Boavizta

Assessment of the environmental footprint of the Public Cloud

French Market Analysis
April 2024
(Data from December 2023)

boavizta.org

Reminder of the context

The electricity consumption of data centers:

- ➔ will double between 2022 and 2026 globally [1]
- ➔ increased by 31% between 2021 and 2022 in Ireland [2]
- ➔ will be multiplied by 6 in the next 10 years in the United Kingdom [3]

Certain limits are already impacting Public Cloud providers (strict rules for hyperscale data centers in the Netherlands, refused planning permissions for data centers in Ireland).

The materiality of IT systems is becoming an integral part of digital strategies.

[1] IEA [2] Central Statistics Office [3] Group CEO of National Grid

Organisations are aiming to assess and reduce the environmental impact of their Public Cloud usage, however, they face obstacles due to fragmented data and tools that are still incomplete.

This study provides an initial market overview of the maturity of this assessment and highlights the expectations of French organisations towards Public Cloud providers.

Study led by Boavizta in partnership with the CRiP

The Boavizta association is an inter-organization working group that aims to evaluate the environmental impact of digital technologies.
Created in France in 2019 | 250+ members

We create commons:
> Evaluation methodologies
> Impact data benchmarks
> Open-source evaluation tools
> Top-level management commitment

We contribute to the High Committee for Eco-Responsible and Sustainable Digital Industry; the Open Carbon Practice; various guides and references; and ensure regulatory monitoring.

https://boavizta.org

The CRiP, a French association bringing together Infrastructure, Technology, and IT Operations leaders.

The association brings together over 13,000 IT leaders from 350 major corporations, companies, and businesses across various industries and sizes.

The *Sustainable IT Working Group* played a crucial role in structuring the study and sharing the knowledge with members of the CRiP association.

https://www.crip-asso.fr/

Subject of the study

Boavizta

Our ambitions :

★ **to assess the maturity of organisations** in evaluating the environmental impact of their Public Cloud usage;

★ to identify actions and decisions aimed at **reducing the environmental impacts of the Public Cloud**;

★ to communicate to Cloud Service Providers (CSPs) the expectations from organisations to **accelerate the maturity of measurement tools**.

Our scope

✅ Iaas / PaaS services from Public Cloud providers

❌ SaaS services

❌ Private Cloud & on-premise infrastructure

Main topics

Cloud Adoption
Used CSP, workload Cloud %, maturity & adoption

Green IT/Sustainable IT strategy
Measurement strategy, IT carbon footprint, organisational maturity of measurement

Assessment of the environmental impact of the Public Cloud
Bottom-up or top-down approach, sponsors, motivational factors

Evaluation practices and tools
Tools & methodological guides, expectations towards suppliers

Feedback & Decisions

Approach of the study

Boavizta

October 2022

Are the CO2 emission reductions promised by CSPs realistic ?

> Blog Boavizta

May 2023

Understanding the results of cloud providers' carbon calculators.

> Blog Boavizta

Analysis of results by Boavizta:

- ➔ A working group of cloud experts from service companies and large enterprises analyzed the data.
- ➔ The synthesis of the results was reviewed by the Boavizta collective.

June -July 2023

Survey conducted among members of the ecosystem to understand the challenges associated with assessing the environmental impact of Public Cloud services.

Sept - Nov 2023

Questionnaire deployed among the members of Boavizta and the Sustainable IT Working Group associated with the CRiP association.

December 2023

Public survey carried out among the Sustainable IT ecosystem and all members of the CRiP association.

January - March 2024

Analysis of results

April 2024

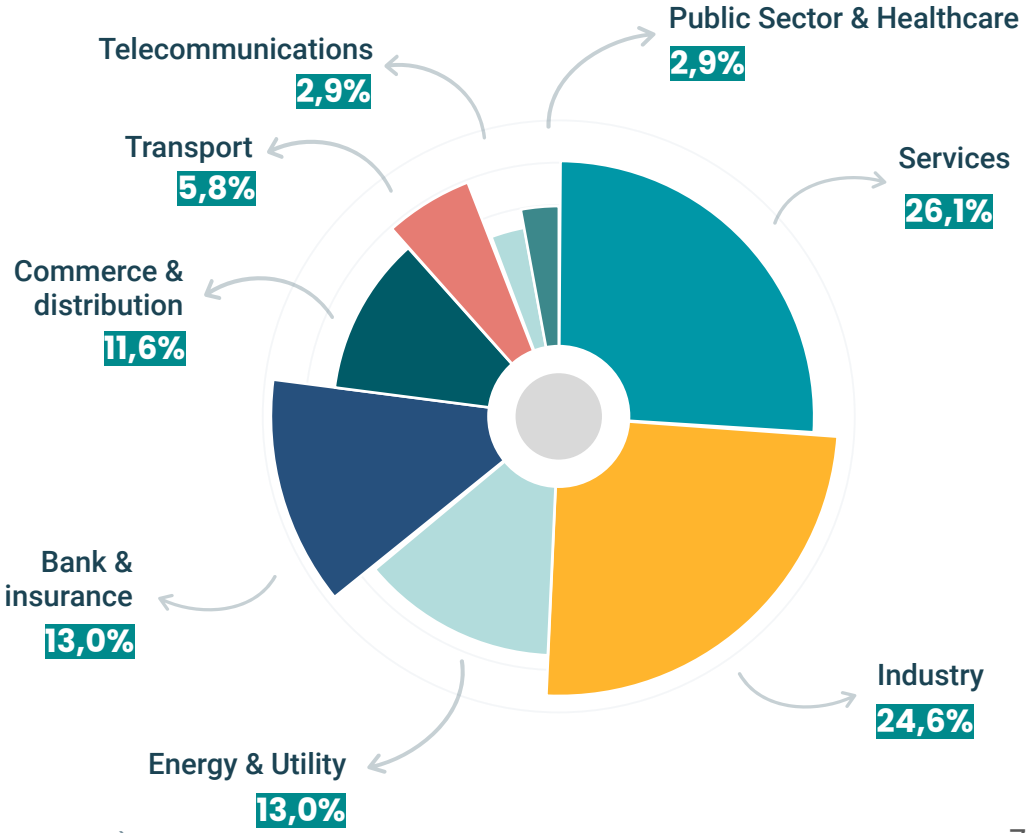
Publication of the study

Categories of participants by organisation type

69 participants, representing **61** unique [1] organisations, participated in the study.

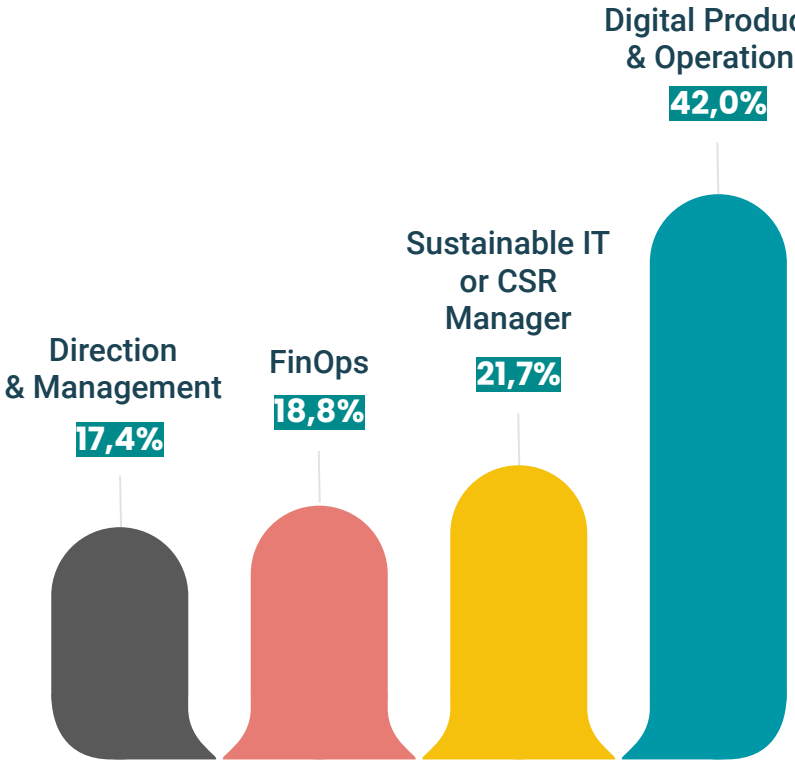
Profile of the participants:

- ➔ 61% large companies
- ➔ 16% mid-sized companies (250 - 4999 employees)
- ➔ 14% small and medium companies (<250 employees)
- ➔ 6% tech start-ups
- ➔ 3% public institutions



[1] 5 companies submitted multiple responses (different business lines)

Categories of participants by job profiles



Digital Products & Operations category includes profiles of Project Managers, Tech Leads, Architects, DevOps/CloudOps, Product Owners.

