

Participant's information

In what capacity or on whose behalf are you participating in this public consultation?

Asociación Española de Startups (AES)

Full name (of the participant or represented institution):

Asociación Española de Startups (AES)

Do you wish to make your name publicly available with your answer or keep it confidential (in which case it will be published as an anonymous answer)?

Public

Contact email (will remain confidential)

[Confidential]

List of Questions:

Assessment of the market's functioning This section seeks to better understand the general features of the sector and the elements that determine competitive dynamics, both on the supply and demand side.

1. In your opinion, what will be the main factors that will drive the growth of the sector in the coming years? (max. 300 words).

In general, the modernization and digitization our societies rely heavily on cloud services as one of the key levers. Cloud services, as enabling technologies that facilitate the design and development of new business models, are taking on an increasingly important role in driving the digital transformation of the European economy. The overall context of modern societies is thus geared towards facilitating the growth of the cloud sector. This is illustrated, in Spain as well as across the EU, by official policy objectives, e.g. the European Union has reaffirmed the role of cloud services in shaping Europe's "Digital Decade"¹, in which, leading up to the 2030 horizon, cloud computing is seen as a key enabler of the community's digital transformation, economic growth and data sovereignty.

Attempting to reach this objective translates into the need to ensure that sophisticated computational resources are at our disposal, which in turn will be supported by cloud computing services. The growth of cloud computing services will be driven by the following factors, as all of them will enable the modernization and digitization of our societies and, at the same time, necessitate comprehensive computing solutions: artificial intelligence (AI) and machine learning technologies; the advanced analytics and processing capabilities required by big data and the Internet of Things; the reduced latency and localized data processing that edge computing demands; the managed security services required in the face of escalating cybersecurity concerns; regulatory compliance requirements regarding data privacy and protection; and the digital transformation taking place across various industries in an attempt to remain competitive.

¹ European Commission (2022), A Europe fit for the digital age, available at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en.

In addition, there is great potential for the growth of cloud services. In the private sector, while its use is widespread among large companies, it is more limited amongst SMEs, in particular for companies with fewer than ten employees. As a matter of fact, for most Spanish SMEs migration by to the cloud is yet to happen. As regards the cloud services market in the public sector in Spain, it has the potential to reach Euros 1,587 million in 2030, from Euros 184 million in 2022². This increase of more than Euros 1,402 million in a decade would bring along too a growth of more than 12,200 new jobs in the cloud services sector in Spain³.

2. How would you classify the different types of agents/operators involved in the cloud market value chain? (max. 300 words).

By service model

In practice, the scope of the offerings within cloud services is varied, ranging from essential infrastructural capabilities to ready-to-use applications. Cloud services can be characterised in terms of three main service models, each of which corresponds to a specific set of functions and use cases within the computing stack.

a) Core service models: IaaS, PaaS and SaaS

Infrastructure-as-a-Service (“IaaS”)

In this service model essential computing resources are outsourced to the infrastructure of external providers. It may include physical machines, virtual machines, networking, storage, or some combination of these. IaaS customers exercise control over their virtualized infrastructure, and can configure the resources as needed for their applications and workloads. While a cloud computing service provider (AWS’ Elastic Compute Cloud (EC2), Microsoft’s Azure Dedicated Host and Google Compute Engine (GCE)) manages the computing infrastructure, clients purchase, install, configure, and maintain their own software, operating systems, middleware, and applications.

Platform-as-a-Service (“PaaS”)

This refers to a specialized platform for customers to develop, run and manage applications without the need to build and maintain the underlying infrastructure. Like IaaS, PaaS offerings comprise servers, storage, and networking services, but also middleware, development tools, business intelligence (BI) services, database management systems, and other utilities. The PaaS provider (e.g. Azure’s SQL database or Google Cloud Run) is responsible for licensing the operating system and for complying with applicable licence terms and conditions.

² Cloud services would account for around 7% of all investments developed in the field of information technologies by the public sector, according to the study by economist Professor José Moisés Martín, commissioned by Nubes and published in July 2022 providing an in-depth analysis of Spain’s cloud ecosystem and its impact on the wider start-up market (the “Nubes study”) (p. 43). The study (see [here](#)) outlines practices that integrated cloud service providers with dominant positions in the software market adjacent to cloud infrastructure can use to limit competition between cloud infrastructure service providers, to the detriment of customers.

³ The Nubes study, p. 44.

Software-as-a-Service (“SaaS”)

SaaS provides a complete software solution. The client rents the use of an application for its organization, and connects to it over the Internet, usually via a web browser. As the application layer of the cloud, all the underlying infrastructure, middleware, application software and application data are located in the service provider’s data centers. The cloud service provider (of, for instance, Microsoft Office 365, Salesforce’s Customer 360 Platform and SAP’s HANA Cloud) administers the hardware and software and could also ensure the availability and the security of the application and the client’s data.

b) New service models: BaaS and FaaS

Backend-as-a-Service (“BaaS”): It is a cloud service model that allows mobile and web developers to outsource all the behind-the-scenes aspects of an application so that they can focus on the front-end only.

Function-as-a-Service (“FaaS”), also referred to as “serverless computing”: It enables customers to execute code without having to allocate processing resources in advance, allowing them to focus only on deploying application code.

Due to their novelty, these emerging service models have not yet gained material traction.

