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## **Competition in the Provision of Cloud Computing Services – Note by Denmark**

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## Denmark

### Danish Business-Users' Concerns On The Market For Cloud Services

#### 1. Introduction

1. Almost 70 per cent of Danish firms bought at least one type of cloud computing service over the internet in 2023.<sup>1</sup> This is among the highest shares in the European Union (EU), with the corresponding average across the EU being 45 per cent of firms.

2. Cloud computing services (henceforth cloud services) are vital for businesses because they offer scalable, cost-effective access to computing resources, enable faster innovation and operational efficiency. They reduce the need for heavy upfront IT investments, allowing companies of all sizes to compete and grow. Thus, businesses' use of cloud services can drive productivity growth across industries by automating routine tasks, improving data management, and enabling more efficient resource usage.

3. At the same time, several national competition authorities have raised concerns over the state of competition in the market for cloud services.<sup>2</sup> In addition to market concentration being relatively high – the three so-called hyperscalers Amazon (Web Services, AWS), Microsoft (Azure) and Google (Cloud Platform, GCP) together have more than 60 per cent of the global cloud market share<sup>3</sup> – concerns have been raised over cloud customers being restricted with regards to freely choosing providers, switching providers, using several providers (multi-clouding), and/or moving (back) to on-premise or other non-public cloud IT solutions.

4. Given the current uptake of cloud services by Danish firms and their important role in driving productivity growth and competitiveness, coupled with the documented concerns for the state of competition in the market, the Danish Competition and Consumer Authority (DCCA) carried out a business-user survey in 2024. The survey focused on competition parameters in the cloud market from the business-user perspective. The survey covers all three layers of the cloud stack: Infrastructure-, Platform- and Software-as-a-Service (IaaS, PaaS and SaaS).

5. The survey was carried out in cooperation with the Danish Chamber of Commerce. More than 1,000 Danish businesses responded to the online questionnaire, during September-October 2024 (the DCCA survey).<sup>4</sup> Unlike the Eurostat data quoted above, the DCCA survey also included firms with 0 to 9 employees.

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<sup>1</sup> Firms with 10 employees or more. Source: Eurostat, *Cloud computing services by size class of enterprise [isoc\_cicce\_use]*.

<sup>2</sup> Including [the United States \(FTC\)](#), [the United Kingdom](#), [France](#), [the Netherlands](#) and [Japan](#).

<sup>3</sup> See for example <https://www.nextwork.org/blog/cloud-computing-stats-2025>.

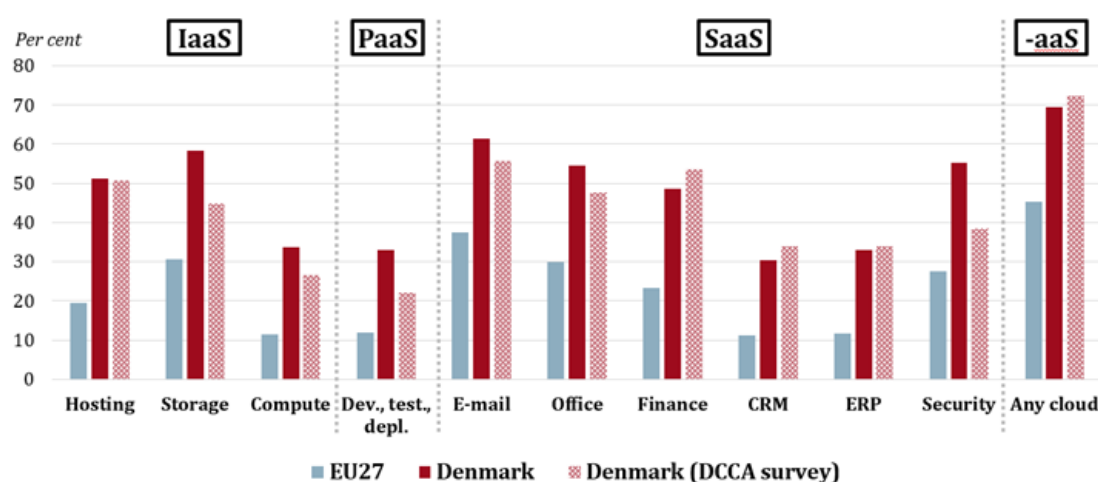
<sup>4</sup> The survey respondents represent firms in the manufacturing, wholesale and retail, transportation, information and communication, professional services, healthcare, welfare and civil society, and the tourism and culture sectors.

6. The DCCA has also conducted a number of interviews with e.g. hyperscalers, business organisations, public sector organisations, as well as Danish and international firms in the IT or IT advisory sector.

## 2. Danish firms are relatively mature cloud customers

7. Eurostat data reveals that 70 per cent of Danish firms bought cloud services over the internet in 2023, which is higher than the EU average of 45 per cent. This is also in line with the data from the DCCA survey, where 72 per cent of the respondents reported that they bought cloud services in 2024, cf. Figure 1.

Figure 1. Share of firms buying cloud computing services over the internet, 2023/24



Source: Eurostat [isoc\_cicce\_use] (“EU27” and “Denmark”) and DCCA survey, (“Denmark (DCCA survey)”), n=1,004. Eurostat data only includes firms with 10 employees or more, from all sectors of the economy. The DCCA survey data includes firms of all sizes, but from a subset of sectors, cf. footnote **Error! Bookmark not defined.** Eurostat data for 2023, DCCA survey data for 2024.

