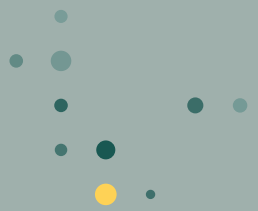
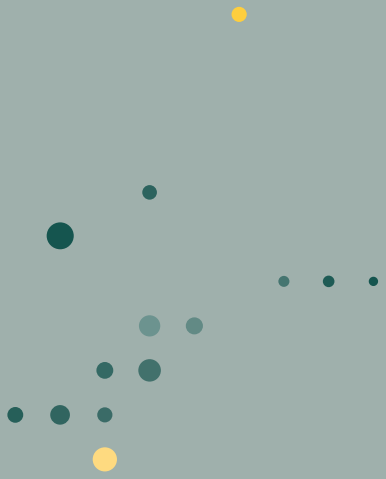
The key to digitalization

How cloud computing can stimulate the digital transformation of SMEs

IE.F





PREFACE

Anchored in the agreement signed by Germany's governing "traffic light" coalition, the digital transformation remains an issue of central importance in 2022. In a supporting role – albeit an extremely important one – we find cloud computing technology: By delivering products and services, the cloud plugs not only companies but also public institutions into the digital world.

Our 2019 study "Keeping cloud computing competitive – How multi-cloud solutions benefit the public & private sectors" examined the cloud computing ecosystem and how cloud providers interact with companies and public institutions. Yet cloud computing goes far beyond the concept of merely sharing servers and computing power: It is a fundamental prerequisite if we are to accelerate the digital transformation. Without it, Europe can never hope to make up the digital gap to the USA.

True, the number of German companies using cloud services has risen sharply since 2018. Many small and medium-sized enterprises (SMEs) in particular, however, are still reluctant to do so – even though using cloud solutions gives them above all the benefit of accessing the latest technology with no need for heavy initial investment. In light of this mismatch, much remains to be done to clear these companies' path to the widespread use of cloud computing services.

In this study, the Internet Economy Foundation (IE.F) and Roland Berger investigate how cloud computing services can accelerate the digital transformation for SMEs. We take stock of where SMEs are at in terms of cloud computing and identify the main obstacles that prevent them from taking the plunge. How can the government help them tear down these barriers? How can it create a better cloud computing ecosystem in Germany, in Europe?

What is at stake now is nothing less than the future, the progress of the digital transformation during the current parliamentary term. Right now, the political signals that emanate from the German government are of critical importance. These signals will determine how well Germany fares in advancing the digital transformation – especially among SMEs. Our hope is that this study will spark a fresh debate about the importance of cloud computing to the digital transformation – a debate in which you are cordially invited to participate.

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RECOMMENDATIONS FOR GREATER USE OF THE CLOUD BY SMEs

How to boost demand:

1. Promote the digitalization of SMEs
2. Improve employees' digital skills
3. Expand cloud usage in public administrations

Improving the European cloudscape:

1. Advance – and improve – the Data Act
2. Create legal certainty with a new data agreement
3. Further develop the European cloud infrastructure
4. Introduce a European seal of data sovereignty

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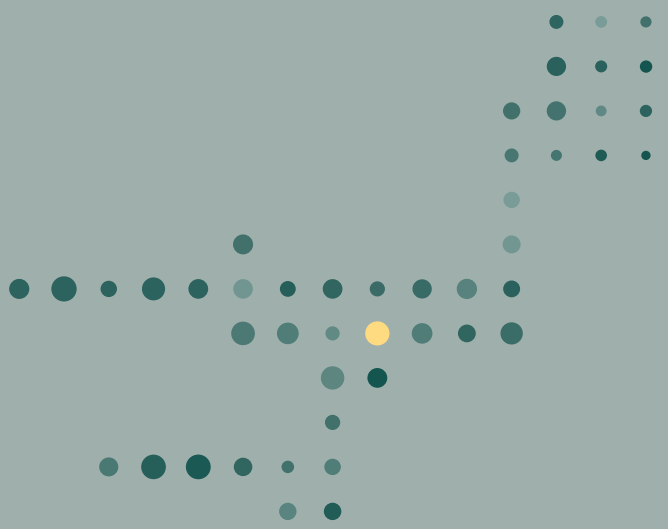
DIGITAL GAP: GERMANY MUST ACCELERATE ITS DIGITAL TRANSFORMATION



In its coalition agreement, the German government commits itself to greater progress. This statement of intent must be more than just empty words, however: It must become reality. Failing that, the country's future viability is at stake – not only, but especially, in the domain of digitalization. A lot has happened in Germany and Europe in recent years, even in comparison with the USA. For a long time, conventional wisdom had it that young, fast-growing companies could only achieve unicorn status – valuations in excess of a billion US dollars – across the Atlantic.

That is no longer the case: In 2021, 85 start-ups in Europe crossed this threshold and became unicorns, almost every third one of them in Germany.[1] Yet the gap between Europe and the USA does remain wide, with the USA boasting four times as many unicorns as Europe. Moreover, every second investor in European unicorns comes from outside Europe. The majority, indeed, are from North America. Whatever the many and varied reasons for this are, one thing is for certain: When it comes to digitalization, Germany and Europe are still playing second fiddle.

That said, the digital transformation is not the exclusive preserve of newly launched companies. On the contrary: It is critically important for the economy and society as a whole to go digital. Effectively, not just processes but whole business models must be able to dock onto the digital world. And this is where Germany falls behind even compared to the EU. The Digital Intensity Index produced by Europe's statistical agency Eurostat can, for example, be used to measure how many companies use digital technologies.

In Germany, only every fourth company reached high or very high levels of digital intensity in 2021. While that is slightly above the EU average (22% of all companies), it falls far short of digital front-runners Sweden (where 47% of all companies achieve high digital density levels), Finland (46%) and Denmark (43%). Among small companies employing between 10 and 49 people, only a good fifth of German players achieve high or very high levels of digital intensity, compared to a 60% figure for firms with more than 250 employees.

This gap between large companies on the one hand and small and medium-sized enterprises (SMEs) on the other is reflected with similar clarity in the arena of cloud computing: In 2021, 55% of the country's large corporations made use of intermediate to sophisticated cloud solutions[2] such as cloud-based financial or accounting software and the cloud-based hosting of corporate databases. The corresponding figure for

1 https://tech.eu/2022/02/28/report-says-eu-tech-unicorn-growth-outstripped-us-in-2021/

2 Eurostat distinguishes between basic cloud computing services such as office software and e-mail, intermediate cloud computing services such as cloud-based software for finance or accounting and customer relationship management, and sophisticated cloud computing services such as cloud-based security software and corporate databases that are hosted in the cloud.