Direction & Management category includes profiles of CIO, CEO/Founders, Management, Finance.

Adoption of Cloud by the participants

Our aim was to assess the level of Cloud adoption among the participants to understand if the most advanced organisations were also the ones with the highest degree of maturity in evaluating their environmental impacts of Public Cloud

Cloud adoption and major providers

Multicloud approach

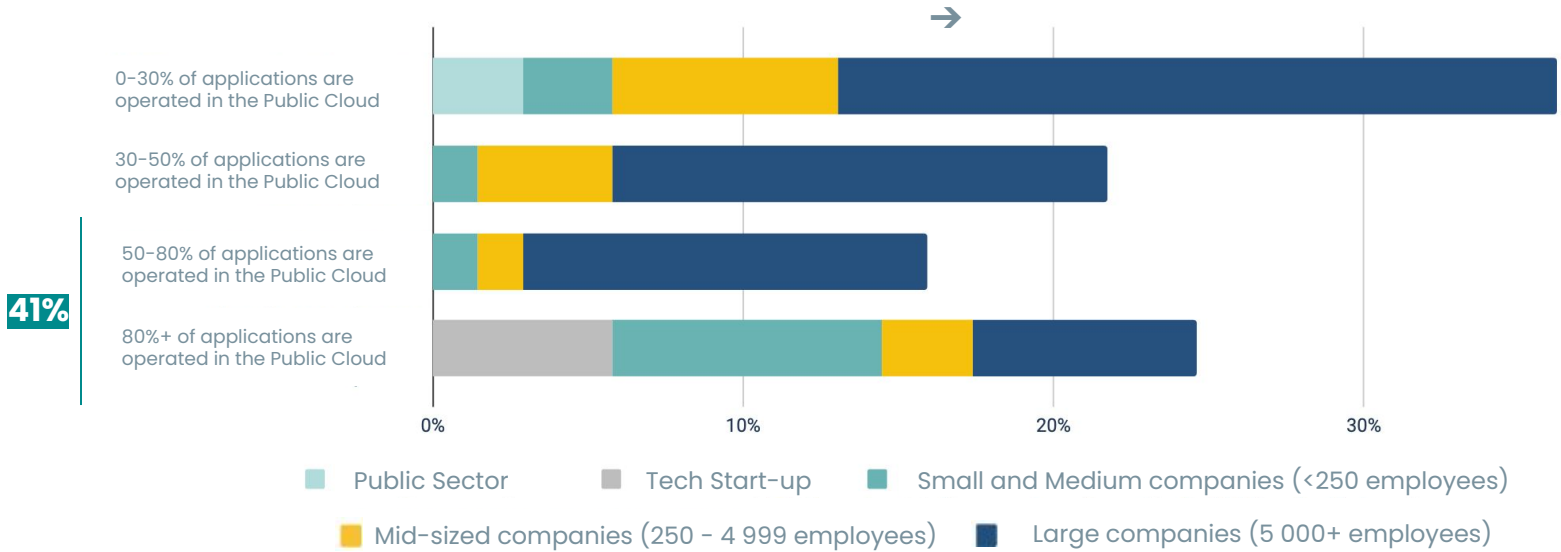
Cloud usage and 3-year growth

Cloud adoption

41% of the respondents operate more than 50% of their applications in the Public Cloud (IaaS / PaaS)

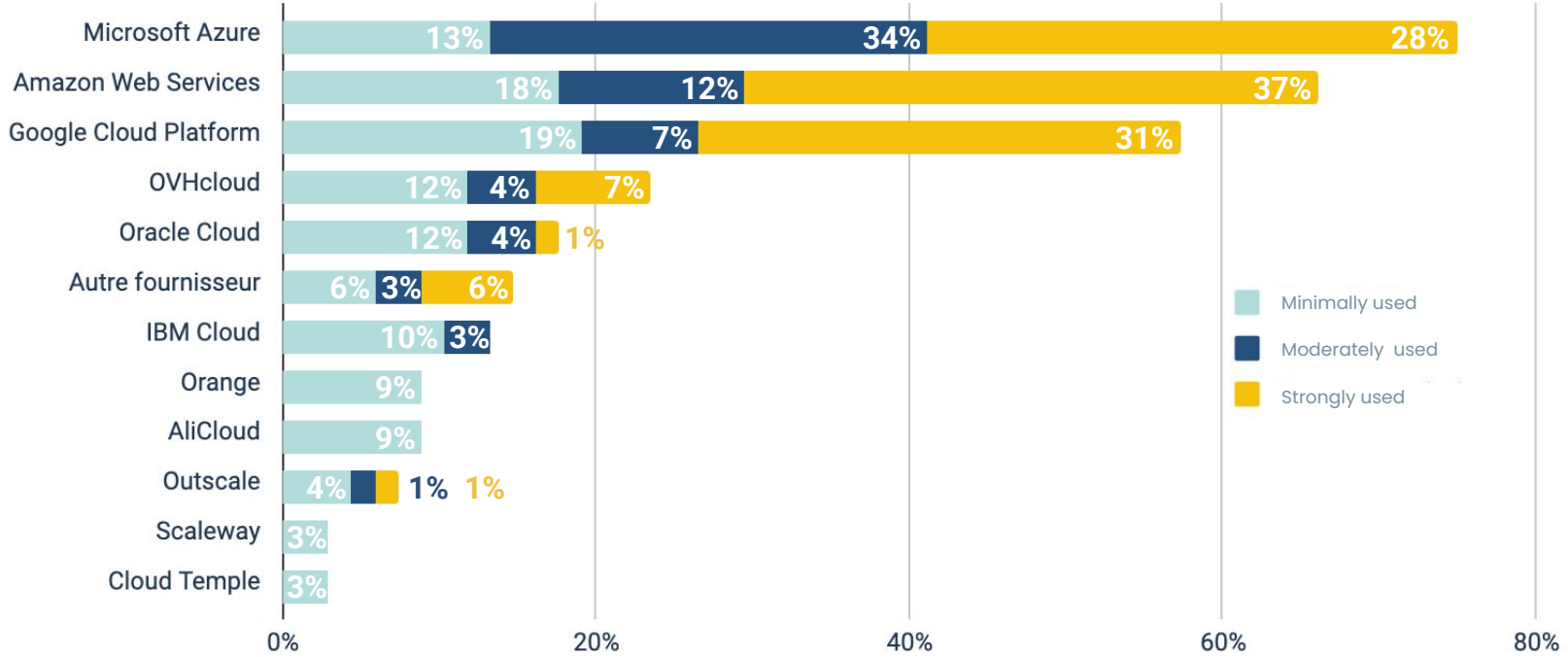
→ **78%** of small companies (<250 employees) operate more than 50% of their workload in the Cloud

→ **32%** of large companies (>250 employees) operate more than 50% of their workload in the Cloud



Cloud adoption and major providers

The 3 American hyperscalers stand out in terms of usage, followed by OVHcloud.