8. E-mail, office and finance/accounting software (SaaS) and database hosting and file storage (IaaS) were the most commonly purchased cloud services, for both Danish and EU firms. However, there are some notable differences between Danish and EU firms when one considers the purchasing patterns of specific types of cloud services.

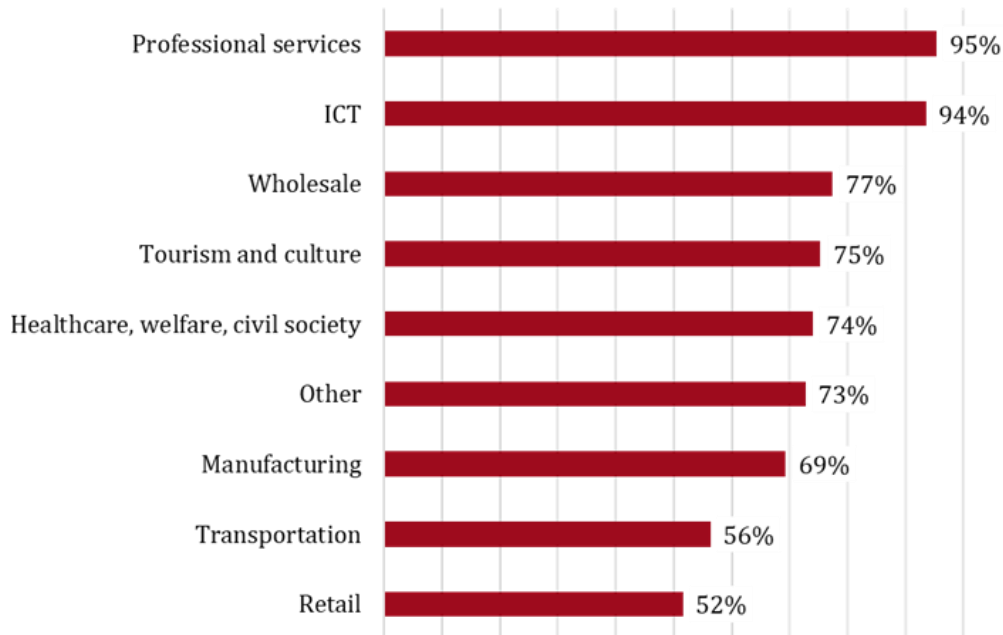
9. For example, while it was less than twice as common for Danish firms to purchase e-mail and office software or file storage as-a-service, compared to the EU average, it was almost three times more common for Danish firms to purchase computing power, ERP applications, access to computing platforms for application, development and testing, CRM software, and database hosting than it was for the average EU firm. Thus, **the uptake of cloud services among Danish firms appears to be relatively more pronounced for the more advanced types of cloud services.**

10. Furthermore, the share of firms that purchased all three types of IaaS (i.e. hosting, storage and computing power) was 250 per cent higher in Denmark (30 per cent) than in the EU as a whole (9 per cent).<sup>5</sup> This suggests that **Danish firms to a relatively large degree have “moved to the cloud”, especially when it comes IT infrastructure services.**

<sup>5</sup> Eurostat, *Cloud computing services by size class of enterprise [isoc\_cicce\_use]*.

11. In addition, purchasing cloud services is more common, the larger the firm is. In Denmark, 94 per cent of the large firms, 80 per cent of the medium-sized and 67 per cent of the small firms, purchased cloud services in 2023.<sup>6</sup> A similar pattern is present also for EU firms on average, although it was **relatively more common for small Danish firms to purchase cloud services compared to small EU firms** (60 per cent more common), than it was for medium-sized and large firms (34 and 20 per cent more common, respectively).

Figure 2. Share of Danish firms that purchased any cloud service, by sector, 2024



Source: DCCA survey, n=1,004.

12. The DCCA survey data also reveals that there are notable differences between sectors regarding the purchasing of cloud services, cf. Figure 2. For example, whereas **almost all firms in the professional services and information and communication sectors** purchased cloud services in 2024, just over half of firms in the retail and transportation sectors did so.

### 3. Microsoft Azure is commonly used by Danish firms

13. Throughout the interviews, perhaps the most commonly recurring comment has been that “Denmark is a Microsoft-heavy country”. The results from the DCCA survey also show that **the (by far) most commonly used cloud provider for Danish firms indeed is Microsoft Azure**.