SMEs was only 31%. Although the European Union aims to have at least 75% of all companies using cloud computing by 2030, this goal is still far off in the distance.

These numbers are worrying, because cloud computing is one of the crucial levers for the digital transformation. Cloud computing facilitates the flexible use of a pool of digital resources and services such as networks, storage capacity and applications. These resources can be sourced with an external provider (in what are known as public clouds) or made available internally (in private clouds). In most cases, combinations of these two models are used in the form of hybrid clouds.[3] Via cloud computing, consumers and companies alike thus have fast and flexible access to highly professional digital services without having to invest in the necessary infrastructure, security technology and compliance measures.

For small and medium-sized enterprises in particular, the use of cloud computing services is therefore an important component of the digital transformation. Yet many SMEs still hesitate to take the plunge. Why? Mainly for fear that third parties could access sensitive company data, or because of uncertainty about an unclear legal situation. The market for cloud computing services is dominated by a handful of US firms that must comply with both US and EU law. This fact can lead to conflicting legal situations regarding privacy issues, leaving corporate customers in particular unsure of where they stand. Similarly, the usability of cloud services can constitute an additional obstacle.

This study describes how, especially for SMEs, cloud computing can simplify and accelerate the digital transformation (Chapter 2). We analyze which cloud products German companies are already using and which they are not, juxtaposing this data with that for the rest of Europe (Chapter 3). In Chapter 4, we then examine the obstacles that make it difficult above all for SMUs to commit to cloud services, before discussing in the final chapter what the German government can do to make it easier to overcome these obstacles – and how both the political echelons and the corporate community can do what it takes to progress.

3 Flexera, State of the Cloud Report 2022

2

DIGITAL ON DEMAND: CLOUD COMPUTING AS A LEVER FOR THE DIGITAL TRANSFORMATION

Simply put, the idea behind cloud computing is to distribute multiple computers and their resources across a network. The introduction of Amazon Web Services helped this technology make the breakthrough: In 2006, the US company became the first to offer a cloud-based server infrastructure originally developed to give Amazon's own trading platform flexibility in handling peak demand periods such as the run-up to Christmas. Cloud services were thus spawned by a desire to make better use of the capacity of existing capital goods.

In the meantime, cloud computing has become the backbone of the digital transformation. But it was the coronavirus crisis that finally made the significance of cloud solutions obvious to every individual user: Work from home, widespread home schooling, videoconferences and collaborative work on documents and processes lined up alongside all sorts of other applications that, without cloud solutions, would have been possible only at inordinate expense or not at all.

The market for public cloud computing is growing continually

The success of this development is reflected in the rapid rise in revenue realized worldwide by the sale of public cloud infrastructure as a service (IaaS) offerings. Rather than buying ready-made software as a service solutions (such as finance or accounting solutions), this arrangement involves customers initially sourcing basic resources such as storing files, computing power and networks externally. According to market analyst Gartner, global sales of these IaaS services have increased by about a third per annum since 2015. In 2022 and 2023, the analysts expect market development to continue in the same dynamic ballpark. Gartner data shows that the overall market for public cloud services – infrastructure, platform and software services – was worth more than USD 400 billion in 2021 and should top the half a trillion dollar mark in 2023. **→A**

This forceful growth is rooted in the huge benefits that cloud computing offers compared to conventional infrastructure and software services that are usually operated by companies themselves. In addition to economic benefits in the form of greater flexibility, impressive scalability and lower costs, all while avoiding the risk of investing in an in-house data center, companies that opt for cloud computing can also reap rewards in the areas of technology, security and sustainability.

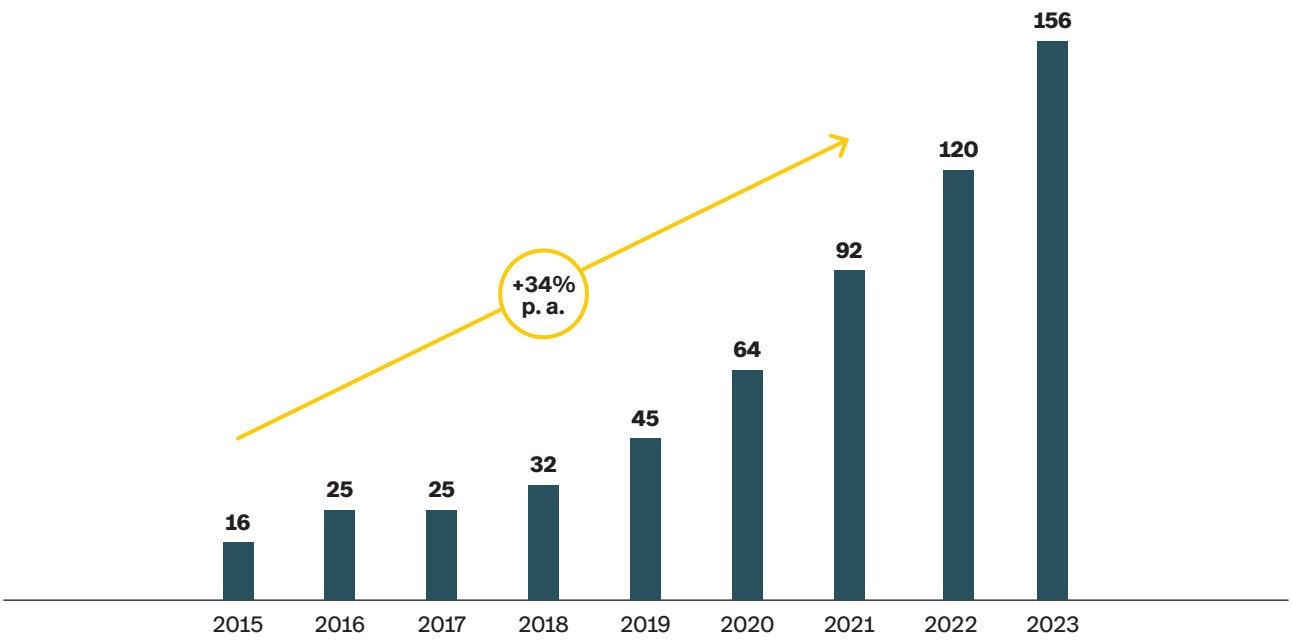
Flexibility and scalability

Before cloud services became widely available, companies that wanted to introduce new digital technologies usually had to invest heavily, either in infrastructure (such as data centers) or in licenses for a given application. This required careful planning: Approval was sometimes needed as well, and the time needed to build the requisite infrastructure had to be allowed for. Moreover, once the technology had been implemented, it had to stay in service for a long period of time to make sure it paid for itself.

