March 28, 2024

Dresner Advisory Services, LLC

2024 Edition

Cloud Computing and Business Intelligence Market Study Excerpt

Wisdom of Crowds® Series

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This report is for informational purposes only. You should make vendor and product selections based on multiple information sources, face-to-face meetings, customer reference checking, product demonstrations, and proof-of-concept applications.

The information contained in this Wisdom of Crowds® Market Study report is a summary of the opinions expressed in the online responses of individuals that chose to respond to our online questionnaire and does not represent a scientific sampling of any kind. Dresner Advisory Services, LLC shall not be liable for the content of this report, the study results, or for any damages incurred or alleged to be incurred by any of the companies included in the report as a result of the report's content.

Definitions

Business Intelligence Defined

Business intelligence (BI) is “knowledge gained through the access and analysis of business information.”

Business Intelligence tools and technologies include query and reporting, OLAP (online analytical processing), data mining and advanced analytics, end-user tools for ad hoc query and analysis, and dashboards for performance monitoring.

Howard Dresner*, The Performance Management Revolution: Business Results Through Insight and Action* (John Wiley & Sons, 2007)

Cloud Deployment Models Defined

Private Cloud: The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them. It may exist on or off premises.

Public Cloud: The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid Cloud: The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Source: National Institute of Standards and Technology

Cloud Business Intelligence Defined

Cloud business intelligence is the technologies, tools, and solutions that employ one or more cloud deployment models.

Introduction

As we mark the 17th anniversary of Dresner Advisory Services in 2024, we are pleased to present the second edition of this report.

We extend our sincere appreciation to our valued clients and partners for your consistent support and motivation. Since our inception in 2007, our focus has been on setting and surpassing high standards, driving innovation, and leading the market in providing increasing value each year.

We started tracking and analyzing this market dynamic in 2012 when adoption was nascent and with few organizations willing to invest. Now with 13 years of data, it is exciting to see the changes that have occurred since the early days of cloud-based solutions. Since that time, cloud-based, and especially public cloud-based solutions, have become increasingly dominant.

We thank our clients, colleagues, and community members for their support, which helps us to develop this important research. We look forward to hearing from you after you explore the study findings within.

We hope you enjoy this report!

Best,

Chief Research Officer

Dresner Advisory Services

Benefits of the Study

This Dresner Advisory Services Cloud Computing and Business Intelligence Market Study provides a wealth of information and analysis, offering value to both consumers and producers of business intelligence technology and services.

Consumer Guide

As an objective source of industry research, consumers use the Dresner Advisory Services Cloud Computing and Business Intelligence Market Study to understand how their peers leverage and invest in cloud computing and related BI technologies.

Using our unique vendor performance measurement system, users glean key insights into BI software supplier performance, which enables:

- Comparisons of current vendor performance to industry norms
- Identification and selection of new vendors.

Supplier Tool

Vendor licensees use the Dresner Advisory Services Cloud Computing and Business Intelligence Market Study in several important ways:

External Awareness

- Build awareness for business intelligence markets and supplier brands, citing Dresner Advisory Services Cloud Computing and Business Intelligence Market Study trends and vendor performance
- Gain lead and demand generation for supplier offerings through association with Dresner Advisory Services Cloud Computing and Business Intelligence Market Study brand, findings, webinars, etc.

Internal Planning

- Refine internal product plans and align with market priorities and realities as identified in the Dresner Advisory Services Cloud Computing and Business Intelligence Market Study
- Better understand customer priorities, concerns, and issues
- Identify competitive pressures and opportunities.

About Howard Dresner and Dresner Advisory Services

The Dresner Advisory Services Cloud Computing and Business Intelligence Market Study was conceived, designed, and executed by Dresner Advisory Services, LLC—an independent advisory firm—and Howard Dresner, its President, Founder and Chief Research Officer.

Howard Dresner is one of the foremost thought leaders in business intelligence and performance management, having coined the term "Business Intelligence" in 1989. He has published two books on the subject, *The Performance Management Revolution – Business Results through Insight and Action* (John Wiley & Sons, Nov. 2007) and *Profiles in Performance – Business Intelligence Journeys and the Roadmap for Change* (John Wiley & Sons, Nov. 2009). He lectures at forums around the world and is often cited by the business and trade press.