Finally, at each end of the value chain there are infrastructure providers and integrators.

Infrastructure providers (e.g. Dell, HP, and Cisco) underpin cloud services by supplying the physical hardware, data centers, and network components essential for cloud operations.

Integrators play an all-important role in bridging the gap between cloud services and end-users. As either managed service providers or system integrators these agents design, implement, and manage cloud solutions tailored to specific business requirements to ensure seamless integration and optimal performance of cloud services.

By level of integration and presence in adjacent markets

Another useful classification, given the competition problems affecting this sector, distinguishes between: non-integrated, “naked” cloud providers, which only offer cloud infrastructure services without any proprietary software of their own, which they need to sub-licence, on the one hand; and integrated cloud providers which operate on adjacent software product segments and offer cloud infrastructure service and license some of their own software, on the other hand.

3. Would you highlight any particular feature of the cloud market in Spain as compared to other European countries?

Spain lags behind the EU average in the adoption of cloud technologies in the business sphere, and is far behind the leading countries in the use of these technologies. In recent years, as a result of the broad-based adoption of cloud services, the European cloud market has more than quadrupled in size, growing from

\$19.91 billion in 2016 to \$90.25 billion in 2022, a figure which is expected to reach \$187.24 billion by 2027⁴.

How do you assess the overall competitive situation of the cloud market in Spain? Are there any particularly significant trends? (max. 300 words).

Certain empirical facts may point to concerns regarding the strength of competition in the cloud market in Spain. In particular, the level of concentration is increasing, with AWS and Microsoft dominating the market; and Microsoft's growth outstripping everyone else's. Moreover, smaller competitors provide fragmented services that offer limited competitive threat to the major players' offerings.

Furthermore, the industry is marked by the presence of players such as Microsoft with market power in adjacent software segments ("legacy software providers"), whose conduct in the market has the effect of foreclosing competing providers in the core cloud market segments, such as through the imposition of unfair licensing terms on on-premise users seeking to migrate to the cloud or preferencing its own cloud services by leveraging its position in the software markets. Such actions directly harm customers and limit the ability of providers without a large installed base of legacy customers to compete on a level playing field, where the software is considered "mission-critical" by end users, as it is required for the smooth and efficient execution of infrastructure-based tasks. In such cases, "naked" providers would have to sub-license the use of the additional software, often as part of special licensing agreements, from legacy software providers players. In doing so, however, there are strong indications, as preliminarily confirmed by regulators globally (see [OfCom](#)'s and [CMA](#)'s final and interim reports, respectively) may leave them vulnerable to asymmetric licensing policies or unfair terms of use.

Some early effects of maturity, such as customers' better understanding of how to optimize their spending on cloud computing, already manifest themselves. As a result, providers now seek to strike longer term contracts with their customers, perhaps partly in view to lock-in expected future rent, and to convince them to adopt a wider variety of their services. Microsoft, specifically, made additional steps to tie its cloud products—including Azure, Microsoft 365 and Dynamics—even more closely together. Despite the growing awareness of customers in using cloud computing services, experts do not see any major sign of intensifying competition in this market⁵.

The faltering overall competitive situation in Spain is cause for great concern, given that many enterprises and SMEs have yet to migrate fully to the cloud. This is exacerbated by the resource constraints involved with avoiding proprietary services: the increased coding and development efforts some participants associated with implementing and maintaining such solutions can make the use of proprietary services the more appealing strategy despite their implications for vendor lock-in. This is a particularly salient barrier for start-up companies who, aside from having limited resources, may prioritize agility and a faster road-to-market over avoiding vendor lock-in. The challenge then is to 'break out' from this proprietary ecosystem at a later stage, when the cloud architecture has matured and teams have grown familiar with these services.

⁴ Statista (2022), Europe public cloud market forecast, available at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en.

⁵ Financial Times (2023), Big Tech under pressure from cost-conscious cloud customers, available at <https://www.ft.com/content/d1eda3a1-fc27-4570-8647-89bac01dd968>.

Another trend is the increasing investment in cloud infrastructure within Spain. Major cloud services providers are expanding their data center presence, enhancing local data residency and compliance with European data protection regulations. It appears that this trend is not only driven by data sovereignty objectives, but also by a growing demand for low-latency services.

4. In your opinion, what are the main elements that determine the dynamics of competition among cloud service providers?

Cloud providers compete on a range of factors; the most important to customers when choosing their main public cloud provider are: service quality (and customer support); price (including discounts and/or cloud credits); data sovereignty requirements; range of services; and number and location of data centers. Moreover, customers also factor into their decision other aspects, namely: reliability; innovation; historical software and software licensing; privacy and security; data management and analytics; and ability to act as a strategic partner.

In addition, it must be noted too that providers that offer a comprehensive range of services, from IaaS to PaaS and SaaS, are better positioned to meet diverse customer needs and attract a broader clientele. The ability to integrate AI, machine learning, and big data analytics into these services further enhances a provider's competitive edge.

In your opinion, which other markets can affect the competitive dynamics in the provision of cloud services? (max. 300 words).

The telecommunications, hardware, and software markets significantly influence the competitive landscape of cloud services.

Regarding software markets, as explained, CSPs have clients with a wide range of needs. Such client requirements will in turn define the types of adjacent services needed, and the level of complementarity experienced, by a specific customer of a cloud computing service provider.