In contrast, cloud computing – or at least the use of public cloud services – does not need any upfront investment. Instead, the required infrastructure, platforms and/or applications can all be purchased on demand as a service. If requirements change, due for example to unexpectedly vigorous demand, the company can re-

A Success story: Revenue from public cloud infrastructure as a service offerings increased by a third per annum between 2015 and 2021

Global revenue from public cloud-based infrastructure as a service offerings [USD bn]



Source: Gartner

spond swiftly and buy extra resources on a flexible basis. Resources can thus be more accurately aligned with actual demand, thereby making the relevant processes more efficient.

Nor does this apply only to comparatively rudimentary resources such as storage capacity and computing power. Mission-critical processes like enterprise resource planning (ERP) and customer relationship management (CRM) can likewise be swapped out to the cloud – all of which makes a major contribution to the digital transformation. This is especially true for small and medium-sized enterprises, for whom setting up a dedicated customer management system is not usually economically viable. As an alternative, they can now procure a highly professional system to manage customer relationships as a cloud service. Web shops are another example: Especially for small companies, it takes a huge amount of time and money to develop and operate their own web shop application. With the aid of a cloud solution, however, it is comparatively easy to set up a web shop and operate it flexibly – even at times of peak demand such as in the Christmas period. Nor should companies underestimate the ability of cloud services to help them bypass problems with supply chains. Cloud providers use long-term contracts to source infrastructure components and are therefore normally less affected by bottlenecks.

Subscribing to technological progress

When companies concentrate on their core business and source digital technologies with one or more cloud providers, another benefit is that they no longer have to bother about keeping digital resources up with the state of the art. Conversely, cloud providers themselves nave no choice but to stay on the leading edge if they want to successfully compete with each other.

In other words, companies that use cloud computing do more than simply purchase infrastructure, platform and applications in the form of a service: In effect, they also take out a subscription giving them permanent access to technological progress.

Cloud computing services guarantee a high level of security

Information security is the term given to the technical objective of guaranteeing the availability of data and applications and protecting them from loss and tampering. As a rule, cloud service providers can deliver stricter security than most traditional IT systems, because their learning curve is quite simply steeper. Generally speaking, it is safe to say that data is very safely guarded against loss, theft or tampering in cloud environments. Thanks to their business model, cloud service providers can exploit economies of scale not only with regard to infrastructure, but also in terms of security standards. For example, numerous providers deploy artificial intelligence tools to identify anomalies in data streams in real time and quickly block harmful files or applications.

With a view to availability too, customers can define the exact requirements that must be satisfied: The guarantee of 99.9% (“three nines”) availability for a cloud service translates into monthly outages of no more than 44 minutes. If “five nines” (99.999%) availability is purchased, the cloud service provider guarantees that the service will never fail for more than 27 seconds a month.

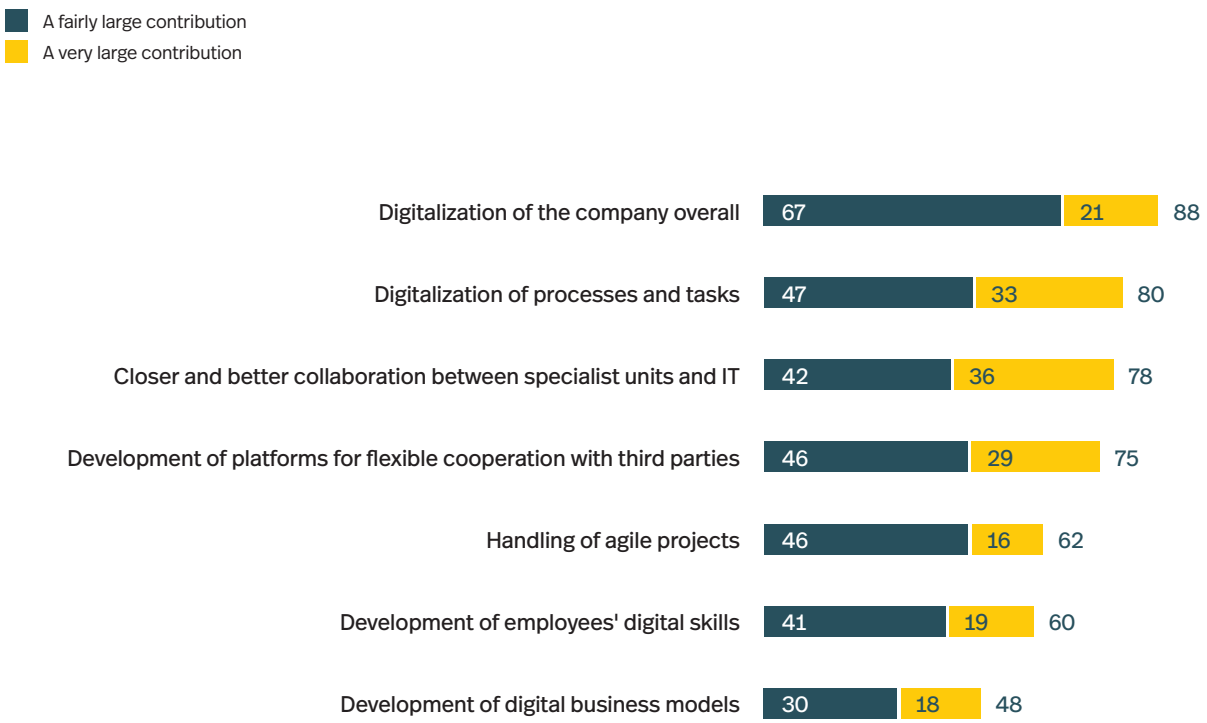
Cloud computing drives greater sustainability

Digitalization devours huge amounts of power. Depending on the number of followers, power consumption for a single tweet or Instagram post can add up to between 1 and 2.5 kilowatt-hours – roughly equivalent to a 60-degree cycle in a modern washing machine. Working on behalf of the European Commission, the experts at Austria's Environment Agency estimate that, by 2025, European data centers could see their energy consumption rise to 90 terawatt-hours per year. Yet economies of scale still enable cloud computing providers to run their data centers more efficiently – and therefore more sustainably – than lots of individual companies each with their own data centers. IEA figures indicate that while data centers have seen their workload increase massively over the past decade, their power consumption has stagnated. The reason is the greater efficiency achieved by using cloud technologies. According to one study by market researchers IDC, more than a third of companies in Germany already use cloud services to reduce CO_2 emissions.