Prior to Dresner Advisory Services, Howard served as chief strategy officer at Hyperion Solutions and was a research fellow at Gartner, where he led its business intelligence research practice for 13 years.

Howard has conducted and directed numerous in-depth primary research studies over the past three decades and is an expert in analyzing these markets.

Through the Wisdom of Crowds® Business Intelligence market research reports, we engage with a global community to redefine how research is created and shared. Other research reports include:

- Wisdom of Crowds® Flagship BI Market Study
- AI, Data Science and Machine Learning
- Analytical Platforms
- Cloud Computing and Business Intelligence
- Data Engineering
- Data Governance
- Enterprise Performance Management
- Self-Service BI

You can find more information about Dresner Advisory Services at www.dresneradvisory.com.

About Jim Ericson

Jim Ericson is a Research Director with Dresner Advisory Services.

Jim has served as a consultant and journalist who studies end-user management practices and industry trending in the data and information management fields.

From 2004 to 2013 he was the editorial director at *Information Management* magazine (formerly *DM Review*), where he created architectures for user and industry coverage for hundreds of contributors across the breadth of the data and information management industry.

As lead writer, he interviewed and profiled more than 100 CIOs, CTOs, and program directors in a program called “25 Top Information Managers.” His related feature articles earned ASBPE national and regional and silver awards for Technical Article and for Case History feature writing.

A panelist, interviewer, blogger, community liaison, conference co-chair, and speaker in the data-management community, he also sponsored and co-hosted a weekly podcast in continuous production for more than five years.

Jim’s earlier background as senior morning news producer at NBC/Mutual Radio Networks and as managing editor of MSNBC’s first Washington, D.C. online news bureau cemented his understanding of fact-finding, topical reporting, and serving broad audiences.

Survey Method and Data Collection

As with all our Wisdom of Crowds® market studies, we constructed a survey instrument to collect data and used social media and crowdsourcing techniques to recruit participants.

Data Quality

We carefully scrutinized and verified all respondent entries to ensure that only qualified participants were included in the study.

Executive Summary

- *Reliability, access and availability, scalability*, and *ease of use* are the perceived most important advantages of cloud. Cloud and software as a service rank 7th in importance of 63 topics we study, near an all-time level of user importance. Industry perceived importance is at an all-time high.
- Current use and future plans for cloud BI are near all-time highs. Cloud use scales with organization size and correlates to success with BI. Industry support for SaaS is at an all-time high 94 percent.
- Public cloud use accelerated over time, is flat year over year, and remains the most popular cloud deployment model.
- Organizations more often report investment *increases* in *public* cloud than in *private* or *hybrid* cloud. Investment varies by industry and other measures. Industry support overwhelmingly favors cloud versus traditional BI.
- Half of respondents say 61 percent or more of all BI / analytical solutions are cloud based. Cloud-based penetration does not track with company age.
- Data quality is the top cloud BI feature requirement, followed by *data visualization, data governance, data preparation*, and *ad-hoc query*.
- The top cloud architecture requirements are *relational database support* and *connectors to on-premises apps.* 2024 architecture importance is below historic levels. Industry support is very strong.
- Amid low awareness, *ISO 27001* and *HIPAA* are the security standards most familiar to respondents. Industry support is incomplete and fragmented.
- The most-required third-party data connectors are *Microsoft Teams, Salesforce, Microsoft OneDrive*, and *Google Analytics*. Industry support is strongest for *Salesforce* and mainstream data sources but incomplete.
- *Subscription license* is now the top cloud BI licensing pick. *A*ll options, including traditional *perpetual license*, are still relevant. One hundred percent of vendors support subscription licensing, and most other and older licensing options are in decline.
- There is increasing use of *BI / analytics software vendor proprietary hosting* versus *third-party cloud service provider* hosting.
- The most preferred cloud providers are *Amazon AWS* and *Microsoft Azure, but Google Cloud, Oracle Cloud*, and *IBM Cloud* are gaining user share.
- Eighty-eight percent of administration and design support is now cloud-based, with just 12 percent requiring desktop support.
- Cloud business intelligence vendor ratings are shown.

Study Demographics

For our 13th annual cloud study, participants provide a cross-section of data across geographies, functions, organization sizes, and vertical industries. We believe that, unlike other industry research, this supports a more representative sample and is a better indicator of true market dynamics. We constructed cross-tab analyses using these demographics to identify and illustrate important industry trends.

