the construction sector.

[256] Eurostat (2026), Data analytics by size class of enterprise, https://ec.europa.eu/eurostat/databrowser/view/isoc_eb_das__custom_13091252/default/table?lang=en

[257]Eurostat (2026), Data analytics by NACE Rev. 2 activity, https://ec.europa.eu/eurostat/databrowser/view/isoc_eb_dan2__custom_13090094/default/table?lang=en

6. ANNEX II – COST ASSESSMENT OF POLICY MEASURES

6.1. Automated contracting

6.1.1. M1 – Rules on the validity of automated contracts

Table 28. Cost assessment of the policy measure M1 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off (familiarisation, adjustment of contracts)	Businesses have to familiarise themselves with the changed rules. Given that the rule follows established principles of contract law, the time needed by a legal professional for familiarisation is expected to be low (we assume 1h on average). No adjustment of existing contracts should be necessary because the rule reconfirms existing expectations that automated contracts can be valid. This only concerns businesses that already use automated contracting, since other businesses will incur adjustment costs in any case when taking up the technology.	Number of current automated contracting users (238,000–476,000) X Time spent (1 h) X Hourly labour costs (€45.30 / h) = €10,781,400–21,562,800
	Recurrent	The measure does not create recurrent costs, such as continuous reporting obligations or costly changes to existing business operations.	€0
Authorities	One-off (implementing regulatory changes)	EU and national legislators must implement legislative changes (assuming that this measure is implemented by a binding instrument).	€217,400
	Recurrent	The measure does not create recurrent costs, such as monitoring or market surveillance. No additional costs for courts are expected as the measure should not increase litigation.	€0
Total	**One-off**		**€10,998,800–21,780,200**

Source: Calculation based on Annex I, see section 5.2.6

6.1.2. M2 – Rules on attribution of actions

There is no available data that allows to predict the exact adjustment costs for businesses. However, we estimate the costs based on the following reasoned assumptions:

- For the familiarisation with the rule and assessment whether it requires an adaptation of contract templates, the staff, in particular legal counsel, takes four hours, corresponding to half a day of work, which could however be distributed across several staff members.
- 10% of businesses doing this assessment decide to adjust terms of their contract templates and hence spend time for redrafting and approving them.
- The adjustment of contract terms is a substantially bigger effort than the familiarisation alone, since it involves evaluating different options, potentially several revisions, and a

decision from superiors. We assume that, altogether, businesses will on average spend 16 staff-hours (corresponding to 2 workdays) on this revision.

Table 29. Cost assessment of the policy measure M2 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	One-off	The measure does not create any adjustment costs for citizens.	€0
	Recurrent (contractual liability)	Users of automated contracting systems may potentially bear contractual liabilities if the system's actions are legally attributed to them. However, the liability risk does not present an additional cost because: i) it is in line with user expectations and ii) potential liability would otherwise be borne by another party and therefore at most presents a shift of costs.	€0
Businesses	One-off	Businesses have to familiarise themselves with the changed rules and potentially change their contracts accordingly. This only concerns businesses that already use automated contracting, since other businesses will incur adjustment costs in any case when taking up the technology. The adaptation costs are expected to be moderate since the measure largely reconfirms existing expectations as to attribution. Nevertheless, considering that attribution of actions can have significant consequences for the parties, automated contracting users have to evaluate to what extent their existing contracts already make a determination in this regard and whether the newly introduced rule has an impact on it (we assume half a day of work, i.e. 4 hours, by a legal professional on average). Some businesses may wish to deviate from the default rules on attribution and thus amend their contracts accordingly. Assuming that this is the case for 10% of affected businesses, these may incur an additional 2 person-days, i.e. 16 hours of work, including reviews, approvals, and roll-out.	Number of current automated contracting users (238,000–476,000) X [Time spent for familiarisation (4 h) + Share of businesses needing contract adjustment (10%) X Time spent for contract adjustment (16h)] X Hourly labour costs (€45.30 / h) = €60,375,840–120,751,680
	Recurrent	Potential contractual liability risk, but not considered additional costs (see explanation for citizens).	€0
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure).	€217,400
	Recurrent	The measure does not create recurrent costs, such as monitoring or market surveillance. Potential court expenses are not considered as fees would be borne by the parties.	€0

Total	**One-off**		**€60,593,240–120,969,080**

Source: Calculation based on Annex I, section 5.2.6

As an alternative to M2, which applies to any type of automated contract, a measure targeted to B2C contracts could be considered. This corresponds to measure M4, a specific rule on the application of consumer law to contracts concluded by consumers using an automated system, which is assessed below.

6.1.3. M3 – Rules on unexpected actions

While the precise reaction of automated contracting users to the proposed legislative change cannot be predicted with the available data, the costs are estimated below based on the following assumptions:

- For the familiarisation with the rules and assessment whether it requires an adaptation of contract templates, the staff, in particular legal counsel, takes four hours, corresponding to half a day of work, which could however be distributed across several staff members.
- Given that the possibilities of unexpected outcomes is one of the most-discussed risks of automated contracting, half of the affected businesses decide to adjust terms of their contract templates and hence spend time for redrafting and approving them.
- The adjustment of contract terms is a substantially bigger effort than the familiarisation alone, since it involves evaluating different options for redrafting, potentially several revisions, and a decision from superiors. Accounting for the complexity of situations in which unexpected actions may occur, we assume that, altogether, businesses will on average spend 24 staff-hours (or 3 workdays) on this revision.

While clarifying certain legal consequences of unexpected actions, Measure 3 does not impact the design of automated systems on a technical level. The frequency and overall economic consequences of unexpected actions, therefore, remain the same, even if the economic risk may be shifted between the contracting parties in certain circumstances.

Table 30. Cost assessment of the policy measure M3 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	One-off	The measure does not create any adjustment costs for citizens.	€0
	Recurrent (contractual liability)	Users of automated contracting systems may be contractually liable for unexpected actions taken by an automated system. However, the liability risk does not present an additional cost because it would otherwise be borne by another party and therefore at most presents a shift of costs.	€0
Businesses	One-off	Businesses have to familiarise themselves with the changed rules and potentially change their contracts accordingly. This only concerns businesses that already use automated contracting, since other businesses will incur adjustment costs in any case when taking up the technology. Automated contracting users must evaluate to what extent their existing contracts already make a determination in this regard	Number of current automated contracting users (238,000–476,000) X [Time spent for familiarisation (4 h) +

		and whether the newly introduced rule has an impact on it (we assume half a day of work, i.e. 4 hours, by a legal professional on average). Considering the potential damage caused by unexpected actions, many businesses may wish to deviate from the default rules on unexpected actions and thus amend their contracts accordingly. Assuming that this is the case for 50% of affected businesses, these may incur an additional 3 person-days, i.e. 24 hours of work, including reviews, approvals, and roll-out.	Share of businesses needing contract adjustment (50%) X Time spent for contract adjustment (24h)] X Hourly labour costs (€45.30 / h) = €172,502,400–345,004,800
	Recurrent	Potential contractual liability risk, but not considered additional costs (see explanation for citizens).	€0
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure).	€217,400
	Recurrent	The measure does not create recurrent costs, such as monitoring or market surveillance. Potential court expenses are not considered as fees would be borne by the parties.	€0
Total	**One-off**		**€172,719,800–345,221,800**

Source: Calculation based on Annex I, section 5.2.6

6.1.4. M4 – Specific rule on application of consumer law to contracts concluded by consumers using an automated system

Table 31. Cost assessment of the policy measure M4 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off	The measure requires traders to familiarise themselves with the new rule related to the application of consumer law. Only traders that are themselves using automated contracting are affected by additional familiarisation costs. The familiarisation costs are expected to be very low since the measure reconfirms existing expectations that consumer law is applicable when a consumer uses an automated contracting system. A legal professional or compliance officer should be able to familiarise themselves with the rule and evaluate how their business interacts with automated contracting systems within 1 hour.	Number of current automated contracting users (238,000–476,000) X Time spent (1 h) X Hourly labour costs (€45.30 / h) = €10,781,400–21,562,800

	Recurrent	The measure does not impose new obligations on traders as it aligns with existing business practice.	€0
Authorities	One-off (implementing regulatory changes)	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). Market surveillance authorities must familiarise themselves with the specificities of automated contracting, which may require an additional person-days, i.e. 8 hours, per Member State.	€217,400 + Member States (27) X Time spent (8 h) X Hourly labour costs (€45.30 / h) = €227,185
	Recurrent	The measure does not create new obligations, nor does it bring additional products under the scope of existing requirements. It therefore does not create recurrent costs, such as additional monitoring or market surveillance activities	€0
Total	**One-off**		**€11,008,585–21,789,985**

Source: Calculation based on Annex I, section 5.2.6

6.1.5. M5 – Identifying and simplification of relevant information requirements

Table 32. Cost assessment of the policy measure M5 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens. While they may receive less pre-contractual information, the simplification should only concern information that is redundant or irrelevant in the context of automated contracting.	€0
Businesses	One-off (familiarisation, adjustment of contracts)	Businesses have to familiarise themselves with the changed rules and potentially change their contracts accordingly. This concerns businesses that currently use automated contracting. It may take a legal professional one hour to understand the simplifications brought by the measure. Given that the measure should strictly be for simplification, we assume adjustments of contracts and information material are not mandatory. Rather, the simplification can be implemented by businesses as and when they see fit, most likely in the course of an adjustment that would have been	Number of current automated contracting users (238,000–476,000) X Time spent (1 h) X Hourly labour costs (€45.30 / h) = €10,781,400–21,562,800

		carried out anyway. We therefore assume no additional costs for contract adjustment.	
	Recurrent	The simplification measure is related to an existing compliance framework and hence does not create additional recurrent compliance costs.	€0
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure).	€217,400
	Recurrent	The measure does not create recurrent costs, such as monitoring or market surveillance.	€0
Total	**One-off**		**€10,998,800–21,780,200**

Source: Calculation based on Annex I, section 5.2.6

The estimate provided in the table above considers an average time spent of eight hours by each business selling to consumers over the internet. It is possible that this presents an overestimate since many of those businesses, which are small or micro-enterprises, rely on external eCommerce platforms for handling their contracts.

6.1.6. M6 – Balanced contractual terms between AI provider and user

Table 33. Cost assessment of the policy measure M6 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off (familiarisation, adjustment of contracts)	Providers of automated contracting systems must familiarise themselves with the legal requirements and adapt their contracts accordingly. The measure may require a substantial adaptation of contract templates and potentially a change of the revenue model to account for higher liability risks. The new compliant documents need to be drafted, reviewed, and approved, for which 10 person-days (i.e. 80 hours) appears as a conservative estimate.	Number of automated contracting providers (1,500–3,000) X Time spent (80 h) X Hourly labour costs (€45.30 / h) = €5,436,000–10,872,000
	Recurrent	Providers of automated contracting systems are exposed to higher liability risks. However, this only shifts costs from other parties and thus does not increase overall costs. However, providers also have to monitor compliance with the specific rules on the provision of the automated contracting system. For the additional time spent by compliance officers and potentially legal	Number of automated contracting providers (1,500–3,000) X Time spent (80 h) X Hourly labour costs (€45.30 / h)

		counsel, we assume 10 person-days, i.e. 80 hours, per year.	= €5,436,000–10,872,000
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). In each Member State, competent market surveillance authorities must be designated, which must familiarise themselves with the newly introduced requirements. For the designation and familiarisation, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €266,324
	Recurrent	Compliance must be monitored by market surveillance and consumer protection authorities. We assume that one audit covers all automated contracting tools of the provider. For the calculation, we therefore assume the number of eligible tools to equal the number of providers. Since not all available automated contracting systems will likely be audited, we assume checks for 10% of relevant systems.	Cost for one audit (€6,000) X Number of automated contracting providers (1,500–3,000) X Share of audited providers (10%) = €900,000–1,800,000
Total	One-off		€5,702,324–11,138,324
	Recurrent (annual)		€6,336,000–12,672,000
	Total (10 years)	**One-off + 10 x recurrent**	**€69,062,324–137,858,324**

Source: Calculation based on Annex I, section 5.2.6

6.1.7. M7 – Freedom to set parameters of the automated systems

Table 34. Cost assessment of the policy measure M7 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	Users of automated contracting systems may spend more time to familiarise themselves with the more complex system settings. However, they will most likely be able to rely on default settings if they do not want to spend that time. We will therefore not consider it an additional cost.	€0
Businesses	One-off (familiarisation, adjustment of	Providers of automated contracting systems must familiarise themselves with the product requirements and adapt their contracts and interfaces accordingly.	Number of automated contracting providers (1,500–3,000)

	contracts and product design)	While a legal professional may require one day to familiarise themselves with the requirements and apply them to the concrete automated contracting system at hand, the redesigning of the system is likely to require substantial work. Not only are changes to the user interface necessary, but it must also be ensured that the system responds correctly to changes in the parameters. The redesign must be reviewed and approved by a compliance officer. Considering the work required from legal professionals and software developers, 10 person-days (i.e. 80 hours) appears as a conservative estimate for the redesigning of the system.	X Time spent (80 h) X Hourly labour costs (€45.30 / h) = €5,436,000–10,872,000
	Recurrent	Providers of automated systems are subject to compliance rules and must ensure that any product release is aligned with the legal requirements. For the additional time spent by programmers, compliance officers, and potentially legal counsel, we conservatively assume 5 person-days, i.e. 40 hours, per year. This considers that the costs for continuous compliance should be lower than for the initial adjustment to the new requirements.	Number of automated contracting providers (1,500–3,000) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €2,718,000–5,436,000
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). In each Member State, competent market surveillance authorities must be designated. Where no changes are foreseen in relation to B2C relations, authorities that are already competent in this area may continue to carry out their tasks. These authorities would nonetheless need to familiarise themselves with the newly introduced requirements. For the designation and familiarisation, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €266,324
	Recurrent	Product compliance must be monitored by market surveillance and consumer protection authorities. The verification of whether the relevant parameters are accessible to the user and function correctly can be carried out as part of the existing monitoring practices, although adjustments to current procedures may be required. Such verification can be considered	Cost for one audit (€6,000)[258] X Number of automated contracting providers (1,500–3,000)

[258] These estimates represent a conservative upper bound. They assume that the verification of the relevant parameters entails recurring marginal effort when integrated into regular market surveillance and consumer protection activities. In this scenario, no stand-alone monitoring activities would be introduced, and the checks are expected to be largely absorbed within existing procedures, resulting in potentially lower recurrent costs.

		relatively simple compared to other safety or cybersecurity requirements. We assume that one audit covers all automated contracting tools of the provider. For the calculation, we therefore assume the number of eligible tools to equal the number of providers. Since not all available automated contracting systems will likely be audited, we assume checks for 10% of relevant systems.	X Share of audited providers (10%) = €900,000–1,800,000
Total	One-off		€5,702,324–11,138,324
	Recurrent (annual)		€3,618,000–7,236,000
	Total (10 years)	**One-off + 10 x recurrent**	**€41,882,324–83,498,324**

Source: Calculation based on Annex I, section 5.2.6

6.1.8. M8 – Disclosure of using automated systems

Table 35. Cost assessment of the policy measure M8 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off (familiarisation, adjustment of contracts and product design)	Providers of automated contracting systems must familiarise themselves with the product requirements and adapt their contracts and interfaces accordingly. While a legal professional may require one day to familiarise themselves with the disclosure requirement and apply it to the concrete automated contracting system at hand, the redesigning of the system is likely to require substantial work. Changes may be necessary to the way in which the system connects to and communicates with traders so as to disclose its automated nature effectively. The redesign must be reviewed and approved by a compliance officer. Considering the work required from legal professionals and software developers, 10 person-days (i.e. 80 hours) appears as a conservative estimate for the redesigning of the system.	Number of automated contracting providers (1,500–3,000) X Time spent (80 h) X Hourly labour costs (€45.30 / h) = €5,436,000–10,872,000
	Recurrent	Providers of automated systems are subject to compliance rules and must ensure that any product release is aligned with the legal requirements. They must also ensure that the automatic disclosure remains up to date with evolving industry standards. For the additional time spent by programmers, compliance officers, and potentially legal counsel, we assume 5 person-days, i.e. 40 hours, per year. This	Number of automated contracting providers (1,500–3,000) X Time spent (40 h) X

		considers that the costs for continuous compliance should be lower than for the initial adjustment to the new requirements.	Hourly labour costs (€45.30 / h) = €2,718,000–5,436,000
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). In each Member State, competent market surveillance authorities must be designated, which must familiarise themselves with the newly introduced requirements. For the designation and familiarisation, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €266,324
	Recurrent	Product compliance must be monitored by market surveillance and consumer protection authorities. A check whether the relevant parameters are accessible to the user and function correctly can be considered relatively simple compared to other safety or cybersecurity requirements. We assume that one audit covers all automated contracting tools of the provider. For the calculation, we therefore assume the number of eligible tools to equal the number of providers. Since not all available automated contracting systems will likely be audited, we assume checks for 10% of relevant systems.	Cost for one audit (€6,000) X Number of automated contracting providers (1,500–3,000) X Share of audited providers (10%) = €900,000–1,800,000
Total	One-off		€5,702,324–11,138,324
	Recurrent (annual)		€3,618,000–7,236,000
	Total (10 years)	**One-off + 10 x recurrent**	**€41,882,324–83,498,324**

Source: Calculation based on Annex I, section 5.2.6

6.1.9. M9 – 'Right of reversal' or right to object to actions of automated systems

Table 36. Cost assessment of the policy measure M9 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off (familiarisation, adjustment of contracts and product design)	Providers of automated contracting systems must familiarise themselves with the product requirements and adapt their interfaces accordingly. While a legal professional may require one day to familiarise themselves with the requirements and apply them to the concrete automated contracting system at hand, the redesigning of the system is likely to require substantial work. Not only does the objection mechanism be implemented, but it must also be ensured that it functions correctly in all situations and handles complications like shopping baskets that expire after non-activity. The redesign must be reviewed and approved by a compliance officer. Considering the work required from legal professionals and software developers, 10 person-days (i.e. 80 hours) appears as a conservative estimate for the redesigning of the system.	Number of automated contracting providers (1,500–3,000) X Time spent (80 h) X Hourly labour costs (€45.30 / h) = €5,436,000–10,872,000
	Recurrent	Providers of automated systems are subject to compliance rules and must ensure that any product release is aligned with the legal requirements. For the additional time spent by programmers, compliance officers, and potentially legal counsel, we assume 5 person-days, i.e. 40 hours, per year, given that the costs for continuous compliance should be lower than for the initial adjustment to the new requirements.	Number of automated contracting providers (1,500–3,000) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €2,718,000–5,436,000
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). In each Member State, competent market surveillance authorities must be designated, which must familiarise themselves with the newly introduced requirements. For the designation and familiarisation, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h)

			= €266,324
	Recurrent	Product compliance must be monitored by market surveillance and consumer protection authorities. The verification of whether the relevant parameters are accessible to the user and function correctly can be carried out as part of the existing monitoring practices, although adjustments to current procedures may be required. Such verification can be considered relatively simple compared to other safety or cybersecurity requirements. We assume that one audit covers all automated contracting tools of the provider. For the calculation, we therefore assume the number of eligible tools to equal the number of providers. Since not all available automated contracting systems will likely be audited, we assume checks for 10% of relevant systems.	Cost for one audit (€6,000) [259] X Number of automated contracting providers (1,500–3,000) X Share of audited providers (10%) = €900,000–1,800,000
Total	One-off		€5,702,324–11,138,324
	Recurrent (annual)		€3,618,000–7,236,000
	Total (10 years)	**One-off + 10 x recurrent**	**€41,882,324–83,498,324**

Source: Calculation based on Annex I, section 5.2.6

6.1.10. M10 – Non-discriminatory treatment of consumers using automated systems

Table 37. Cost assessment of the policy measure M10 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off	Businesses have to familiarise themselves with the changed rules and potentially change their contracts accordingly. The policy measure is addressed to any businesses that sell to consumers on the internet. However, the rule is only relevant in substance to traders that take an interest in whether their customers use automated systems. Traders that sell scarce goods such as concert tickets may want to prevent scalping by automated systems. Conversely, businesses that offer consumables may encourage customers to use an automated system to refill the stock	Number of businesses selling to consumers over the internet (5,362,500) X Share of affected businesses (1 %) X Time spent (40 h) X

[259] These estimates represent a conservative upper bound. They assume that the verification of the relevant parameters entails recurring marginal effort when integrated into regular market surveillance and consumer protection activities. In this scenario, no stand-alone monitoring activities would be introduced, and the checks are expected to be largely absorbed within existing procedures, resulting in potentially lower recurrent costs.

		automatically through them. In the absence of specific data on the prevalence of these types of business models, we assume that 1% of eCommerce traders are affected by the non-discrimination rule. The costs for affected businesses may be considerable, especially where their business model relies on either restricting or requiring the use of automated systems by customers. For adaptation of contract templates and potentially to the business practices, we assume an average of 5 person-days, i.e. 40 hours.	Hourly labour costs (€45.30 / h) = €97,168,500
	Recurrent	Businesses selling to consumers over the internet must ensure compliance with the rules on non-discrimination while simultaneously preventing fraudulent use of automated tools. This will require continuous attention from programmers, compliance officers, and legal counsels. We thus assume that only 1% of traders incur additional compliance efforts of 5 person-days i.e. 40 hours, per year.	Number of businesses selling to consumers over the internet (5,362,500) X Share of affected businesses (1 %) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €97,168,500
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). In each Member State, competent market surveillance authorities must be designated, which must familiarise themselves with the newly introduced requirements. For the designation and familiarisation, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €266,324
	Recurrent	Compliance with the legal requirements must be monitored by market surveillance and consumer protection authorities. As the measure addresses both automated system providers and general eCommerce websites, we subsume both under the much larger number of eCommerce businesses. Due to the large number of online sellers, only a sample can realistically be audited. We assume checks on 1 out of every 10,000 eCommerce sellers, amounting to an estimated number of audits in the range of a few hundreds. This is consistent with the	Cost for one audit (€6,000) X Number of businesses selling to consumers over the internet (5,362,500) X Share of audited businesses (0.01%) =

		number of checks carried out in a typical "sweep" coordinated by the CPC Network.[260]	€3,217,500
Total	One-off		€97,434,824
	Recurrent (annual)		€100,386,000
	Total (10 years)	**One-off + 10 x recurrent**	**€1,101,294,824**

Source: Calculation based on Annex I, section 5.2.6

6.1.11. M11 – Protection from manipulation and conflicts of interest of automated systems and other prescriptive requirements

Table 38. Cost assessment of the policy measure M11 (automated contracting)

Stakeholder group	Cost type	Explanation	Quantification
Citizens/ consumers	Any	The measure does not create any adjustment or recurrent costs for citizens.	€0
Businesses	One-off	Providers of automated contracting systems must familiarise themselves with the disclosure obligations of conflicts of interest. Businesses with relevant conflicts of interest must adapt their documentation and compliance documents accordingly. A legal professional may spend on average half a day (4 hours) familiarising themselves with the requirements and evaluating whether a relevant conflict of interest exists. Where a conflict of interest may be found with 10% of providers, these may incur an additional 1.5 days (12 hours) to draw up and place an appropriate disclosure.	Number of automated contracting providers (1,500–3,000) X [Time spent for familiarisation (4 h) + Share of businesses needing contract adjustment (10%) X Time spent for contract adjustment (12h)] X Hourly labour costs (€45.30 / h) = €353,340–706,680
	Recurrent	Providers of automated systems must monitor whether conflicts of interest arise in relationship to certain traders and ensure their correct disclosure to customers. For the additional time spent by a compliance officers, we assume 5 days of work per year, i.e. 40 hours.	Number of automated contracting providers (1,500–3,000) X Time spent (40 h) X Hourly labour costs (€45.30 / h)

[260] European Commission, Sweeps, https://commission.europa.eu/topics/consumers/consumer-rights-and-complaints/enforcement-consumer-protection/sweeps_en.