Therefore, in addition to the “core” cloud market segments (IaaS, PaaS and SaaS), customers also typically need to consider the availability of complementary, or “adjacent”, services when choosing their cloud providers. These consist primarily of software components, such as productivity software and operating/database management systems, which can either be purchased through integrated PaaS or SaaS solutions, or bought separately and integrated with existing cloud infrastructure. In many cases, these adjacent products may initially have been acquired as part of an “on-premise” licensing arrangement (in most cases, enterprise software from Microsoft), which customers subsequently seek to deploy within a cloud environment following their cloud migration. The compatibility, level of integration and cost of these separate software components may be an important input into the customer's decision as to which cloud infrastructure service provider to choose.

5. In your opinion, when contracting cloud services from an operator, how do the main providers' offers differ from each other? (max. 300 words).

The main providers' offers differ across several key dimensions: service portfolio and pricing models; performance and reliability; geographic reach; and customer support.

- The service portfolio is a significant differentiator, and pricing models also vary among the main providers.
- Performance and reliability are critical, and all main providers ensure high availability through global data center networks.
- Geographic reach is another point of differentiation. As to geographic distribution, it affects not only latency but also compliance with data sovereignty laws, which can be crucial for certain industries and regions.
- Customer support and service quality differ as well.

6. When contracting cloud services from an operator, describe in order of importance the factors that, in your opinion, are the main determinants of the contracting decision, such as, among others, price, technical quality of the service, the provider's portfolio of services, security, transparency of the contract, nationality of the provider, previous relationship with the same provider, previous knowledge by the staff, etc. (max. 300 words).

Customers' preferences guiding the choice of a CSP include, typically, technical quality, security, price, service portfolio, contract transparency, and provider nationality, in that order. In addition, because of the links between cloud services markets and adjacent software markets and how legacy software providers are leveraging their dominant position in the latter grow in the former, historical relationships, familiarity and dependencies with legacy software providers as a very relevant factor influencing the decision for a choice of CSP, in particular upon migration to the cloud from on-premise based solutions.

- Technical quality: uptime, latency, scalability, and the provider's ability to meet specific technical requirements are critical. Technical excellence and robust performance metrics make the reliable, high-performance infrastructure that customers seek to support their operations.
- Comprehensive security measures: data encryption, compliance with regulations, and strong access controls to ensure the ability to protect against cyber threats as well as data integrity.
- Cost-effectiveness, especially for SMEs, and transparent and flexible pricing models.
- A comprehensive service portfolio allowing scalation and innovation without switching providers.
- Transparent contractual terms: clear terms and conditions, straightforward service level agreements (SLAs), and the absence of hidden fees.
- Familiarity with a (reliable) provider.
- Provider's nationality: the preference for domestic over foreign providers, which results from perceived advantages in data sovereignty, support responsiveness, or compliance with local regulations, is however not such as to prevail over other determinants.

7. When contracting cloud services from an operator, assess the extent to which contract terms and conditions are negotiable (max. 300 words).

Most customers have standard contracts that have been agreed without negotiation, but larger customers either engage in bilateral negotiations and occasional tenders and are able to negotiate terms that depart from standard contracts.

However, where licences are integrated in the cloud computing solutions, some legacy software provider firms, e.g. Microsoft, have started imposing penalties on customers that use their closed-source (proprietary) products (e.g. Windows) on rival cloud infrastructure providers. Evidence has been found of increases in licensing fees for customers requiring the use of proprietary software on cloud infrastructure that is different from that of the integrated provider owning it, with the price of the bundled software remaining, on the other hand, widely unaffected⁶. These restrictions take the form of reduction or suppression of “Bring Your Own Licence” standards, or the application of large price differentials.

In addition, for those CSPs that deploy “lock-in” strategies, it is observed that, once users are “locked-in” into their contract, the relationship with software providers often rapidly deteriorates. Providers are noted to implement price hikes on customers on renewed contract cycles (“drip prices”), as well as exacting surcharges through changes to licensing and pricing models.

8. Indicate what difficulties may arise, at the time of contracting a provider’s cloud services, to anticipate the final cost of use of the contracted service (max. 300 words)

The final cost of using cloud services can be influenced by a multitude of factors inherent to their nature, namely: pricing models; usage patterns; additional fees; technical requirements; vendor strategies; and historical data.

- The elements of pricing models (computer instances, storage volumes, data transfer, and ancillary services) contribute to the overall cost, but the interactions and dependencies among them is difficult to predict accurately upon contracting the cloud services.
- Usage is influenced by business cycles, seasonal demands, and unexpected spikes in traffic or processing requirements. Only with ongoing monitoring and adjustment of resource allocations the attempt may be made to optimize costs effectively.
- Additional costs such as egress fees for data transfer out of the cloud provider's network can add significant expenses; moreover, cost projections can be complicated by factors like geographic regions, bandwidth requirements, and fluctuations in data volume.
- New technical demands or integrations during the contract period are likely to require additional services or adjustments to existing configurations.
- Initially cost-effective arrangements, as part of vendor lock-in strategies, such as long-term commitments or volume usage with price discounts, may restrict flexibility and increase the cost of migration or scaling.
- Without sufficient past usage data, future spend is very difficult to predict.

⁶ CISPE-commissioned study by Professor Frédéric Jenny on anti-competitive practices in the market for cloud infrastructure services (see here) (“Jenny study I”), p. 8.