14. The data does not allow for an assessment of market shares but some usage patterns are noticeable. For example, using Microsoft Azure is more common the larger the firm is (the same is true for AWS customers), whereas the opposite pattern is true for GCP. This

<sup>6</sup> Ibid. Data from the DCCA survey shows that 69 per cent of Danish micro firms (0-9 employees) purchased cloud services.

is in line with claims made by several interviewees, who have mentioned that Azure is typically more common for legacy firms whereas start-ups tend to choose GCP.<sup>7</sup>

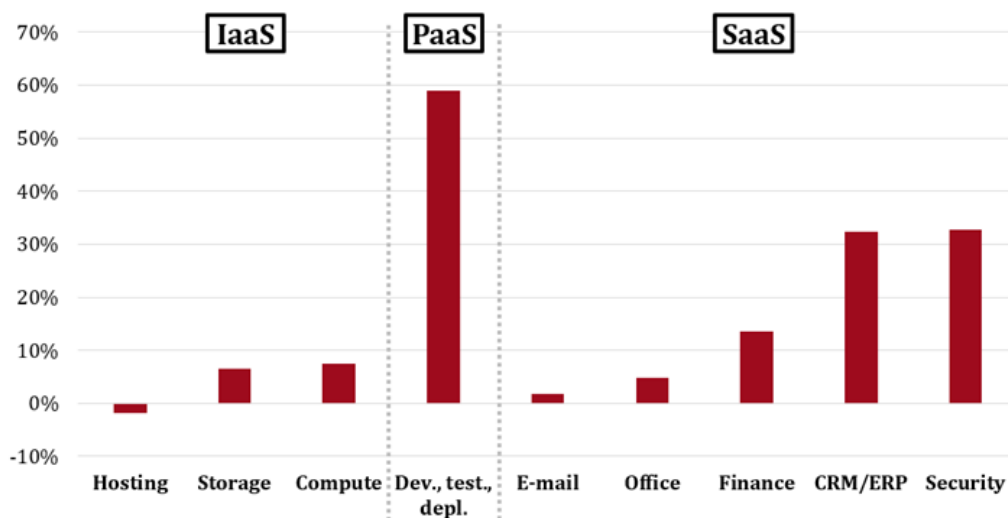
15. However, the data also reveals that **one third of the surveyed firms that purchase cloud services use at least two cloud providers**. It is also more common for Azure customers to use at least one other cloud provider (56 per cent of Azure customers), than it is for them to rely solely on Azure for their cloud needs (44 per cent). Among Danish GCP customers, 65 per cent use at least one other cloud provider, and for Danish AWS customers, 89 per cent use at least one other cloud provider.

16. Of those 56 per cent of customers that purchase from Azure and at least one other provider, buying access to PaaS is relatively far more common, compared to those 44 per cent who are Azure-only customers, cf. Figure 3.

17. Purchasing security, CRM/ERP and finance/accounting SaaS is also relatively more common for Azure multi-cloud customers. However, there is a much smaller difference when it comes to purchasing any of the three types of IaaS, or purchasing e-mail and office SaaS, between Azure-only and Azure multi-clouding customers.

18. The data suggest that Danish firms' **multi-clouding behaviour is primarily driven by customers' purchasing access to PaaS and more advanced SaaS, rather than multi-clouding at the IaaS layer or the more basic SaaS layer**. This includes the possibility that many multi-clouding customers relies on one IaaS provider, on whose infrastructure it runs the PaaS and SaaS they buy from another provider.

**Figure 3. Difference in cloud purchasing patterns (types of cloud services purchased) between customers who use Microsoft Azure and at least one other cloud provider and Azure-only customers, 2024**



Source: DCCA survey, n=341.

19. Furthermore, it is particularly *less* common for Danish firms that are *not Azure-customers* to purchase IaaS, especially computing power and file storage, compared to the purchasing patterns of Azure-only or Azure-multi-cloud customers. These customers may,

<sup>7</sup> It should, however, be noted that among Danish firms with 0 to 9 employees, Microsoft Azure was nonetheless the most commonly used provider of cloud services.

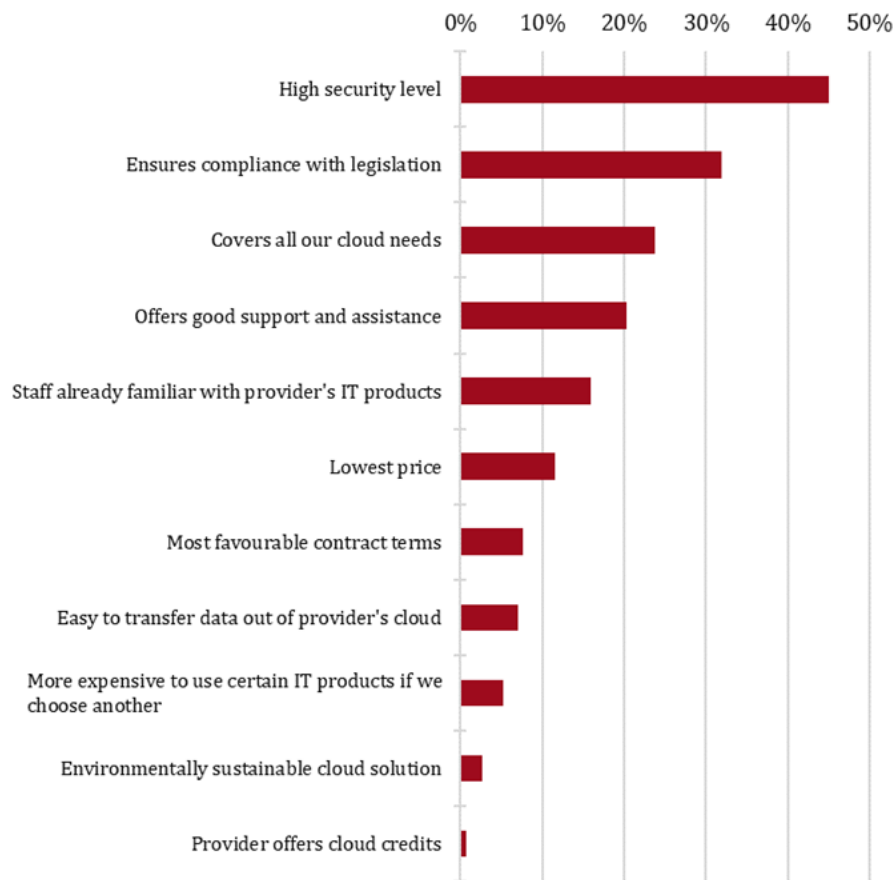
for example, purchase PaaS and SaaS, without running them on a public cloud infrastructure.