			= €2,718,000–5,436,000
Authorities	One-off	EU and national legislators must implement legislative changes (if a binding instrument is chosen to implement this measure). The market surveillance authorities responsible for the enforcement of the UCPD must familiarise themselves with the newly introduced requirements and the technical features of automated contracting systems. For the designation of staff and familiarisation with the topic, we assume an additional 5 person-days, i.e. 40 hours, per Member State.	Adoption and transposition (€217,400) + Member States (27) X Time spent (40 h) X Hourly labour costs (€45.30 / h) = €266,324
	Recurrent	Compliance with the legal requirements must be monitored by market surveillance and consumer protection authorities. As the measure addresses both automated system providers and general eCommerce websites, we subsume both under the much larger number of eCommerce businesses. Due to the large number of online sellers, only a sample can realistically be audited. We assume checks on 1 out of every 10,000 eCommerce sellers, amounting to an estimated number of audits in the range of a few hundreds. This is consistent with the number of checks carried out in a typical "sweep" coordinated by the CPC Network.[261]	Cost for one audit (€6,000) X Number of businesses selling to consumers over the internet (5,362,500) X Share of audited businesses (0.01%) = €3,217,500
Total	One-off		€619,664–973,004
	Recurrent (annual)		€5,935,500–8,653,500
	Total (10 years)	**One-off + 10 x recurrent**	**€59,974,664–87,508,004**

Source: Calculation based on Annex I, section 5.2.6

6.2. Data-driven business models

To ensure a structured and comparable evaluation of policy measures related to data-driven business models (DDBMs), this Annex applies a **six-point ordinal scale** for the assessment of two key dimensions:

- **Number of stakeholders affected**
- **Average cost of compliance or adaptation**

[261] European Commission, Sweeps, https://commission.europa.eu/topics/consumers/consumer-rights-and-complaints/enforcement-consumer-protection/sweeps_en.

Category	Definition
0 – none	No stakeholders affected or no costs incurred.
1 – very low	A negligible share of stakeholders affected or minimal compliance adjustments, typically absorbed without significant disruption.
2 – low	A limited group of stakeholders affected or minor adaptation costs, such as contractual adjustments or simple administrative changes.
3 – moderate	A broad group of stakeholders affected or moderate compliance costs, requiring some process redesign but manageable within existing structures.
4 – high	A large share of stakeholders affected or significant compliance costs, potentially requiring systemic adaptation across business models or institutions.
5 – very high	Almost all relevant stakeholders affected or very substantial costs, including large-scale structural changes or recurrent burdens with major economic implications.

Scores are derived through a **triangulated qualitative assessment** based on:

1. **Stakeholder consultation evidence** (focus groups, surveys, expert panels) on the breadth of impact and perceived burdens.
2. **Comparative legal and economic analysis**
3. **Reasoned assumptions** aligned with the causal chain approach recommended in the **Better Regulation Toolbox (Tool #57, #58)**, ensuring that scoring reflects both direct costs and wider uptake implications.

6.2.1. M1 – Rules on the consequences of a withdrawal of consent on the contract

Table 39. Cost assessment of the policy measure M1 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	One-off	Consumers do not incur one-off adaptation costs.	Number of stakeholders affected: none (0) Average cost: none (0)
	Recurrent	The policy measure affects all customers to DDBMs under the scope of the DCD. Currently, only few consumers withdraw their consent to data processing operations. However, even a small share of consumers can amount to a large number of people. Therefore, we qualify the number of affected stakeholders as high. M1.1: Consumers may lose access to digital content or services when they wish to withdraw consent. They may have to search for alternative privacy-friendly providers that may charge a considerably higher price. M1.2: Consumers may lose access to certain features when they wish to withdraw consent. They may have to pay a price to regain access. However, they do not have to change service provider, reducing the extent of negative consequences of the withdrawal.	M1.1 Number of stakeholders affected: High (4) Average cost: Very high (4) M1.2 Number of stakeholders affected: High (4) Average cost: Moderate (3) M1.3 Number of stakeholders affected: None (0) Average cost: None (0)

		M1.3: Consumers do not incur any cost when they withdraw consent.	
Businesses	One-off	Businesses that provide digital content or digital services to consumers may need to adapt their terms and conditions, ensuing considerable costs. However, the measure only affects those businesses that rely on revenue generated from collecting personal data in this context.	Number of stakeholders affected: Moderate (3) Average cost: High (4)
	Recurrent	M1.1: Businesses do not incur additional costs or loss of revenue. M1.2: Businesses should not incur a loss of revenue as they can balance out the reduction of value generated from data through higher fees to the customer. They may incur additional costs from offering several service variants. M1.3: Businesses may suffer a substantial loss of revenue when customers withdraw consent. For those relying on data revenues, the loss may be structural and unsustainable.	M1.1 Number of stakeholders affected: None (0) Average cost: None (0) M1.2 Number of stakeholders affected: Moderate (3) Average cost: Low (2) M1.3 Number of stakeholders affected: Moderate (3) Average cost: Very high (5)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws and familiarisation. These costs are expected to be low since the measure integrates into the existing legal framework of the DCD and it leaves no room for regulatory choices.	Number of stakeholders affected: Low (2) Average cost: Very low (1)
	Recurrent	The measure does not create additional costs for monitoring or enforcement as any such activities would be carried out in the context of the enforcement of the existing DCD.	Number of stakeholders affected: None (0) Average cost: None (0)
Total		Depending on the choice of sub-measure, a large number of consumers could be affected by less favourable service conditions, insofar they wish to withdraw consent to data sharing, or a more limited but substantial number of businesses could bear a loss of revenue. M1.1: High spread, moderate costs overall, but potentially high for a limited number of consumers. M1.2: High spread, moderate costs overall M1.3: Moderate spread but high to very high average cost, especially for businesses that lose revenue without compensation.	M1.1 Number of stakeholders affected: High (4) Average cost: Moderate to High (3–4) M1.2 Number of stakeholders affected: High (4) Average cost: Moderate (3) M1.3 Number of stakeholders affected: Moderate (3) Average cost: High to Very high (4–5)

6.2.2. M3 – Better information on the economic benefits from the data sharing

Table 40. Cost assessment of the policy measure M3 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0)

			Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the information requirements and adapt their documentation templates. In particular, those businesses that use the data for purposes beyond the performance of the contract may have to undertake efforts describing and quantifying value generated from data to customers in a clear manner. Costs are moderate, as they involve internal compliance adjustments rather than structural changes.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
	Recurrent	Businesses must ensure that their pre-contractual information on the value generation from data is compliant and up to date. Updates may be frequent if business practices and data processing operations change.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws. These costs are expected to be low since the measure integrates into the existing legal framework of contractual information obligations.	Number of stakeholders affected: Low (2) Average cost: Very low (1)
	Recurrent	Market surveillance and consumer protection authorities monitor compliance with the pre-contractual information requirements. These checks can be integrated into general enforcement structures for similar information obligations.	Number of stakeholders affected: Low (2) Average cost: Low (2)
Total		The principal costs are adaptation and compliance costs for businesses. Consumers are unaffected, and authorities face only minor burdens. Overall, the measure creates moderate one-off and recurrent compliance costs for a substantial group of businesses.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)

6.2.3. M4 – Standardised label on the existence, nature and timespan of the economic benefit in return for the shared data

Table 41. Cost assessment of the policy measure M4 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the label and adapt their documentation. In particular, those businesses that use the data for purposes beyond the performance of the contract may have to undertake efforts determining the nature of the benefit returned for data access and add the label to their product design or user documentation. Costs are significant but expected to be manageable within compliance budgets.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
	Recurrent	Businesses must ensure that the label is in line and up to date with the current business practice regarding economic benefits in return for data access. Updates may be frequent if business practices and data	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)

		processing operations change but remain within moderate cost levels given that processes are ongoing compliance tasks.	
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws (if a binding instrument is chosen to implement this measure). At EU level, developing and adopting an effective label design will involve moderate costs, especially for awareness and usability testing.	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
	Recurrent	Market surveillance and consumer protection authorities monitor compliance with the label, which requires resources but can be integrated into existing enforcement structures. They may run information campaigns to generate awareness of the label among consumers.	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
Total		The principal costs are adaptation costs, as well as generating active awareness of the label. Consumers are unaffected. Overall, the burden is moderate across stakeholders.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)

6.2.4. M5 – Information on possibilities on use of products or services with limited or zero data sharing

Table 42. Cost assessment of the policy measure M5 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the information requirements and adapt their documentation templates. The measure does not require that businesses change their business models, but rather only describe them transparently, so the adaptation burden remains low.	Number of stakeholders affected: Moderate (3) Average cost: Low (2)
	Recurrent	Businesses must ensure that their documentation is compliant and up to date. Updates to core service variants provided by the business are unlikely to be very frequent. Costs remain low and manageable within existing compliance structures.	Number of stakeholders affected: Moderate (3) Average cost: Low (2)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws (if a binding instrument is chosen to implement this measure). These costs are expected to be low since the measure integrates into the existing legal framework of contractual information obligations.	Number of stakeholders affected: Low (2) Average cost: Low (2)
	Recurrent	Market surveillance and consumer protection authorities monitor compliance with the pre-contractual information requirements. These checks can be integrated into general enforcement structures for similar information obligations.	Number of stakeholders affected: Low (2) Average cost: Low (2)

Total		The principal costs are adaptation and compliance costs for businesses, though they remain limited. Consumers are unaffected, and authorities face only minor burdens.	Number of stakeholders affected: Moderate (3) Average cost: Low (2)

6.2.5. M6 – Promote the development of personal data management systems

Table 43. Cost assessment of the policy measure M6 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	Any	Businesses do not incur significant one-off or recurrent costs as the measure does not impose binding obligations on them. Some costs related to the development, purchase, integration and maintenance of software solutions may arise on a voluntary basis, given the flexibility in implementation.	Number of stakeholders affected: Moderate (3) Average cost: Low (2)
Authorities	One-off	Public authorities supporting the initial development of PIMS incur moderate R&D costs (if a binding instrument is chosen to implement this measure). These are typically project-based subsidies or funding calls and remain comparable to other legislative adaptation costs.	Number of stakeholders affected: Very low (1) Average cost: Moderate (3)
	Recurrent	Public authorities may incur recurrent costs for maintaining and updating the supported PIMS. The costs are recurrent but not substantial, as they build on already established systems.	Number of stakeholders affected: Very low (1) Average cost: Low (2)
Total		The costs are related to the development and maintenance of the PIMS with public funds.	Number of stakeholders affected: Very low (1) Average cost: Moderate (3)

6.2.6. M7 – Option to use products without data sharing

Table 44. Cost assessment of the policy measure M7 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the requirements and adapt their contracts and potentially business practices. In particular for businesses that rely on revenue generated from the collected data, the	Number of stakeholders affected: Moderate (3) Average cost: High (4)

		design of an economically viable service variant requires substantial work.	
	Recurrent	Businesses must maintain different service variants, which may lead to more complex management and revenue streams. Scaling synergies in the value of collected data may be reduced if more customers choose the service variant without data sharing.	Number of stakeholders affected: Moderate (3) Average cost: Moderate (3)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws (if a binding instrument is chosen to implement this measure). These costs are expected to be low since the measure integrates into the existing legal framework of contractual information obligations.	Number of stakeholders affected: Low (2) Average cost: Low (2)
	Recurrent	Market surveillance and consumer protection authorities enforce compliance of businesses conducting DDBM. While these checks can be integrated into general enforcement activities, they may add additional workload.	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
Total		The principal costs are adaptation and compliance costs for businesses. The measure imposes structural adaptation costs and ongoing compliance requirements, resulting in high overall costs.	Number of stakeholders affected: Moderate (3) Average cost: High (4)

6.2.7. M8 – Compensation for data access

Table 45. Cost assessment of the policy measure M8 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the requirements and adapt their contracts and potentially business practices. The design of a business model that aligns with the obligation to provide compensation for data access requires substantial work.	Number of stakeholders affected: High (4) Average cost: High (4)
	Recurrent	The obligation to provide compensation for data access, regardless of the form of compensation, can amount to substantial costs for affected businesses. In particular, the costs for compensation scale with the number of customers, unlike other compliance rules, which primarily create flat adaptation costs. For data-driven companies, the financial impact could be systemic and fundamentally undermine the business model, justifying a score of very high.	Number of stakeholders affected: High (4) Average cost: Very high (5)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws (if a binding instrument is chosen to implement this measure).	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
	Recurrent	Market surveillance and consumer protection authorities enforce the obligation to provide compensation for data access. While these checks can	Number of stakeholders affected: Low (2)

		be integrated into general enforcement activities, they may add additional workload due to the need to assess compensation mechanisms.	Average cost: Moderate (3)
Total		The compensation for data access is likely to present a substantial cost for many businesses. The main burden lies with businesses, especially large consumer-facing data-driven manufacturers. The obligation scales with customer numbers and creates potentially systemic economic impacts. Overall, this places the measure high and very high in scope and average cost, respectively.	Number of stakeholders affected: High (4) Average cost: Very high (5)

6.2.8. M9 – Rules on the adequacy between the proposed goods or services and the collected data

Table 46. Cost assessment of the policy measure M9 (DDBM)

Stakeholder group	Cost type	Explanation	Qualification
Citizens/ consumers	Any	Consumers do not incur one-off or recurrent costs as the measure does not impose obligations on them.	Number of stakeholders affected: None (0) Average cost: None (0)
Businesses	One-off	Businesses collecting data in the context of contractual relationships must familiarise themselves with the requirements and adapt their contracts and potentially business practices. The design of a business model that aligns with the obligation to provide compensation for data access requires substantial work.	Number of stakeholders affected: High (4) Average cost: High (4)
	Recurrent	The obligation to ensure an adequate return in value to collected data requires a continued monitoring and assessment of compliance.	Number of stakeholders affected: High (4) Average cost: Moderate (3)
Authorities	One-off	Authorities incur costs for the transposition of the measure into national laws (if a binding instrument is chosen to implement this measure). The development of relevant methodologies for assessing the value of data and the adequacy of a contractual performance will require additional policy work.	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
	Recurrent	Market surveillance and consumer protection authorities enforce the adequacy in contractual relationships. While these checks can be integrated into general enforcement activities, they may add additional workload.	Number of stakeholders affected: Low (2) Average cost: Moderate (3)
Total		The development and monitoring of compliant business models are the main cost driver for businesses. Authorities also face notable methodological and enforcement tasks. Overall, the measure produces high one-off and recurrent costs.	Number of stakeholders affected: High (4) Average cost: High (4)

7. ANNEX III – FACTORS INFLUENCING USE AND UPTAKE

7.1. Automated contracting solution

The chapter analyses factors influencing the use and adoption of automated contracting solutions, focusing on AI in contracting and smart legal contracts. The results are presented in aggregate form, addressing automated contracting technologies generally and highlighting key differences between the two technologies.

7.1.1. Benefits

Before discussing the specific advantages, it is important to consider the enabling factors – those critical conditions that facilitate the successful adoption and use of automated contracting technologies. These conditions are instrumental in unlocking the full range of potential benefits. This helps clarify how businesses can fully capitalise on the potential of automated contracting.

The first key enabling factor relates to the **volume of contracts**. Automated contracting becomes particularly valuable when dealing with large volumes of contracts, whether due to frequent transactions, a large number of parties involved, or both[262]. On average, larger companies are thus naturally better positioned to capitalise on economies of scale. With their capacity to spread initial setup and operational costs across a broader contract base, these companies can further reduce the average cost per contract compared to SMEs, making automation cost-effective[263] [264]. Equally important is **contract standardisation**, which amplifies the advantages of automation. Routine or uniform contracts with a standardised structure, content, and terms are ideal candidates for automation[265]. Another significant enabling factor is the **regulatory environment**. Interviews with academia, businesses familiar with automated contracting solutions, and technology providers suggested that policy initiatives aimed at harmonising and creating a cohesive regulatory environment—such as the EU's Artificial Intelligence Act and the United Nations' Model Law on Automated Contracting[266]—facilitate and contribute to the adoption of these technologies. A cohesive regulatory environment reduces uncertainty, making it easier for businesses to embrace these technologies. Insights from interviews with technology providers and field experts revealed that **decreasing costs associated with automation technologies** also contribute to increased adoption. As these costs continue to decline, businesses are increasingly recognising these technologies as a cost-efficient alternative to traditional contracting processes. Finally, advancements in AI, particularly in **natural language processing,** have improved the capabilities of automated contracting systems. Interviews with experts in automated technologies highlighted that these improvements allow automated contracting systems to better understand and generate natural language, therefore adapting better to contracting needs.

With the enabling factors outlined, attention can now shift to the specific benefits of automated contracting technologies—AI in contracting and smart legal contracts. While both solutions

[262] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission

[263] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

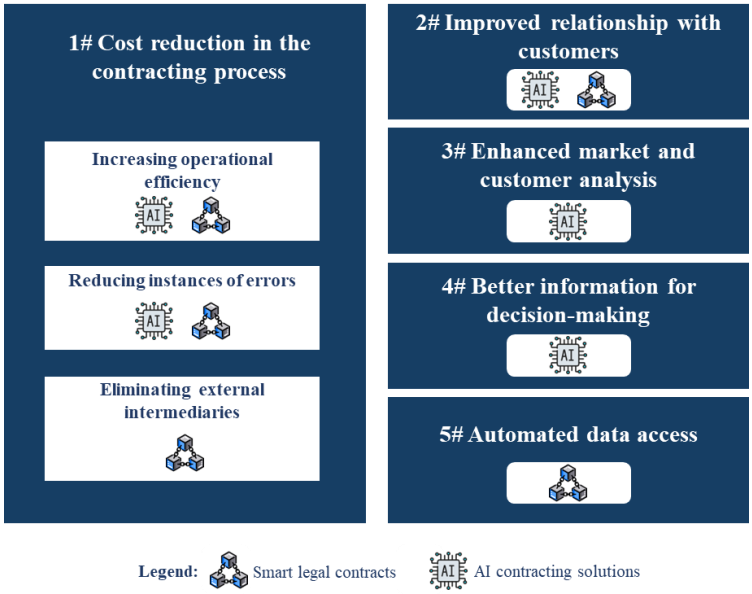
[264] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[265] Deloitte Development LLC. (2020). Tech Bytes part 4: Intelligent contract life cycle management—Bending the iron triangle. Deloitte. https://www.intelagree.com/hubfs/IntelAgree_October_2024/Pdf/us-about-deloitte-tech-bytes-part-4.pdf

[266] Annex IV: UNCITRAL Model Law on Automated Contracting (A/79/17 94 V.24-13025). (2024). https://uncitral.un.org/sites/uncitral.un.org/files/mlac_en.pdf . For the announcement of the formal adoption, please see notice of 15th July 2024, UNISL/362.

share a range of advantages, each also brings unique strengths. The figure below provides an overview of the benefits associated with automated contracting technologies, highlighting the type of technology each benefit applies to.