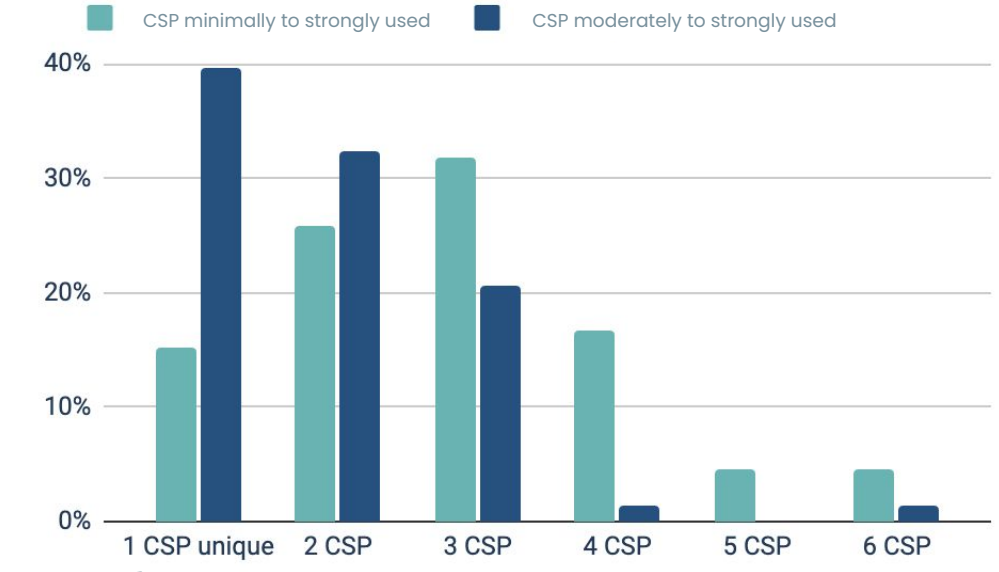
Classification of various CSPs by usage level

Multicloud approach

The majority of respondents declared having adopted a multicloud strategy.

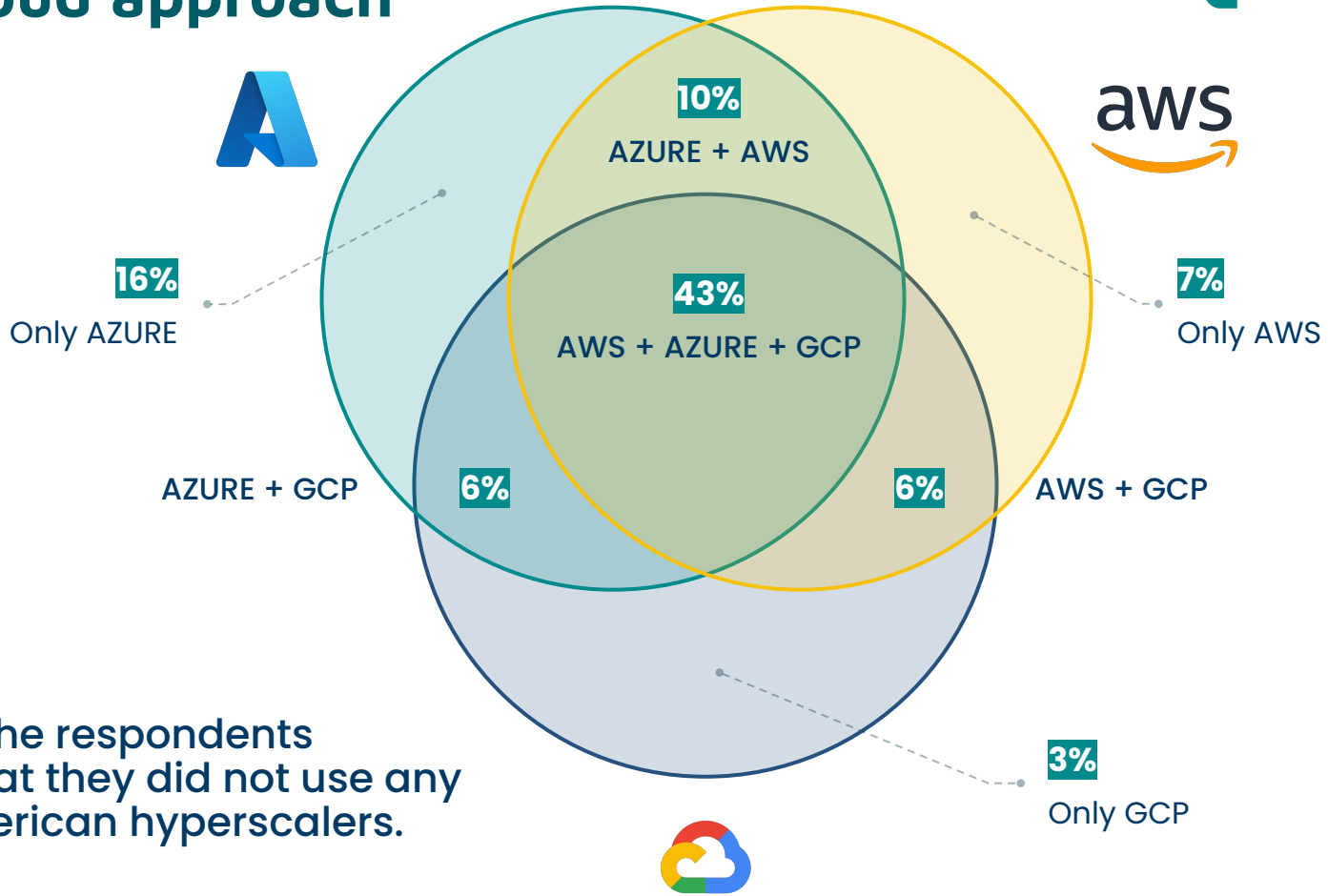
However, this approach often relies on primary CSP associated with supporting CSPs.

➔ The proportion of monocloud strategy is higher if we exclude the “minimally used” category



Number of CSPs by usage

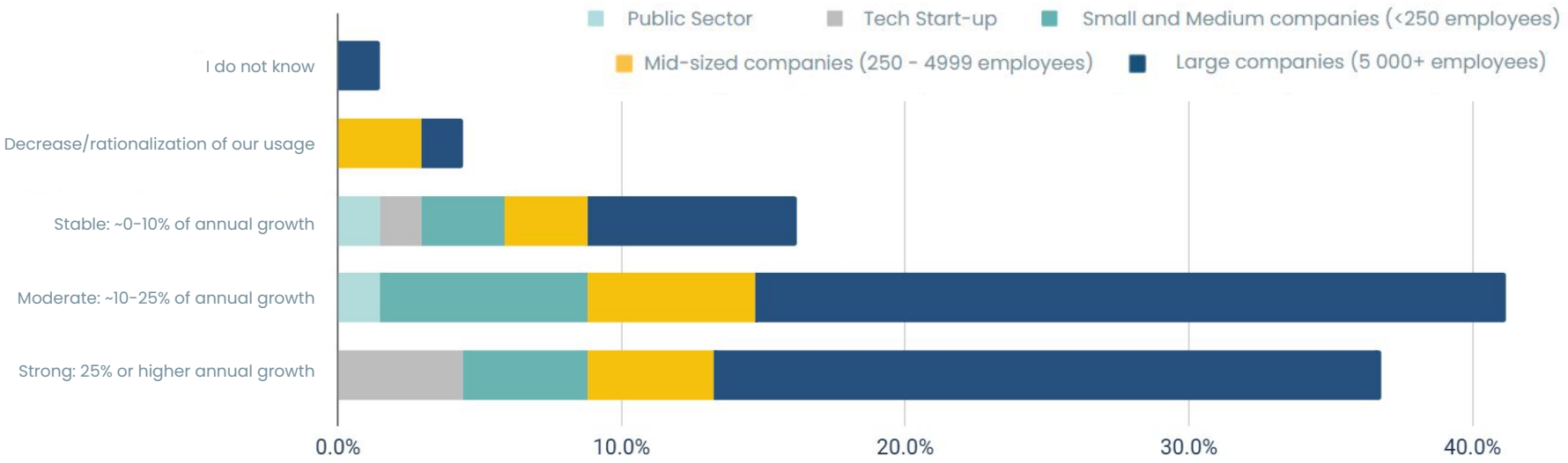
Multicloud approach



Only 9% of the respondents declared that they did not use any of the 3 American hyperscalers.