Geography

Survey respondents in 2024 represent a span of geographies. North America, which includes the United States, Canada, and Puerto Rico, accounts for about 58 percent of our survey base. EMEA respondents are the next largest group with about 25 percent, followed by Asia Pacific and Latin America (fig. 1).

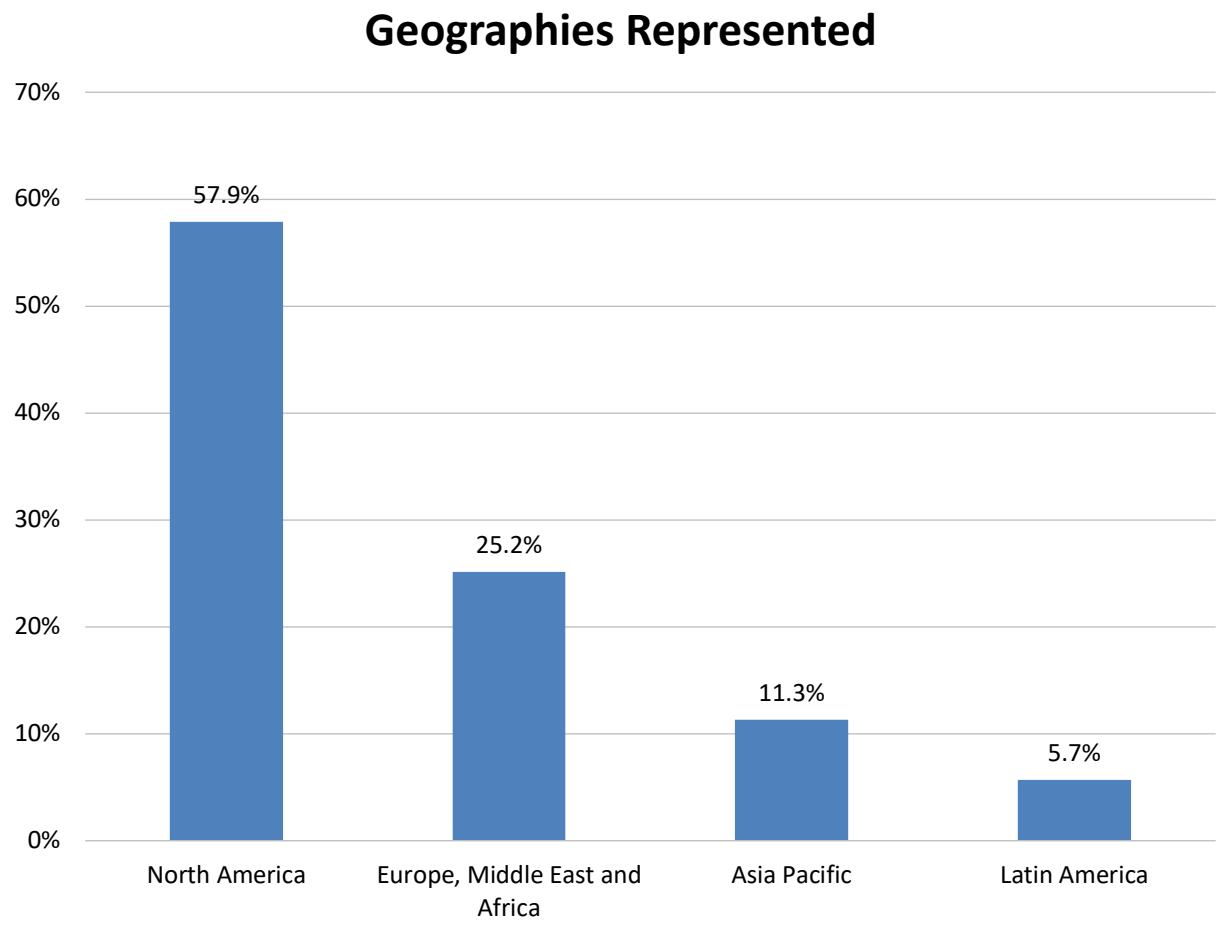

Figure 1 – Geographies represented

Functions

In our 2024 study, *IT* respondents make up the largest group in our sample (37 percent) (fig. 2). *Executive management* (21 percent), *finance* (15 percent), and the *BICC* (12 percent) are the next most represented. Tabulating results by function enables us to compare and contrast the plans and priorities of different departments within organizations.