Figure 19. Benefits of automated contracting solutions



Benefit #1: Cost reduction in the contracting process

Various reports and academic studies suggest that the potential for cost savings through the integration of AI and smart legal contracts in contracting practices [267], primarily driven by increased operational efficiency and a reduction in the risk of errors. In the case of smart legal contracts, this is further substantiated by a 2020 report, which highlighted that businesses adopting this technology can reduce their contract management costs by up to 60%[268]. Our recent survey results support these findings—where 53% of respondents (out of 114 respondents)[269], identified cost reduction as a key advantage of automated contracting solutions. Specifically, 39% of survey respondents (out of 59 respondents) reported a moderate cost reduction of 25% to 50%, and 19% (out of 59 respondents) reported a significant reduction between 50% and 75%, closely aligning with the higher estimates in the literature. On the other hand, 27% (out of 59 respondents) noted only a slight reduction of less than 25%, and 15% (out of 59 respondents) saw no change in contracting costs[270]. Cost savings are primarily driven by two main mechanisms: a) increasing **operational efficiency** and b) **reducing instances of errors**. Additionally, smart legal contracts offer further cost savings, c) by eliminating the **need for external intermediaries**.

[267] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission. Vatiero, M. (2023). *Do smart contracts incur higher transaction costs than traditional contracts?* Law and Economics *of the* Digital Transformation. n: Mathis, K., Tor, A. (eds) Law and Economics of the Digital Transformation. ILEC 2023. Economic Analysis of Law in European Legal Scholarship, vol 15. Springer, Cham.https://doi.org/10.1007/978-3-031-25059-0_2. Rich, B. (2018). How AI is changing contracts. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts. Rich, B. (2018). How AI is changing contracts. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts.

[268] Deloitte Development LLC. (2020). Tech Bytes part 4: Intelligent contract life cycle management—Bending the iron triangle. Deloitte. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-about-deloitte-tech-bytes-part-4.pdf

[269] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions. The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[270] These percentages are calculated on a total of 59 respondents who quantified the cost reduction derived from using automated contracting solutions. Calculations are based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

a) Increasing operational efficiency

On average, it is estimated that it takes a company 20-30 days to create, negotiate, and finalise a contract[271]. As early as 2003, a study predicted that automating the entire process for medium to long-term contracts could reduce the contracting cycle a 50% [272]. More recent sources raised this estimate to 75%[273]. These findings align with our survey results—where 71% of respondents (out of 114 respondents) identified faster contractual processes as the most significant benefit of automated contracting technologies[274]. Notably, 35% (out of 65 respondents) reported a moderate reduction of 25% to 50% in the contractual cycle, while 29% (out of 65 respondents) reported a significant reduction (50%-75%). However, 25% of respondents (out of 65 respondents) experienced only a slight reduction (less than 25%), and 11% (out of 65 respondents) reported no change, suggesting that automation full potential may not yet be fully realised for all businesses[275]. The acceleration in the contractual process is primarily due to automation, which enables key functions to be performed **without the need of human intervention**. Both smart legal contracts and AI-driven contracting solutions contribute to this overall operational efficiency in distinct ways. On the one hand, *smart legal contracts* speed up contractual processes primarily through **autonomous execution and enforcement**. These contracts embed rules that trigger automatic responses based on specific conditions—once a condition is met, the corresponding contractual obligation is executed. The result is a significant reduction in the time lag between the occurrence of an event and the fulfilment of contract terms, speeding up the entire contractual process[276].

In addition to faster contractual processes, smart legal contracts also allow businesses to handle a higher volume of contracts through **standardisation**. As noted in interviews with academia, businesses familiar with automated contracting solutions, and technology providers, smart legal contracts provide a **consistent framework for execution**, ensuring that each contract follows the same process without variation. This standardisation makes it easier for businesses to manage a large volume of contracts while maintaining consistency in enforcement and execution. On the other hand, *AI-driven contracting solutions* speed up the contracting process by intervening at three key moments: data extraction, drafting, and execution. First, AI **streamlines contracts onboarding,** the initial review and understanding of a contract's elements, analysing legal language and extracting key clauses and obligations[277]. According to recent research, this saves time on manual review, with even basic extraction techniques reducing time by 30–40%, and advanced tools achieving hit rates of 80–90%. For example, a mid-sized company could save up to 2,000 hours for every 100,000 pages processed[278].

Next, AI-driven solutions **enhance contract drafting** by learning from previous contracts and applying company-specific standards. Interviews with academia, businesses familiar with automated contracting solutions, and technology providers highlighted that AI can use

[271] Minahan, T. A. (2005). The contract management solution selection report. AberdeenGroup. https://www.controlkeeper.com/media/1174/aberdeen_2005_contract_mgmt.pdf, p. 2.

[272] PricewaterhouseCoopers LLP. (2003). Contract management: Control value and minimise risks. PwC. https://cmsd.nl/wp-content/uploads/2015/10/memba_pwc_contractmgmt.pdf, p. 15.

[273] See for instance: International Journal for Multidisciplinary Research (2024), Automating Contract Lifecycle Management in Salesforce: A Technical Deep Dive, https://www.ijfmr.com/papers/2024/6/33010.pdf, p. 4; See also: https://www.contracts365.com/blog/mastering-contract-automation-a-step-by-step-approach.

[274] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[275] These percentages are calculated on a total of 65 respondents who quantified the reduction in the contractual cycle duration derived from using automated contracting solutions. Calculations are based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[276] Scholz, L. H. (2017). *Algorithmic contracts*. Florida State University College of Law. https://ir.law.fsu.edu/articles/607/.

[277] Rich, B. (2018). *How AI is changing contracts*. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts.

[278] Bernard, R. N., & Rao, A. (2021). It's time to get excited about boring AI. PwC publications. https://www.pwc.com/boring-ai.

predefined templates to draft contracts, ensuring consistency while reducing errors (*error reduction* is analysed in more detail below). The ability to create standardised contract templates with pre-defined, uniform provisions and clauses, such as termination terms and penalties, ensures that all contracts are consistent and maintain core uniformity[279].

Example: Integrating AI for contract review and drafting

Choi et al. (2024) examined the effects of AI assistance on contract drafting. They asked law students to perform different legal tasks, one of which consisted in drafting a contract. Access to AI-assisted tools significantly enhanced students' performance, leading to improvements both in time efficiency and the quality of their work[280]. Building on this concept, an investment fund specialising in AI start-ups highlighted a promising AI tool developed to assist large law firms. The fund is monitoring an AI tool designed to support large law firms by acting as a paralegal assistant, helping legal teams processing and structuring text more efficiently. This AI tool enables users to efficiently search for and retrieve the most relevant clauses on specific topics, making it especially valuable for law firms handling high volumes of data-intensive tasks. It also suggests optimal phrasing based on the firm's accumulated knowledge and legal precedents, leveraging extensive data to improve accuracy and consistency in clause construction.

In addition to drafting and onboarding, AI can also automate **contract execution**, making predictions based on data—such as market conditions. Once predefined conditions are met, AI can autonomously trigger execution, minimising delays and human error[281]. Finally, AI-driven contracting solutions offer **language-agnostic capabilities**, which also support the handling of a higher volume of contracts. By interpreting language as numerical data, these systems operate seamlessly across different languages, without bias. As emphasised in interviews with technology providers, this feature ensures that AI-driven solutions can perform consistently regardless of the language of the contract, further reducing costs and increasing efficiency.

b) Reducing instances of errors

Friction points—namely, inefficiencies that disrupt the smooth flow of the contract lifecycle—are the bedrock of errors, misunderstandings, and deviations from standard procedures in contract processes. A 2020 report highlighted up to 40 friction points in the contract lifecycle—out of which around 70% materialise during negotiation and creation, while 30% in the execution phase. The average added-value that could be achieved from reducing and eliminating this friction points is estimated to be equivalent to 0.5% of contract revenue, potentially reaching as high as 12–15% in optimal cases[282].

The adoption of automated contracting technologies shows significant promise in mitigating these friction points. A 2018 study comparing lawyers' performance with an AI algorithm's performance in identifying issues in contracts revealed that the AI algorithm achieved a 94% accuracy rate, surpassing the lawyers' 85% average—a nearly 10% improvement in error reduction[283]. This level of precision is especially valuable, given that time pressures usually limit thorough review. For instance, a survey found that 66% of lawyers felt they could not

[279] Rich, B. (2018). *How AI is changing contracts*. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts

[280] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[281] Ibid.

[282] Cummins, T., & Agrawal, A. (2020). Faster contracts. Better contracts: Eliminating the friction points in contracting. World Commerce & Contracting & SirionLabs. https://www.worldcc.com/Portals/IACCM/Resources/10006_0_Faster-Better.pdf

[283] LawGeex. (2018). Comparing the performance of artificial intelligence to human lawyers in the review of standard business contracts. https://images.law.com/contrib/content/uploads/documents/397/5408/lawgeex.pdf

proofread effectively under time constraints, and 33% admitted skipping it for this reason[284]. For what concerns smart legal contracts, while there are no studies providing numerical data on the exact reduction in errors during the contract execution, existing research consistently highlights the potential of smart legal contracts to minimise errors in contractual agreements [285]. Our recent survey results support these findings—where 35% of respondents (out of 114 respondents) identified improved accuracy and fewer errors as key benefits of automated contracting[286]. 41% of stakeholders (out of 59 respondents) reported a moderate reduction in contract-related errors between 25% and 50%, while 24% (out of 59 respondents) experienced a significant reduction of over 50%. In contrast, 25% (out of 59 respondents) noted only a slight reduction (less than 25%) and a 10% (out of 59 respondents) experienced no change at all[287]. By minimising errors in both the creation and execution of contracts, businesses can lower the chances of contract-related litigation and disputes, as well as operational disruptions, both of which can result in substantial financial burdens. The specific mechanisms driving these benefits vary depending on the technology used.

Smart legal contracts encode and **automate the execution of contractual terms**, ensuring strict adherence to pre-programmed conditions. This automation reduces legal uncertainties and minimises the risk of human error that might arise from manual oversight[288]. Interviews with technology providers highlighted that the same mechanism may be applied to disputes and remedies, by incorporating **pre-planned mechanisms** in the contract. These pre-defined clauses within the contract's code would activate automatically under specific conditions, such as a breach, eliminating the need for manual intervention and providing a clear, predictable framework for resolving disputes. While smart legal contracts reduce errors by automating the execution and enforcement of contractual terms, *AI-driven contracting solutions* reduce errors through **advanced forecasting capabilities**. In fact, AI allows to process vast amounts of contract-related data to identify potential issues, such as biases or suboptimal clauses[289]. In this sense, interviews with businesses that are independently developing their own AI-driven contracting solutions for internal use highlighted that AI can be trained on firm-specified key contracting principles (KCPs) to automatically review and **analyse contracts for compliance issues and discrepancies**. This capability not only helps mitigate legal risks, but also enables proactive risk management, preventing issues from escalating into costly legal disputes or operational disruptions.

c) Eliminating external intermediaries

Smart legal contracts provide another means of reducing overall contracting costs by decreasing the need for human oversight and eliminating certain external intermediaries. This cost reduction arises from the digital enforcement of contractual terms, which **automates processes that traditionally require third-party involvement**, speeding up the resolution of

[284] Plaka, S. (2014, May 14). Proofreading – why are law firms putting their clients at risk?LexisNexis. https://www.lexisnexis.co.uk/blog/future-of-law/proofreading-why-are-law-firms-putting-their-clients-at-risk

[285] See for instance Sinha, A., Purwin, V., Damak, M., Erturk, E., & Tong, D. (2022, October 4). Smart contracts could improve efficiency and transparency in financial transactions. S&P Global. https://www.spglobal.com/en/research-insights/special-reports/smart-contracts-could-improve-efficiency-and-transparency-in-financial-transactions,

[286] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[287] These percentages are calculated on a total of 59 respondents who quantified the reduction in contract-related errors derived from using automated contracting solutions. Calculations are based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[288] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission., *page 41*

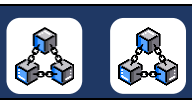
[289] Rich, B. (2018). *How AI is changing contracts*. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts

contractual obligations[290]. However, despite their potential, smart legal contracts face some limitations. Blockchain, and thus smart legal contracts, cannot fully replace all intermediary functions, such as physical distribution and performing necessary physical checks, nor can it take on relationship management or reconciliation roles[291]. A practical example of disintermediation via smart legal contracts is the **automated distribution** of income or dividends to multiple investors based on their ownership percentages. As noted in interviews with academia, businesses, and technology providers, this automated distribution reduces the costs associated with managing payments and facilitates **fractional ownership** without the need for third-party intermediaries.

***Example**: Automating loan schedules in the maritime industry with smart legal contracts*

An interview with a smart legal contract provider offered a practical example from the maritime industry. In this case, a smart legal contract was designed to automate loan schedules for a shipping vessel, adjusting payments in real-time based on interest rates. The contract processes payments from the borrower and allocates amounts to interest, principal, or fees. In cases of loan syndication, the contract distributes payments among multiple lenders using a digital asset structure, simplifying the process and reducing the costs of managing syndicated loans.

Benefit #2: Improved relationships with customers



Inefficiencies in agreements cause 45% of organisations to deliver poor customer experience[292]. In this context, a report on contract management dating back to 2003 already emphasised that one of the main purposes of effective contract management is maximising the value of relationships with customers[293]. Similarly, a 2021 report found that 6.9% of enterprises cited increased attractiveness as a business partner as one of the primary goals and expected benefits of the digitisation of the contracting process[294]. Specifically, when it comes to the automation of the contracting process, a 2020 report emphasised "ease of doing business" as an important advantage resulting from the implementation of automated contracting solutions based on AI [295]. Our survey results reinforce these findings, with 24% of respondents (out of 114 respondents) highlighting improved relationships with customers as a key benefit of automated contracting[296]—though only 5% (out of 114 respondents) specifically mentioned increased trust as a primary benefit[297]. This difference may be explained by the fact that **increased trust** often serves as a driver for improved relationships, but the latter is a more immediate and visible

[290] Vatiero, M. (2023). *Do smart contracts incur higher transaction costs than traditional contracts?* Law and Economics *of the* Digital Transformation,in: Mathis, K., Tor, A. (eds) Law and Economics of the Digital Transformation. ILEC 2023. Economic Analysis of Law in European Legal Scholarship, vol 15. Springer, Cham. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4491727, pages 2-3.

[291] Tan, T. M., Salo, J., Ahokangas, P., Seppänen, V., & Sandner, P. (2021). Revealing the disintermediation concept of blockchain technology: How intermediaries gain from blockchain adoption in a new business model. In Blockchain and the future of Europe: Opportunities and challenges. IGI Global.

https://www.researchgate.net/publication/349173292_Revealing_the_Disintermediation_Concept_of_Blockchain_Technology_How_Intermediaries_Gain_From_Blockchain_Adoption_in_a_New_Business_Model, page 92.

[292] Bartels, A., Guarini, M., & Danilow, A. (2019). The Forrester Wave™: Contract lifecycle management for all contracts, Q1 2019: The 13 providers of CLM solutions for all contracts that matter most and how they stack up. Forrester Research. https://www.forrester.com/report/The-Forrester-Wave-Contract-Lifecycle-Management-For-All-Contracts-Q1-2019/RES143011

[293] PricewaterhouseCoopers LLP. (2003). Contract management: Control value and minimise risks. PwC. https://cmsd.nl/wp-content/uploads/2015/10/memba_pwc_contractmgmt.pdf, page 17 .

[294] Cummins, T., Brooks, N., & McQuillen, J. (2021). Can the contracting process improve without an owner? World Commerce & Contracting & KPMG Law. https://www.worldcc.com/Portals/IACCM/KPMG-report-v5%20FINAL.pdf

[295] Cummins, T., & Agrawal, A. (2020). Faster contracts. Better contracts: Eliminating the friction points in contracting. World Commerce & Contracting & SirionLabs. https://www.worldcc.com/Portals/IACCM/Resources/10006_0_Faster-Better.pdf, page 16.

[296] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[297] Ibid.

outcome. Businesses may experience **improved relationships** through better communication, smoother processes, and enhanced customer satisfaction—tangible benefits that are easier to observe. Meanwhile, **increased trust** may be more foundational and abstract, contributing to stronger relationships over time, but less frequently cited as an explicit benefit because its effects are more subtle and harder to quantify.

Both AI-driven solutions and smart legal contracts contribute to this enhanced trust, though in slightly different ways. *AI-driven solutions* support trust by reducing errors and improving compliance monitoring, which ensures contracts are accurate and consistent. However, *smart legal contracts* take this a step further by enabling "**trust-less transactions"**, namely transactions that do not require to place trust in any third party or intermediary. The automated execution based on pre-defined "if-then" conditions, guarantees that terms are fulfilled exactly as programmed, eliminating the risk of breaches, providing a reliable environment for contractual agreements, and enhancing confidence in the contracting process.

The blockchain technology that underlies smart legal contracts serves as a transparent, immutable ledger that records every transaction. As highlighted in interviews with technology providers, this inherent transparency ensures that all transactions are **visible and verifiable**. This feature is particularly valuable for **supervision and oversight**, as it facilitates compliance verification and creates a robust audit trail, ensuring that all actions can be tracked and monitored.

***Example*: Leasing solution for electric buses under SFDR compliance**

An interview with a smart legal contracts provider highlighted a practical example involving the leasing of electric buses under the Sustainable Finance Disclosure Regulation (SFDR), Article 9. In this case, a smart legal contract integrates with bus telemetry to collect real-time data on usage and energy consumption. This creates a visible, verifiable audit trail for tracking carbon intensity and sustainability metrics. Stakeholders can easily access this data via dashboards, ensuring compliance with SFDR guidelines and simplifying reporting on carbon offset per euro invested.

Benefit #3: Enhanced market and customer analysis

AI-powered solutions help organisations better meet market demands, enabling them to monitor and process real-time **market data**. They uncover valuable insights into market dynamics—such as competitors' pricing strategies, market trends, and demand patterns—enabling the creation of contracts based on future predictions. In line with this, survey results showed that 20% of respondents (out of 114 respondents) identified improved marketing and market analysis as a key benefit of these AI-powered solutions[298].

In this respect, the practice of **dynamic pricing** allows companies to adjust prices over time based on supply and demand fluctuations[299]. The rise of digital markets and AI algorithm development has facilitated dynamic pricing in e-commerce, where companies use price-tracking tools to monitor competitors and quickly adjust their own prices. This adaptability ensures that contracts remain relevant to changing market conditions, helping organisations

[298] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[299] LeewayHertz. (n.d.). *AI pricing engines: How LeewayHertz's generative AI platform transforms pricing strategy management*. https://www.leewayhertz.com/ai-pricing-engines/#How-LeewayHertzs-generative-AI-platform-transforms-pricing-strategy-management

optimise profitability[300]. Moreover, AI-driven contracting solutions enable tracking and analysis of individual customer data, making it possible to tailor contracts according to specific consumer preferences and profiles[301]. While enhanced contract personalisation was not considered one of the most significant benefits of automated contracting technologies, our survey results indicate that only 10% of respondents (out of 114 respondents) highlighted this benefit[302], it remains particularly relevant in the context of AI-driven contracting solutions. By using consumer data—such as demographic details, location, interests, purchasing patterns, and service usage—companies can estimate a customer's willingness to pay and offer **personalised pricing**[303]. AI-driven contracting solutions can also be leveraged after a product or service has been delivered or sold. By examining customer feedback and reviews, these solutions provide valuable insights into how pricing strategies influence customer satisfaction and loyalty[304].

Benefit #4: Better information for decision-making

According to a report from the International Association for Contract and Commercial Management (IACCM), 95% of organisations lack full visibility over their contractual obligations[305]. This means that organisations frequently do not possess a clear, accessible record of their contractual commitments, which constrains their capacity to proactively manage risks, ensure regulatory compliance, and maintain effective business relationships. For the identification and categorisation of specific contractual obligations, it is fundamental to conduct meaningful contract analysis, extracting well-structured metadata. However, a 2020 report highlights that many organisations encounter challenges such as inconsistent metadata extraction and fragmented information classification[306]. These issues hinder the consolidation of data across multiple contracts, limiting a comprehensive overview essential for strategic decision-making.

AI can efficiently analyse **complex natural (legal) language**, transforming clauses and obligations into reportable metadata[307]. This metadata not only simplifies the review of individual contracts, but can also be aggregated across contracts to identify broader patterns and trends. Through the analysis of this data at scale—supplemented with real-time market data analysis, when relevant—organisations can gain valuable insights that support macro-level decision-making, enabling more strategic decisions related to compliance, risk management, and contract performance. Reinforcing this insight, our survey results reveal that 18% of respondents (out of 114 respondents) viewed enhanced decision-making as a pivotal advantage of AI-driven contract solutions[308], highlighting AI's critical role in elevating contract management to a more strategic and insight-driven function. Expanding on its role in

[300] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[301] Oliver, M. (2021). Contracting by artificial intelligence: Open offers, unilateral mistakes, and why algorithms are not agents. *ANU Journal of Law and Technology, 2*(1), 45-87. https://search.informit.org/doi/epdf/10.3316/agispt.20220516066960

[302] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

[303] LeewayHertz. (n.d.). *AI pricing engines: How LeewayHertz's generative AI platform transforms pricing strategy management*. https://www.leewayhertz.com/ai-pricing-engines/#How-LeewayHertzs-generative-AI-platform-transforms-pricing-strategy-management

[304] Ibid.

[305] Gul, E. (2024). 35+ contract management statistics you should know. Weshare. https://www.weshare.net/statistics/contract-management-statistics/#resources

[306] Cummins, T., & Agrawal, A. (2020). Faster contracts. Better contracts: Eliminating the friction points in contracting. World Commerce & Contracting & SirionLabs. https://www.worldcc.com/Portals/IACCM/Resources/10006_0_Faster-Better.pdf, page 8.