Companies that use cloud computing have permanent access to technological progress.

B Going digital thanks to the cloud: Nearly every ninth company sees cloud computing as a key lever to drive the digital transformation

What contribution does the use of cloud computing make to digitalization at your company? [%]



Source: Bitkom Cloud Monitor 2021

Two challenges: Cost control and cloud lock-in

Its many and varied benefits aside, cloud computing technology naturally also has its drawbacks. Buying in cloud services requires expertise and good management, without which the cost can be unexpectedly high. One reason is that the sheer flexibility of cloud services can itself lead to dynamic costs. Wherever possible, it is therefore important to track and analyze cost and consumption data in real time to enable precise financial controlling and planning. The corporate community has clearly understood this point: In the "State of the Cloud Report 2022", four out of five respondent companies highlighted controlling the cost of cloud services as a major challenge in cloud computing.

Another is that using a single provider for many different cloud services can lead to what is known as cloud lock-in, making it difficult to switch to an alternative provider. This effect is partly because it takes a lot of effort to migrate the data stored in a cloud to other systems. There is also a lack of standardized interfaces, which again pushes up the cost of switching between cloud providers. One way to mitigate this challenge is to operate a balanced cloud portfolio as part of a multi-cloud strategy (see also the IE.F study "Keeping cloud computing competitive"[4]).

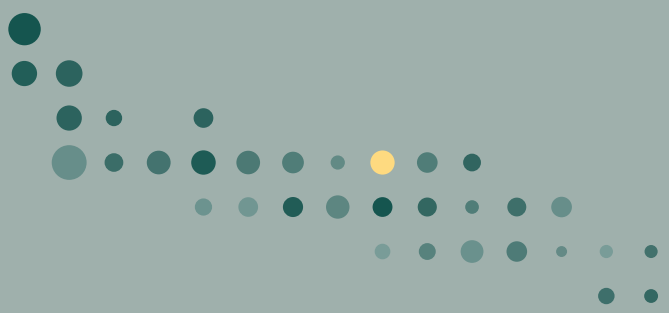
The benefits far outweigh the drawbacks

Overall, the benefits of cloud computing are far greater than its disadvantages. Or, to put it another way: the drawbacks of cloud computing must be well managed. On the other hand, the drawbacks accruing to companies that fail to use cloud services cannot be offset even by good management. Why? Because the cloud has established itself as an essential lever of digital transformation. Companies themselves agree with this view: In a survey conducted by Bitkom Research, nine out of ten companies acknowledged that cloud computing made a large or very large contribution to the digitalization of their company overall. →B

4 Internet Economy Foundation and Roland Berger, 2019: Keeping cloud computing competitive. How multi-cloud solutions benefit the public and private sectors: https://www.ie.foundation/content/4-publications/cloudstudy_ief_rb_de.pdf

3

SACRIFICING THE FUTURE TO CAUTION? HOW GERMAN COMPANIES USE CLOUD COMPUTING



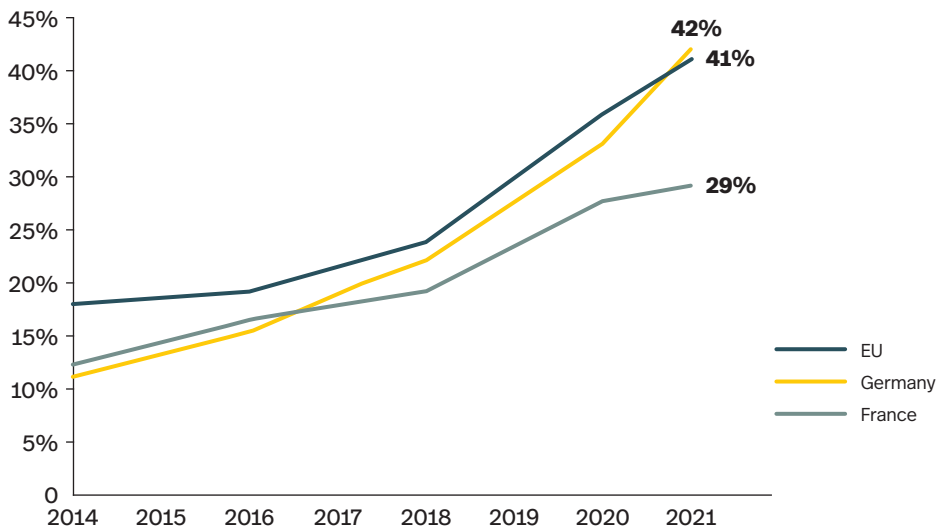
Many companies have long since grasped that cloud computing is not a trend: It is the new standard. The change in the share of companies[5] that use cloud services reveals a marked increase especially since 2018. Developments in the EU and Germany are unfolding largely in parallel, with German companies having gained ground on the EU average: Whereas only a good tenth of German companies made use of cloud services in 2014, this figure had climbed to 42% in 2021 – a number slightly higher even than the average of all EU countries (41%). →C

As far as it goes, this is a gratifying development. However, these numbers also mean that fewer than every second German company currently trusts in the cloud – in France even less than one third. Bearing in mind the advantages outlined in the preceding chapter, that is not a good sign for Germany's and Europe's digital transformation.