9. Assess the transparency of contract terms and conditions and indicate whether changes in contract terms and conditions are common (max. 300 words).

The concerns with regards to contractual terms relate to multilayered contractual arrangements not necessarily aligning with each other, and to charges.

As a result of the lack of alignment of multilayered contractual arrangements, cloud users find it hard to know exactly whether to renegotiate the element that has finished or wait until all elements have lapsed and they are fully out of contract.

The lack of transparency regarding public cloud charges explains how customers may be able to state their total overall spend with their cloud providers –either on an annual or monthly basis–, but find it difficult to understand how these charges are arrived at. Some businesses even employ people in their finance teams dedicated to managing their cloud spend, as the complexity warrants full time members of staff to manage this side of the business.

10. In migrating to the cloud, explain the role of the integrator or intermediary, and its relevance to the competitive dynamics of the market (max. 300 words).

From specialized consulting firms to managed service providers, those acting as integrators or intermediaries in the migration to the cloud have as their main task facilitating the transition from on-premises systems to cloud-based solutions. To do so they rely on their expertise in cloud architecture, deployment strategies, and integration with existing IT infrastructures.

First, they assess an organization's current IT environment, to in turn try and identify suitable cloud solutions and design a migration plan, with a dual aim: minimize disruption while maximizing the benefits of cloud computing. As part of this assessment, integrators evaluate workload suitability for the cloud, select appropriate cloud platforms, and determine the most effective deployment model (public, private, hybrid) based on performance, security, and compliance requirements.

Then, during migration, integrators assist with the technical aspects of data transfer, application refactoring, and system integration to ensure seamless functionality in the cloud environment.

Finally, they oversee the implementation of cloud-native services, such as containers, serverless computing, and data analytics tools, optimizing performance and cost-efficiency.

As to the integrators' relevance to the competitive dynamics of the cloud market, it lies in its ability to enhance the value proposition of CSPs, and at the same time enable businesses to leverage cloud services more effectively. Customer satisfaction and loyalty are enhanced, they drive demand for cloud solutions and influence competitive differentiation among CSPs.

Moreover, integrators' specialization in specific industries or use allows to offer tailored solutions that address unique business challenges. This also helps expand the market reach of cloud providers to niche markets.

11. For software development companies offering independent cloud-based software applications, consider which are the main channels to reach the end customer and the factors on which the choice of the chosen channel(s) depends. When offering independent cloud-based software applications, consider whether it is possible to do so in more than one marketplace from a vertically integrated provider (max. 300 words).

The main channels are: direct sales through the company's website or sales team; partnerships with resellers or distributors; and online marketplaces.

- Direct sales allow for direct engagement with customers and provide control over the sales process, pricing, and customer relationships. The company's marketing capabilities, sales infrastructure, and target customer base's buying preferences are to be considered.
- Resellers or distributors expand market reach by leveraging established networks and customer relationships. The choice of this channel depends on finding reliable partners with complementary expertise and aligned business goals.
- Online marketplaces offer exposure to a global audience of cloud users actively seeking software solutions integrated with specific cloud environments. The following must be taken into consideration: compatibility of the software with different cloud providers; marketplace fees; support for billing integration; and the marketplace's user acquisition capabilities.

When considering offering software in more than one marketplace from a vertically integrated provider, while companies gain access to distinct customer segments within the same ecosystem, it also requires adapting the software to meet each marketplace's technical and business requirements, managing multiple contracts and integrations, and ensuring consistent marketing efforts across platforms.

12. Assess the conditions required to intermediaries to be able to sell the products of one or more cloud service providers, and whether in your opinion they affect the competitiveness of the final solution offered by the intermediary in relation to other sales channels (max. 300 words).

From an exclusively commercial standpoint, in light of the important role of resellers and managed service providers, intermediaries in the cloud ecosystem are expected to meet the following essential conditions:

- Technical expertise: they must possess comprehensive knowledge of cloud technologies, deployment options, and specific offerings of CSPs.
- Certifications and partnerships with CSPs, to the extent that these are often prerequisites for intermediaries to resell CSP products.
- Sales and marketing capabilities.

- Customer support and service delivery, because intermediaries assume responsibility for ongoing support, troubleshooting, and ensuring smooth operation of CSP products.
- Compliance with legal and regulatory requirements to ensure data security, privacy, and operational integrity, mitigating risks associated with cloud adoption for customers.

As part of their activity, intermediaries must navigate challenges such as dependency on CSP pricing models, limitations in modifying CSP products, and balancing multiple vendor relationships. And they manage to, successfully.

However, problems concerning the resale of cloud services in combination with software licences from legacy software providers, in particular Microsoft, remain. Resellers are unable to put together competitive offers combining software from Microsoft and cloud services from CSPs other than Microsoft or Microsoft partners.

Barriers to competition in the cloud sector. In a preliminary analysis, the CNMC has identified several challenges from the point of view of competition in the cloud sector. The aim of this section is to identify and assess possible barriers to competition to determine whether there is room for improvement in terms of competition and efficiency.

13. Assess whether there are significant barriers to entry into the cloud services or cloud infrastructure market. If so, indicate and describe what type of barriers (e.g., regulatory, investment size, availability of qualified staff, other) and indicate which services or cloud layer (IaaS, PaaS, SaaS) are affected by each barrier (max. 300 words).