[307] Rich, B. (2018). How AI is changing contracts. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts.

[308] This percentage is calculated on a total of 114 respondents (97%) who reported benefits from using automated contracting solutions The 97% calculation is based only on respondents who provided a specific answer about the benefits of automated contracting solutions and thus respondents who selected 'I do not know' were excluded from this calculation.

compliance, *AI-driven contracting solutions* can continuously monitor and analyse contracts to ensure adherence to contractual terms and legal requirements. According to interviews with businesses that are independently developing their own AI-driven contracting solutions for internal use, this capability supports ongoing compliance analytics, providing organisations with the tools to effectively track and **maintain legal compliance** across a large portfolio of contracts.

In terms of risk management, AI-driven contracting solutions play a crucial role in identifying and mitigating potential risks. In this regard, insights gathered from interviews with businesses that are independently developing their own AI-driven contracting solutions for internal use highlighted that AI can help in building risk profiles and assessing exposure, providing **insights on potential risks**—such as likelihood and maximum risk exposure—and aiding in informed decision-making to mitigate them.

***Example*: Using AI-powered contract management for ongoing compliance**

An interview with a company familiar with AI-driven contract management tools highlighted a practical example of how AI supports ongoing compliance. In this case, a contract management tool integrated with an AI algorithm detects modifications to standard clauses and prompts users to seek legal review when necessary. The tool also tracks key contract details such as execution dates and deadlines, ensuring organisations can monitor compliance with contractual obligations in real-time. This helps maintain oversight across a large portfolio of contracts, simplifying legal compliance and enabling more effective management.

Benefit #5: Automated data access

This benefit specifically applies to use cases involving data sharing agreements, where access to datasets between parties is a critical component. Unlike the broader benefits discussed above, **automated data access** is particularly relevant in situations where organisations need to manage and enforce data access rights efficiently. Interviews with experts in automated technologies, businesses familiar with smart legal contracts, and technology providers revealed that smart legal contracts offer significant advancements in the automation of **data access management**. In data sharing agreements, smart legal contracts can automatically manage and enforce access rights. This is possible because legal language—usually written in complex, human-readable text—is translated into a programmable code. This allows the contract terms to be displayed into a machine-readable format, enabling automatic execution. For example, if an organisation requires access to specific datasets from another party, the smart legal contract can be designed to include predefined conditions for access. Once the predefined criteria are met, the contract automatically grants or restricts access to the data as specified.

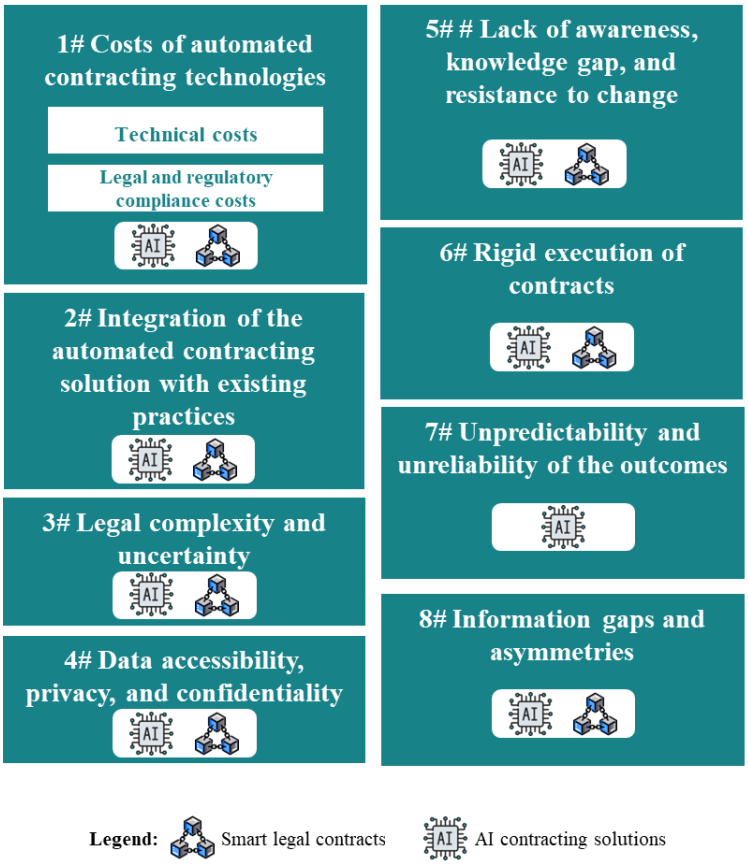
***Example*: Standardising web scraping permissions with smart legal contracts**

During an interview with a business familiar with smart legal contracts, an example was discussed involving the standardisation of web scraping permissions. In this scenario, a copyright owner of a musical work could use a smart legal contract to automate and standardise the process of setting permissions for web scraping. By encoding specific conditions—such as allowing only non-commercial research or restricting use solely to viewing—into a machine-readable format, the smart contract ensures that each interaction follows a consistent, predefined and compliant process. When a web scraper accesses the site, it can automatically determine its permissions based on these terms, enforcing compliance uniformly and reducing the need for manual review or interpretation of the contract.

7.1.2. Challenges

This section discusses the challenges of adopting automated contracting solutions, including implementation barriers and potential risks. While both smart legal contracts and AI-driven solutions share common challenges, each also faces unique issues due to their specific functionalities. Key factors have been identified as primary obstacles to successful implementation.

Figure 20. Challenges of automated contracting technologies



Challenge #1: Costs of automated contracting technologies

The costs associated with the implementation and use of automated contracting technologies represent a notable challenge for businesses. According to our survey results, 46% of respondents (out of 89 respondents) who have experience with these technologies mentioned technical costs as a considerable or major challenge[309], while 52% (out of 86 respondents) pointed to legal costs in the same terms[310]. These findings are consistent with existing literature,

[309] This percentage is calculated on a total of 89 respondents who evaluated the challenge posed by technical costs in adopting automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

[310] This percentage is calculated on a total of 86 respondents who evaluated the challenge posed by legal costs in adopting automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

which also suggests that implementation costs of automated contracting technologies are significant barriers to their broader adoption [311].

General trends in the adoption of automation technologies further support these conclusions. A 2020 report based on a survey about AI technologies revealed that 83% of enterprises surveyed identified adoption costs as a challenge for adoption[312]. More recently, Eurostat data from 2023 shows that 45.8% of EU enterprises reported that the high adoption costs of AI prevented them from using these technologies, decreasing from 54.2% in 2021, yet still affecting a significant proportion of enterprises[313]. Regarding smart legal contracts, a 2020 report on blockchain and other distributed ledger technology implementation has similarly highlighted—based on interviews with experts in the field—that high integration costs may deter potential users from implementing these solutions [314]. To understand this issue, the present subsection provides an overview of the main cost drivers associated with the implementation and maintenance of automated contracting solutions, which can be broadly categorised into a) **technical costs** and b) **costs related to legal and regulatory compliance**. The analysis demonstrates that the degree to which these costs pose a challenge is highly subjective and largely depends on the specific nature of the solution and the functionalities required.

a) Technical costs

Implementing automated contracting solutions begins with a **requirement specification phase**—a foundational step that incurs its own costs as it involves assessing the current environment and defining precise needs to guide effective system implementation. Following this, technical costs can be divided into two main categories: **set-up costs** and **recurring costs**. Set-up costs include the initial investment in purchasing, licensing, and customising hardware and software, as well as training staff and hiring specialised professionals for system set-up. Recurring costs, on the other hand, cover the ongoing expenses related to the continuous use, maintenance, and support of these technologies. Technical costs associated with each type of technology are outlined below.

For *smart legal contracts*, the nature of the blockchain used—public or proprietary—significantly influences the cost structure. When opting for a **public blockchain**, organisations primarily incur set-up costs related to contract specification, development, and deployment. As noted by technology providers during interviews, these costs involve coding the contract for the selected blockchain and deploying it onto the platform, with expenses varying based on the contract's complexity and market conditions. Recurring costs for public blockchain-based smart legal contracts include **gas fees**, which represent the cost required to execute transactions

[311] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission. Vatiero, M. (2023). *Do smart contracts incur higher transaction costs than traditional contracts?* Law and Economics *of the* Digital Transformation In: Mathis, K., Tor, A. (eds) Law and Economics of the Digital Transformation. ILEC 2023. Economic Analysis of Law in European Legal Scholarship, vol 15. Springer, Cham, . https://doi.org/10.1007/978-3-031-25059-0_2.

Vatiero, M. (2023). *Do smart contracts incur higher transaction costs than traditional contracts?* Law and Economics *of the* Digital Transformation In: Mathis, K., Tor, A. (eds) Law and Economics of the Digital Transformation. ILEC 2023. Economic Analysis of Law in European Legal Scholarship, vol 15. Springer, Cham, . https://doi.org/10.1007/978-3-031-25059-0_2. Rich, B. (2018). How AI is changing contracts. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts.

[312] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf.

[313] These percentages are derived from our calculations based on the dataset *isoc_eb_ain2*. They are calculated based on the total number of enterprises with 10 or more employees (excluding those in mining, quarrying, and the financial sector, as these are not covered in the database) that have ever considered implementing AI technologies.

[314] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies? Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content.

on a public blockchain network. These fees are denominated in the cryptocurrency native to the particular network and fluctuate based on several factors, including network demand, computational complexity, transaction resource requirements and overall market conditions.

Organisations that choose to develop their **own proprietary blockchain infrastructure**—or alternatively, more traditional mechanical solutions—face higher initial costs, particularly in the creation of the blockchain environment. Additionally, there are ongoing costs associated with maintenance and supervision, which encompass solution **monitoring**, **upkeep** and **troubleshooting.** A significant technical cost for smart legal contracts, irrespective of the blockchain used, lies in the **integration** with existing organisational systems and external data sources. Since smart legal contracts can only execute actions based on data within the blockchain, integration with external systems is indispensable to retrieve and process information from outside sources. Additional costs may also arise from creating a user interface to facilitate effective interaction with smart legal contracts.

Developing, integrating, and maintaining blockchain also requires **specialised expertise**. As noted in interviews with academia, many organisations lack the technical expertise needed to manage these systems in-house. In fact, our survey results indicate that 49% of respondents (out of 92 respondents) identified finding qualified staff as a considerable or major issue in setting up and operating automated contracting solutions[315]. As a result, many organisations outsource the setup and maintenance to external providers. Alternatively, some opt for subscription-based models that include platform access, updates, and support, with additional costs for specific integrations or transaction processing. For *AI-driven contracting solutions*, costs vary based on whether organisations opt for an off-the-shelf or custom-built solution. **Off-the-shelf solutions** typically involve initial costs related to licensing and integrating the system with the broader technological infrastructure and organisations' existing tools—nevertheless, these solutions are generally pre-trained and ready for immediate use, minimising the set-up time and resources required. Subscription models are common, where organisations pay periodically for platform access and support services.

For organisations developing their **own AI solutions**, interviews with businesses that are independently developing their own AI-driven contracting solutions for internal use highlighted that the major expenses include creating algorithms tailored to their contracting needs, training the AI on relevant datasets, and integrating it into the broader technological infrastructure of the organisation. Ongoing costs include maintenance, system updates, and troubleshooting, which can be outsourced if necessary. As with smart legal contracts, many organisations lack the in-house expertise required to develop and maintain these systems. This lack of technical skills often leads businesses to outsource development or, alternatively, opt for off-the-shelf solutions that come with built-in support, updates, and easier integration. This trend is reflected in our survey results, where only 8% of surveyed respondents (out of 98 respondents) reported opting for an AI solution developed in-house[316]. In general, both *AI-driven* and *blockchain-based technologies* entail similar types of costs; however, the magnitude of these costs is significantly influenced by the specific technology used—including distinctions between AI and blockchain, as well as between off-the-shelf and in-house AI solutions, and private and public blockchain. There are, however, two important costs necessary for the effective implementation and sustained use of both technologies. The first is **system integration**, as these technologies need to be adapted to an organisation's existing infrastructure and tools—public blockchain being the exception—and, in some cases, connected to or trained on data sources to

[315] This percentage is calculated on a total of 92 respondents who evaluated the challenge of finding qualified staff in adopting automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

[316] This percentage is calculated on a total of 98 respondents who specified the type of AI solution their company use or intend to use . Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

ensure effective operation. The second is the ongoing cost of **staff training**, as equipping employees to operate and manage these systems is essential for successful adoption.

b) Legal and regulatory compliance costs

Legal and regulatory compliance costs related to automated contracting technologies typically fall into two categories: administrative costs and legal review expenses arising from ensuring that the solution is legally compliant. **Administrative costs** in this context refer to recurrent expenses, such as documenting automated contracting technologies implementation, monitoring and reporting usage, or maintaining legal compliance records. Businesses that have integrated these technologies have generally reported during interviews that there are no significant administrative costs associated with the ongoing use of automated contracting solutions. However, businesses tend to conduct thorough **legal reviews** prior to adopting these technologies, which involve either the outsourcing of **external legal expertise** or **in-house evaluations**. These reviews typically address two main concerns that frequently arise when using such technologies: **understanding how to ensure compliance with current contract law** and potential **liabilities**—particularly in cases of system malfunction or errors involving external solutions. For businesses engaged in cross-border transactions, an additional third concern arise from differing interpretations and enforcement of contracts **across jurisdictions**, further encouraging legal reviews to mitigate risks. While these legal reviews are typically conducted before implementing the solution, they can also be recurrent to ensure continued compliance with evolving legal frameworks.

The aforementioned three concerns—legal compliance, liability issues, and jurisdictional complexities— are discussed in *challenge 3* and analysed in more detail in chapter 3.3.

Challenge #2: Integration of the automated contracting solution with existing practices

Integrating automated contracting solutions into existing business practices is often a complex and resource-intensive process. According to interviews with businesses familiar with automated contracting solutions, these technologies generally require significant **adaptation and customisation** to align with specific organisational needs. Unlike "plug-and-play" solutions, automated contracting tools require extensive preparatory work. This integration complexity adds to the time and resource demands, especially affecting upfront technical costs and delaying the adoption timeline. This challenge also emerged from our survey data, where 48% of respondents (out of 84 respondents) rated integration complexities as a considerable or major issue[317].

Broader industry trends in the adoption of AI reinforce these findings. A 2020 report based on a survey about AI technologies outlined that 81% of enterprises surveyed identified the high cost of adapting operational processes as a challenge for adoption, with 76% also mentioning incompatible or insufficient IT infrastructure [318]. Moreover, Eurostat data on AI adoption shows

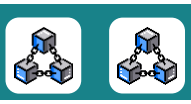
[317] This percentage is calculated on a total of 84 respondents who evaluated the challenge of integrating automated contracting solution with their existing business operations. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

[318] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf.

a slight decrease in enterprises reporting integration difficulties, from 49.8% in 2021 to 48.4% in 2023[319]. While the decrease is minimal, it indicates a persistent concern about integration.

Smart legal contracts similarly face significant integration barriers. A 2020 report on blockchain and distributed ledger technologies suggests that large-scale implementations need to consider the robustness of the network infrastructure, ensuring it can support the scalability required for effective operations[320]. For *smart legal contracts*, the integration process also requires careful consideration of the selection of the **appropriate blockchain**—whether private, permissioned, or public. This decision can have a significant impact on how seamlessly the technology integrates with existing systems. Interviews with academia and technology providers revealed that the lack of standardised best practices and technical frameworks to guide companies in the integration and implementation of smart legal contracts on different types of blockchain networks complicates this process. Companies must consider several factors such as transaction volume, stakeholder involvement, and system integration without clear direction, making it difficult to determine the most suitable blockchain infrastructure. Another factor that can hinder the integration of smart legal contracts is the need for human judgment, particularly when contracts involve subjective measurements or unstructured data. Interviews with technology providers indicated that in such cases, human-in-the-loop approvals or decisions may still be required. This partial reliance on human oversight challenges the complete automation of the contractual process and adds complexity to integrating smart legal contracts into business operations. Similarly, *AI-driven contracting solutions* face some challenges due to their current limitations in emotional intelligence. While this may not affect standard-form contracts that require little to no negotiation, it becomes a significant barrier in more complex contractual relationships where nuanced human interaction is critical[321].

Challenge #3: Legal complexity and uncertainty



Balancing traditional **contract law principles** with the **innovative aspects** introduced by automated contracting technologies is crucial for their effective implementation and usage within the business context. The main challenge arises from the fundamental differences between conventional contracting and automated contracting—which operate on algorithms and predefined rules[322]. This distinction creates uncertainty about how automated contracting fit within existing legal frameworks, requiring careful consideration to ensure alignment with the principles of contract law. This legal uncertainty stands out as a major concern, with our survey results indicating that over 74% of respondents (out of 84 respondents) identified it as a considerable or major challenge to the use of automated contracting solutions[323].

General trends in the adoption of automation technologies also underscore legal complexity and regulatory uncertainty as critical barriers to adoption. A 2020 report based on a survey about

[319] These percentages are derived from our calculations based on the dataset *isoc_eb_ain2*. They are calculated based on the total number of enterprises with 10 or more employees (excluding those in mining, quarrying, and the financial sector, as these are not covered in the database) that have ever considered implementing AI technologies.

[320] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies? Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content

[321] World Commerce & Contracting (2023). AI in contracting: An untapped revolution. Insights from the global contracting community. https://www.worldcc.com/Portals/IACCM/Resources/11556_0_AI%20in%20contracting%20an%20untapped%20revolution.pdf

[322] Oliver, M. (2021). *Contracting by artificial intelligence: Open offers, unilateral mistakes, and why algorithms are not agents.* ANU Journal of Law and Technology, 2(1), 45-87. https://search.informit.org/doi/epdf/10.3316/agispt.20220516066960. Durovic, M., & Janssen, A. (2019). *The formation of blockchain-based smart contracts in the light of contract law.* European Review of Private Law, 6(2019), 753–772. http://static.ie.edu.s3.amazonaws.com/Tertulia/Papers%202018/Papers/The%20Formation%20of%20Blockchain-based%20Smart%20Contracts%20in%20the.pdf

[323] This percentage is calculated on a total of 84 respondents who evaluated their uncertainty regarding the legal rules applicable to automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

AI technologies highlighted that 69% of enterprises surveyed identified the need for new regulation as an external challenge for adoption, with 59% of enterprises also identifying the liability for potential damages as a challenge[324]. Recent Eurostat data from 2023 indicates that 45.5% of EU enterprises reported regulatory uncertainty as a significant factor preventing them from adopting AI and other emerging technologies, up from 32.4% in 2021[325]. This upward trend suggests a growing concern among enterprises about the regulatory environment and its implications for investment and use of AI solutions. Regarding smart legal contracts, a 2020 report on implementing blockchain and distributed ledger technologies underscores regulation as a major barrier to adoption. Expert interviews further suggested that the lack of stable, clear guidance on regulatory impacts can prevent potential users from implementing these solutions[326].

Within this context, one core issue concerns the ability of automated contracts to satisfy the requirements for the formation of a valid binding contract, such as the 'meeting of minds'[327], raising questions about whether individuals or entities behind the technology can be legally bound by the agreement[328]. This legal uncertainty becomes particularly relevant when determining whether **contractual liability** can be imposed in the event of something going wrong. In cases of **mistakes** or **unintended consequences**, there may be uncertainty about the ability of existing doctrines to cope with automated contracts. Further, in the event malfunctions or errors, it could be unclear whether the responsibility falls on the technology providers or the legal professionals who crafted the agreement[329].

The immutability of smart contracts, in particular, can create complications when legal intervention is required. For example, in traditional contract law, in certain cases a court may hold a contract to be void *ab initio*. Practical problems may ensue where a smart contract has already executed on the blockchain, leading to a situation whereby reality jars with the legally correct position.[330] Additionally, the use of **pseudonyms** in blockchain-based smart legal contracts can complicate the use of authenticated **digital signatures**[331], as it can be difficult to confirm the signatory's identity, legal capacity, and authority[332].

Finally, while many of the **fundamental principles of contract law** are generally consistent across regions, cross-border transactions introduce further complexities. Interviews with legal experts highlighted that, while consumer law of the Member States is heavily rooted in the EU consumer *acquis* which ensures a high degree of harmonisation, contract law has historically

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[324] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

[325] These percentages are derived from our calculations based on the dataset isoc_eb_ain2. They are calculated based on the total number of enterprises with 10 or more employees (excluding those in mining, quarrying, and the financial sector, as these are not covered in the database) that have ever considered implementing AI technologies.

[326] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies? Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content

[327] Durovic, M., & Janssen, A. (2019). *The formation of blockchain-based smart contracts in the light of contract law.* European Review of Private Law, 6(2019), 753–772. http://static.ie.edu.s3.amazonaws.com/Tertulia/Papers%202018/Papers/The%20Formation%20of%20Blockchain-based%20Smart%20Contracts%20in%20the.pdf

[328] Oliver, M. (2021). *Contracting by artificial intelligence: Open offers, unilateral mistakes, and why algorithms are not agents.* ANU Journal of Law and Technology, 2(1), 45-87. https://search.informit.org/doi/epdf/10.3316/agispt.20220516066960

[329] Scholz, L. H. (2017). *Algorithmic contracts*. Florida State University College of Law. https://law.stanford.edu/wp-content/uploads/2018/03/3_SCHOLZ-FINAL_Formatted_Mar18.pdf.

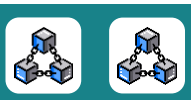
[330] A distinction should be noted between the definition of smart legal contract for the purposes of this study, and a pure smart contract, which is a mere self-executing if/then code.