#### 4. Security and compliance matter most, price less important

20. When asked about the decisive factors when firms selected their cloud provider, **IT security was by far the most commonly reported factor**, cf. Figure 4. **Compliance with relevant legislation**, for example the EU's GDPR (Regulation (EU) 2016/679), was ranked as the second most important factor. The DCCA considers it relatively unsurprising that security and compliance are central factors to Danish firms' choice of cloud providers.

21. Perhaps more interestingly, the third most important factor (if one ignores the “do not know” option) was that **the provider covers all of the firm's cloud needs**. This may (at least partially) explain why many firms choose the largest cloud providers. The factor was selected by 35 per cent of the Azure-only customers, 27 per cent of the Azure-multi-cloud customers, but “only” by 17 per cent of the non-Azure customers. Similarly, that firms are already familiar with the provider's other IT products – the fifth most commonly chosen factor – may also favour choosing one of the larger cloud providers, since they also offer several other types of IT services. Danish firms also appear to value that the provider offers **good support and assistance**, which was selected as the fourth most important factor.

**Figure 4. Which of the following factors were decisive for your firm's choice of cloud provider?  
Maximum three answers possible**



Source: DCCA survey, n=725. "Do not know" (25%) not included in graph.

22. The factors “price”, “favourable contract terms” and, particularly, the “provider offering cloud credits” appear to be relatively less important factors for Danish firms. That the provider offers the lowest price was only reported as a decisive factor by 11 per cent of firms, and the offering of cloud credits by a mere 1 per cent. This suggests that Danish firms’ choice of cloud provider is not prominently driven by a desire to reduce cloud expenditure costs the most. This may contribute to making it more difficult for smaller cloud providers to attract customers.

23. That certain IT products become more expensive if the firm chose another provider, or the ability to transfer data out of the provider’s cloud, are also not reported as decisive factors by many.

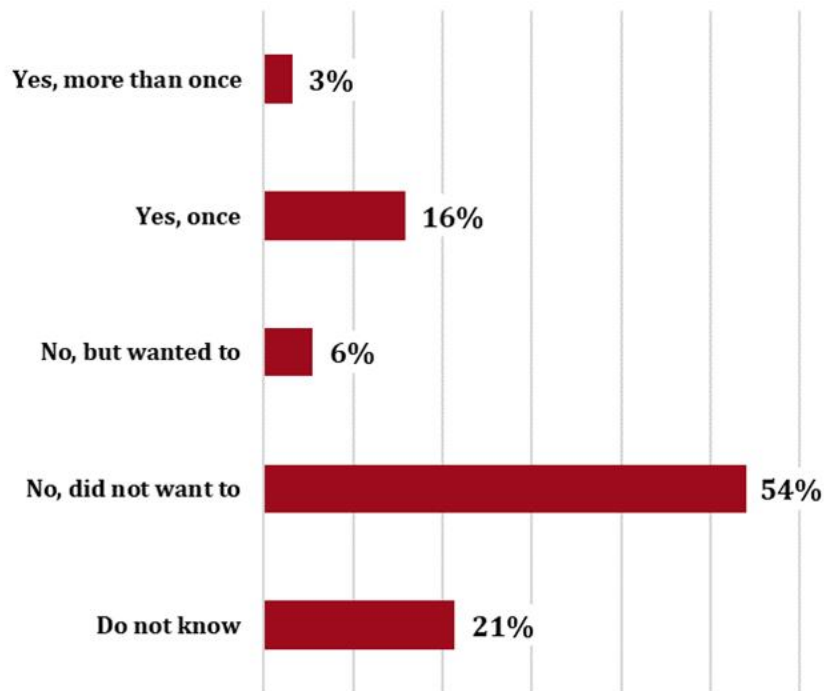
## 5. Uncommon to switch cloud providers – but do firms want to?

24. Other competition authorities have pointed out that it can be difficult for customers to switch from one cloud provider to another. This could constitute a concern for the competitive functioning of the cloud market, if customers are involuntarily locked-in to the provider they chose at one point in time. Not only would it limit providers’ incentives to attract customers via e.g. lower prices, better terms and conditions or innovative offerings,

but it would also increase the ability of cloud providers to exploit their customers' weak bargaining position.

25. Indeed, several interviewees have mentioned that cloud providers appear to employ strategies that push customers to purchase “more” cloud services, for example in order to retain rebates and discounts previously enjoyed. Furthermore, individual Danish firms have mentioned that they have faced steep price increases, and media outlets have reported that public sector organisations are unable to switch to alternative providers, despite facing substantial increases in their IT expenditure.<sup>8</sup>

Figure 5. Has your firm switched cloud provider within the last three years?