Cloud usage and 3-year growth

78% of the companies, regardless of their size, anticipate moderate or strong growth in Cloud usage (10% or more per year) over the next 3 years.



Projection of growth in Public Cloud usage (IaaS et PaaS) over the next 3 years

Maturity of the environmental footprint assessment of IT systems

Evaluating the environmental impact of the Cloud is an essential element in a comprehensive assessment of an IT system's environmental footprint.

To understand how organizations are approaching this, we surveyed participants to gain insights into their maturity and objectives regarding Cloud impact assessment.

IT environmental impact assessment approach

Raising awareness about the environmental impact of digital technologies

Training teams in eco-design

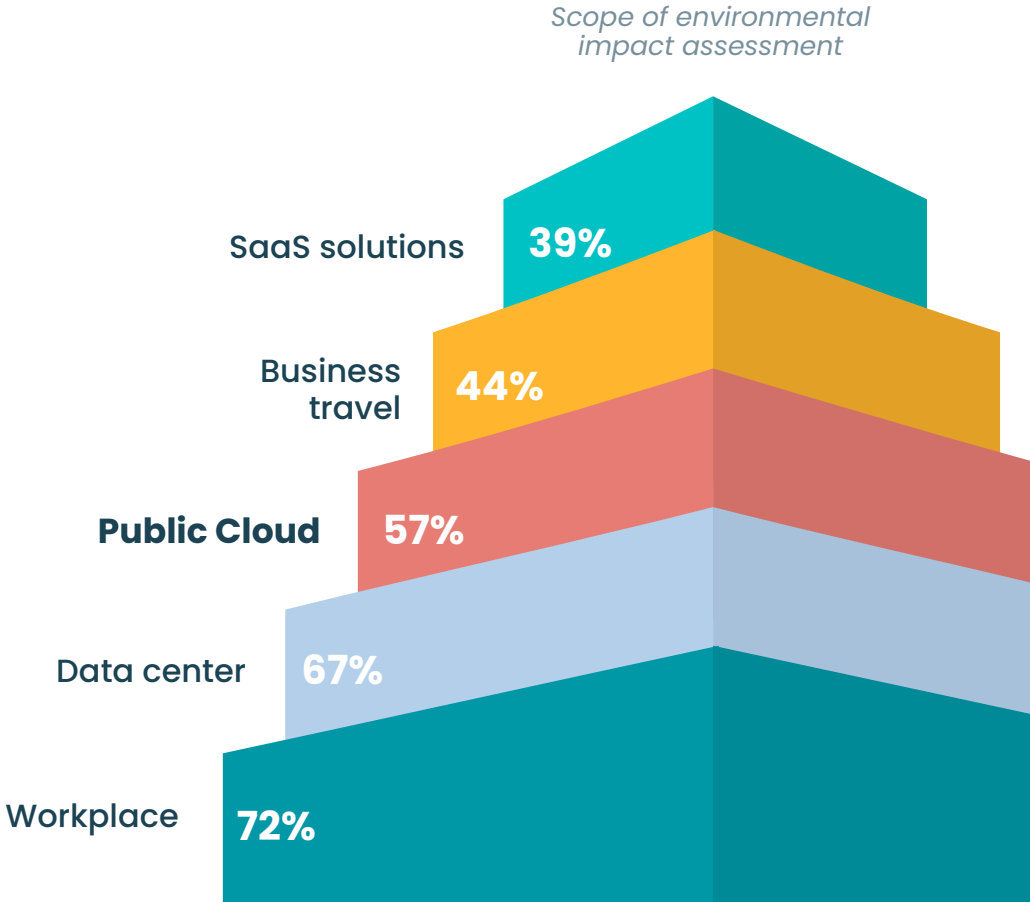
Should we be concerned about the environmental impact of the Public Cloud?

IT environmental impact assessment approach

Boavizta

84% of the participants have already initiated the IT environmental impact assessment process (**69%** of them for over a year).

The assessment includes a multi-criteria approach for **29%** of the participants.



Proportion of IT teams aware of the environmental impact of digital technologies

40% of the participants are mature and have raised awareness of the environmental impact of digital technology among more than 75% of IT teams

15% are initiating awareness-raising initiatives

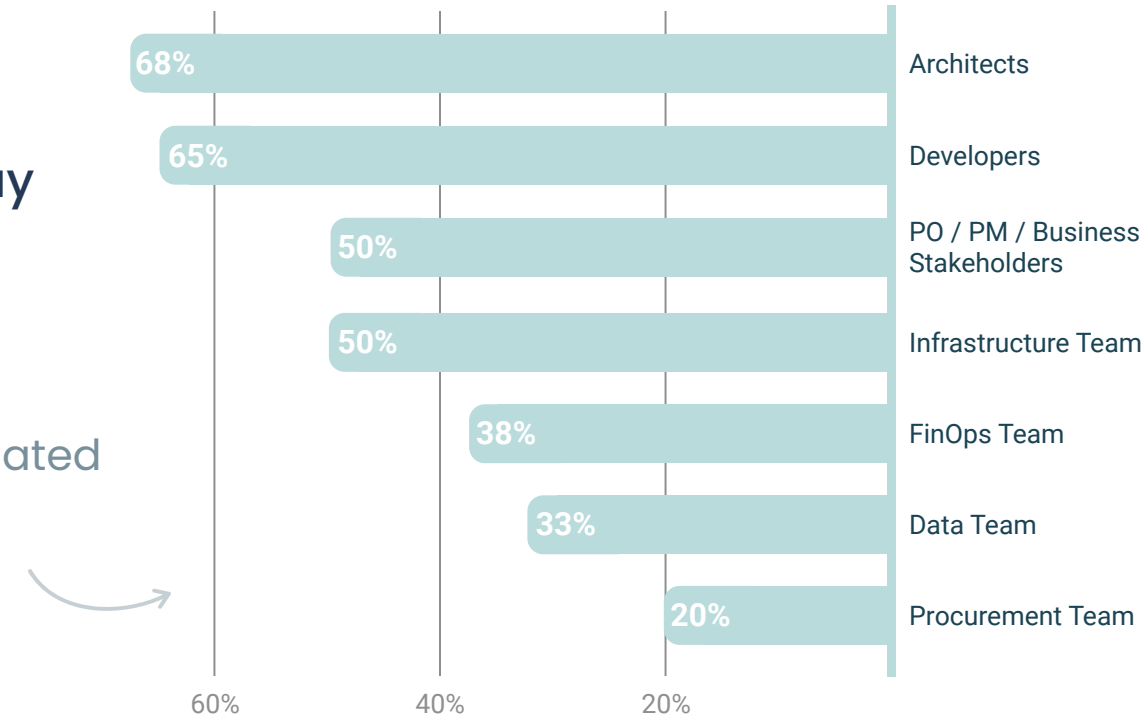
26% are in the process of rolling out awareness sessions
(25-70% of teams informed)

19% are in the deployment phase of awareness-raising initiatives
(10-25% of teams informed)

Training teams in eco-design

Everyone has a role to play in eco-design.

59% of participants have initiated eco-design training in their organisation.



Types of profiles trained by companies that have initiated eco-design training

Should we be concerned about the environmental impact of the Public Cloud ?

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83% of respondents
(across all sectors)
indicate that this is **a future problem that needs to be anticipated** now

In addition, the Cloud can lead to a **significant increase in usage and a rebound effect (79%)**

Is the environmental impact of the Cloud a negligible concern, since CSPs are committing to short-term carbon neutrality?

→ **77%** disagree with this view.
→ **19%** are undecided and partially agree.

Focus on environmental impact evaluation of the Public Cloud

The core of our study aims to understand the motivations and maturity of organisations in assessing the environmental footprint of their Public Cloud services

What is the share of the Public Cloud in the IT department's carbon footprint?

Assessing the environmental impact of the Public Cloud: who are the sponsors?

What are the key objectives?

How to build expertise?

What support is provided by CSPs?

Market tools

What is the share of the Public Cloud in the IT department's carbon footprint?