[331] Durovic, M., & Janssen, A. (2019). *The formation of blockchain-based smart contracts in the light of contract law.* European Review of Private Law, 6(2019), 753–772. http://static.ie.edu.s3.amazonaws.com/Tertulia/Papers%202018/Papers/The%20Formation%20of%20Blockchain-based%20Smart%20Contracts%20in%20the.pdf

[332] European Union Blockchain Observatory & Forum. (2019). *Legal and regulatory framework of blockchains and smart contracts: Thematic Report 2*. https://www.blockchain4europe.eu/wp-content/uploads/2021/05/report_legal_v1.0.pdf

developed at national level, which tends to risk more divergence in application and interpretation.

Challenge #4: Data accessibility, privacy and confidentiality



Both smart legal contracts and AI-driven contracting solutions face challenges related to privacy and confidentiality, as they require access to sensitive data while operating in environments designed to prioritise transparency and efficiency. The **transparency** inherent in technologies like blockchain[333], and the **data-intensive** nature of AI[334], can conflict with the need to protect proprietary and sensitive information, which is often a core component of contractual practices. For AI contracting solutions, a 2020 survey-based report on AI technologies found that 77% of enterprises surveyed identified strict standards for data exchange—such as data protection laws—as a barrier to adoption[335]. This challenge also emerges from Eurostat data from 2023, which indicates that privacy and data protection issues deterred 42.4% of enterprises from adopting AI solutions, up from 29.4% in 2021[336]. In the case of smart legal contracts, a 2020 report points in the same direction and highlights understanding how to ensure GDPR compliance as a challenge[337].

However, the nature of these privacy-related challenges differs significantly between the two technologies. In smart legal contracts operating on public blockchains, **transparency**—one of blockchain's core strengths—can become a liability. While public blockchains enable anyone, including regulators and authorities, to access and inspect the smart contract code, this visibility raises major privacy concerns, as sensitive information may be inadvertently exposed to unauthorised parties[338]. For businesses that need to keep certain contractual details private, this lack of confidentiality could serve as a strong deterrent to adopting smart legal contracts.

In contrast, *AI-driven contracting solutions* require **large volumes of data**, much of which includes confidential and proprietary information extracted from contracts[339]. These systems use this data to identify patterns and make predictions on new, unseen text. While the process is sophisticated and valuable, it inherently depends on access to sensitive information, causing businesses to hesitate due to concerns about privacy risks and the potential misuse of proprietary data[340]. This reluctance to share data—stemming from fears it might be accessed by unauthorised parties—can hinder both the training and effectiveness of AI-driven contracting solutions.

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[333] Nzuva, S. (2019). Smart contracts implementation, applications, benefits, and limitations. *Journal of Information Engineering and Applications*. https://www.researchgate.net/publication/336369143_Smart_Contracts_Implementation_Applications_Benefits_and_Limitations

[334] World Commerce & Contracting (2023). AI in contracting: An untapped revolution. Insights from the global contracting community. https://www.worldcc.com/Portals/IACCM/Resources/11556_0_AI%20in%20contracting%20an%20untapped%20revolution.pdf

[335] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

[336] These percentages are derived from our calculations based on the dataset isoc_eb_ain2. They are calculated based on the total number of enterprises with 10 or more employees (excluding those in mining, quarrying, and the financial sector, as these are not covered in the database) that have ever considered implementing AI technologies.

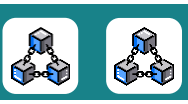
[337] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies? Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content, page 24.

[338] Nzuva, S. (2019). Smart contracts implementation, applications, benefits, and limitations. *Journal of Information Engineering and Applications*. https://www.researchgate.net/publication/336369143_Smart_Contracts_Implementation_Applications_Benefits_and_Limitations

[339] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[340] World Commerce & Contracting (2023). AI in contracting: An untapped revolution. Insights from the global contracting community. https://www.worldcc.com/Portals/IACCM/Resources/11556_0_AI%20in%20contracting%20an%20untapped%20revolution.pdf

Challenge #5: Lack of awareness, knowledge gap and resistance to change



The novelty of AI and blockchain technologies has contributed to a general **lack of awareness and understanding** within businesses regarding their potential applications, benefits, and limitations, which hinders widespread adoption. For blockchain solutions—such as smart legal contracts—, this translates in a limited appetite for investments. A common perception persists that blockchain is mostly suited to financial services, with limited applicability in other industries[341]. Furthermore, interviews with technology providers indicated that blockchain technology is often associated with the volatile cryptocurrency market, further fuelling scepticism in traditional sectors. In contrast, the appetite for AI investments is high and continues to grow in Europe, as AI is widely perceived as a key enabling technology with applications across all economic sectors. Reflecting this enthusiasm, AI companies have received median funding volumes significantly higher—over 60% more—than other software companies, particularly in early-stage investments[342].

Despite this momentum, the annual investment gap in AI and blockchain technologies is estimated to be approximately around €5–10 billion. This gap is more pronounced for AI compared to blockchain, highlighting a substantial shortfall in available funding[343]. In this line, a 2020 survey-based report on AI technologies also found that 65% of enterprises surveyed identified the lack of public or external funding as a major barrier to adopting these technologies—a challenge particularly pronounced for SMEs[344], particularly in early-stages, where investments tend to be more concentrated in local markets[345], as well as for younger enterprises[346]. This is further supported by interviews with businesses familiar with automated contracting technologies, reporting that attracting investors remains difficult and thus the venture capital market for automated contracting solutions is underdeveloped slowing the growth of companies in this area and limiting their potential impact on the market.

In addition to funding challenges, the adoption of automated contracting technologies is further hindered by a **shortage of skilled workers**. A 2020 survey-based report on AI technologies underscores this is a wide challenge across industries, with 81% of enterprises reporting a lack of skills concerning their existing staff and 85% facing difficulties in hiring new staff with the right skills[347]. Likewise, Eurostat data shows that the percentage of enterprises not using AI due to a lack of expertise rose from 62.6% in 2021 to 68.8% in 2023[348]. Similarly, a 2020 report on

[341] Verbeek, A., & Lundqvist, M. (2021). *Artificial intelligence, blockchain, and the future of Europe: How disruptive technologies create opportunities for a green and digital economy*. European Investment Bank.Artificial intelligence, blockchain and the future of Europe: How disruptive technologies create opportunities for a green and digital economy

[342] MMC Ventures. (2019*). The state of AI playbook*. https://mmc.vc/wp-content/uploads/2024/01/The-State-of-AI-playbook.pdf

[343] Verbeek, A., & Lundqvist, M. (2021). *Artificial intelligence, blockchain, and the future of Europe: How disruptive technologies create opportunities for a green and digital economy*. European Investment Bank. https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf.

[344] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

[345] Verbeek, A., & Lundqvist, M. (2021). *Artificial intelligence, blockchain, and the future of Europe: How disruptive technologies create opportunities for a green and digital economy*. European Investment Bank https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf.

[346] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[347] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf.

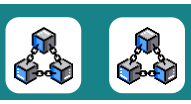
[348] These percentages are derived from our calculations based on the dataset isoc_eb_ain2. They are calculated based on the total number of enterprises with 10 or more employees (excluding those in mining, quarrying, and the financial sector, as these are not covered in the database) that have ever considered implementing AI technologies.

blockchain and distributed ledger technologies highlights that the availability of skilled workers remains a critical factor for adoption[349].

Our survey results further confirm these findings, with 46% of respondents (out of 86 respondents) identifying the shortage of knowledgeable staff as a considerable or major obstacle in implementing automated contracting solutions[350]. Technology providers mentioned that to address this issue for users, they are developing solutions that minimise the need for advanced technical expertise, making these technologies more accessible to non-technical professionals.

Importantly, the challenge is not only about a lack of skills, but also **resistance to change**. Interviews with technology providers and businesses familiar with automated contracting technologies suggested that legal professionals are often hesitant to adopt these solutions. This resistance may stem from various concerns, including fear of job displacement, doubts about the reliability of the technology (analysed in more detail in *Challenge #8*), or a reluctance to move away from familiar practices.

Challenge #6: Rigid execution of contracts



Automated contracting technologies are often characterised by their **rigidity and inflexibility**. While these features ensure precision and automation, they can clash with the need for flexibility in legal agreements. This rigidity manifests in different ways for smart legal contracts and AI-driven solutions, presenting challenges in anticipating and addressing unforeseen circumstances, adjusting contract terms post-execution, and safeguarding consumer rights. Our survey results indicate that 47% of respondents viewed rigid execution as a considerable or major problem for the use of automated contracting solutions[351].

For *smart legal contracts*, the immutability of blockchain technology makes it difficult to amend terms once encoded and executed. Unlike traditional contracts, which allow for judicial interpretation to fill gaps, smart legal contracts require all contingencies to be specified upfront, leading to **increased transaction costs**, as parties must invest significant effort into negotiating and documenting all possible scenarios in advance[352]. This ex-ante effort becomes even more **critical be**cause any **errors or fraudulent actions** discovered after the contract's execution cannot be reversed or cancelled. Once a smart legal contract is executed on the blockchain, the transaction is final, leaving no recourse for addressing mistakes after execution[353].

Another challenge concerning smart legal contracts relates to language. Smart legal contracts rely on programmable logic rather than traditional legal language, making it difficult to encode

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[349] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). *How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies?* Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content

[350] This percentage is calculated on a total of 86 respondents who evaluated the challenge posed by the rigidness automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

[351] Idem.

[352] Vatiero, M. (2023). *Do smart contracts incur higher transaction costs than traditional contracts?* In Mathis, K. & Tor, A. (Eds.), Law and economics of the digital transformation (pp. 21-32). Springer. https://doi.org/10.1007/978-3-031-25059-0_2

[353] European Union Blockchain Observatory & Forum. (2019). *Legal and regulatory framework of blockchains and smart contracts: Thematic Report 2*. https://www.blockchain4europe.eu/wp-content/uploads/2021/05/report_legal_v1.0.pdf. Incorporating arbitration mechanisms into smart legal contracts can provide a means to mitigate this issue. This approach involves parties integrating clauses that allow to refer disputes to arbitration, halting the contract's automatic processes pending arbitration outcomes. However, embedding arbitration clauses may reduce smart contracts' appeal introducing complexities that counteract their inherent immutable nature. Moreover, the exact mechanism arbitration in smart legal contract would follow remains unclear.

[354] Rogers, J., Jones-Fenleigh, H., & Sanitt, A. (2017, October). Arbitrating smart contract disputes: Negotiation and drafting considerations. Norton Rose Fulbright. International Arbitration Report, Issue 9. https://www.nortonrosefulbright.com/-/media/files/nrf/nrfweb/imported/international-arbitration-report---issue-9.pdf?revision=c9a5375e-5aff-4a71-a492-18c9305047d6&revision=5248112395077387904

vague and standard-like terms, such as "good faith", "best efforts", and "reasonable period"[355]. These terms are often used in traditional contracts to allow flexibility, but they are challenging to represent in precise code, further reducing the adaptability needed in complex contractual relationships.

In *AI-driven contracting solutions*, rigidity arises from their inability to adapt or renegotiate terms during execution. Once AI-driven solutions are **instructed to perform repetitive transactions**, they follow those instructions without room for human intervention. As in the case of smart legal contracts, this lack of flexibility requires meticulous preparation before execution, shifting the focus to the ex-ante stage to prevent issues during the contract's lifecycle.

The inflexible nature of automated contracting technologies can introduce risks related to **consumer protection**. For *smart legal contracts*, the irreversible nature of blockchain technology complicates compliance with consumer protection laws related to business-to-consumer (B2C) contracts. For instance, the right of a consumer to **withdraw from a contract** within a specified period or **suspend a contract** become challenging to fulfil when the contract is encoded on a blockchain and cannot be altered once executed[356].

Interviews with consumer associations highlighted similar challenges for *AI-driven contracting solutions* in the context of consumer protection. When AI-driven contracting solutions terminate contracts, the absence of **mechanisms to contest or undo AI-driven decisions** can leave consumers locked into unfavourable agreements with no means of reversal, potentially binding them to terms they did not fully agree to or anticipate. Furthermore, the absence of a **pre-transaction review period** to carefully examine and understand the terms and the rapid execution of AI-managed contracts can also lead to situations where consumers may be subjected to unfavourable conditions or terms that they were not fully aware of before the contract was concluded.

Finally, the automated enforcement of contracts in both technologies risk **shifting the legal burden of initiating legal action in disputes or breaches from businesses to consumers.** With the automated enforcement of contract terms once specific conditions are met, consumers can become bound to agreements with few options for reversal—potentially binding them to terms they did not fully agree or anticipate. In such cases, if a consumer believes a contract was enforced unfairly or in error, the responsibility to initiate legal proceedings to contest the terms often falls on them, rather than on the business, which traditionally would be the ones to take action to enforce the contract. This shift could potentially increase costs and procedural hurdles for individuals seeking to challenge the terms of an automated contract or seeking compensation for breaches.

Interviewed experts in automated technologies also pointed out that this shift in the legal burden is compounded by the lack of **nuanced consideration** in *smart legal contracts*. Traditional legal processes often take into account extenuating circumstances and ethical considerations, allowing for a more balanced and empathetic approach to enforcement. In contrast, smart legal contracts enforce terms strictly as coded, leaving no room for human judgment or adjustment, which can lead to rigid and potentially unfair outcomes in complex contractual disputes.

Challenge #7: Unpredictability and unreliability of the outcomes

[355] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission.

[356] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission.

An additional challenge relevant to AI-driven contracting solutions relates to unpredictability and reliability of outcomes. Existing research indicates that AI's complex nature and the difficulty in deciphering its internal processes—and consequently the inability to comprehend the reasons behind unexpected outcomes—erode confidence in automated contract decisions[357] [358]. A 2020 survey-based report on AI technologies highlights the prevalence of this challenge across industries, with 80% of enterprises surveyed identifying complex algorithms as difficult to understand and trust—a challenge particularly pronounced among SMEs[359]. For businesses, this difficulty in comprehending AI-driven processes can complicate adoption, as uncertainty in how decisions are reached limits the perceived reliability of these systems. Our survey results further confirm these findings, with 48% of respondents (out of 82 respondents) highlighting predictability and reliability of the outcomes of automated contracting solutions as a considerable or major obstacle in implementing automated contracting solutions[360].

One of the main issues in this field is opacity, often referred to as the **"black-box problem"**. The internal processes of AI-driven systems are inherently complex, which defines human-scale reasoning and understanding[361] and impedes users from fully grasping the rationale behind specific decisions[362]. Opacity not only makes it challenging to trust these systems but also opens the door for undetected risks. Fraud, discriminatory practices, or other illegal activities may be obscured by the complexity of these algorithms, allowing unethical practices to proceed unnoticed under the cover of sophisticated AI decision-making[363].

AI-driven solutions may also produce **unexpected outcomes** due to their **non-deterministic behaviour**, where the same input does not consistently result in the same output[364]. Large language models (LLMs)—AI systems that are designed to understand and generate human-like text, and often serve as a foundation for AI-driven solutions—, introduce another layer of complexity. These models are prone to **"hallucinations",** generating information that appears accurate and reliable but is in fact false[365]. Together, the unpredictability and risk of misinformation introduce significant uncertainties in system performance, making it challenging for businesses to trust these technologies entirely.

During interviews, businesses familiar with AI-driven contracting solutions pointed out that many of these systems are primarily trained on USA contracts, which creates significant barriers when applied to the European legal context. The reliance on USA-centric datasets means that these solutions may **fail to fully grasp the nuances of European legal systems**. While AI's pattern-recognition abilities allow these solutions to operate across different languages, this does not eliminate the risk of **linguistic biases**, particularly when dealing with domain-specific

[357] Scholz, L. H. (2017). *Algorithmic contracts*. Florida State University College of Law. https://law.stanford.edu/wp-content/uploads/2018/03/3_SCHOLZ-FINAL_Formatted_Mar18.pdf.

[358] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en ..

[359] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

[360] This percentage is calculated on the total of 82 respondents who evaluated the challenge posed by the rigidness automated contracting solutions. Calculations are based only on respondents who provided a specific answer and thus respondents who selected 'I do not know' were excluded from this calculation.

[361] JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[362] Oliver, M. (2021). Contracting by artificial intelligence: Open offers, unilateral mistakes, and why algorithms are not agents. *ANU Journal of Law and Technology, 2*(1), 45-87. https://search.informit.org/doi/epdf/10.3316/agispt.20220516066960

[363] Scholz, L. H. (2017). *Algorithmic contracts*. Florida State University College of Law. https://law.stanford.edu/wp-content/uploads/2018/03/3_SCHOLZ-FINAL_Formatted_Mar18.pdf.

[364] Joint JRC (2025), Study on novel forms of contracting in the Digital Economy (CoDE) AI-enabled autonomous contracting, https://commission.europa.eu/topics/business-and-industry/doing-business-eu/contract-rules/digital-contracts/innovative-technologies-and-data-contracts_en.

[365] Ibid.

terminology and legal conventions across jurisdictions. These biases can lead to errors and inconsistencies that further compromise the performance of AI-driven contracting systems[366].

Compounding these risks is the phenomenon of **"catastrophic forgetting"**, where AI systems may lose information from previously encountered tasks or experiences while learning new ones[367]. This could result in the loss of crucial information from earlier contracts as the AI continues to learn, further undermining the reliability and predictability of its decisions.

Challenge #8: Information gaps and asymmetries

Interviews with consumer associations revealed that the inherent complex nature of automated contracting technologies makes it difficult for consumers to understand how decisions are made and what data is used, leading to a sense of lost control, as consumers feel unable to assess the fairness and impartiality of automated decisions. Moreover, consumers are often unaware when automated contracting technologies—either AI-based solutions or smart legal contracts—are being use in the contractual cycle, including the negotiation, drafting and execution of contracts, as companies typically do not disclose this information. For AI-driven contracting solutions, the AI Act establishes the right to a clear and meaningful explanation of the role of the AI system in decisions affecting users (article 86), which aims to address this issue[368]. However, lack of such explanations exacerbates consumer knowledge gaps, further eroding consumer trust in automated contracting technologies. Such findings align with a 2020 survey on AI adoption among businesses, where 65% of enterprises surveyed identified low public trust as a challenge, and 61% cited reputational risks related to AI use[369]. This applies to blockchain technology as well, with a 2020 report on blockchain and distributed ledger technologies highlighting prevalent concerns about blockchain's association with money laundering and illegal activities[370].

Within this context, the use of *AI-driven contracting solutions* introduces significant risks related to **information asymmetries** between consumers and businesses. Through big data exploitation and advanced analytics, businesses gain insights into consumer behaviour, preferences, and purchasing power, which gives them a strong informational advantage. This allows AI systems to not only select who to contract with, but also tailor contract terms, such as pricing, loan approvals, or insurance premiums, to their advantage. This informational imbalance raises ethical concerns, as it may contribute to discriminatory practices[371], particularly in areas with significant social impact such as lending and credit. The AI Act prohibits the exploitation of vulnerabilities (such as socioeconomic status) through AI to cause significant harm to consumers (Article 5(1)b), aiming to address these risks[372].

Moreover, as AI-driven contracting solutions become more prevalent, consumers' autonomy in making informed decisions can be undermined. Interviews with consumer associations

[366] Rich, B. (2018). *How AI is changing contracts*. Harvard Business Review. https://hbr.org/2018/02/how-ai-is-changing-contracts

[367] Ohio State University. (2023). Overcoming 'catastrophic forgetting': A leap in AI continuous learning. https://neurosciencenews.com/ai-continuous-learning-23671/

[368] European Commission. (2024). Commission staff working document: Fitness check of EU consumer law on digital fairness (SWD(2024) 230 final).

[369] Ipsos Belgium, iCite Solvay Brussels School of Economics & Management. (2020). *European enterprise survey on the use of technologies based on artificial intelligence.* DG Communications Networks, Content & Technology. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

[370] European Crowdfunding Network, Fraunhofer IMW, Frankfurt School Blockchain Center. (2021). How do SMEs in Europe deploy Blockchain and Distributed Ledger Technologies? Blockpool. https://publica-rest.fraunhofer.de/server/api/core/bitstreams/d3d55eb8-2e07-450a-9a77-07ccb940d65a/content.

[371] Scholz, L. H. (2017). *Algorithmic contracts*. Florida State University College of Law. https://law.stanford.edu/wp-content/uploads/2018/03/3_SCHOLZ-FINAL_Formatted_Mar18.pdf.

[372] European Commission. (2024). Commission staff working document: Fitness check of EU consumer law on digital fairness (SWD(2024) 230 final).

highlighted concerns that AI-driven decision-making may lead to **biased contract terminations** or **push consumers towards less suitable alternatives**, potentially resulting in contracts that do not align with their best interests. Even when AI presents recommendations, it may do so in ways that, while technically correct, can still mislead consumers, further exacerbating the informational gap. To address these risks, the AI Act prohibits AI systems from using subliminal or intentionally manipulative and deceptive techniques that distort behaviour beyond a person's awareness (Article 5(1)a)[373], seeking to reinforce consumer autonomy.

***Example:** Consumer concerns with AI-driven decision-making in contract termination*

An interview with a consumer association revealed a specific case illustrating concerns about AI-driven decision-making in the termination of contracts. This example involves a UK company offering a dynamic energy-switching service powered by an AI algorithm. The algorithm continuously monitors the energy market for better rates, terminating existing contracts and initiating new ones without direct consumer involvement. This raises questions about the consumer's true consent to terminate the original contract—particularly if the original contract included specific benefits or terms that the AI may not account for—and whether consumers can easily withdraw from unwanted contracts to return to previous agreements if AI-driven decisions do not meet their needs. Moreover, the algorithm does not specify how it defines "better rates" or the criteria it uses to decide.