Source: DCCA survey, n=725.

26. The survey data **cannot comprehensively confirm or reject the presence or strength of customer lock-in** in the Danish market for cloud services.<sup>9</sup> However, the data suggest that lock-in is an issue for a limited number of cloud customers, at most. In fact, while approximately one in five Danish firms report that they have switched cloud provider at least once, only one in twenty report that they have not, but wanted to, cf. Figure 5. More than half of firms report that they did not want to switch. Furthermore, there are no notable differences when one considers the difference between answers from Azure-only, Azure multi-cloud or non-Azure customers, respectively.

27. That said, the DCCA understands that switching between different cloud infrastructures can be relatively doable without incurring significant costs, whereas moving

<sup>8</sup> Version2, 19 February 2024, *Kommunernes Microsoft-udgifter er eksploderet: "Vi har ikke andet valg"*.

<sup>9</sup> For example, the data does not allow the DCCA to analyse which types of cloud services respondents have switched, or wanted to switch but did not.

an application built on one provider's platform to another platform can be near or actually impossible.

## 6. Which barriers to switching?

28. Other competition authorities have pointed to a number of barriers to switching or multi-clouding in the cloud market. Lack of interoperability between different providers, data transfer (or egress) fees, committed spend agreements and licensing issues are, for example, the four hypotheses of competitive harm in the UK CMA's market investigation.<sup>10</sup>

29. The DCCA survey only include answers from the demand-side to contribute to the description of these issues. When asked about barriers to switching cloud providers, Danish firms reported that technical barriers are the most common, followed by other switching costs, lack of price transparency and lack of skills, cf. Figure 6. These types of barriers were reported by approximately 20 per cent of Danish cloud customers, respectively.

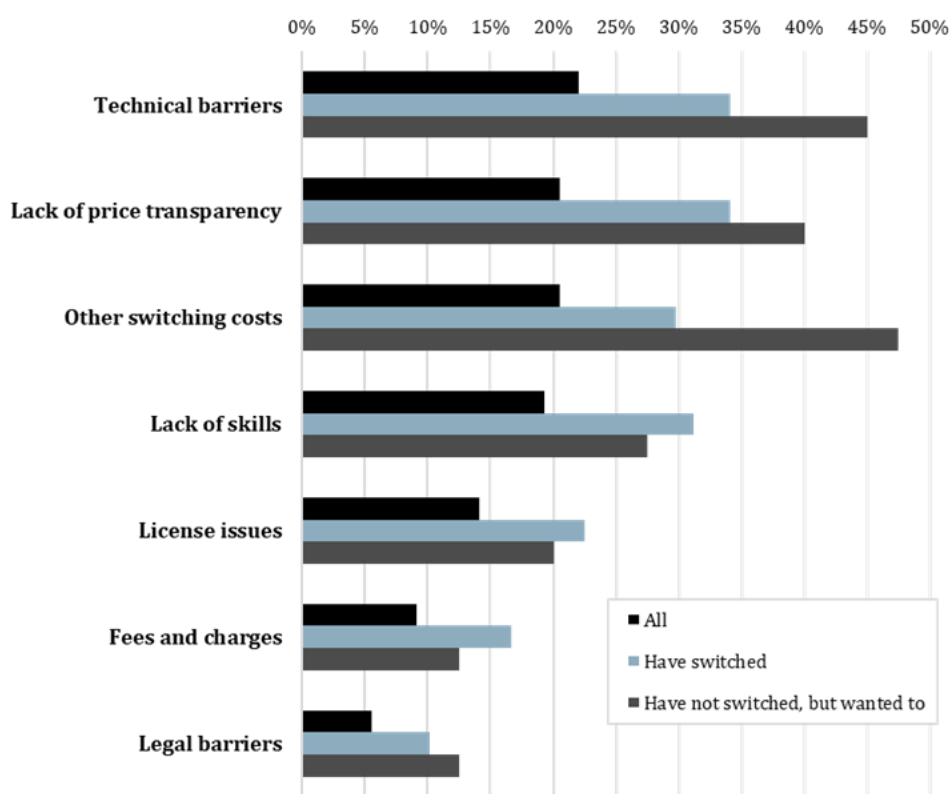
30. Licensing issues were reported by 14 per cent of respondents. The barrier relates to firms incurring costs for converting or purchasing new licenses, when switching to a different cloud provider. 18 per cent of the Azure-only and 17 per cent of the Azure multi-cloud customers reported it as a barrier, whereas 11 per cent of the non-Azure customers did.

31. However, when looking at the subset of respondents who either have switched cloud provider (once or more than once) or who wanted to switch but have not, within the last three years, the pattern is similar but the magnitudes are different. For example, between 40 and 50 per cent of Danish cloud customers who wanted to switch cloud provider but have not, report that they faced other switching costs, technical barriers and a lack of price transparency. The corresponding shares among firms that have switched cloud providers are 30 to 35 per cent.

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<sup>10</sup> Competition and Markets Authority, 17 October 2023, *Issues statement*, available at <https://www.gov.uk/cma-cases/cloud-services-market-investigation>.