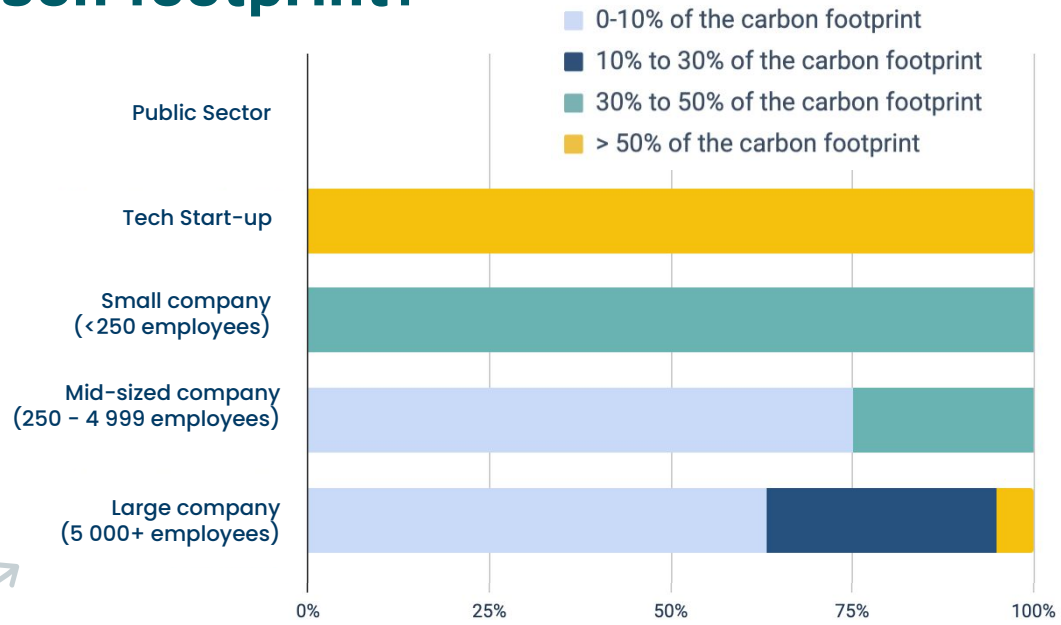
58% of participants are unaware of the share of their Public Cloud services (IaaS & Paas) in their IT department's carbon footprint.

For the remaining **42%**, Public Cloud represents:

10% More than **30%**

10% Between **10** et **30%**

22% Less than **10%**



Share of the Public Cloud services (IaaS & Paas) in the IT department carbon footprint

The impact of the Cloud on the IT department's carbon footprint **is more significant for small businesses than for larger ones.**

Assessing the environmental impact of the Public Cloud: who are the sponsors?

43% CIO / CTO

-

22% CSR Direction

-

18% FinOps / Digital / Operations Managers

-

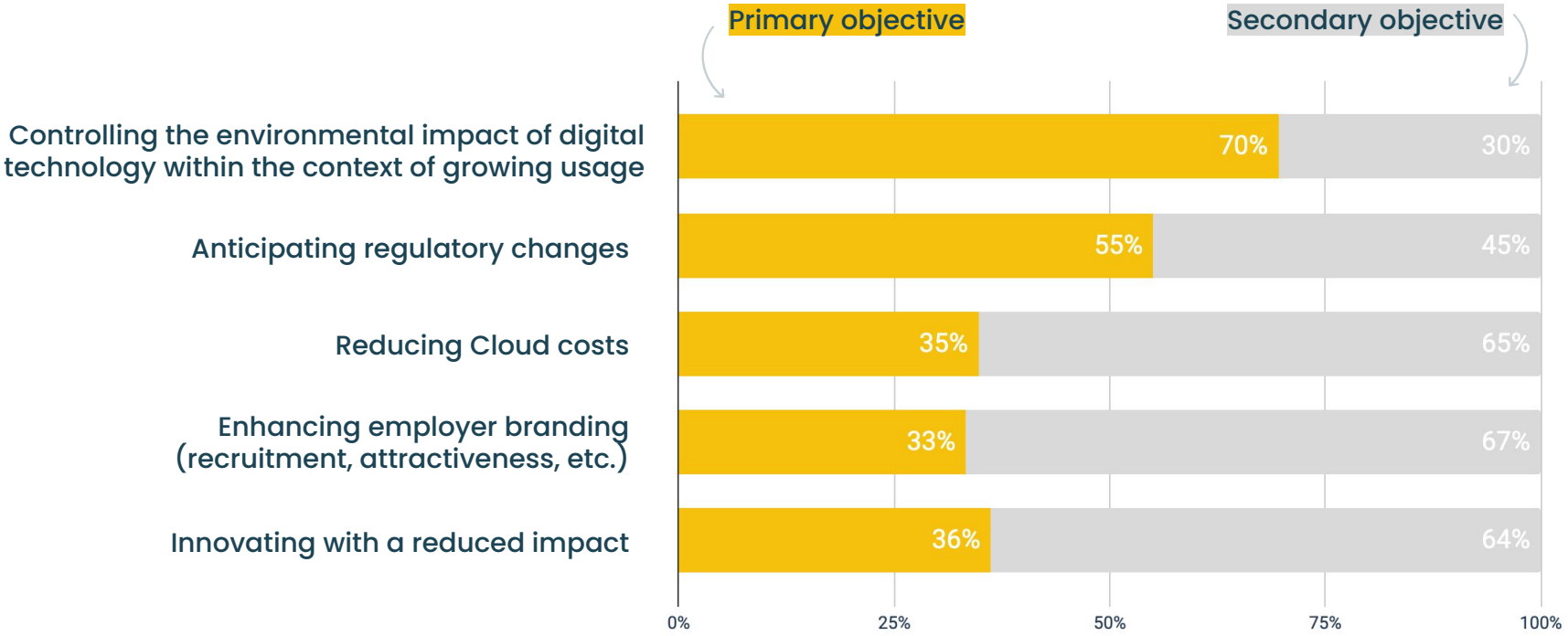
17% of participants do not have sponsors for the scope related to Cloud

What is the priority?

Controlling the environmental impact of digital technology within the context of growing usages.

(69% of the respondents)

Assessing the environmental impact of the Public Cloud: What are the key objectives?



Key objectives aimed to be achieved through the environmental impact assessment of the Public Cloud in order of importance.

Assessing the environmental impact of the Public Cloud: How to build expertise?

Boavizta

"Collaborative work across organisations to improve the framework and develop the most relevant methodology."

"There is almost no training on this subject, we are looking to identify new ways for developing skills related to assessing the impact of Public Cloud."

"Through analysis and proof of concept."

QUOTES

"Training, expert support and recruitment of qualified professionals."

"Individual initiatives created by the Sustainable IT collective of our technology department."

"Through raising awareness among the CSR team, self-training, research and seeking information on this topic. "

With no standard training path, **teams develop expertise in this specific area by relying on the knowledge and resources provided by expert collectives and associations**
(Boavizta, Green Software Foundation, Teads engineering, INR, CRiP / GT Numérique Responsable)

What support is provided by the Cloud Service Providers (CSP)?