For *smart legal contracts*, information asymmetries arise in a different way. The coded language used in these contracts differs fundamentally from traditional human language, creating substantial **barriers to interpreting the intent or legal validity of contractual terms**[374]. This complicates the fulfilment of information requirements in business-to-consumer (B2C) transactions, where the terms must be clearly and comprehensibly stated to ensure consumers are fully informed about their rights and obligations. The Unfair Contract Terms Directive (UCTD) mandates that contract terms are drafted in clear and intelligible language (Article 5)[375]. However, the complexity of coded contracts can prevent consumers from fully understanding the implications of their agreements, adding to the asymmetry of information between parties[376].

7.1.3. Deep dive on legal challenges

This section focuses on the role of the law as an issue for the uptake of automated contracting technologies, using a case study approach. Three legal case studies have been developed in order to tease out some of the legal issues at play for users (or potential users) of automated contracting technologies. Thus, the case studies are drafted from a user-centric perspective with two of them set out from the perspective of a company wishing to adopt automated contracting solutions, setting out (i) the uncertainty which the current legal framework presents for this company, and (ii) the potential impact of legal fragmentation on the company's decision to adopt the solutions. The third case study, concerning imbalances in contracting focuses more on the perspective of the consumer, and rather than dwelling on the potential impact of such imbalance on take up, the impact is rather seen from a fairness and consumer law perspective. The assessments made in the course of these case studies bear out a number of issues. The first is that, owing to the fact that certain legal frameworks impacting upon automated contracting technologies (such as contract law) are primarily national frameworks, there is naturally some risk of legal fragmentation. The second is that, given the novelty of these technologies, legislative provisions have not yet 'caught up', and the legislative provisions which are in place

[373] Ibid.

[374] Kaal, W. A., & Calcaterra, C. (2018). Crypto Transaction Dispute Resolution. *Business Lawyer*. University of St. Thomas (Minnesota) Legal Studies Research Paper No. 17-12. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2992962

[375] Ibid.

[376] VVA, London Economics, Datarella, Prof. Michèle Finck, CSES (2023), Study on civil law rules applicable to smart contracts, Innovative technologies and data in contracts - European Commission.

were developed for a different technological reality. Thus, at present, there is much uncertainty as to how these legal concepts should apply to these technologies.

Legal uncertainty

The legal uncertainty which the case study focuses on relates broadly to two aspects: whether a given automated contract can be regarded as a valid enforceable legal contract; and whether, in the event of an outcome which was not intended by one or both parties, the contract can be voided. Both questions are important from the point of view of any party considering entering into such contracts. On the question of validity, it can be said that a contract will be a valid legally binding contract if it satisfies the requirements for a legally binding contract – in other words, it is not a question of whether an agreement formed via an automated contracting technology is a category of agreement which is valid contract under national contract law, but rather whether an agreement formed via an automated contracting technology meets certain requirements which determine whether any contract is valid. Initial legal uncertainty can arise by parties asking the wrong question in this regard. For example, asking "are contracts formed via AI contracting tools or smart contracts valid legal contracts?", whereas the question they should be asking is "do these contracts satisfy the requirements for validity?". This is linked to a definitional uncertainty: whether one is talking about a deterministic or non-deterministic AI contracting tool, or a tool which executes with or without human intervention. Similarly, when talking about 'smart contracts', it should be noted that a pure smart contract in the sense of being mere "if/then" code would be regarded as a mere technical arrangement, but not legal contract in the civil law sense. Thus, it can be said that not all smart contracts are 'smart legal contracts'. It should be noted that the working definition of 'smart legal contracts' for the present study is 'legally binding contracts in which either some or all of the associated terms, conditions and rights under the contract are defined in and/or performed by code execution.' However, there is no universally agreed definition of smart legal contract. Thus, it is not possible to state that smart legal contracts satisfy the validity requirements under national law in order to be regarded as valid binding contracts. The best one can state is that a particular smart legal contract or type of smart legal contract possesses the components that enable it to be a valid legal contract.

There is some certainty in relation to agreements in relation to, inter alia, the disposal of real property. There, some sort of human intervention (e.g. notarisation) is required for validity, so such contracts cannot be validly entered into wholly via automated contracting technologies. However, for other contracts without such a requirement, there are certain grey areas, depending on the nature of the technology used and the agreement formed. For example, it is not entirely clear whether an agreement made using a non-deterministic AI contracting tool would be regarded as sufficiently fulfilling the 'meeting of minds' requirement under contract law. On the other hand, it is possible that such uncertainties could be mitigated by parties by incorporating some human intervention prior to execution. A clear uncertainty, which arises in relation to both B2B and B2C contracts is how statutory pre-contractual information requirements to provide information in clear and comprehensible language is satisfied in the context of automated contracting solutions. It should be noted that contract law has developed over centuries and has shown itself to be incredibly adaptable to new technologies. Until the 18th century legal contracting was generally conducted in person. By the early 19th century, the development of the postal service challenged the manner in which some of the validity requirements should apply. The conundrum was thus: if a valid contract is formed only upon acceptance of an offer, and the offer and acceptance are both communicated via the postal service (with a natural delay during postage), when is the contract regarded as having been formed? If it was necessary for the acceptance to reach the offeror before the contract could be

said to be validly formed, this would create too much legal uncertainty.[377] After all, the party accepting the offer would not necessarily know if the acceptance had been received by the offeror, who might need to send him a letter to confirm receipt, and so on. The courts took a practical approach, noting that the only way to ensure legal certainty was to set out a general rule that an offer made via post was to be regarded as accepted upon posting by the party accepting the offer.[378] While the development of the postal rule may seem like ancient history, contract law has shown itself adaptable to other technologies which were the 'novel contracting technologies' of their time, such as contracts formed via telegram, telephone, email and modern 'click-wrap' contracts. Nonetheless, the fact that each generation of technology is accompanied by a body of case law dealing with disputes concerning the validity of contracts shows that there was just as much uncertainty among parties as there is today for those considering using automated contracting technologies.

Turning to the issue of unintended outcomes,[379] where this is due to the mistake of the automated contracting tool used by one or both parties, it is possible that the contract will be declared void. Again, such issues are not new to contract law, even if the technologies are, and the parties can console themselves with the fact that a body of jurisprudence exists covering unilateral or mutual mistakes and their impacts. However, they tend to relate to a mistake of fact, rather than a mistake in the functioning of an automated tool.[380] In some instances, the mistake may be mutual to both parties and so fundamental to the nature of the contract that it cannot be said that there is a meeting of minds between the parties, in which case, the contract will not have satisfied *ab initio* the requirements for a valid contract.[381] It is also possible that a party makes a unilateral mistake, when negotiating a contract, such as an obvious clerical error. For example, where a party rejects an offer of EUR 2,000 but makes a counteroffer of EUR 1,250, which is quickly accepted by the other party.[382] Or when a contract is executed for EUR 10.00 instead of EUR 1,000. It will be difficult for the latter party to enforce such a contract, when it was clearly a mistake made by the vendor. A challenge, however, arises when the mistake is less obviously an oversight or clerical error.

A further challenge occurs in relation to smart legal contracts, which are by nature self-executing and which execute in an immutable manner (via the blockchain), so that a contract will likely have been executed immutably by the time a mistake has been ascertained by the party looking to void the contract. In this case, a mere declaration that the contract is void and a refusal of specific performance will not be particularly useful for the party claiming the mistake. The judge would have to order the contractual arrangement to be unwound, which may not even be possible at the time his court is seized of the matter.[383]

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[377] A crucial consideration in terms of legal certainty was that the postal services kept good records of postage, and market participants had a certain amount of confidence in the system. If receipt by the offeror was required to be proven by the party accepting the offer, this would have been an evidential nightmare for that party. It was much easier to refer to a receipt from the local post office.

[378] The postal rule set out this general principle but made it subject to exceptions to be determined by the parties. For example, if the party making the offer expressly states that acceptance is to be by some other means, the rule does not apply. This became more relevant with the development of telephones and telegrams. Seminal cases concerning the postal rule in contract law include Adams v Lindsell 1 B & Ald 681, Household Fire and Carriage Accident Insurance Company (Limited) v Grant (1878–79) LR 4 Ex D 216, Henthorn v Fraser [1892] 2 Ch 27.

[379] One possibility is that the use of non-deterministic AI leads to an unintended outcome to the extent that the requirement of a 'meeting of minds' cannot be said to have been met, with the result that a valid contract cannot be regarded as having been formed.

[380] A separate question is potential recourse in tort against the provider of the automated contracting tool, for damages flowing from any malfunctioning of that tool which may have led to the unintended result.

[381] Such a situation may arise where it is clear that both parties believe the contract to concern different things. A famous common law example is the 19th century case of Raffles v Wichelhaus (1864) 2 H&C 906 where the contract was for cotton to be delivered by the ship *Peerless* travelling from Mumbai. It turned out there were 2 different ships by the same name, one leaving Mumbai in October, the other in December. It was clear that one party intended to sell the grain from one ship while the other party intended to buy grain from the other.

[382] This is a real example which arose in the case of Webster v Cecil (1861) 30 Beav 62, although naturally the currency was pounds sterling rather than euros.

[383] While much is made of the impotence of courts in dealing with the immutable nature of blockchain, it should be noted that courts have the power to impose a variety of orders and remedies. For example, if a transfer from A to B is made via a smart legal contract, the court can order B to transfer it back to A. Alternatively, should this no longer be possible (e.g. because B has since sold it on to a good faith purchaser), the court can order B to pay damages to A.

A certain amount of legal uncertainty always exists and is a fact of life. It tends to be more pronounced in the case of new technologies because they call into question many of the existing legal concepts. However, there seems to be evidence that stakeholders regard this challenge of legal uncertainty as being particularly problematic.[384] When dealing with stakeholder concerns regarding legal uncertainty, it is important to distinguish between the usual uncertainty involved where existing legal frameworks are adapting to new technologies, and legal uncertainty as to whether the existing legal framework is capable of so adapting. For example, in relation to the 'meeting of minds' requirement for the formation of a valid contract, the retention of human oversight or intervention prior to the execution of the contract can mitigate uncertainty relating to this point. On the other hand, a situation where a contract is being drafted, negotiated and executed autonomously by a non-deterministic AI system, with no human intervention or oversight presents a real challenge for the current legal framework – it is uncertain if or how such contracting can satisfy the meeting of minds requirement – there are possibilities to 'make it fit', but for the time being these remain very much in the academic sphere.[385]

In this sense, the challenge of legal uncertainty arises due to the innovative and novel nature of these contracting technologies, which raises questions about how existing legal frameworks can deal with them, combined with the fact that many of the legal issues which arise have not yet gone from the sphere of legal scholarship into the courtroom or legislative assemblies. Thus, the absence of legislation or case law which would help clarify the application of existing legal frameworks to these technologies.[386]

Legal fragmentation

From the point of view of a company which wishes to use automated contracting technologies across all 27 Member States, there are naturally rules of contract law, consumer law and tort law at national level to pay heed to. A large amount of these rules are broadly similar across Member States.[387] However, there are differences in these legal frameworks too among Member States.[388] Equally, the requirements of these legal frameworks would apply to the company irrespective of its use of these technologies. Indeed, part of the challenge will be national courts

[384] As noted in Section 3.2.2, legal uncertainty is one of the key challenges highlighted by stakeholders in the EEN survey, where over 80% of relevant respondents identified it as a considerable or major problem for the use of automated contracting solutions. Furthermore, while not addressing automated contracting specifically, in a targeted survey conducted as part of the Study to support the Fitness Check of EU consumer law on digital fairness and the report on the application of the Modernisation Directive (EU) 2019/2161, noted that concerning the use of AI systems in the context of B2C commercial practices (including AI chatbots), 50.5% of respondents noted that there was regulatory certainty to a moderate or large extent, while the rest regarded there to be little or no regulatory certainty.

[385] See Eliza Mik, 'From Automation to Autonomy: some non-existent problems in Contract Law' (2020) 36 Journal of Contract Law 205 for an interesting discussion on the distinction between normative and technical autonomy. The author posits that term 'autonomy' is an elusive one. In its broadest sense as understood in the liberal democratic tradition, it is linked with the individual being a moral and rational agent. In the legal tradition, it is linked with the concepts of moral and causal responsibility. However, she posits that what is meant by autonomy in the context of technology is a much narrower concept – technical automation, linked with the mechanisation of tasks. She argues that human beings have for a long time completely delegated the conduct of tasks to machines, without any normative connotations. She cites the examples of Mars rovers, shopping bots and trading algorithms. In essence, since the sort of autonomy with which we are concerned is mere technical autonomy and not normative autonomy in the sense of personhood (which would entail the attribution of notions normally attributable to a person such as intention to the technology itself), there is no agency between the AI system and the person using it. Rather the AI system is a mere tool being used by the person. The fact that the AI system has a higher degree of technical autonomy than courts are used to dealing with should not render this approach doctrinally unsound.

[386] It should be noted that the new UNCITRAL Model Law on Automated Contracting offers clarity to many of the issues causing uncertainty. For example, Article 5 provides that a contract shall not be denied validity or enforceability on the sole ground that no natural person reviewed or intervened in any action carried out in connection with the formation of the contract. This would address the questions raised in this report concerning the 'meeting of minds' requirement for validity. Article 7 ensures that the actions of the automated system are attributed. If the parties do not provide otherwise, an action carried out by an automated system is attributed to the person who uses the system for that purpose. Article 8 deals with 'unexpected actions' carried out by the automated system, whereby the foreseeability of the action is emphasised.

[387] For example, in relation to the formation of a contract, across Member States, there are many communalities in the conditions required to be present for the valid formation of a contract. Likewise, in relation to civil liability, causation is a requirement in order for liability to arise.

[388] For example, in the field of tort law, the standard of proof in some Member States is the "balance of probabilities", effectively a sort of 50+% test, whereas in others it is higher, such as "substantial likelihood" or "high degree of probability". See Comparative Law Study on Civil Liability for Artificial Intelligence, Ernst Karner/Bernhard A. Koch/Mark A. Geistfeld November 2020

trying to apply existing legal frameworks to these new technologies. In the absence of a harmonised approach, some fragmentation can be expected.[389]

In relation to B2B contracts that the company is executing, companies could at least try to deal with any potential issues arising from fragmented contract law frameworks by inserting choice of law clauses in favour of the Member State whose contract law the company regards as being the most clear.[390] However, for now it is too soon to tell which Member State that might be. In addition to the lack of case law, there is a lack of legislation dealing with automated contracting at national level. One exception is Greece, where legislation clarifies that the legal provisions of the Greek Civil Code concerning the formation of a contract, its validity, defects of will and the pre-contractual obligations directly apply to smart contracts. It also clarifies that a smart contract may be part of a main contract concluded in another way.[391] Thus, its terms may: (a) be formulated by the contracting parties and incorporated in computer program code; or (b) be pre-identified in the distributed ledger technology and selected or accepted by the parties. The Greek legislation also provides that, where a smart legal contract is sought to be relied on in court, the content of the computer code can be proven by an expert report conducted by a person with special knowledge in the science of cryptography, which should be submitted along with the electronic code. Thus, the content of the code can be rendered to the court in the Greek language.[392]

Of course, in B2C contracts the nature of these technologies will test many of the concepts of existing legal frameworks which were developed prior to their existence. Thus, despite the high level of harmonisation of consumer law (national consumer law being heavily rooted in the EU consumer acquis), it is possible that fragmented approaches may still emerge.[393]

The Unfair Terms in Consumer Contracts Directive applies to terms in consumer contracts which have not been individually negotiated which are unfair, in the sense of causing a significant imbalance in the parties' rights and obligations arising under the contract, to the detriment of the consumer,[394] and sets out in annex an indicative and non-exhaustive list of the terms which may be regarded as unfair. There is quite a lot of discretion retained by national courts when assessing the unfairness of a contractual term, taking into account 'the nature of the goods or services for which the contract was concluded and by referring, at the time of conclusion of the contract, to all the circumstances attending the conclusion of the contract and to all the other terms of the contract or of another contract on which it is dependent.'[395] It is not

[389] For example, as noted in ICF, Novel Forms of Contracting in the Digital Economy, Interim Report certain terms which are essential to certain contracts such as 'reasonably' or 'in good faith' are naturally difficult to implement in computer code. It is not clear, at the current state-of-the-art, if automated contracting tools are capable of fully understanding and implementing these nuanced notions. As disputes come before national courts, these are the kinds of challenging interpretational issues for judges.

[390] For example, should the courts of a Member State clearly deal with the issue of autonomy of AI systems in the manner proposed by Mik (2020) – it is possible that many companies would favour that legal system as it would provide legal certainty. Article 3(1) of the Rome I Regulation provides that the contract shall be governed by the law chosen by the parties; Article 4 provides that in the absence of choice, for a contract for the provision of services, the law of the Member State where the service provider has its habitual residence will apply; Article 6 provides that for consumer contracts, it will be the Member State where the consumer has his habitual residence (provided the service provider pursues professional activity in that Member State or directs its activities to it), unless the consumer contract agrees otherwise, with the proviso that this cannot deprive the consumer of certain protections which he would have benefited from in his Member State of habitual residence.

[391] Greek Law 4961/2022 regarding 'Emerging Information and Telecommunications technologies, enhancement of digital governance and other provisions' (Official Gazette (FEK) A΄ 146/27.7.2022), Article 49. For more on this Greek Law, see ICF, Novel Forms of Contracting in the Digital Economy, Interim Report

[392] Ibid, Article 51

[393] A natural advantage of the fact that consumer law is heavily grounded in the consumer acquis is that such fragmentation can be mitigated by the need to refer to the CJEU for a preliminary reference pursuant to Article 267 TFEU. However, it should be noted that in cases before courts or tribunals of a Member State whose decision there is a judicial remedy under national law, the court has discretion on whether to refer the question. Should a lower court not refer the question directly, this can cause delays in resolving the question. Given differences among Member State courts in terms of referral tendencies, this could generate, at least temporarily, fragmentation. For economic actors, unlike legal scholars, what matters is whether there is a clear, harmonised approach at the time they are entering into a contract, not whether clarity or harmonisation may come at some future date. See Arthur Dyevre, Monika Glavina, Angelina Atanasova, 'Who Refers Most? Institutional Incentives and Judicial Participation in the Preliminary Ruling System' (2020) Journal of European Public Policy 27(6) 912-930

[394] Directive 93/13/EEC, Article 3(1).

[395] Ibid, Article 4(1)

a full harmonisation directive but allows for Member States to adopt more stringent rules, which they must inform the Commission of if they extend the unfairness assessment to individually negotiated contractual terms or to the adequacy of the price or remuneration; or contain lists of contractual terms which shall be considered as unfair.[396] The purpose of this requirement is to ensure that the Commission can keep consumers and traders alike informed of any differences among Member States in this regard (enabling them to be aware of any fragmentation that might arise).

The extent to which this potential fragmentation acts as an obstacle in practice is unclear. The evidence from the stakeholder consultation is limited in that regard, and the nascent nature of the technologies means that it may be difficult to quantify. As businesses operating across 27 different Member States are required, in any event, to deal with 27 different legal systems (with different employment and social security frameworks, different property and planning rules etc), it is somewhat a given that they need to deal with different contract law, and civil liability rules too. The question is to what extent these differences in contract law and civil liability law rules have the potential to act as an obstacle to the uptake of these technologies.

The challenge of legal fragmentation seems inextricably linked to the abovementioned challenge of legal uncertainty. As noted above, the fact that the novel issues which these technologies present for existing legal frameworks have hitherto remained largely in the realm of legal scholarship, and that a significant body of case law has not yet developed, means that parties seeking to use such contracting technologies are operating without a clear roadmap. Likewise, as these issues do come before national courts, it is possible that judges in different jurisdictions will take significantly different approaches in trying to align their existing legal frameworks with these technologies.

Imbalance between parties

As noted in Section 3.2.2 above, consumer associations have noted a lack of awareness of how automated contracting works and information asymmetry between providers and consumers. It is unclear whether this informational/awareness issue has any impact on uptake. Yet, there are concerns about imbalance between contracting parties which can be said to relate less to the issue of uptake and more to the issue of fairness, and whether the body of consumer law developed at EU level is sufficient to ensure that fairness in the context of these novel contracting technologies. A specific example which may arise in this regard is the use of AI assistants by consumers to engage in contracts. Particularly, where the AI Assistant of a large platform is put at the consumer's disposal to search for the best deals or execute the most advantageous contracts for him, and the AI Assistant somehow limits the scope of the search to certain offers (e.g. those on the platform itself), or some other aspect of its functioning does not necessarily deliver the best possible outcome for the consumer.[397] To the extent that the platform is regarded as being in a dominant position on a relevant market, setting the AI assistant to prioritise deals on its own platform could be regarded as an abuse of dominant position pursuant to Article 102.[398]

While it may be necessary to clarify the scope of consumer law (or indeed other legal frameworks) to cater for the continued penetration of such technologies, there are a number of simple possibilities which could address the unfairness by at least ensuring that the consumer retains a certain element of (ex ante) control over the execution of contracts via such AI

[396] Ibid, Article 8a

[397] Assuming that the provider of the AI assistant is a designate 'gatekeeper' pursuant to the DMA, pursuant to Article 6(5) DMA, it 'shall not treat more favourably, in ranking and related indexing and crawling, services and products offered by the gatekeeper itself than similar services or products of a third party. The gatekeeper shall apply transparent, fair and non-discriminatory conditions to such ranking'

[398] The *Google Shopping* Case is a recent example here where Google was held to have abused its dominant position by favouring its own comparison shopping service on the results pages of its general search engine, while demoting the results from competing services. See AT.39740; Case T-612/17; Case C-48/22 P.