5 Except where otherwise specified, the Eurostat data shown here covers companies outside the banking sector.

New standard? Not even every second German company uses cloud services yet

Percentage of companies that buy cloud computing services used over the internet



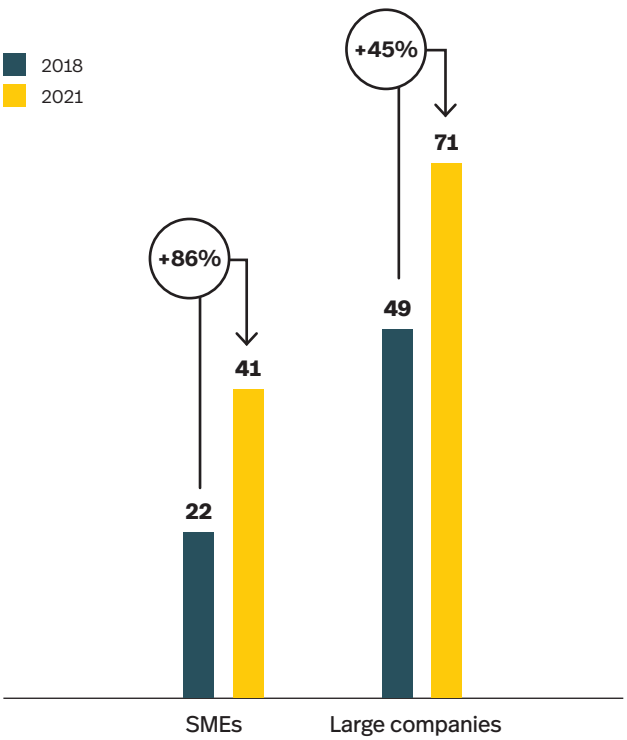
Source: Eurostat 2021

SMEs catching up with large companies

If we split the numbers into small and medium-sized enterprises (with 10-249 employees) on the one hand and large companies (with at least 250 employees) on the other, the picture that emerges is a little less gloomy. First, large companies make much more frequent use of cloud services than the average of all companies. In 2021, nearly three quarters (71%) of all large companies made use of the cloud. And although SMEs lag far behind this cloud usage figure at just 41%, they are rapidly catching up: The percentage of SMEs that use cloud services has nearly doubled since 2018. →D

D Playing catch-up: The share of SMEs that use the cloud is growing significantly faster than the share of large companies

Percentage of German companies that use cloud computing services [%]



Source: Eurostat

SMEs use a wide range of cloud services

Service models (such as infrastructure as a service and software as a service) and delivery models (public and private clouds) are not the only distinctions drawn between cloud services. This is because, firstly, neither a given service model nor the selected delivery model says anything about what cloud computing is actually used for. Figure E therefore illustrates the various services German SMEs source via cloud computing. Here, a distinction is drawn between basic cloud computing services such as office software and e-mail, intermediate cloud computing services such as cloud-based financial or accounting and customer relationship management software, and sophisticated cloud computing services such as cloud-based security software and corporate databases that are hosted in the cloud.

What are referred to as basic cloud services are the ones most frequently used by German SMEs. Accordingly, cloud services are used primarily for e-mail, storage of files and office software. However, these uses are followed directly by security software, one of the sophisticated cloud services. Around every sixth German SME sources financial or accounting software via the cloud.

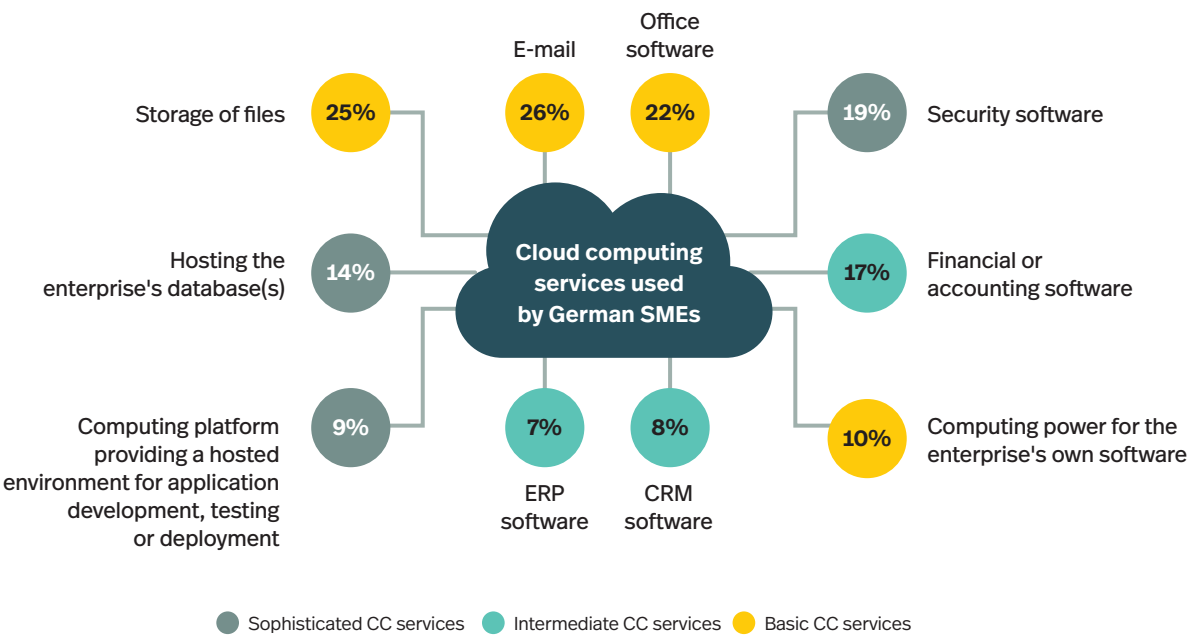
By contrast, far fewer SMEs use enterprise resource planning (ERP) and/or customer relationship management (CRM) software in the form of cloud services. →E

German SMEs' use of the cloud lines up with the EU average

Most companies use the cloud not just for one application but for multiple applications. Figure F shows the percentage of SMEs that use at least one cloud service in the given category. It is conspicuous that very few SMEs use only basic or intermediate cloud services such as e-mail, office software and accounting software. A quarter of the SMEs in Germany (25%) source at least one sophisticated service via the cloud, a figure slightly below the EU average of 29% and a bit above the average of French companies. Although German SMEs are catching up fast with their use of the cloud, this figure nevertheless leaves the country lagging far behind Europe's

E Colorful cloudscape: German SMEs make use of a very diverse array of cloud services