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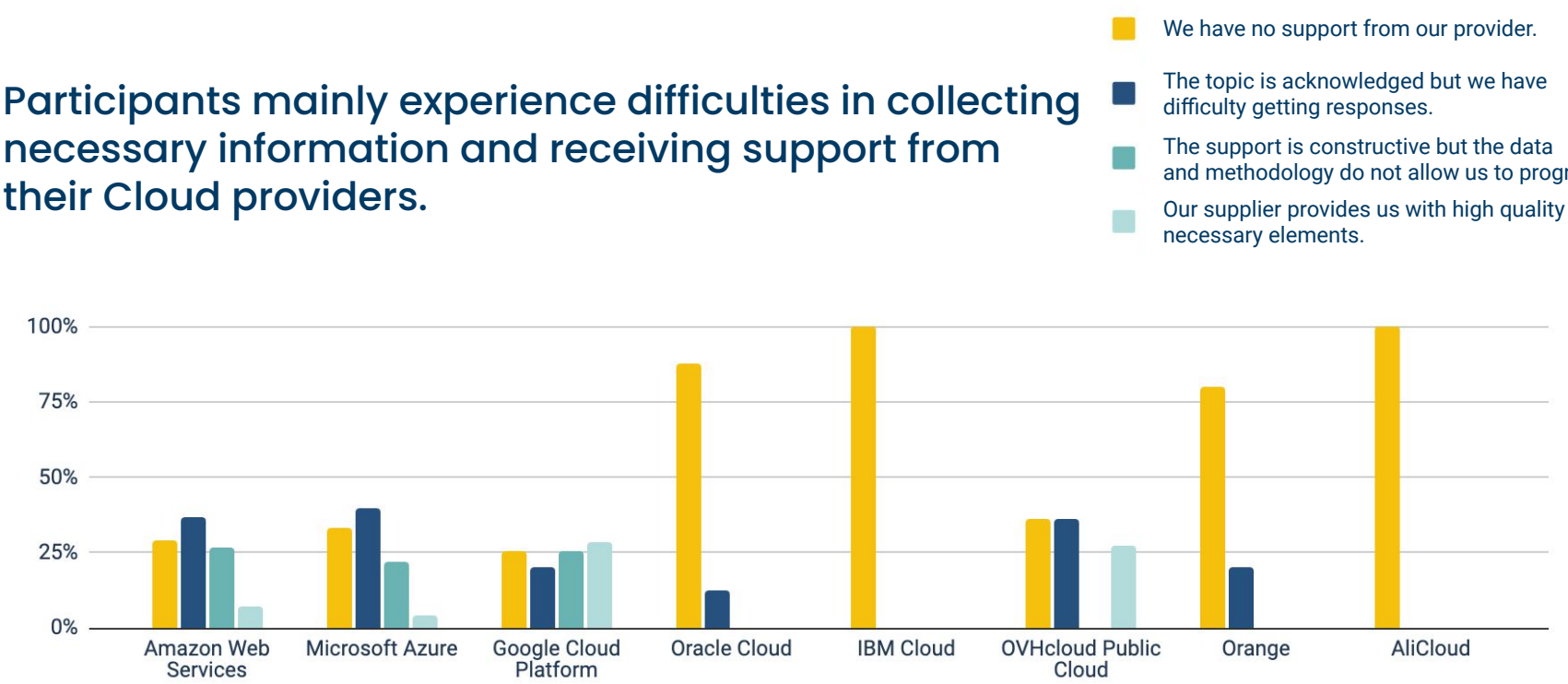
Participants mainly experience difficulties in collecting necessary information and receiving support from their Cloud providers.



Quality of support from CSPs on the assessment of the carbon footprint of their services (n≥5 only)

Tools for assessing the environmental impact of the Public Cloud

Between **22% and 29%** of the participants use the **carbon calculators** provided by the Public Cloud providers (AWS, Azure, GCP).

The next most commonly used are **Open Source Tools,** such as Cloud Carbon Footprint (**13 %**) and Boavizta (**10 %**).

13 % of the respondents have developed **their own tools**.

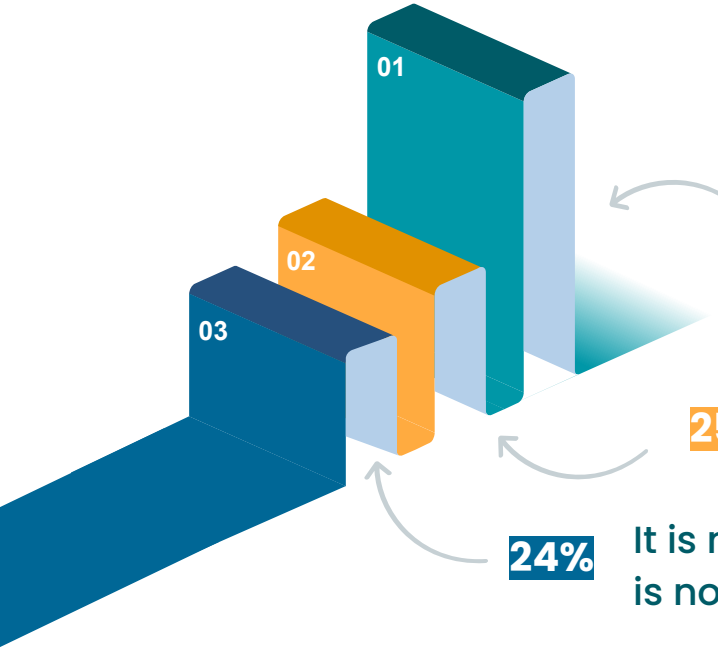
4% of the respondents are using **commercial tools**. The most popular are solutions by Fruggr and Resilio. Other unlisted tools were mentioned, including Sweep, Aguaro or Spot (Netapp).

Boavizta

What are the expectations of the organisations?

- ➔ A uniform, reliable and compliant methodology
- ➔ Transparency of data and calculations
- ➔ A scope of coverage adapted to their organisation and digital products
- ➔ An approach by field of intervention: organisational, business, run/project, actual vs. projection
- ➔ Monitoring & action plans for on-the-ground activities

Carbon dashboard: a selection factor when choosing a supplier?



49% Carbon dashboard is as important as financial dashboard.

25% It is a differentiating factor.

24% It is not an important factor because the market is not yet mature.

Note: while assessing the carbon footprint of the Cloud, **30%** of respondents include the scope beyond infrastructure, such as facilities, travel, and services, in their calculation.

What practices should be adopted to reduce the environmental footprint of the Public Cloud?

Beyond the assessment, our goal was to identify leverage actions to reduce the environmental impact of the Cloud and to understand if this could become a decision-making factor

Are you using the "Sustainability" guides from Public Cloud providers?

FinOps / GreenOps practices

Sobriety by Design

Usage of "Sustainability" guides

AWS, Google and Microsoft provide *sustainability* best practice guides for Cloud users:

[Sustainability Pillar for AWS Well-Architected Framework]

[Design for environmental sustainability Cloud Architecture Center]

[Announcing sustainability guidance Azure Well-Architected Framework]

⅓ of the participants are **not aware** of these guides.

⅓ of the participants are aware of these guides but **do not use** them.

⅓ of the participants **use** these guides.

AWS's "Sustainability Pillar" guide is the most consulted (15% of the participants consider using them very often).

Adoption of FinOps / GreenOps practices

Boavizta

	Adopted	Upcoming	Not specified
Continuous analysis/removal of unused resources	60%	32%	9%
Automate stopping of instances outside of usage hours	55%	23%	22%
Automate scaling of resources	41%	43%	16%
Lifecycle management of data	35%	45%	20%
Usage of spot/ephemeral instances	30%	35%	35%
ARM instances (better energy efficiency/performance ratio)	16%	35%	49%

"In the Cloud, efforts to reduce environmental footprint are reinforcing FinOps practices"

Is *sobriety by design* becoming a common practice?

A *sobriety by design* approach is becoming more widely adopted:

41% of respondents **have already implemented it;**

34% of respondents **are planning to do so** in the near future.

61% of respondents are willing to **compromise on service quality** to **reduce environmental impact**;

35% of respondents have already **abandoned** a feature or an application;
(12 large companies, 3 mid-sized companies, 8 small companies/startups)

32% of respondents are considering **relocating** their workload to a geographic area with a **lower carbon footprint**.

Climate commitments of leading Cloud providers

Achieving carbon neutrality:
an ambitious path for leading Cloud providers.

We aimed to gather the opinions
of organisations using these services
on their providers' climate commitments.

Can Cloud computing contribute to an organisation's low-carbon strategy?

Carbon neutrality ambitions

Environmental commitments of Cloud Service Providers

SBTi commitments already being challenged

Can Cloud computing contribute to an organisation's low-carbon strategy?

Boavizta

Public Cloud technology is seen as a tool that can **contribute to the decarbonization of IT services** (IT for Green) by **64 %** of participants.

It is also viewed as an opportunity to **reduce the impact of IT departments** by **84%** of participants.