**Figure 6. Which barriers do you consider that your firm faces regarding switching between cloud providers? Multiple answers possible**



Note: Technical barriers relate to interoperability or data portability issues between different cloud providers. Lack of price transparency relates to difficulties in comparing different cloud providers' prices and offerings. Other switching costs include the costs of time to carry out the switch, including systems integration, risks of downtime, consultancy/advisory expenses, or training/educations costs. Lack of skills relate to staff not being sufficiently familiar with other cloud providers and their services. License issues relate costs for converting or purchasing new licenses, when switching to a different cloud provider. Fees and charges include costs related to moving data from the existing cloud provider. Legal barriers include long notice periods, termination fees or exclusivity requirements. Other/None/Do not know/Not relevant (53%, 32%, 23%, respectively) not included in graph.

Source: DCCA survey, n=725.

32. Lack of skills is a more commonly reported barrier for those firms that have switched, than it is for those who have not but wanted to, although the shares for both subsets are around 30 per cent.

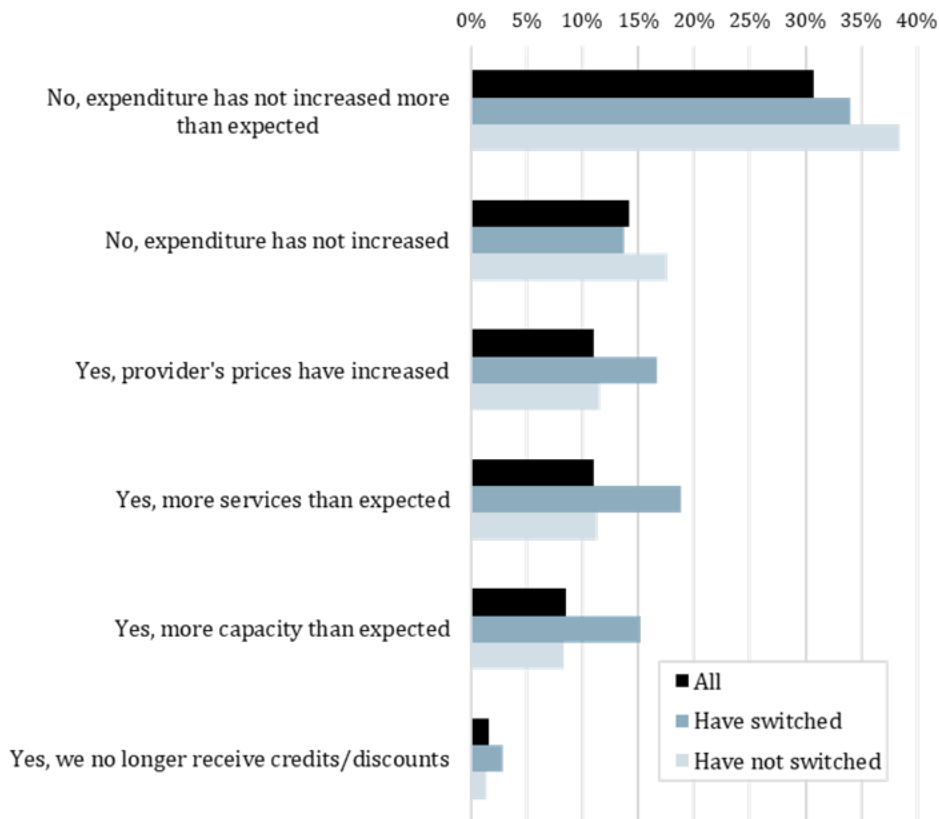
33. Similarly, but to a lower degree, licensing issues and fees and charges are more commonly reported as a barrier for those that have switched compared to those who wanted to switch but have not.

34. In other words, the share of firms that report that they face switching barriers is substantially higher among those that either have switched or, in particular, those who wanted to switch but did not, compared to the shares reported by all firms (i.e. including firms that have not switched and did not want to, or firms who do not know if they have switched or not).

## 7. Cloud expenditure has increased – but so has consumption

35. The UK CMA has also provisionally found that prices for some cloud services have gone up over time, whereas prices for others have gone down.<sup>11</sup> The survey evidence suggests that **Danish firms' cloud expenditure have increased since their contract entry**, cf. Figure 7. Less than one in six Danish firms report that their cloud expenditure has not increased, since they entered into their current contract with their cloud provider.

**Figure 7. Has your firm's cloud expenditure increased more than expected, since you entered into the contract with the provider? Multiple answers possible**



Source: DCCA survey, n=725. "Do not know" (29%, 13%, 18%) not included in the graph.

36. On the other hand, the survey evidence also suggests that **the increase in cloud expenditure is not primarily driven by unexpected price increases**. Instead, the by far most common answer (almost one-third) of respondents report that cloud expenditure has not increased more than expected. Furthermore, around 10 per cent of respondents report that expenditure has increased because they have purchased more cloud services (i.e. an extensive increase) or because they have purchased more cloud capacity (an intensive increase), than initially expected. 2 per cent of firms report that expenditure has increased because they no longer receive credits or discounts that they previously had.

<sup>11</sup> Competition and Markets Authority, 28 January 2025, *Cloud services market investigation – Summary of provisional decision*, supra 9, available at: <https://www.gov.uk/cma-cases/cloud-services-market-investigation>.