Percentage of German SMEs that use the named cloud computing (CC) service



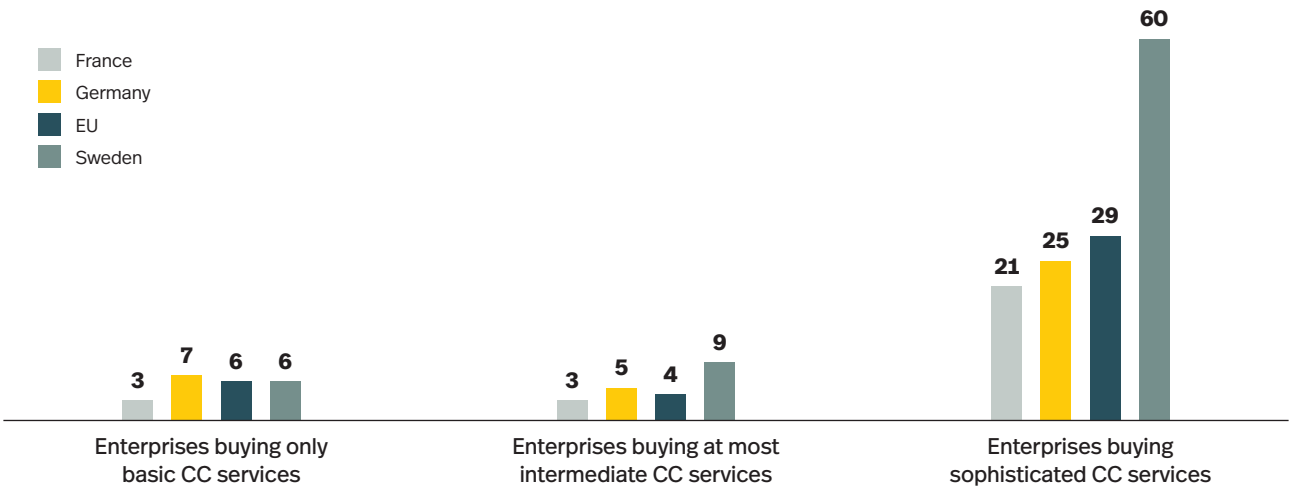
Source: Eurostat 2021

leading lights: In Sweden, fully 60% of small and medium-sized enterprises use at least one sophisticated cloud service. In Finland, Denmark and the Netherlands too, more than half of SMEs do the same. All these countries regularly occupy top slots in comparative international digitalization rankings such as the European Union's Digital Economy and Society Index. In the current index, published in 2021, these four countries fill the four top places – with Germany way down the list in 11th place. →F

The overall picture is clear: In Germany, SMEs in particular are still cautious about using cloud computing. This is true in comparison both to large companies in Germany and to SMEs in those European countries that are leading the digital transformation. And it is no coincidence: Using sophisticated cloud services is a critical tool with which to digitalize processes and business models. But why the reluctance? The following chapter takes a closer look at what keeps SMEs from venturing into the cloud.

F A long way to the top: More than twice as many Swedish SMEs use high-end cloud services than their counterparts in Germany

Percentage of SMEs that use at least one cloud computing service in the specified category [%]



Source: Eurostat 2021

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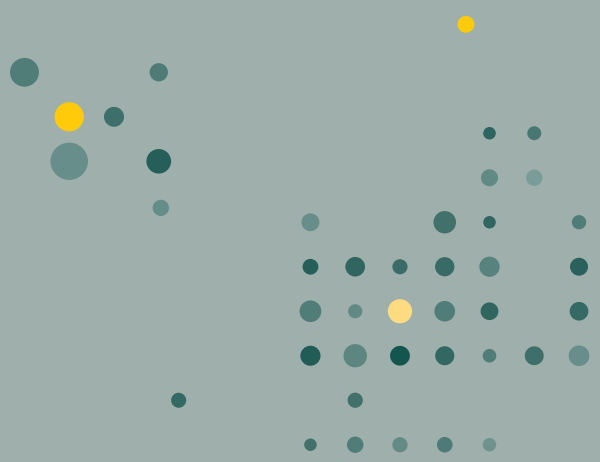
ROCKY ROAD: OBSTACLES ALONG THE PATH TO THE CLOUD

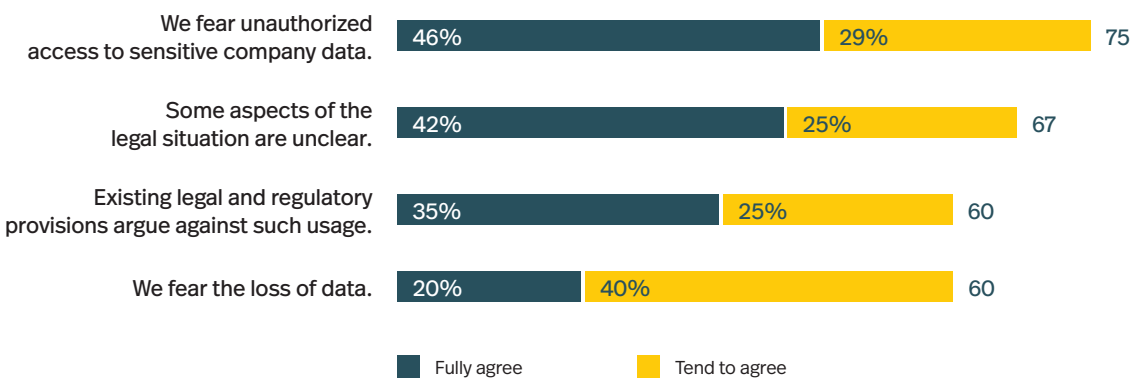


Cloud computing, like every technology, has both its downside and specific challenges associated with the use of cloud services. Chapter 2 has already explored the problems surrounding cost control: Without professional real-time monitoring of the usage fees incurred, the cost of cloud services can come as a nasty shock. According to the corporate community itself, an even more serious issue is that of data security. In Flexera's latest State of the Cloud Report, 85% of respondent companies cited security as a challenge in the context of cloud computing. A challenge is not necessarily an obstacle, though, as most of the companies quizzed by Flexera also claimed to be "heavy cloud users".

By contrast, the survey conducted by Bitkom on behalf of Cloud Monitor in 2021 also discloses the views of those companies that do not use public cloud solutions and are neither planning to do so nor even talking about it. One finding is that a large proportion of these companies (75%) are afraid of unauthorized access to sensitive company data. A slightly smaller majority (60%) fears the loss of data. Alongside data security issues, the legal situation is the main matter that concerns those companies that do not yet use public cloud services. Two thirds (67%) are worried about the unclear legal situation, while slightly fewer (60%) agree that existing legal provisions argue against the use of public cloud services. **→G**

G Stumbling blocks: Concerns about security and the legal situation keep companies from using public cloud services

Percentage of companies that use no public cloud solutions and that agree with the given statement [%]



Source: Bitkom Cloud Monitor 2021

Companies fear the loss of data

Ensuring compliance with the principles of personal data privacy enshrined in the European General Data Protection Regulation (GDPR) constitutes a major challenge where public cloud services are used. In the cloud, the physical location of data is essentially immaterial, as long as the provider complies with the contractually agreed requirements regarding security and performance. In the case of personal data, however, cloud service providers must also ensure that the storage and processing of this data likewise satisfies the demands of the GDPR.