Assistants, and ensuring that the consumer is sufficiently informed of any algorithmic preferences which the AI Assistant may be employing which results in limiting the scope of the offers being assessed.

The challenge in relation to the imbalance between the parties[399] is one of information asymmetry and opacity. The consumer (or even business) using an AI contracting tool does not possess certain information about the manner in which the tool operates, which might have a detrimental impact on him (e.g. if the tool prioritises products or services on a particular platform, this may lead to the consumer receiving only the best offer on that platform, but not the best offer generally speaking).[400] Crucially, the consumer (or even business) does not know whether the reason he has not necessarily received the best offer from his perspective is (i) due to the AI tool not fully understanding his wishes, or due to the algorithm including certain preferences (although not discriminatory or prioritising the goods or services of the platform) which have not yielded the best outcome for him, or (ii) whether the algorithm has actually been set in such a way as to prioritise the goods or services of the platform on whose AI tool the consumer relies. The latter (assuming the platform is a 'gatekeeper' pursuant to the DMA, is illegal. However, without knowledge of how the algorithms work, the consumer (or business) has no way of knowing if the behaviour is illegal. By contrast, the party whose AI contracting tool the consumer is using does possess this information.[401]

A practical suggestion raised by the ELI would be to ensure that some sort of human intervention (either approval or objection) is always retained prior to a contract executed by an AI Assistant becoming binding. Another possible suggestion is "consumer protection by design and default". A further possibility may be at least the proactive flagging to a consumer of the fact that the AI Assistant offered by a platform may prioritise certain content, and that it may not necessarily choose the best option available to the consumer out of all the possible offers which exist. This enables the consumer to be at least aware of the limitations.

7.2. Data-driven business models

This chapter provides an analysis of the factors influencing the **use and uptake of data-driven business models in the EU**. The analysis focuses on the benefits these models can bring, while also addressing the challenges that may arise, such as legal complexities, consumer reluctance to share data, required technical investments, and skills shortages. The results of this analysis are presented in an aggregated manner, addressing data-driven business models as a whole, while noting key differences between the two specific models studied: **data contracts** and **connected products**, where applicable.

[399] Obviously imbalance between parties gives rise to several challenges (e.g. many of the practices which may be enabled or exacerbated by AI are dealt with in DG JUST Study to support the Fitness Check of EU consumer law on digital fairness and the report on the application of the Modernisation Directive (EU) 2019/2161 Final Report), but here we focus on the challenges which are specific to the use of automated contracting solutions.

[400] Other information which the consumer might not know is whether the platform whose AI contracting tool he is using uses his personal data to practice price discrimination or manipulative practices. For an appreciation of personalised pricing (and a distinction between first, second and third degree personalised pricing), see DG JUST Study to support the Fitness Check of EU consumer law on digital fairness and the report on the application of the Modernisation Directive (EU) 2019/2161 Final Report - Part 1, led by CSES, section 2.1.5. While price discrimination has traditionally been common in many types of markets, there is a concern that 'increased depth of data available to major platforms and merchants and improvements in algorithms, alongside the potential to adapt and display personalised prices in real-time, could enable online merchants to exploit information asymmetries and vulnerabilities of individual consumers when supported by data and automated processes.' In relation to the potential for manipulative practices, see ICF, Novel Forms of Contracting in the Digital Economy, Interim Report, Chapter 2.6.5.

[401] The more (technical) autonomy the consumer cedes to the AI assistant, the more pronounced the impact of this informational asymmetry is likely to become. As noted in the Commission staff working document. Fitness check of EU consumer law on digital fairness [COM (2024) 288 final], already 15% of consumers of users of virtual assistants indicate that they had often experienced a situation where they were charged for a purchase they did not intend to make (e.g. unknowingly entered into a paid subscription). The more technical autonomy ceded to the AI assistant and the less oversight of the consumer, the more risk of such mishaps arising. In that sense, the moral duty on the company offering the AI assistant becomes more pronounced. In addition, as noted by the ELI, several of the concepts and definitions of consumer legislation may need to be studied more closely in the context of contracting via AI assistants in order to assess whether they are still relevant, such as 'materially distorting the economic behaviour of consumers' (Article 2(e) Unfair Commercial Practices Directive), 'undue influence' (Article 2(f) Unfair Commercial Practices Directive), and 'transactional decision' (Article 2(k) Unfair Commercial Practices Directive).

It is important to note that the analysis of data-driven business models is more limited compared to the one for automated contracting technologies (see section 3.3) due to constraints in data collected, including more limited responses to the survey conducted for this study.

7.2.1. Benefits

This section provides an overview of the **main benefits associated with data-driven business models**. Benefits are categorised into two dimensions: 1) organisation-related benefits, and 2) customer-related benefits.

Figure 21: Benefits of data-driven business models

Dimension #1: Organisation-related benefits

Data generated through data-driven business models offers substantial benefits to organisations deploying these models. One key advantage is the ability to **enhance decision-making** on business operations and opportunities, as organisations can gather valuable **insights into consumer behaviour**[402]. By analysing this data, businesses can better understand their customers, allowing them to make more informed choices. Additionally, when individual consumer data is aggregated at scale, it can reveal **patterns in broader population behaviour**. These patterns help organisations generalise insights about larger demographic groups, enabling them to cater more effectively to their target markets[403]. Improved decision-making based on data-driven business models can also lead to **higher product and service quality**, as well as greater **efficiency** in their delivery. By leveraging consumer insights, organisations can refine their offerings to better align with customer preferences and needs. This enhanced quality and efficiency can, in turn, lead to increased sales and improved cost-effectiveness, ultimately boosting **profitability**. According to literature and interviews with data protection law experts,

[402] Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713. Bulger, M., Taylor, G., & Schroeder, R. (2014). *Data-driven business models: challenges and opportunities of big data*. Oxford Internet Institute. https://www.oii.ox.ac.uk/wp-content/uploads/old-docs/nemode_business_models_for_bigdata_2014_oxford.pdf. See for instance section 2.2.

[403] Graef, I., Petročnik, T., & Tombal, T. (2023). *Conceptualizing autonomy in an era of collective data processing: From theory to practice*. Digital Society. https://doi.org/10.1007/s44206-023-00045-3.

these benefits are particularly pronounced when organisations adopt data-driven strategies effectively[404].

Studies from McKinsey support these findings, revealing that businesses that make extensive use of customer analytics are 23 times more likely to outperform their competitors in new customers acquisition and 9 times more likely to do so in customers retention[405]. This capacity to deeply understand and respond to customer behaviour not only enables these businesses to achieve, on average, 85% higher sales growth than their competitors, but also optimise operations and supply chains, resulting in overall operational profit increases of approximately 6%[406], and underscoring the powerful impact of data-driven customer insights on overall business performance. Notably, this success is not solely driven by investments in IT systems but also by fostering the necessary skills within both analytics teams and executive leadership to interpret and act on the data insights[407]. Cultivating a data-driven culture has become crucial, as highlighted in a report conducted by Harvard Business Review Analytic Services. In this study, 75% of executives familiar with their organisations' data and analytics strategies indicated that such a culture is very or extremely important to overall success[408]. Interviews with data legislation experts revealed that organisations adopting data-driven strategies experience **increased productivity and innovation**, with enhanced efficiency in their processes through better customer insights.

Beyond internal use, data-driven business models can create additional revenue streams by enabling the **sale of data** to third parties, to the extent such sale is permitted under applicable law. Selling data not only increases profitability but also allows organisations to form new partnerships and access markets and industries beyond their direct competition[409]. Interviews with data legislation experts highlighted that data-driven models allow businesses to diversify their revenue streams by capitalising on the data they collect. However, data selling seems to be still **relatively underutilised**, particularly among SMEs. Although statistics on data transactions in general are not available, some insights can be drawn from Eurostat data on big data. According to these statistics, only 0.4% of SMEs are currently involved in selling big data, compared to 1.7% of large enterprises. On the buying side, 0.9% of SMEs purchase big data, while 4.1% of large enterprises engage in buying big data[410]. These figures suggest that large enterprises may be more actively participating in both the buying and selling of data, likely due to their greater resources and infrastructure for handling and monetising data. Nevertheless, according to interviews with data legislation experts the number of organisations wanting to sell and buy data are expected to grow as the digital economy expands, bringing the benefits of selling data to more organisations.

Data-driven business models cannot only enhance profitability through effective usage of data, but could also provide businesses with a competitive advantage. According to experts in European law, businesses collecting large amounts of data can choose to withhold it from

[404] Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713. Bulger, M., Taylor, G., & Schroeder, R. (2014). *Data-driven business models: challenges and opportunities of big data*. Oxford Internet Institute. https://www.oii.ox.ac.uk/wp-content/uploads/old-docs/nemode_business_models_for_bigdata_2014_oxford.pdf

[405] McKinsey (2014). *Using customer analytics to boost corporate performance.* https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Marketing%20and%20Sales/Our%20Insights/Five%20facts%20How%20customer%20analytics%20boosts%20corporate%20performance/Datamatics.pdf.

[406] Brown, B., Kanagasabai, K., Pant, P., & Serpa Pinto, G. (2017). Capturing value from your customer data. McKinsey & Company. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/capturing-value-from-your-customer-data.

[407]McKinsey (2014). *Using customer analytics to boost corporate performance.* https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Marketing%20and%20Sales/Our%20Insights/Five%20facts%20How%20customer%20analytics%20boosts%20corporate%20performance/Datamatics.pdf.

[408] Harvard Business Review Analytic Services. (2022). Transforming Data into Business Value through Analytics and AI. . Transforming Data into Business Value through Analytics and AI.

[409] Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713

[410] Eurostat (2024). *Big data analysis by size class of enterprise.* https://doi.org/10.2908/ISOC_EB_BD.

competitors or third parties, thereby **safeguarding their market position**. While this can be seen as a benefit for individual organisations that deploy data-driven business models, it is important to note that it can potentially become a risk at a macro-level, as it may negatively impact competition in the market. This benefit to individual organisations deploying data-driven business models should therefore be taken with caution, as this could lead to monopolistic practices and competition distortion, according to interviews with data legislation experts and literature[411].

An example of this competitive advantage is found in organisations that sell **connected products.** Organisations utilising connected products gain a significant edge by controlling the data generated through these devices. While the Data Act was introduced to ensure that users of connected products and related services can access the data they co-create, organisations can attempt to retain de-facto exclusive control over data. According to the literature, the user right to share connected products' data is narrowly scoped (excluding inferred and derived data), and is surrounded by legal uncertainty (e.g. trade secrets, GDPR compliance, "reasonable" compensation), both of which can create complex negotiations, disputes and high transaction costs. Combined with unresolved issues around technical interoperability and "in situ" access to devices, this can make the mechanism slow, costly and unattractive for users and third parties, allowing data holders to retain de facto exclusive control over the most valuable data [412]. It was argued that this exclusivity allows them to maintain a dominant market position, potentially preventing competitors from benefiting from the same insights[413].

It is important to note that these observations are primarily based on ex-ante literature and early assessments, and that the practical effects of the Data Act's application are only beginning to emerge. The concerns identified in the literature should therefore be revisited in light of empirical evidence from the implementation of the Data Act, which became applicable in September 2025 at the time of writing, and can be more fully assessed in the context of its subsequent evaluation.

Dimension #2: Customer-related benefits

While the benefits of data-driven business models are primarily realised by the organisations deploying them, some advantages extend to the customers of these organisations as well. These customer-related benefits, though more limited compared to the operational and profitability gains experienced by businesses, refer primarily to the value customers receive from products and services and, potentially, to lower prices. To the extent that these benefits for customers are based on processing of personal data, businesses must comply with the GDPR and have a valid legal basis under this Regulation.

As highlighted in interviews with data legislation experts and existing literature, one key benefit for customers of data-driven business models is the **improvement of existing products and the creation of new ones,** based on customer behaviour and interests. By analysing data patterns, organisations can refine their offerings to better meet customer needs, resulting in

[411] European Commission: Directorate-General for Justice and Consumers (2022). *Study on model contract terms and fairness control in data sharing and in cloud contracts and on data access rights – Executive summary*, Publications Office of the European Union. https://data.europa.eu/doi/10.2838/462588. Data.Europe.eu (2022). *Sharing Data (Anti-)Competitively. Will European data holders need to change their ways under the proposed new data legislation?*

[412] Kerber, Wolfgang. (2023) *Governance of IoT Data: Why the EU Data Act will not fulfill its objectives.* GRUR International. Journal of European and International IP Law p. 120–135 https://doi.org/10.1093/grurint/ikac107 ; Kraemer, j. et al. (2023*) Data Act: Towards a balanced EU regulation*. CERRE. https://cerre.eu/wp-content/uploads/2023/03/230327_Data-Act-Book.pdf; Max Planck Institute for Innovation and Competition (2022). *Position statement on the EU Data Act*. https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/Position_Statement_MPI_Data_Act_Formal__13.06.2022.pdf

[413] Kerber, Wolfgang. (2023) *Governance of IoT Data: Why the EU Data Act will not fulfill its objectives.* GRUR International. Journal of European and International IP Law, p. 120–135, https://doi.org/10.1093/grurint/ikac107, see for instance section 3.

improved product quality and a more personalised customer experience[414]. The ability to **gain consumer insights** in order to better understand customer needs and behaviour trends allows businesses to provide tailored solutions, ultimately increasing customer satisfaction—according to a report by the Harvard Business Review Analytic Services, leaders in data utilisation reported a 79% increase in customer satisfaction, compared to 51% among other businesses[415].

Finally, one might question whether the increased profitability businesses gain through data-driven business models, as discussed in previous sections, translates into benefits for customers. Determining this impact specifically for DDBMs would require additional in-depth research, but economic theory offers some useful insights. According to the economics principles of productive and allocative efficiency, in perfectly competitive markets, firms often leverage increased profitability to reduce costs, thereby benefiting consumers through lower prices. In such markets, the **pressure to maintain or increase market share** compels firms to **pass on cost savings to consumers in the form of reduced prices**.

Further evidence is provided by Ten Kate and Niels (2005) who argue that, in non-perfectly competitive markets, such as oligopolies, the *pass-on rate* — meaning the proportion of cost savings reflected in lower prices —is largely independent of the price elasticity of demand and the market share of the cost-saving firm. Instead, the **number of competitors in the market** and the **type of competition** play a more significant role. Their analysis further suggests that, while the **strength of cost pass-on varies depending on these factors**, firms generally do not need to give up benefits for the sake of customers. Instead, **cost pass-on allows them to expand their profits because lowering prices attracts new customers**, leading to increased sales that can outweigh the reduced profit margin per unit[416]. This seems to suggest that cost pass-on is a strategy employed by organisations to increase their market share, therefore indirectly benefitting customers as well.

7.2.2. Challenges

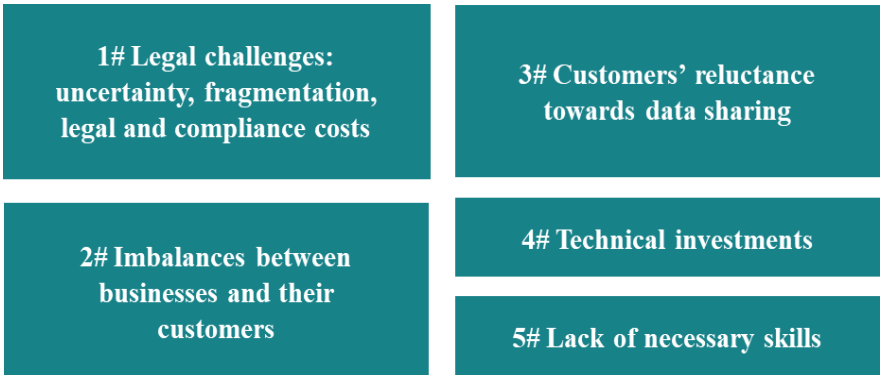
This section provides an overview of the main **challenges** associated with data-driven business models. These include legal challenges, consumers' reluctance towards data sharing, technical investments, and lack of skills. These barriers can hinder the successful deployment of data-driven models and pose risks throughout their entire lifecycle. It is important to highlight that this section offers a comprehensive overview of the main challenges, of different nature, associated with the use and uptake of data-driven business models, establishing the baseline for the subsequent analysis in chapters 4.2.2.1 and 4.3. Building on this analysis, the following sections will first delve into the legal dimension (chapter 4.2.2.1) and then examine whether the identified challenges amount to problems (chapter 4.3).

[414] ECLA & Osborne Clarke (2022). *Data-driven Business Models: The role of legal teams in delivering success*. ECLA Association Services SPRL. https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf; Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713

[415] The survey conducted by Harvard Business Review Analytic Services included 366 executives familiar with their organisations' data and analytics strategies. A subset of these respondents, termed "leaders" and representing 45% of participants, rated their organisations' effectiveness in using data to create business value between 7 and 10 on a 0-10 scale. In contrast, "other businesses" refers to the remaining 55%, who rated their effectiveness below 7 on the same scale. Harvard Business Review Analytic Services. (2022). Transforming Data into Business Value through Analytics and AI. Patrocinado por Google Cloud. https://hbr.org/sponsored/research/transforming-data-into-business-value-through-analytics-and-ai.

[416] Ten Kate, A., & Niels, G. (2005). *To what extent are cost savings passed on to consumers? An oligopoly approach*. European Journal of Law and Economics, 20(3), 323–337. https://doi.org/10.1007/s10657-005-4199-3

Figure 22. Challenges data-driven business models



Challenge #1: Legal challenges: uncertainty, fragmentation, legal and compliance costs

As mentioned extensively in the literature and during interviews with both experts in data legislation and organisations deploying data-driven business models, the adoption of data-driven business models may entail a number of legal challenges. One significant challenge is the **perceived complexity of the European legal framework**, which encompasses a vast array of regulations concerning the digital economy. Many organisations view this regulatory landscape as overly complex, a sentiment echoed in a study conducted by the European Company Lawyers Association (ECLA), where over two-thirds of company lawyers in Europe identified this as the main obstacle to implementing data-driven business models [417]. Similar concerns are echoed in other studies, which highlight confusing or fragmented data-protection and data-economy rules, lack of clarity about legal consequences, and regulatory obstacles as key barriers to deploying data-driven business models in the EU [418].

Interviews with organisations deploying these models and results from the surveys conducted as part of this study further confirm this challenge. Consulted organisations reported that navigating this complex regulatory landscape involves adhering to multiple legal frameworks, including the General Data Protection Regulation (GDPR), contract law, digital legislation, and various sector-specific regulations. In terms of human resources, nearly 50% of companies within the EU-27 are estimated to allocate 2 employees specifically for integrating these legal requirements into business processes, dedicating between 11 and 20 days per employee for these adjustments—thus the average estimated adjustment costs to comply with EU digital fairness legislation for each business in the EU-27 range between €1600 and €2331[419]. Additionally, interviews with organisations that deploy data-driven business models cross-border further highlighted that the **variations in regulations and levels of compliance across Member States add another level of complexity**. For example, one organisation operating cross-border noted that different countries classified their services differently—such as whether a service was defined as critical infrastructure—further complicating legal compliance across the EU. The lack of uniform regulation tends to increase the legal burden on organisations striving to comply with diverse and sometimes overlapping regulatory requirements. In fact, when entering another Member State's market, 81% of companies operating cross-border are

[417] ECLA & Osborne Clarke (2022). *Data-driven Business Models: The role of legal teams in delivering success*. ECLA Association Services SPRL. https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf

[418] European Commission & Ipsos (2020). European enterprise survey on the use of technologies based on artificial intelligence. https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-09/european-enterprise-survey-and-ai-report.pdf

(While AI-focused, this study is directly relevant to data-driven business models, as it shows that regulatory complexity and uncertainty are key barriers for deploying AI-based, data-intensive solutions in Europe); Pagallo, U. (2022) *The politics of data in EU law: will it succeed?* Digital society 1, 20. https://doi.org/10.1007/s44206-022-00021-3; Paemen et al. (2022) Digital services regulation in the EU: an evolving landscape. Clifford Chance. https://www.cliffordchance.com/insights/resources/blogs/talking-tech/en/articles/2022/09/digital-services-regulation-in-the-eu-an-evolving-landscape.html

[419] European Commission. (2024). Commission staff working document. Fitness check of EU consumer law on digital fairness [COM(2024) 288 final], See page 58 *Regulatory complexity*.

estimated to incur additional costs due to differences in national transposition and interpretation of EU legislation[420].

These challenges are not only present at the adoption phase, but also persist throughout the operation of data-driven business models—the average estimated administrative costs to comply with EU digital fairness legislation for each business within the EU-27 range from €1280 to €2500 annually[421]. According to interviewed organisations deploying data-driven business models, this regulatory burden often discourages the adoption of data-driven models altogether.

Additionally, several interviews with organisations deploying data-driven business models revealed that **legal complexities** and associated costs—such as legal fees and the hiring of legal professionals—tend to **disproportionately impact SMEs**. This disparity stems from the fact that many legal costs are **fixed**, such as the one-off costs for consulting legal experts, which represent a more significant burden for smaller companies with limited financial resources. While larger organisations have the capacity to absorb these costs due to greater economies of scale and internal resources, SMEs often struggle to allocate the necessary budget to address compliance requirements.