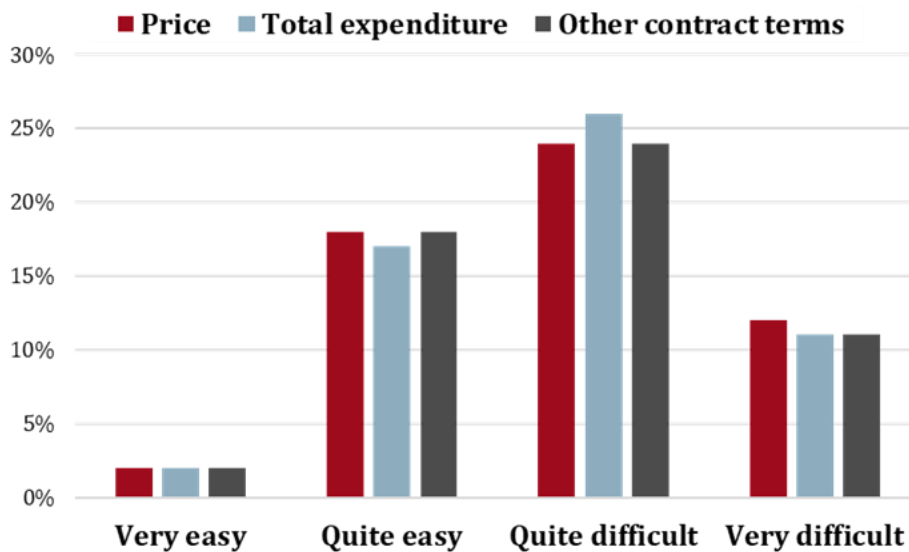
37. Nonetheless, around 10 per cent of Danish firms do report that their provider’s prices have increased. This could, *prima facie*, be explained by those firms using those cloud services that e.g. the CMA found had increased in price. However, the DCCA survey data does not allow for such a granular analysis. For firms that have switched cloud provider during the last three years, the share is 15 per cent. Indeed, firms that have switched cloud provider are also to larger degree reporting that they have used more cloud services and capacity than initially expected, compared to firms that have not switched cloud provider.

**8. Difficult for customers to compare cloud providers**

38. As mentioned in section 6, lack of price transparency was ranked as the second most common barrier to switching among Danish firms. During the interviews conducted prior to sending the survey questionnaire out, the lack of transparency when customers want to compare different cloud providers offerings was mentioned as a prominent issue.

39. **More than one-third of Danish firms find it difficult to compare different cloud providers regarding price, total expenditure and other contract terms**, cf. Figure 8.

**Figure 8. How easy or difficult was/is it to compare different cloud providers across the following factors? All firms**



Source: DCCA survey, n=725. “Do not know” (43%, 44%, 44%) not included in the graph.

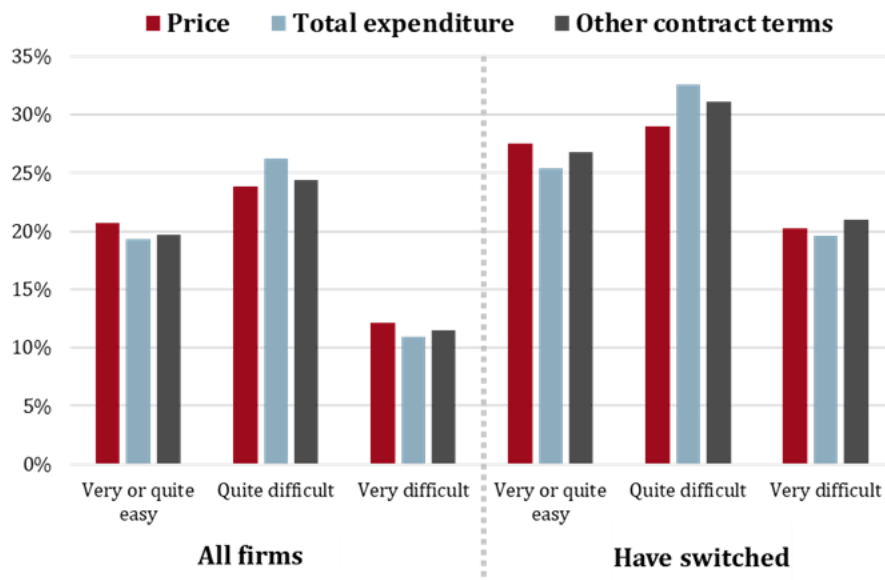
40. Around 20 per cent find it easy, although only 2 per cent of firms find it very easy to compare cloud providers, whereas more than 10 per cent find it very difficult. Furthermore, the data suggest that firms find it somewhat more difficult to compare their total expenditure across different providers, whereas other contract terms is considered somewhat easier.

41. When considering those firms that have switched cloud provider during the last three years, a slightly different picture emerges, cf. Figure 9. First, the share of “do not know” answers is just above 20 per cent across all three factors of comparison, compared to well above 40 per cent for all firms.

42. Second, **more than 25 per cent of firms who have switched cloud provider report that they found it very or quite easy to compare different providers**, which is around 33 per cent more common than it is for all firms (for confidentiality reasons, the answer options “very easy” and “quite easy” are combined, but keeping Figure 8 in mind, one may expect that the majority of firms find it quite easy rather than very easy). However, **around 30 per cent of firms who have switched find it quite difficult**, which is 21 to 28 per cent more common than it is for all firms.