It follows that transferring data to a country outside the EU is permitted only if the cloud service provider can still guarantee compliance with European data protection standards. That is why cloud users often secure contractual guarantees that their data will be stored at a data center within the EU, or even in their home country. Germany's federal police force, for example, stores footage from its bodycams in the cloud run by US provider AWS – albeit on condition that this data must be stored solely in Germany.

At the same time, companies need to be extremely careful with more than just personal data: Germany's highly innovative SMEs in particular must ensure that no unauthorized parties gain access to their trade secrets. In a survey conducted in 2021 by the analysts at techconsult, 56% of respondent German companies said they insist that cloud providers store their most sensitive data at German data centers.

Inconsistent legislation – A problem for European cloud users

Even then, however, obtaining contractual assurances that data processing is restricted to a given country is no guarantee of compliance with the GDPR. In what is known as the CLOUD Act (Clarifying Lawful Overseas Use of Data Act), for instance, the US government has determined that providers of electronic communication services[6] must – on request by a suitably authorized US agency – disclose data to that agency even if it is stored outside the USA. Where it applies, the duty for the data processing firm to provide administrative assistance takes precedence over the protection of personal data. This ruling thus flatly contradicts the GDPR, and the European Court of Justice has thus declared both of the EU Commission's attempts to find a solution – first with its Safe Harbor Regulation and then with the EU-US Privacy Shield Agreement – to be null and void.

In March 2022, the European Commission then announced a new agreement with the US government. According to Commission President von der Leyen, this agreement strikes a "balance between security, the right to privacy and data protection". At the start of October, the US government gave the corresponding amendments the force of law by decree. So, it is now up to the European authorities to determine whether the new US

6 Including internet providers, IT service providers and cloud providers, for example

rules provide adequate protection for personal data. Experts are skeptical about whether this new ruling goes far enough to accommodate the demands of the European Court of Justice. This being the case, it remains questionable whether the dilemma between the CLOUD Act and the GDPR can indeed be resolved. Especially small and medium-sized enterprises with no legal department of their own now find themselves in an unclear legal situation which, in case of doubt, could keep them from using cloud computing to accelerate their digital transformation.

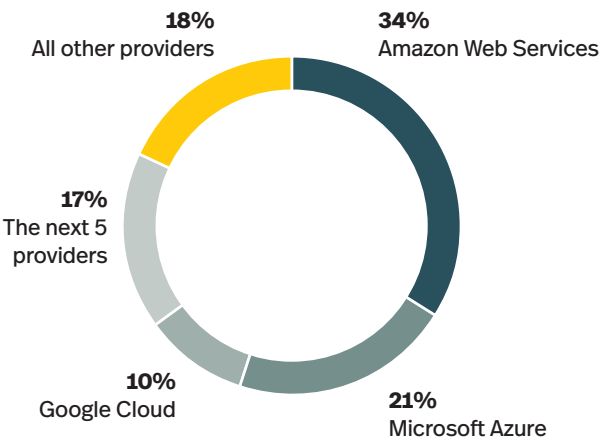
US providers dominate the cloud market

The inconsistencies between the CLOUD Act and the GDPR create a challenge for European companies above all because the market for infrastructure as a service and platform as a service offerings is dominated by US players. The three biggest providers of such services – Amazon Web Services, Microsoft Azure and Google Cloud – together account for just under two thirds of total global revenues. →H

According to the Synergy Research Group, their market share in Europe is even higher, at 69%. By contrast, European cloud providers have collectively cornered only 16% of their home market. True, European cloud providers' revenues have risen markedly. However, this has happened more slowly than for their rivals from the USA, meaning that the European providers have actually lost absolute market share in recent years. Since 2017, their share of the European IaaS and PaaS market has fallen from roughly 27% to slightly below 16% in 2021.

H Out in front: Only three providers control nearly two thirds of the global market for infrastructure as a service offerings

Percentage of global revenue from infrastructure as a service/platform as a service offerings, by provider [Q2 2022]



Source: Synergy Research Group

Europe needs more competition in the cloud market

To some extent, the leading cloud providers have their innovative and customer-friendly products to thank for this powerful market position. But they have also embedded their cloud services in comprehensive ecosystems that keep customers closely tied to their cloud services, often making it very difficult to switch to another provider (a tactic known as vendor or cloud lock-in). On the other hand, an innovative and versatile cloud ecosystem is of fundamental importance if cloud users are to be able to choose between both different cloud service providers and different delivery models. Europe boasts a raft of widely varying cloud service providers, including European companies such as OVH, Deutsche Telekom, IONOS and Outscale.

To date, however, not a single European cloud provider has grown large enough to seriously compete with the three current top dogs. One reason is that the European market is more heavily fragmented than the American one, making it harder for cloud providers to reach critical mass. The Gaia-X project is one important way to tackle this problem: Based on harmonized standards of data protection and interoperability, Gaia-X aims to become a pan-European platform for different cloud providers, but also to make it easier to scale up innovations.

This approach could establish a competitive ecosystem to counter today's dominant cloud providers. Besides adding fresh competition, it would also supply European SMEs with cloud solutions that comply with data protection requirements and the EU's values. Sufficient demand is probably there: In a survey conducted by techconsult in 2021, 40% of German companies said they insisted that cloud providers offer a server location in Europe.

Based on harmonized standards, a pan-European cloud platform can boost the international competitiveness of the continent's cloud ecosystem.

5

WHERE ACTION IS NEEDED: RECOMMENDATIONS FOR A BETTER EUROPEAN CLOUD ECOSYSTEM AND GREATER USE OF THE CLOUD BY SMEs

Establishing cloud computing as the go-to solution for the flexible, on-demand delivery of scalable IT resources on a pay-per-use basis is an important factor in driving the digital transformation across Europe's economy. Especially for small and medium-sized enterprises, the benefit of using cloud services is that they can harness the capabilities of innovative – indeed cutting-edge – digital solutions without the dual burden of heavy investment and a highly specialized internal IT department. Although cloud usage has risen sharply of late, fewer than half of German SMEs yet take advantage of this technology. The principal reason is the unclear legal situation, because the biggest providers of cloud services come from third countries outside Europe and are therefore bound by legislation that conflicts with the GDPR.