Some of the features of the way CSPs do business in this sector may be perceived as a barrier to entry and expansion in cloud services, namely: need for high levels of capital investment; the importance of the range of services; economies of scope; and, to a lesser extent, network effects. However, in our opinion, they are not such as to disincentivize entry and expansion, because they can be mitigated through colocation, leasing of data centers, partnerships, etc.

Instead, these workarounds fail due to the very aggressive or predatory pricing of legacy software providers, in particular Microsoft, that offer their software bundled or tied with cloud services for free or at a very discounted price. This effectively could prevent new non-integrated cloud providers to reach a critical mass of clients that would allow them to reach profitability. Naked cloud providers, in the face of significant entry and maintenance costs, may therefore be unable to match below-costs predatory prices that are offered by some legacy software providers with a strong position in the relevant adjacent software market segment. Similarly, the way these discounted combined offers are structured acts as a barrier to switching and multi-cloud.

14. In your opinion, assess which cloud layers (IaaS, PaaS, SaaS) present the greatest competitive challenges and explain why (max. 300 words).

The major competitive challenge is posed by the vertical integration of services between IaaS, PaaS and SaaS offerings, (e.g. SaaS services are generally built on PaaS and IaaS, without which they cannot be scaled up or down flexibly). The importance of this integration from a competition standpoint is illustrated

by the fact that control of one-fifth of a software adjacent market, as is the case for SAP in the Customer Relationship Management (CRM) software may be sufficient to establish substantial comparative advantages. This is so because legacy software providers who offer products across the cloud services stack may leverage their SaaS offerings to bundle or tie their products, through which they offer preferential pricing conditions to customers and/or exclude competitors from the marketplace.

In addition, regardless of the various cloud computing service offerings, when choosing a cloud provider, customers will normally also consider the availability of complementary products in adjacent product segments. Most of these products are software components, which can be purchased through integrated PaaS or SaaS solutions or, alternatively, separately and then integrated with an existing cloud infrastructure (IaaS) solution. The compatibility, level of integration, and cost of these separate software components can be an important factor in a customer's decision about which cloud infrastructure service provider to turn to. This configuration lends support to the risk of competitive harm caused by conduct by legacy software providers that leverage their market position in their respective adjacent software markets.

From the below list of adjacent software products most often combined with cloud computing services it can be concluded the impact that leveraging practices by Microsoft alone may have on the level of competition in the cloud computing sector:

- Productivity software
- Operating systems (OS)
- Database management systems (DBMS)
- Sharing and storing services
- Collaboration tools
- Virtualisation and orchestration software
- Developer Frameworks

15. For companies already present in the cloud market, what are the main obstacles to their activity and to competition in the sector? (max. 300 words).

Cloud providers must navigate obstacles such as technological innovation, cybersecurity risks, intense competition, and operational challenges to sustain growth, enhance customer value, and maintain leadership positions in the rapidly evolving landscape of cloud computing.

In addition, strategies and unfair practices relating to licensing restrictions by legacy software providers, in particular Microsoft, consisting in leveraging a dominant position in their respective software markets constitutes the main competition problem faced by “naked” cloud providers present in the cloud services market, thus threatening its contestability and distorting competition. This is also the conclusion of studies by private parties, in Spain and abroad, and of market investigations by regulators and National Competition Authorities (NCAs) across the world.

Microsoft accounts for the lion's share of this competition problem because of the pervasiveness of its operating system and productivity software among enterprise workloads running in on-premise environments, and its widespread use by cloud-native organizations too. Microsoft software-related

workloads account for a significant majority of all on premises workloads that have not yet migrated to the cloud as well as the workloads of cloud-native companies.

Microsoft's anti-competitive practices in the cloud computing infrastructure market, are limiting competition between cloud infrastructure service providers, to the detriment of customers. Such practices are preventing Spanish companies from fully realizing the benefits of the cloud and risk negatively impacting the economy as a whole.

Cloud migration and change of provider

16. Assess what technical or economic difficulties exist for migrating to the cloud. Indicate, in your opinion, which solutions could be implemented to mitigate them (max. 300 words).

Apart from the fact that it can be technically and operationally challenging, as well as time-consuming, to migrate on-premises workloads to the cloud, especially given that many companies developed their IT architectures over several decades without any thought that they might one day migrate to a cloud environment, the competition problem described in the answer to the previous question appears to be exacerbated when a company first considers transitioning to the cloud.

This is so because the company's priorities generally include ease of transition and integration to minimize disruption to its employees –and potentially end customers. This means that they will as a rule want to keep their productivity software and operating system on the virtual machines, and they may also need cloud storage capacity and collaboration tools. Customers typically do this by adopting a so-called “lift-and-shift” approach, whereby they simply move their existing on-premises workloads into a cloud environment. If they have to migrate any back-end databases, this process could mean that they are tied to a specific software, as the switching costs could be high.

It appears that there are three forms under which software providers create limits to interoperability. The first relates to specificities of a technical nature, whereby software providers may employ operating specificities or proprietary language to reduce the ease of interaction (and eventually migration) between systems.