43. However, the most pronounced difference is the share of firms that find it very difficult to compare cloud providers. **Around 20 per cent of firms who have switch cloud provider report that it is very difficult to compare cloud provider**, compared to just above 10 per cent of all firms.

**Figure 9. How easy or difficult was/is it to compare different cloud providers across the following factors?**



Source: DCCA survey, n=725. "All" include firms who have, have not, or do not know if they have or not, switched cloud provider during the last three years. Answer "Do not know" not included in the graph.

44. The difference is particularly pronounced for comparisons of total expenditure and other contract terms, where it is 80 and 84 per cent more common for firms who have switched to report that it is very difficult, compared to all firms. Price comparisons are considered very difficult for 67 per cent more firms who have switched.

45. In addition to the survey results suggesting a considerable lack of *ex ante* ability to compare different cloud providers, one of the most common messages from the DCCA's interviews with Danish cloud customers was that **it is very difficult – many even used the word “impossible” – to understand the cloud bills they receive from their providers**. Interviewees mention several pages of specifications and costs that even relatively experienced IT experts struggle or fail to understand. In other words, there appears to be a form of extreme transparency that makes customers unable to understand what they are paying for.

46. The lack of understandability makes it difficult for customers to assess their current cloud use and how much it costs, thus limiting the ability to adjust and seek new providers

or more optimal cloud or other IT setups. Thus, the lack of clarity of cloud bills could be a barrier to competition.

47. The issue appears to be quite common and not limited to Denmark,<sup>12</sup> and all three hyperscalers offer a swathe of FinOps solutions that can help customers optimise their cloud use and manage costs.<sup>13</sup> In addition, FinOps solutions are also offered by third parties, and the global cloud FinOps market is estimated to be worth around 13.5 billion USD in 2024, with double-digit compounded annual growth rates expected ahead.<sup>14</sup>

48. The DCCA understands that the standpoint from providers can broadly be summarised by the notion that cloud computing, as are many other IT solutions and services, is technically complex and that it is not possible to make it much more transparent than it currently is. While the customer interviewees tend to agree that cloud and IT indeed is complex, they do not seem to *prima facie* agree that the cloud bills cannot be made more accessible than they currently are. However, the DCCA has not been made aware of any concrete suggestions for how to improve *ex post* transparency for cloud customers.

## 9. Conclusion: signs of barriers to competition but not immediately obvious how to mitigate them

49. The information collected via the survey and from the interviews show that there are **signs from the demand-side of the market for cloud services that competition is limited**. Technical barriers, lack of transparency and other switching costs appear to restrict the abilities to select the cloud setup that is optimal for each cloud customer.

50. **However, the signs are not overwhelmingly pointing towards obvious remedial actions** that e.g. competition authorities should take. For example, the survey evidence suggest that it is more common for Danish firms to have switched cloud providers during the last three years than not. Furthermore, while most Danish firms report that their cloud expenditure has increased more than expected when entering into contract, only about one in ten report that this was due to their provider having raised the prices.

51. Fundamentally, while there are signs that there are restrictions to customers' freedom to optimise their cloud use, it is not clear to what extent those restrictions are commercially motivated or e.g. inherent in the technical solutions employed to provide and deliver cloud services. There also appears to be relevant economies of scale and scope, which may favour the very type of market concentration observed in the cloud market.

52. Furthermore, there also does not appear to be any concrete "low-hanging fruits" regarding how to address the competitive restrictions in the market. For example, addressing technical barriers to switching or multi-clouding likely requires a cloud service-

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<sup>12</sup> See, for example, Forbes, 10 July 2024, *Why Is It Still So Tough To Control Cloud Costs?*, available at: <https://www.forbes.com/councils/forbestechcouncil/2024/07/10/why-is-it-still-so-tough-to-control-cloud-costs/>.

<sup>13</sup> FinOps is short for financial operations and describes services that aim to optimise customers' cloud use. See for example <https://aws.amazon.com/blogs/aws-cloud-financial-management/tag/finops/>, <https://azure.microsoft.com/en-us/solutions/finops> or <https://cloud.google.com/learn/what-is-finops>.

<sup>14</sup> Markets and Markets, 19 July 2024, *The Cloud FinOps Market: A \$23.3 billion Industry Dominated by AWS, Microsoft, IBM, Google*, available at <https://www.globenewswire.com/news-release/2024/07/19/2915918/0/en/The-Cloud-FinOps-Market-A-23-3-billion-Industry-Dominated-by-AWS-Microsoft-IBM-Google-MarketsandMarkets.html>.

by-cloud service assessment, which may require relatively in-depth technical knowledge to effectively and proportionately achieve the desired outcome.

53. The DCCA notes in that regard that the EU's Data Act (Regulation (EU) 2023/2854) provides for increased switching abilities and interoperability, between different providers of data processing services, as well as the abolishment of data egress or switching charges.

54. Lastly, however, the DCCA considers that **the lack of transparency for cloud customers to *ex ante* compare different cloud providers' offerings, and/or *ex post* understand and assess their current cloud consumption, is concerning**. It may very well be that cloud computing just is so inherently complex that it is not possible to meaningfully equip customers with better insight than what is currently available, but the DCCA's preliminary conclusion is that the matter merits further discussion.