Could Public Cloud reduce the carbon footprint of applications by 80%?

55% of respondents find the **data provided by CSPs insufficient** to validate this point
(across all organisations)

26% consider it unrealistic

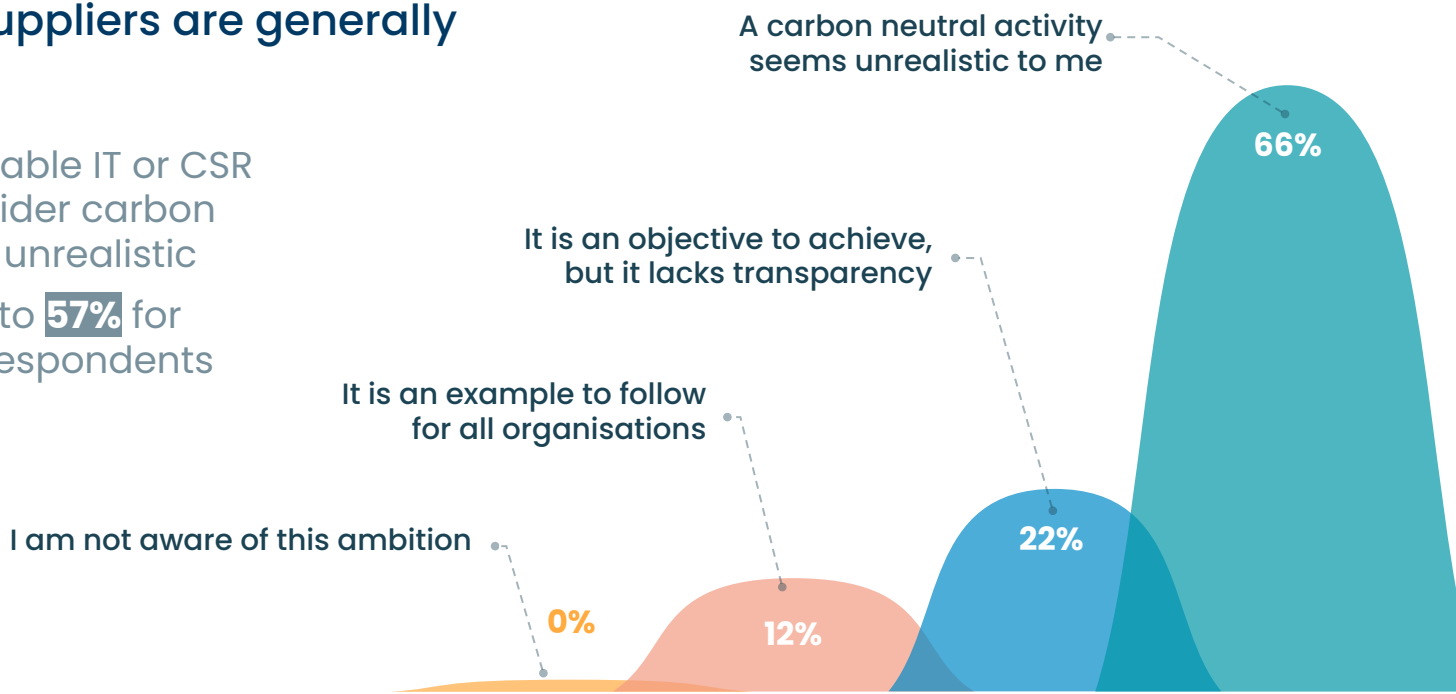
10% view is as ambitious

7% have measured it and found it unachievable

Carbon neutrality ambitions

The carbon neutrality ambitions declared by the suppliers are generally poorly perceived.

- ➔ **100%** of Sustainable IT or CSR Managers consider carbon neutrality to be unrealistic
- ➔ This rate drops to **57%** for the rest of the respondents

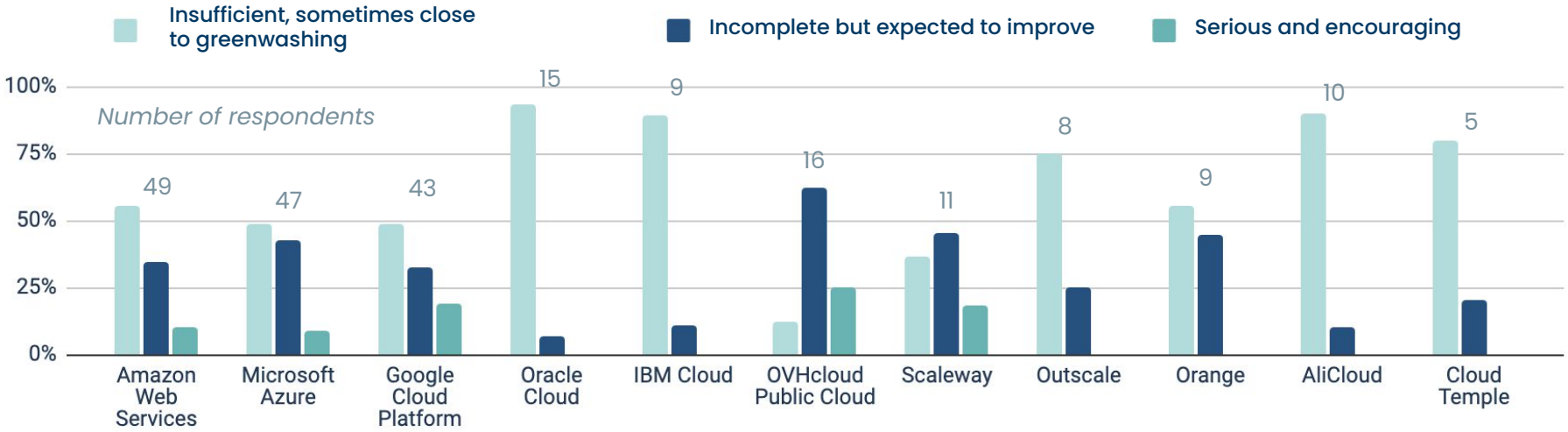


Perception of clients regarding the carbon neutrality ambitions of Public Cloud providers

Environmental commitments of the CSPs

The respondents mostly view their suppliers' commitments as "insufficient, sometimes close to greenwashing".

French CSPs (**43%**) are seen more favorably than American CSPs (**57%**) and Asian CSPs (**90%**).



Perception of clients regarding the environmental commitments of major Public Cloud providers

SBTi commitments already being challenged

Boavizta

SBTi is a corporate climate action organisation that records carbon footprint commitments from 8,000 companies and evaluates their progress against the Paris Agreement. The organisation has already validated 5,000 trajectories.

	Alphabet	amazon	Microsoft
Year of reference	2019 → 2030	→ 2040	2017 → 2030
Scope 1 & 2 commitments (related to direct emissions and energy)	-50% (market-based i.e. using green electricity certificates) Currently under validation	Net zero Commitment revoked by SBTi	Net zero Commitment revoked by SBTi
Scope 3 commitments (indirect emissions, accounting for between 75% and 97% of total emissions)	-50% in absolute value Currently under validation	Net zero Commitment revoked by SBTi	-30% in intensity per unit of revenue

Conclusion

Expectations towards suppliers

What is needed to go further?

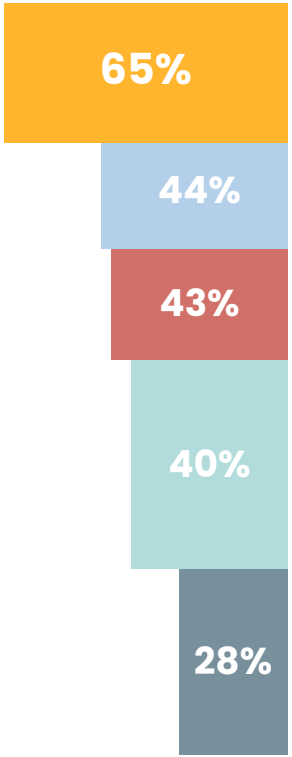
Call to action

Expectations towards suppliers

Boavizta

	Ranked as the n°1 priority by the respondents	Ranked as n°2 priority by the respondents
Standardize calculation methods	35%	30%
Provide more **transparency** on the calculation methodology	30%	30%
Share data that enables the impact to be estimated during project conception	15%	12%
Expand the scope of services included in the CSP's calculators	10%	14%
Develop a single **multi-provider calculator**	10%	13%

What is needed to go further internally?