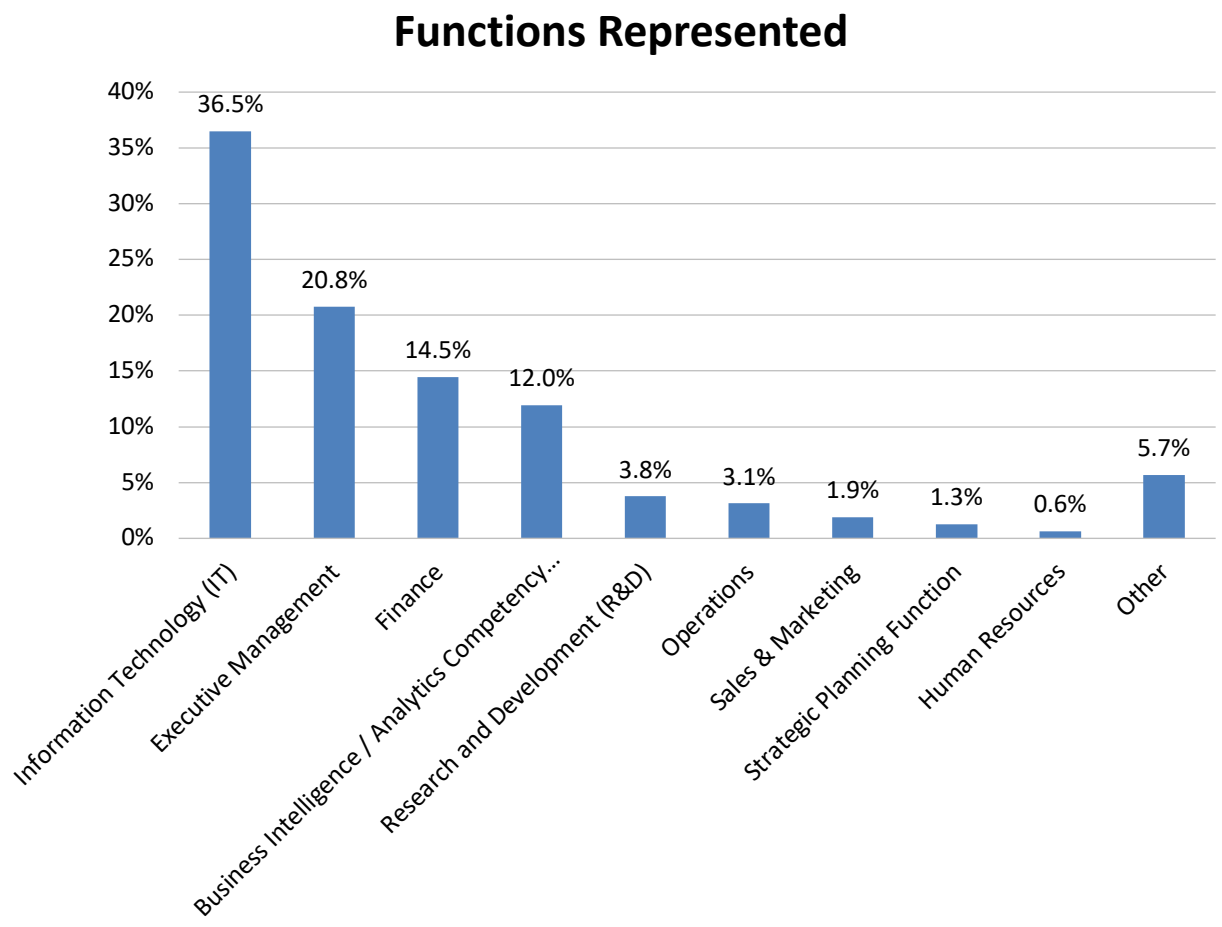

Figure 2 – Functions represented

Vertical Industries

Our study base includes a cross section of vertical industries. *Business services* (23 percent) is the most represented, followed by *technology, financial services, manufacturing, consumer services, education*, and *healthcare*. We allow and encourage the participation of independent consultants, who often have deeper industry awareness than their customer counterparts. This also yields insight into the partner ecosystem for BI vendors (fig. 3).