If there were more European cloud providers, it would be easier for SMEs to find an alternative to the third-country (non-EU) providers that currently dominate the market. That is important, because cloud providers domiciled in the EU are far less affected by divergent legislation surrounding personal data than, say, US companies. At the same time, measures to promote cloud usage can play a part in accelerating the digitalization of SMEs.

5.1 How to boost demand for cloud services

Evaluate and ramp up measures to promote the digitalization of SMEs

Alongside pan-European initiatives to step up the use of cloud computing – one example being the European Cloud Alliance – there are also a variety of offerings to support the digitalization of SMEs. For example, development bank KfW provides digitalization and innovation loans that cover eligible aspects such as the cost of setting up the use of cloud technology. It would be worthwhile investigating whether this measure achieves its intended goal, or whether adjustments to the funding criteria might make sense. The same goes for subsidies under the aegis of the "Digital jetzt" ("Digital Now") program to fund investment by SMEs, for instance.

Improve employees' digital skills

Even though cloud applications are usually designed to be very user-friendly and do not require corporate IT departments to operate a dedicated infrastructure, getting the most out of cloud technology does require a degree of knowledge and experience. That goes for the formulation of the right cloud strategy, but also for efficient operation. To take just one example: It is important to constantly track and manage the costs incurred for different cloud applications. This in turn presupposes a knowledge of the right methods and processes, which can be taught in advanced courses.

Appropriate staff training and education thus plays an important part in advancing SMEs' digital transformation with the aid of cloud technology. The "Digital Now" program mentioned above subsidizes investments in employee qualifications in areas such as digital technologies. It makes sense to examine the extent to which use is made of cloud technology training courses in the context of this development program, and whether there are specific areas where improvements could be made when updating the funding guidelines.

Expand cloud usage in public administrations

In the future, public authorities and administrations should press ahead more aggressively with best-practice solutions. This would vividly demonstrate how European standards and values can be reconciled to innovative cloud solutions. In particular, hybrid delivery models for multi-cloud solutions can show that the market does indeed have suitable solutions with which to process sensitive data. Doing so would generate three benefits: First, administrations would be able to enhance their skill sets, streamline internal processes and make digital services available more quickly. Second, they could set an example for companies that currently remain hesitant about using cloud solutions. Third, administrations could inject their own impetus into the overall cloud ecosystem – for example where new, innovative solutions have to be developed for a major tender.

5.2 How the European cloudscape can be improved

Advance – and improve – the Data Act

In February 2022, the European Commission tabled its first draft of a regulation for a "fair and innovative data economy". Under the terms of this Data Act, rules are to be introduced that will make it easier for customers to switch between cloud providers and launch measures to guard against unlawful data transmission. The proposed regulation marks an important step toward reinforcing trust in cloud services and mitigating the danger of vendor lock-in. On the other hand, the planned regulation must not worsen the existing legal uncertainty by imposing data sharing obligations that are too rigid and complex. To avoid this, the German government should, at the European level, advocate a concrete and practical design for the planned regulation – for example by more clearly defining the terminology used, especially with regard to precisely what data is covered by the regulation.

Create legal certainty with a new data agreement

The EU Commission has in the past made various attempts to resolve inconsistencies in EU and US legislation by means of agreements (such as Safe Harbor and the Privacy Shield). Both agreements have been declared null and void by the European Court of Justice. In March 2022, the EU Commission therefore announced a new agreement with the USA whose aim was to give greater legal certainty to both cloud providers and cloud users. On October 7, 2022, US President Biden implemented

the agreement in US law by decree. The next step is for the EU Commission to verify whether the US laws now provide adequate protection pursuant to Article 45 of the General Data Protection Regulation, such that personal data can be transmitted to the USA. The agreement would be an important and necessary step toward clarifying the legal situation, thereby making it easier for SMEs to step up into the cloud.

Further develop the European cloud infrastructure

Notwithstanding, a data agreement between the EU and the USA is no substitute for a European cloud infrastructure. At the European level, numerous initiatives have already been launched to target a better and better-connected European cloud ecosystem. Under EU Regulation 2018/1807 governing the free flow of data within the single European market, a working group populated by cloud service providers (SWIPO) in 2020 presented a voluntary code of conduct designed to improve interoperability and data portability across different cloud services. In addition, project Gaia-X, initiated by the German government to create a European cloud platform, was raised to the status of a European project.

Also, the "Important Project of Common European Interest for Next Generation Cloud Infrastructure and Services" (IPCEI-CIS) marks an important step toward building a common platform for the various approaches to a European cloud ecosystem. The project is being headed by Germany and France and should generate investment in the "high single-digit billions range out of public and private funding". This is another important step, but one that must be flanked by other measures. To put that in perspective: Amazon alone invested money in the "high single-digit billions" range in research and development in the first two months of 2022. It is therefore critical not to delay the launch of the IPCEI any longer, and to rapidly move ahead with other tendering rounds within the framework of this project.

Introduce a European seal of data sovereignty

A large number of European cloud providers already comply with the strictest data protection stipulations. It is therefore important for cloud users to be able to swiftly identify such offerings and rely on a guarantee that the principles of data sovereignty are upheld along the entire value chain. Essentially, the generation, storage and transmission of data must take place fully within the legal space that is the European Union, and the transmission of data to third countries must be precluded.

To this end, the European Union could introduce a quality seal that provides transparency, fosters trust among customers and makes it easier for European cloud providers to advertise with their high quality standards. Even SMEs with little cloud experience and no dedicated legal department could then quickly and reliably assess whether a given cloud provider can be trusted to process their data in accordance with European values.

Such a seal could also serve to define and demand compliance with minimum standards in terms of interoperability across cloud services and the portability of the data they process. Again, this would significantly reduce the threat of cloud lock-in. Lastly, the European Commission should also define standards for the operation of data centers, especially with a view to the use of renewable energy.

To summarize: Especially for SMEs, it is crucial to advance the digital transformation with the aid of cloud computing. To do so, it is necessary to both nurture demand and improve the European cloud ecosystem. Only then will Europe be able to safeguard its future prosperity and strengthen its competitive position in the global economy.

Cloud computing is crucial for SMEs to advance their digital transformation. Therefore, it is necessary to both nurture demand and improve the European cloud ecosystem.

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