Time and **budget** for the assessment

Multi-criteria evaluations & databases

Expertise development

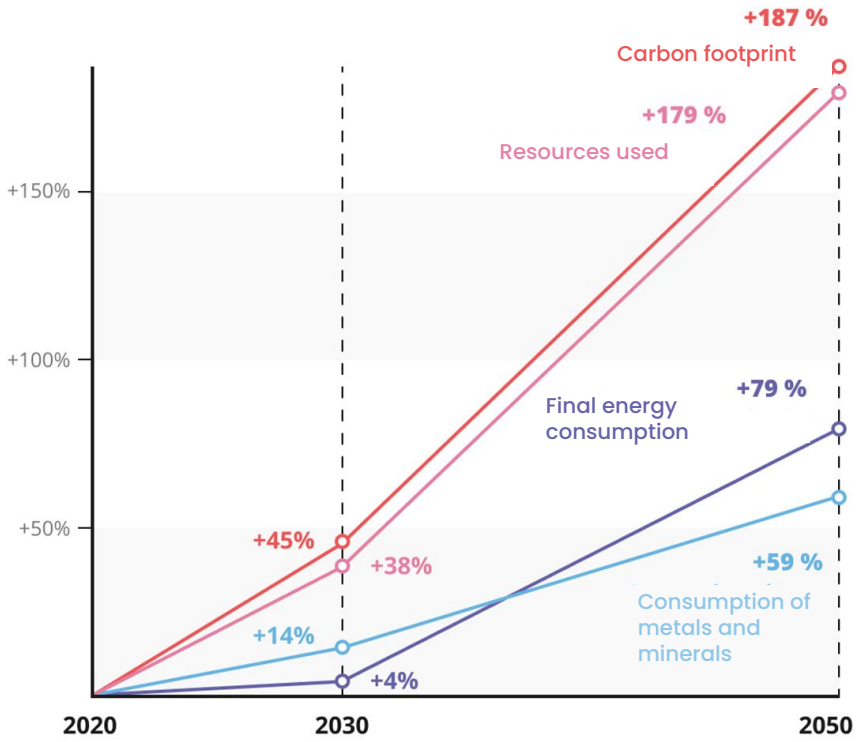
A **regulatory framework** to take action

Operational & business commitment regarding sobriety and impact assessment

Better **sponsorship from management**

A collective **awareness**

Call to action



Source in French : Etude ADEME – Arcep > Empreinte environnementale du numérique en 2020, 2030 et 2050

Although challenging, it is important to **move beyond the carbon footprint** to broaden the impact of digital technologies to include other environmental factors, such as water and biodiversity.

Offering a low-carbon digital service is competitive - unlike environmental reporting.

Without a common framework to assess a service, a "low-carbon" offer can resemble greenwashing.

Therefore, it is crucial to **share resources** to **co-develop open impact assessment frameworks**.

Call to action

For organisations:

- ➔ Focus on collective and ecosystem-wide efforts rather than individual assessments.
- ➔ Commit for the long term: it is a marathon, not a sprint.
- ➔ Develop expertise and skills.
- ➔ Challenge current digital practices.

For Cloud providers:

- ➔ Build customer trust to address a shared challenge.
- ➔ Co-create an open-source evaluation methodology for core services (IaaS) with all stakeholders.
- ➔ Provide reliable data on environmental impact.
- ➔ Think about business models suitable for a low-carbon world in line with the planet's limits.

To integrate the multi-factor impact of digital technologies usage including water resources, biodiversity, and abiotic resources, going beyond carbon footprint.

Appendix

Supplier responses

Glossary

Authors & acknowledgements

Responses of Cloud suppliers

The objective of this study is to advance the assessment of the environmental impact of Cloud Computing.

We have shared our findings with the major Cloud providers to allow them to share their responses regarding clients' expectations, as well as the challenges they face.

For obvious reasons related to communication and product strategy, discussions are still ongoing.

As of today, only Microsoft has shared a public response with us, which you will find below.

Microsoft

Boavizta feedback from Microsoft

April 5th, 2024

Microsoft feedback on survey results

The survey results were shared by Thales on the 6th March 2024. Microsoft reviewed the results of the document *« Résultats préliminaires – Etude sur l'évaluation de l'empreinte environnementale du Cloud Public »*

Microsoft strengths in the strategy for Sustainability are:

- **Emissions Impact Dashboards** helping customers to estimate and **track their carbon emissions** related to M365 and Azure usage: https://www.microsoft.com/en-us/sustainability/emissions-impact-dashboard
- The **study for « the carbon benefits of cloud computing** » (last update in 2020) => Download The Carbon Benefits of Cloud Computing: a Study of the Microsoft Cloud from Official Microsoft Download Center
- New service "Azure Carbon Optimization" (preview) helps you measure and minimize the carbon impact of your Azure footprint with high granularity. This service provide **recommendations and opportunities to optimize customer resource utilization**: What is Azure carbon optimization (Preview) | Microsoft Learn
- **Strong implication of Microsoft** in the Green Software Foundation to promote the principles of green software development : https://greensoftware.foundation/articles/10-recommendations-for-green-software-development
- In regards to the requirements CSRD: the offer **Microsoft Cloud for Sustainability supporting the customer to prepare their reporting CSRD.** Microsoft Sustainability - Products for a Sustainable Future

https://www.microsoft.com/en-us/sustainability/emissions-impact-dashboard
The Carbon Benefits of Cloud Computing: a Study of the Microsoft Cloud
What is Azure carbon optimization (Preview) | Microsoft Learn

10 Recommendations for Green Software Development | GSF
Microsoft Sustainability - Products for a Sustainable Future

Regarding the assessment of the impact of Public Cloud services:

We observe that our clients receive **the most comprehensive and high-quality input necessary to understand their environmental impacts**. While we still sometimes face challenges in obtaining the information, we are committed to improving our service.

In May 2023, we launched our innovative automated **carbon calculator** designed to estimate the monthly GHG emissions of our clients' infrastructure. **It is the first solution on the market that offers such a transparent and comprehensive approach.**

We are currently working to update the **methodology and lifecycle inventory** of our carbon calculator to integrate a Public Cloud offering. This will enable our Public Cloud clients, as is currently the case with Baremetal and Hosted Private Cloud, to access the **monthly GHG emissions data** of their infrastructure. We aim to deliver the first version of the tool in the second semester of 2024.

Regarding our environmental impact assessment methodology, we are collaborating closely with ADEME and Boavizta **to standardize methodologies as soon as possible.** We are sharing our expertise and we are ready to adopt a single methodology when one becomes available. In the meantime, **we are publishing our own methodology** on our corporate website **to ensure transparency and accessibility for all.**

OVHcloud

OVHcloud is recognized for its strong and dedicated commitment to environmental responsibility. This reflects several years of transparency and a holistic understanding enabled by our vertically integrated industrial model, which allows us to anticipate future challenges.

We are dedicated to maintaining transparency, promoting international reporting standards that ensure accurate environmental KPI tracking, and to continuing to innovate to address the challenges of tomorrow. Our commitment is ambitious, and we will leverage our entire value chain to deliver sustainable solutions.

Thank you for sharing the results of the study which motivates us to continue our mission.

Authors & acknowledgements

We would like express our sincere gratitude to the following individuals and organisations for their valuable contributions to this project:

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Contact us: http://boavizta.org/en/contact

Glossary

CSP	Cloud Service Provider
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
CTO	Chief Technical Officer
FINOPS	Financial Operations
IAAS	Infrastructure as a Service
IEA	International Energy Agency
PAAS	Platform as a Service
SAAS	Software as a Service
SBTi	Science Based Targets initiative

Our website

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Would you like to join us? Contact us!

👉 **http://boavizta.org/contact**

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