Moreover, although there are also **variable costs** that scale with company size—such as ongoing compliance monitoring and legal consultations—larger companies are typically better equipped to spread these costs across a broader operational base. SMEs, by contrast, may not benefit from such scale effects, making the relative impact of legal complexities more significant. As a result, and as confirmed by interviews with organisations deploying DDBMs, SMEs are often at a disadvantage in managing the regulatory demands associated with data-driven business models, potentially limiting their capacity to fully engage in the digital economy.

Finally, organisations deploying data-driven business models, particularly those using AI and algorithms, must meet both **legal and ethical expectations**. While transparency and fairness are legal requirements under various regulations, such as GDPR and sector-specific laws, ethical considerations become especially critical with algorithms due to their potential for biased outcomes, particularly in sensitive industries. Interviews with data legislation experts emphasised that algorithms pose risks of bias and discrimination, potentially leading to unintended social injustices. Thus, organisations are expected to adopt ethical frameworks that actively mitigate these risks beyond legal obligations. For instance, the EU AI Act underscores the need for transparency and fairness in high-risk AI applications, reflecting the importance of ethical governance in preventing algorithmic bias. While ethical considerations do not necessarily pose an obstacle to adopting data-driven business models, they add an important layer to an already complex legal framework.

Challenge #2: Information asymmetries between businesses and their customers

Literature, along with interviews with consumer associations and organisations implementing data-driven business models, revealed that customers are **often unaware of the true purpose behind data collection** and how their data is processed[422]. An experiment illustrates the extent of this unawareness. In this experiment (conducted outside the EU and therefore not bound by GDPR regulations), 97% and 93% respectively of 543 participants agreed to the terms of service and a privacy policy of a social networking site that declared it would share all your

[420] Ibid.

[421] Ibid.

[422] Cf.Breidbach, C. F., & Maglio, P. (2020). *Accountable algorithms? The ethical implications of data-driven business models*. Journal of Service Management. https://doi.org/10.1108/JOSM-03-2019-0073, p. 163.

information with the US' National Security Agency and that users must give their first-born child as payment[423]. This evidence highlights how consumers often overlook critical details in Terms & Conditions (T&Cs), resulting in **limited understanding of how their data may be used in practice**.

This limited understanding arises partly because Terms & Conditions (T&Cs) are often lengthy, complex, and filled with legal jargon, making it difficult for customers to fully grasp the extent of data usage[424]. As a consequence, customers may not be fully aware that, within data contracts, their personal data is essentially being **used as a form of payment**[425].

This lack of transparency contributes to imbalance, as businesses and organisations using DDBMs gain a disproportionate amount of control over consumer data[426]. Participation in digital society increasingly **requires engagement with data-driven services** to access information, stay connected, or use essential functions[427]. Many services have terms of service and privacy policies that users must accept to gain access; those who decline are simply denied access[428]. People must either agree with the terms and policies or not use the service[429]. As a result, consumers may feel **pressured to share data**, further tipping the balance of power toward organisations.

On a positive note, **consumer knowledge of data rights is increasing**. GDPR has raised public awareness about data privacy, with 69% of EU citizens being aware of the regulation in 2020, and 51% knowing about their right to access personal data with private companies[430]. This is an important development, as it contributes to **addressing the information and power imbalance** between consumers and organisations. However, increased awareness of data rights does not necessarily equate to greater understanding of how customers' data is used in each specific context, as this depends on the detailed T&Cs of each service, their accessibility and transparency. In fact, 70% of consumers remain concerned about how their personal data is used and shared[431].

One proposed solution to this specific challenge, suggested during interviews with an organisation employing DDBMs, is to introduce a **standardised data transparency label**—similar to energy efficiency labels for appliances—to indicate the level of data exploitation in each service. Such a system could provide consumers with a quick, comprehensible overview of data usage, without requiring them to review detailed T&Cs.

Challenge #3: Customers' reluctance towards data sharing

[423] Obar, J. & Oeldorf-Hirsch, A. (2020). *The biggest lie on the Internet: ignoring the privacy policies and terms of service policies of social networking services*, Information, Communication & Society, 23:1, 128-147, p. 128. https://doi.org/10.1080/1369118X.2018.1486870

[424] Ibid, p. 128; Yerby, J. & Vaughn, I. (2022). *Deliberately confusing language in terms of service and privacy policy agreements*. Issues in Information Systems, Volume 23, Issue 2. https://doi.org/10.48009/2_iis_2022_112, p. 146.

[425] Directorate-General for Justice and Consumers. (2023) *Study to support the Commission's policy development on promoting repair of consumer goods and contracts in the data economy*.

[426] Cf. Elvy, S.-A. (2016). *Contracting in the Age of the Internet of Things: Article 2 of the UCC and Beyond*. Hofstra Law Review. https://ssrn.com/abstract=2725913, p. 14-16.

[427] Breidbach, C. F., & Maglio, P. (2020). *Accountable algorithms? The ethical implications of data-driven business models*. Journal of Service Management. https://doi.org/10.1108/JOSM-03-2019-0073

[428] Yerby, J. & Vaughn, I. (2022). *Deliberately confusing language in terms of service and privacy policy agreements*. Issues in Information Systems, Volume 23, Issue 2. https://doi.org/10.48009/2_iis_2022_112

[429] Robinson, E. P., & Zhu, Y. (2020). *Beyond "I Agree": Users' understanding of web site terms of service*. Social Media + Society. https://doi.org/10.1177/2056305119897321, p. 2.

[430] FRA (2020). *Your rights matter: Data protection and privacy - Fundamental Rights Survey*. https://fra.europa.eu/sites/default/files/fra_uploads/fra-2020-fundamental-rights-survey-data-protection-privacy_en.pdf, p. 12.

[431] European Commission. (2024). Commission staff working document. Fitness check of EU consumer law on digital fairness [COM(2024) 288 final].

As transparency around data usage in data-driven business models decreases (due to complex, jargon-filled T&Cs, as mentioned above), customers are becoming more **reluctant to share personal data with organisations**. Interviews with data legislation experts and organisations deploying data-driven business models highlighted this general reluctance, which poses obstacles for the effective operation of data-driven business models. The growing consumers' concern about data privacy and the use of their personal data, leading to unwillingness to share their data, is reflected in several statistics. For instance, a study conducted by the European Union Agency for Fundamental Rights (FRA) shows that 41% of EU citizens do not wish to share personal data with private companies[432]. Additionally, Eurostat data shows that roughly 8% of consumers do not use IoT devices due to concerns relating to privacy and protection of personal data, while 7% do not use IoT devices due to concerns about security[433].

This reluctance, which can be traced back to current business practices surrounding data use, can also have further repercussions on the effective deployment of data-driven business models. Since **access to customers' data** is critical for these models to function and innovate, the unwillingness of customers to share their data limits their full economic potential[434]. Furthermore, this hesitancy extends beyond individual consumers; as noted in the literature, many businesses are also reluctant to share data with third parties, highlighting a **B2B** dimension to the issue[435].

This issue could be further amplified by customers exercising their right to withdraw consent for data sharing, as provided under data privacy laws, such as the GDPR. While consent withdrawal seems to remain an underutilised option at present[436], an increased use of this right could create additional challenges for business in the future. First, a possible limitation of **service development**, as these models often depend on a continuous flow of consumer data to function effectively. Second, an **increase of legal and administrative burdens**, as additional policies must be implemented to manage the consequences of (substantial) consent withdrawal. This, in turn, may lead to higher operational costs as businesses work to ensure compliance and maintain transparent relationships with their customers.

The right to withdraw consent remains **essential for protecting consumer interests**, especially in light of the imbalances discussed earlier. To address the challenge of customer's reluctance effectively, solutions must focus on tackling the root causes of consumer reluctance. Ensuring robust data protection regulations, alongside protective rules and strict enforcement, will be key in building consumer trust. Ultimately, fostering **transparency and accountability** will be critical aspects in bridging the trust gap and enabling sustainable data-driven business practices.

Challenge #4: Technical investments

In addition to legal challenges, organisations face significant technical challenges when operating data-driven business models. As highlighted in interviews with data legislation experts, the adoption of these models requires sustained technical investments, which can be particularly overwhelming for smaller organisations. These investments can serve as a major

[432] European Union Agency for Fundamental Rights (2020). *Your rights matter: Data protection and privacy - Fundamental Rights Survey*. https://fra.europa.eu/sites/default/files/fra_uploads/fra-2020-fundamental-rights-survey-data-protection-privacy_en.pdf, p. 3.

[433] Eurostat (2024). *Internet of Things - barriers to use.* https://doi.org/10.2908/ISOC_IIOT_BX

[434] Bulger, M., Taylor, G., & Schroeder, R. (2014). *Data-driven business models: challenges and opportunities of big data*. Oxford Internet Institute. https://www.oii.ox.ac.uk/wp-content/uploads/old-docs/nemode_business_models_for_bigdata_2014_oxford.pdf; ECLA & Osborne Clarke (2022). *Data-driven Business Models: The role of legal teams in delivering success*. ECLA Association Services SPRL. https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf

[435] Bulger, M., Taylor, G., & Schroeder, R. (2014). *Data-driven business models: challenges and opportunities of big data*. Oxford Internet Institute. https://www.oii.ox.ac.uk/wp-content/uploads/old-docs/nemode_business_models_for_bigdata_2014_oxford.pdf, virtual page 4.

[436] Cf. Florea, M. (2023). *Withdrawal of consent for processing personal data in biomedical research*. **International Data Privacy Law**, 13(2), 107–123. https://doi.org/10.1093/idpl/ipad008, p. 2.

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barrier to adoption, as they involve both the development of initial systems and the ongoing costs of managing them. Technical investments are typically divided into **set-up costs**, incurred at the beginning of implementation, and **recurring costs**, which are associated with the day-to-day operations of data-driven business models.

One of the most prominent set-up costs related to data-driven business models is the establishment of **IT infrastructure**. As emerged from desk research[437], interviews with data legislation experts and organisations deploying data-driven business models, and the long survey[438] conducted as part of this study, organisations need **IT systems and software capable of processing large amounts of data**. This includes systems for data collection, storage, monitoring, analysis, and, where applicable, integration with related systems or connected products. Without such infrastructure in place, it becomes impossible for organisations to effectively implement a data-driven business model.

In terms of **recurring costs**, data-driven business models require continuous investments in **data processing,** including **integration** and **management,** which is essential to ensure an effective use and interpretation of data. In the survey conducted as part of this study respondents stated that investments to be made in data integration can also be seen as a barrier to the implementation of data-driven business models.

Another major recurring cost is **(cyber)security** within data-driven business models. These models involve the collection and analysis of vast amounts of data, which raises critical security concerns. Organisations must ensure compliance with regulations, implement robust security measures, and establish internal compliance guidelines to safeguard sensitive information and maintain customer trust. Notably, cybersecurity considerations are essential for any data-driven business model, regardless of the type of data being collected and analysed. Although cybersecurity is relevant to a range of business models beyond those examined in this study, it warrants some attention here due to the costs involved in implementing adequate security measures, which can quickly become a significant challenge[439]. According to a study conducted by the European Company Lawyers Association (ECLA), a third of company lawyers in Europe identified cybersecurity as a key obstacle to implementing data-driven business models[440].

Challenge #5: Lack of necessary skills

Successfully operating data-driven business models requires an organisation to employ staff with expertise in both data handling and data strategy. As emerged from desk research, many companies lack the necessary expertise to fully understand the opportunities these business models present and to handle data effectively. Evidence shows that this skills gap exists at two levels: the **executive layer**, where it impacts the development and implementation of a robust data strategy, and the **operational level**, where it hampers effective data analysis[441] [442].

[437] Ancillai, C., Sabatini, A., Gatti, M., & Perna, A. (2023). *Digital technology and business model innovation: A systematic literature review and future research agenda*. Technological Forecasting and Social Change. https://doi.org/10.1016/j.techfore.2022.122307 (no page numbers).

[438] Due to the limited responses to cost-related questions in the surveys, insights on the costs are primarily an overview of the main types of costs gathered through literature.

[439] Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713, p. 2.

[440] European Company Lawyers Association (ECLA) & Osborne Clarke (2022). *Data-driven Business Models: The role of legal teams in delivering success*. ECLA Association Services SPRL. https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf.

[441] European Company Lawyers Association (ECLA) & Osborne Clarke (2022). *Data-driven Business Models: The role of legal teams in delivering success*. ECLA Association Services SPRL. https://www.osborneclarke.com/system/files/documents/22/09/30/DDBM_Study_20220930.pdf.

[442] Acciarini, C., Cappa, F., Boccardelli, P., & Oriani, R. (2023). *How can organizations leverage big data to innovate their business models? A systematic literature review*. Technovation. https://doi.org/10.1016/j.technovation.2023.102713.

The shortage of qualified talent poses a considerable cost to organisations, as acquiring skilled staff becomes essential to maintaining competitiveness. Interviews with organisations deploying data-driven business models, as well as the survey conducted for this study, show that this challenge disproportionately affects **smaller companies**, which often lack the resources to attract and retain top talent in management, engineering, and data science. Larger organisations, on the other hand, are typically better positioned to offer competitive salaries and benefits, allowing them to secure the necessary expertise more easily. This discrepancy further deepens the divide between large and small businesses in their ability to leverage data-driven business models.

7.2.3. Deep dive on legal challenges

This section focuses on the role of the law as an issue for the uptake of data driven business models using a case study approach. Three legal case studies have been developed in order to tease out some of the legal issues at play for users (or potential users) and providers of data driven business models. Thus, the first two of the case studies set out (i) the uncertainty which the current legal framework presents for a service provider, and (ii) the potential impact of legal fragmentation on the service provider's decision to adopt a data driven business model. The third case study concerns potential imbalances between the user and the service provider, which may be implicit in the model. These imbalances are primarily portrayed from a fairness perspective, rather than dwelling on their potential impact on the take up of this business model.

Legal Uncertainty

Data-driven business models have become a pervasive presence in the digital economy. However, some of these business models, where a seemingly 'free' service is offered in exchange for the personal data of the user find themselves at a difficult juncture between data protection rights and contract law. One of the points of contention is the effect that withdrawing consent to personal data processing may have on an agreement for the supply of digital services. This aspect remains a matter for national law – however, there is a high degree of disparity at the national level as to what the contractual consequences are when a customer relies on their right to withdraw consent.[443] Only Estonia and Germany have explicitly addressed this situation in their national legislation, while many other Member States agreed that it falls under general contract law, resulting however in different outcomes (termination, claim of damages).[444] Uniquely, the Czech Republic indicated that withdrawal of consent cannot constitute a ground for termination of the contract.[445] Given the lack of harmonisation on this point, service providers face uncertainty as to their contractual position in such instances, as well as to the extent of their obligations towards the customer, both under contract law and data protection legislation.

It is not clear whether or to what extent the existence of a degree of legal uncertainty in this regard is hindering the uptake of data-driven business models, as results show that consumers rarely withdraw their consent for processing of their personal data.[446] This finding hinders a definitive understanding on the impact that legal uncertainty in relation to this aspect may have on service providers, as many may not have faced this phenomenon on a relevant scale. However, it has been previously indicated that companies perceive national rules on data contracts as unclear, which may give rise to high legal and compliance costs.[447] These costs may primarily dissuade start-ups and SMEs from adopting a data driven business model. This finding was also observed in the long survey carried out as part of this study, whereby most

[443] 2022 Questionnaire concerning data contracts addressed to national authorities by the European Commission.

[444] ibid.

[445] ibid.

[446] European Commission, 'Study to support the Commission's policy development on promoting repair of consumer goods and contracts in the data economy – Part B: Contracts in the data economy' (2023), pages 84-85.

[447] ibid pages 104, 105.

respondents indicated the costs related to legal and regulatory compliance to constitute a 'considerable', or even 'major' problem for the uptake of data-driven business models.

In conclusion, the divergent approaches at the national level to the contractual consequences of a withdrawal of consent in the context of data contracts gives rise to a degree of legal uncertainty which may impact companies relying (or seeking to rely) on a data driven business model.

Legal Fragmentation

While there is a relative degree of consistency between the 27 Member States in their contract law doctrines and development, the introduction of data contracts has led to a wide array of responses, as many Member States aim to adapt their traditional private law concepts to this new notion.[448] Most cumbersome divergences appear in relation to the 'data' aspect of the contract; for example, a high degree of disparity at the national level has been observed in relation to the contractual consequences of a withdrawal of consent, or of an infringement of data protection legislation.[449] Such variety across 27 Member States, albeit in regard to specific aspects, requires extensive monitoring and high legal and compliance investments, as highlighted by the business representatives consulted as part of this study. In the same vein, other studies highlight that service providers face moderate to great costs due to differences in national legislation, which may thus hinder the cross-border operation of data driven business models.[450]

The negative impact of this fragmentation is primarily observed in relation to aspects which have not been harmonised across the Member States. The fragmentation at the national level also builds upon a very complex EU regulatory landscape, which combines *inter alia* the General Data Protection Regulation, contract law, consumer protection law, digital legislation, and potentially sector-specific regulations. This increasingly convoluted legislative regime gives rise to monitoring and compliance costs which may dissuade undertakings, particularly SMEs, from venturing into the market for a data driven business.[451] However, given the novel character of the regulation of this business model, it is expected that its nascent phase will be marked by a relative degree of legal fragmentation and uncertainty for businesses and users, as described above. This fragmentation may appear as a challenge for service providers seeking to expand their businesses across borders. Whether such negative impacts will temper in time or remain a hurdle, affecting the take-up of this model (especially by SMEs, given the high legal compliance costs) needs to be assessed in the longer future.

Imbalance between parties

It is not clear if the apparent imbalance between consumers and digital service providers in terms of the valuation of the consumer's personal data has affected the uptake by consumers of services which require them to share their personal data.[452] However, this apparent imbalance may also give rise to fairness concerns, which exist independently of the question of uptake, and which require further investigation. The value of personal data is highly contextual and there is a substantial gap between the perspective of consumers and of digital service providers,

[448] See Section "Deep dive on legal challenges" below.

[449] 2022 Questionnaire concerning data contracts addressed to national authorities by the European Commission.

[450] European Commission, 'Commission staff working document – Fitness check of EU consumer law on digital fairness' COM(2024) 288 final, pages 71, 72.

[451] European Commission, 'Study to support the Commission's policy development on promoting repair of consumer goods and contracts in the data economy – Part B: Contracts in the data economy' (2023), pages 102-106; see European Commission, 'Commission staff working document – Fitness check of EU consumer law on digital fairness' COM(2024) 288 final, pages 70-73 for a median estimation of costs incurred. Concurring findings result from long survey and in-depth interviews carried out as part of this study.

[452] Please note this includes both free services and services which are paid for. The two scenarios are defined by specific particularities, which may give rise to different degrees of unfairness, from a comparative perspective (i.e. the balance between the benefits enjoyed by service providers and by users may seem more disproportionate when users also pay for the service, in comparison to when they do not). The overarching commonality remains the informational asymmetry between users and service providers, as well as the different opportunities for harnessing the financial value of personal data, which give rise to imbalance between the parties.

largely due to information asymmetry between consumers and service providers. Users struggle with a general lack of understanding of data driven economic models, and with limited opportunities for the economic exploitation of their own personal data.[453]

While the GDPR imposes certain transparency obligations on digital service providers as data controllers, these requirements are more connected to the qualitative value of personal data, as a component of the 'feeling' of privacy, rather than to its quantitative (monetary) value. The disconnect between the qualitative valuation and quantitative valuation of personal data is showcased, for example, by the infrequent choice of payment over personal data sharing in 'pay-or-consent' models.[454] Moreover, as personal data is a non-rivalrous resource, it is possible for the same data to be exchanged with multiple service providers, without affecting its supply. This perception of an unlimited supply may in turn further lower the economic value affixed by users to their personal information, especially when faced with the choice between 'unlimited' personal data and 'limited' financial resources. On the other hand, personal data has a much higher value for service providers, which enjoy the know-how and opportunities to rely on data aggregation and processing to maximise their returns. The extent to which such benefits can be accessed depends however on a number of factors, including *inter alia* the number of users, the personal information they provide, the technological tools available to the service providers or the potential economies of scale and scope.[455] For that reason, the level of imbalance between the consumers and service providers may vary, based on a wide array of factors.[456] A more cautious conclusion would be that the relationship between the two is characterised by a high degree of informational asymmetry, which can be compounded by other factors, thus resulting in a form of inherent unfairness.

[453] Marc van Lieshout, 'The Value of Personal Data' in in J. Camenisch, S. Fischer-Hübner and M. Hansen (eds), *Privacy and Identity Management for the Future Internet in the Age of Globalisation* (Heidelberg: Springer, 2015) 29–36.

[454] See Pinar Akman, A Web of Paradoxes: Empirical Evidence on Online Platform Users and Implications for Competition and Regulation in Digital Markets' (2022) 16(2) Virginia Law and Business Review 217, where respondents to a survey are asked if they would prefer to lose access to a free online platform but receive $10 per month in exchange for the loss. 46% responded that they would not, suggesting that the value the service as $10 or more. Elsewhere in the survey they were asked, if the free platform began charging $5 per month, they would stop using it, and switch to an alternative. 80% said they would stop using it, which implies a valuation of $5 or less. This seems paradoxical, but suggests a general hesitancy to pay for such online services.

[455] See for a comprehensive discussion on the topic, Jan Krämer, Daniel Schnurr, Sally Broughton Micova, 'The Role of Data for Digital Markets Contestability - Case Studies and Data Access Remedies' (CERRE, 2020).

[456] Certain instances (e.g., gatekeepers) already being addressed through other EU legislative instruments (e.g. DMA) or Article 102 TFEU.