The second form pertains to switching costs due to software licensing practices, which may be significant both in monetary and time-duration terms. Indeed, the European Commission details in the impact assessment of the Digital Markets Act that switching costs are already considerable when a customer uses IaaS cloud services, but they are even higher when using PaaS and SaaS services⁷. Migration between systems is an inherently cumbersome and expensive process, costing in the millions and taking anywhere between months to several years⁸. But the impact of high switching costs due to anti-competitive software licensing practices goes even further to generate complete lock-in effects: given lengthy migration times – and the desire to amortize the remainder of contractual costs– users are often incentivized to accept unfavorable renegotiated terms rather than abandoning the ecosystem altogether.

⁷ Publications office of the EU (2020). European Commission Digital Markets Act - Impact assessment support study - Annexes. Available at: www.op.europa.eu/en/publication-detail/-/publication/2a69fd2a-3e8a-11eb-b27b-01aa75ed71a1/language-en.

⁸ Jenny study I, par. 103.

A third form of limits to interoperability concerns the way software providers leverage compatibility concerns as a means to keep users on the native platform. This compatibility is highly valued by customers, because it determines speed and seamless utilization, or lack thereof. Concretely, this often expresses itself in one of two ways:

- i. Compatibility as optimization: in-house functionalities are often engineered in such a way as to work best within the native platform, and to form “natural pathways” towards other product suites. e.g. the CMA is investigating how Microsoft is making it difficult for Active Directory to integrate with IAM services and tools other than Microsoft’s cloud IAM service, Entra ID.
- ii. Compatibility as guarantees: users are encouraged to resort to “approved partners” when integrating non-native functionalities into the local ecosystem, with any other recourse giving rise to the end of product warranties. This control of the certification chain allows dominant providers to artificially limit compatibility with certain players and ultimately reduces user choice.

The effects of tying and “raising rivals’ costs” can be considered to be very similar, as interoperability is ultimately limited, with adverse effects on the quality of the service.

As to the possible solutions, the [10 principles of fair software](#) have been conceived to precisely tackle head on software licensing restrictions limiting competition in the cloud sector. In addition, it is interesting to see how the potential remedies put forward by the Competition and Markets Authority in its [Initial views on selecting a potential remedy package](#) (par. 6.9) regarding software licensing practices call out Microsoft:

- “(a) *non-discriminatory pricing for Microsoft software products, regardless of which cloud infrastructure they are hosted on;*
- (b) *allowing customers to freely transfer previously purchased Microsoft software products to the cloud infrastructure of their choice without incurring additional costs;*
- (c) *increasing price transparency in relation to the use of Microsoft software products on Azure and third party cloud infrastructure;*
- (d) *requiring parity of Microsoft software products and product functionality for use on Azure and third party cloud infrastructure.”*

17. In your opinion, once the services of one cloud provider have been contracted, what technical, economic or other factors might make it difficult to change provider? In your opinion, which solutions might be implemented to mitigate these difficulties? (max. 300 words).

Switching is generally a straightforward process. However, customers do experience technical challenges relating to switching between public clouds, and this can affect their willingness to consider switching and the extent to which switching takes place. As a result, customers must invest extra effort and resources to mitigate lock-in.

It must be prevented that customers consider this as a trade-off when deciding their cloud strategy: some view lock-in as being necessary to gain the benefits of the cloud (e.g. by procuring highly abstracted

proprietary, managed PaaS services), whereas other customers prioritize reducing lock-in as much as possible (e.g. by deploying and managing their own cloud-agnostic software).

Whilst some specific software, such as Kubernetes and Terraform, as well as proprietary services such as Azure Arc, may help customers use more than one cloud, such software does not fully overcome the challenges of using multiple public clouds and switching between them.

Similarly, AWS's and Microsoft's claim that they are incentivized to make their public clouds interoperable in order to retain customers that value avoiding a lock-in and/or to win such customers from competing providers is not enough. While lowering such barriers may allow cloud providers to win more incremental customers and/or workloads from their rivals, it may also increase the risk that these cloud providers lose customers and/or workloads to their rivals, or that these cloud providers would have to offer more competitive prices, quality or levels of innovation in order to retain them.

If existing customers face barriers to switching and multi-cloud, then the strength of competition is likely to be weaker than when competition was focused on customers moving to public cloud for the first time.

Neither customer nor provider-led mitigations may effectively support efficient switching for customers. Some solutions that might be implemented for cloud providers with market power on the adjacent software segments to mitigate these difficulties are the following:

- (a) increase the degree of standardization of cloud services and/or interfaces. This could be achieved through: (i) voluntary standards; (ii) mandatory standards; or (iii) broader principles-based requirements;
- (b) improve the interoperability of cloud services, through the use of abstraction layers;
- (c) increase interconnectivity and reduce latency;
- (d) increase transparency around the interoperability of cloud services;
- (e) improve the portability of skills between cloud providers.

Interoperability of cloud services

18. In your opinion, what are the difficulties in contracting the services of more than one cloud provider? In your answer, please assess aspects of vertical interoperability (between services located in different cloud layers), horizontal interoperability (between services located in the same cloud layer) and interoperability of the data produced when using different cloud services. In your opinion, what solutions could be implemented? (max. 300 words).

The anti-competitive software licensing practices referenced elsewhere in this response are the biggest barrier to multi-cloud as they raise the costs for customers wishing to switch away from legacy players. Other issues that could deter multi-cloud include data latency, security and potential service disruption.

This is illustrated by the actual degree of multi-cloud use, which is quite limited in scope and mostly found amongst larger customers.

As is the case for switching, if existing customers face barriers to multi-cloud, then the strength of competition is likely to be weaker than when competition was focused on customers moving to public cloud for the first time.

Potential remedies would seek to mitigate or prevent any adverse effect on competition and, to this end, are likely to be targeted on reducing barriers to using a multi-cloud approach for customers. This may be expected to unlock a number of benefits for customers and rival providers. The solutions put forward to overcome technical barriers, in the answer to question 16, may prove useful here too.

**19. Assess the advantages and disadvantages of adopting interoperability standards or protocols, including their impact on competition and/or innovation (max. 300 words).
Commercial terms**

Interoperability standards stimulate competition by lowering barriers to entry for new players and promoting a diverse ecosystem of cloud services and solutions. SMEs and startups benefit from reduced integration costs and complexity, enabling them to innovate and compete alongside larger providers. This fosters a competitive marketplace where providers differentiate based on service quality, innovation, and customer-centric solutions rather than proprietary lock-in strategies.

By far the most commonly mentioned technical enabler to reduce vendor lock-in is to use vendor-agnostic solutions instead of proprietary services from cloud providers. There is understanding that PaaS solutions in particular lack in portability, so using agnostic alternatives to proprietary PaaS solutions is seen as the most important decision to reduce vendor lock-in.

Related to this is the increasing use of containerization software such as Docker. These tools, that package software applications along with their dependencies into standardized ‘containers’, make the applications more portable across computing environments and are widely seen as a way to reduce vendor-lock in.

However, there is a perceived trade-off between standardization/increased interoperability on the one hand and performance optimization on the other. It has been cautioned that in striving towards greater interoperability between cloud services, companies (or regulators) risk targeting the ‘lowest common denominator’ in terms of functionality of these services, potentially at the expense of innovative freedom from cloud providers, restricting access to cutting-edge innovation provided by proprietary vendor services.

Commercial terms

20. When contracting services from the same cloud provider, and from the point of view of its commercial offer, assess what obstacles exist to contracting each service separately (max. 300 words).

Not an obstacle as such, but a commercial strategy discouraging that cloud services are contracted separately is that service-by-service discounts are offered as part of an overall package, not in isolation. This is a problem in particular where such discounts are granted by cloud providers with market power.

Another practice that limits the possibility of contracting services separately is the recourse by integrated legacy software cloud providers to mixed bundling when they offer the software combined with its cloud infrastructure services for a relatively lower price, while offering its software licences alone for a relatively higher price.

Bundling is also achieved in the cloud services sector by the refusal to detail the precise price structure of SaaS offerings. Legacy software providers actively strive to maintain opacity in pricing, as well as favoring bilateral agreements on pricing and conditions –often signed with a confidentiality agreement. This, as a result, makes it difficult for cloud users to compare offers and allows cloud providers to extract rent through differential pricing in a highly “personalized” industry.

An alternative to mixed bundling is tying. Tying occurs when a seller agrees to sell or lease a product or service only if the customer agrees to purchase another given product or service. For instance, an integrated provider may optimize its software to work on a specific cloud infrastructure service and be very slow and inefficient on other cloud infrastructure services. While in principle everybody could use the software, in practice its use would be limited to same-brand cloud infrastructure services.

21. When contracting additional services from a cloud provider, assess the relationship between contracting these services and the discounts for the use of additional services (max. 300 words).

Committed spend discounts or agreements (CSDs) are made between a cloud provider and a customer in which the customer commits to spend a minimum amount across CSP’s services over a period of years, and in return, receives a percentage discount on its spend with that provider during those same years. That is, they are a pricing structure that incorporates a conditional discount.

The provision of discounts can be beneficial to customers. However, when discounts are provided by providers with market power, they can give rise to concerns about harm to competition: committed spend discounts harm competition by reducing the ability and incentive of smaller suppliers to compete for customers of the incumbents and/or leading to the weakening or marginalization of some suppliers, for example because they lose, or fail to achieve, economies of scale.

In any event, it appears that while the existence of discounts does have an impact on switching behaviour, that impact does not exist in isolation from other factors that would be considered if switching cloud providers was being considered. Rather, the impact of CSDs on switching behaviour is only one element of a larger cumulative set of factors that affect cloud users’ willingness to multi-cloud or switch cloud providers.

6 Public procurement of cloud services

Procurement of cloud services

22. Assess the existing obstacles to competition in the public procurement of cloud services, and indicate the solutions that could be implemented in your opinion (max. 300 words).

The important role played by the digitization of public administrations has been recognized and, in this sense, innovative public procurement constitutes a key lever to promote a robust and dynamic entrepreneurial fabric. However, for public procurement to play that dynamic role, which in Spain is included in the main strategic planning instruments linked to digitization, it is important how and in what way the public sector makes its purchases of cloud services.

In public procurement of cloud services, several obstacles hinder competition and limit the diversity of providers that can participate effectively; in particular, the lack of a centralized cloud (IaaS and PaaS) contracting framework. Indeed, while the Spanish Public Sector Contracts Law (Ley 9/2017) provides for the development of centralized framework agreements for cloud infrastructure, it does not identify specific criteria for such procurement by the central government or public entities. The lack of a standardized national framework for IaaS/PaaS leads to fragmented procurement practices across different agencies, resulting in non-transparent processes that do not ensure effective competition. At the regional administration level, Catalonia and Madrid have taken the initiative to develop their own IaaS framework agreements, highlighting the demand for structured procurement; Catalonia has executed its framework agreement and the Madrid framework agreement is pending the final award.

One significant obstacle is the complexity of procurement requirements and regulations. Public sector procurement processes often involve lengthy and intricate procedures, including stringent compliance with legal frameworks, security standards (e.g., GDPR), and specific technical requirements. These complexities can deter smaller or newer cloud providers with limited resources from participating, favoring larger, more established providers who have the capacity to navigate and fulfill rigorous procurement criteria.

Moreover, procurement practices sometimes prioritize cost considerations over other factors such as innovation, service quality, or long-term value. Bid evaluation criteria heavily weighted towards price competitiveness may disadvantage providers offering innovative or specialized cloud solutions that could potentially deliver higher value or performance benefits. This limits the competitive landscape to providers capable of offering low-cost solutions, potentially overlooking opportunities for technological advancement or service differentiation.

Additionally, limited transparency and information asymmetry in procurement processes can pose barriers to competition. Lack of clear guidelines, inconsistent requirements across administrations, or insufficient information sharing about past procurement decisions and outcomes may hinder new entrants from understanding and navigating the procurement landscape effectively. Enhanced transparency in procurement practices, standardized evaluation criteria, and proactive engagement with potential providers can promote a more inclusive and competitive environment.

To address these obstacles, solutions could include streamlining procurement procedures to reduce complexity and administrative burden, while ensuring compliance with essential regulatory and security standards. Introducing flexibility in bid evaluation criteria to include qualitative factors alongside cost considerations can encourage innovation and diversity among cloud service providers. Furthermore, improving transparency through accessible procurement guidelines, standardized frameworks, and regular stakeholder engagement can enhance competition by fostering fair and equitable opportunities for all providers, regardless of size or market tenure. These measures collectively aim to promote a more competitive public procurement environment for cloud services, benefiting public sector organizations and taxpayers alike through improved service quality, innovation, and value delivery.

These obstacles identified could be solved by leveraging: (i) [Royal Decree Law 36/2020](#), which encourages the creation of standardized framework agreements to streamline procurement, particularly for European Recovery Funds; and (ii) the newly established Interministerial Commission for Innovation in Public Procurement and the Plan for Innovation in Public Procurement created under [Royal Decree 364/2024](#).

In addition, if the public procurement market does not act as a driver of new entrepreneurial initiatives, due to a poor design of public contracts, Spain will lose opportunities to strengthen its startup ecosystem and will be a less attractive market for the establishment and scaling of other entrepreneurial projects.

23. Provide additional comments on other barriers, distorting factors or issues that you consider relevant to the functioning of this sector (max. 500 words).

In our answer to this question, we would like to focus on the affected parties by competition related problems in the cloud sector, namely: competitors of legacy software provider, in particular Microsoft, and customers (consumers, private clients and public administration).

- Competitors:

- by chilling innovation and increasing dependency on large integrated cloud players to the detriment of European SME's with competing solutions.

- Customers:

- unfair software licenses lock-in customers
- license fees are rising out of proportion to growth and customers are paying an additional 'tax' of billions of Euros every year, just to be able to run the software they own in the cloud infrastructure of their choice
 - the cost of repurchasing at 80 to 100% of the cost of the original licences
 - many dissuaded by the higher prices and forced to select Microsoft's own cloud solutions, depriving them of flexibility to build the cloud set-up they desire, and unfairly excluding competing providers
 - on key metrics such as latency and downtime, Azure performs less well than competitive clouds – yet customers are still pushed towards forgoing those competing services because of the price implications of selecting them

- the inability to license Office 365 to work with competing virtual desktops forces customers to switch to Windows Cloud PC rather than the preferred third-party cloud
- no choice but to participate in Microsoft's schemes (its new reseller programmes)
- the changes of October 2022 by Microsoft only increase Microsoft's access to the end customers

- The European economy:

- Money that could be spent on developing European services for European consumers is being diverted to the pockets of some of the wealthiest and largest software firms through unfair means
 - research from I-COM in Italy suggests that removing this tax by adopting the [10 principles of fair software](#) could lead to growth in the IT sector of as much as €1.61 billion per annum
 - in France research commissioned by the Concorde Foundation found that anti-competitive practices such as these had wiped €6 billion of potential growth from the French cloud market
 - the Nubes study found that anti-competitive behaviour leveraging strong links between cloud services and adjacent software products was risking the potential for more than €1.4 billion in cloud revenues by 2030, and 12,400 new cloud jobs
 - the aggregate cost of the licence portability policy, in terms of the estimated surcharge on the European cloud market, is in the order of magnitude of something like 20%
 - Microsoft's surcharges to use its software on customers' choice of independent cloud infrastructure added as much as 28% to the cost of software: for a single product (SQL Server) conservative estimates put the additional cost at over €1 billion per year

24. Assess the current European and national regulatory framework in its ability to promote an efficient and competitive operation of the cloud services market. If so, how could it be improved? (max. 500 words).

NS/NC

25. In your opinion, what other regulations could affect the competitive dynamics of the cloud sector? If so, how could they be improved? (max. 500 words).

NS/NC

26. Provide additional comments on other solutions or recommendations (not necessarily of regulatory nature) to improve the competitive dynamics in the cloud sector (max. 500 words).

NS/NC