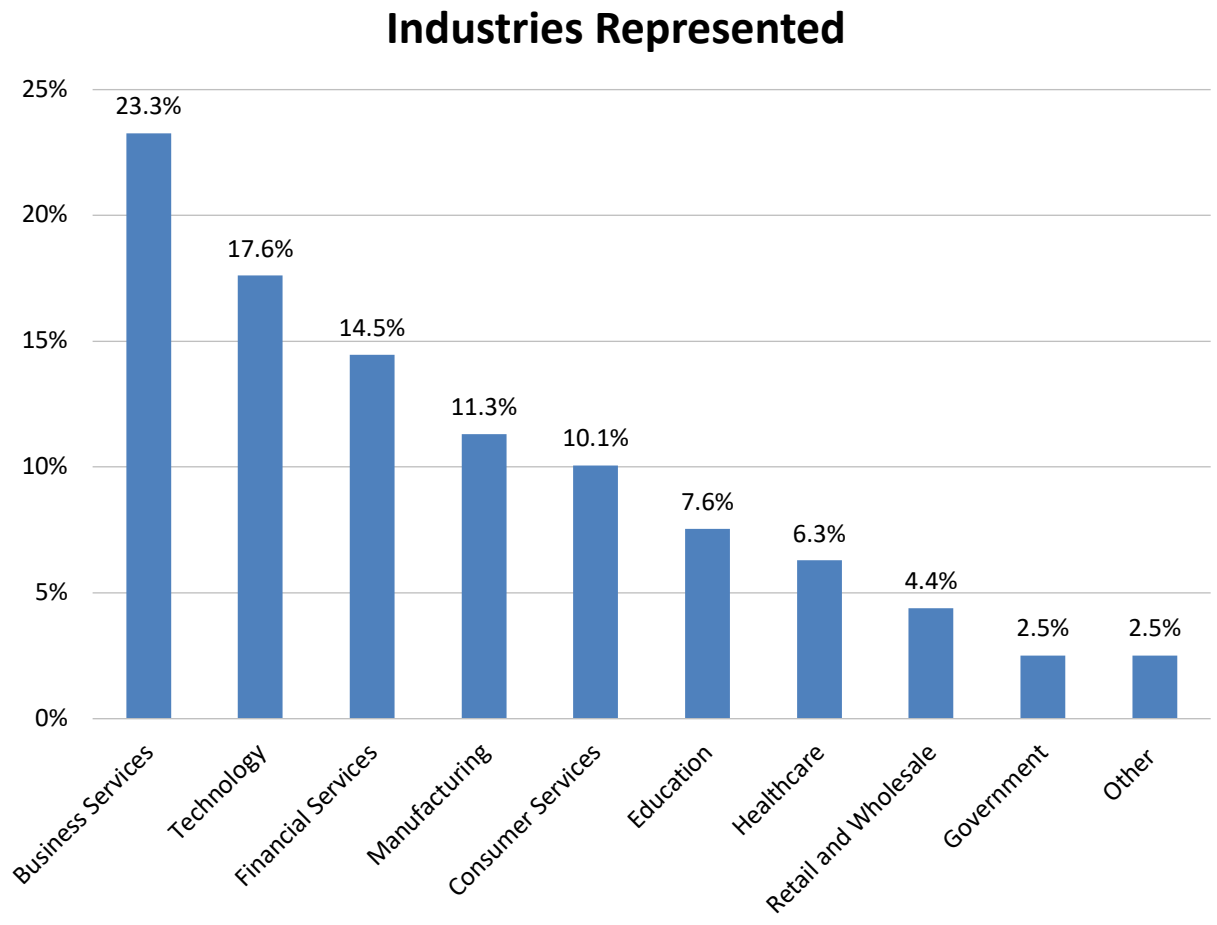

Figure 3 – Industries represented

Organization Size

Our 2024 survey base includes a mix of small, midsize, and large organizations (fig. 4). Small organizations (1-100 employees) account for 29 percent of the sample; midsize organizations (101-1,000 employees) account for 27 percent; and the remaining 45 percent are spread across large organizations with more than 1,000 employees. Segmenting respondents by organization size helps us identify differences in behavior, attitudes, and planning often related to headcount.

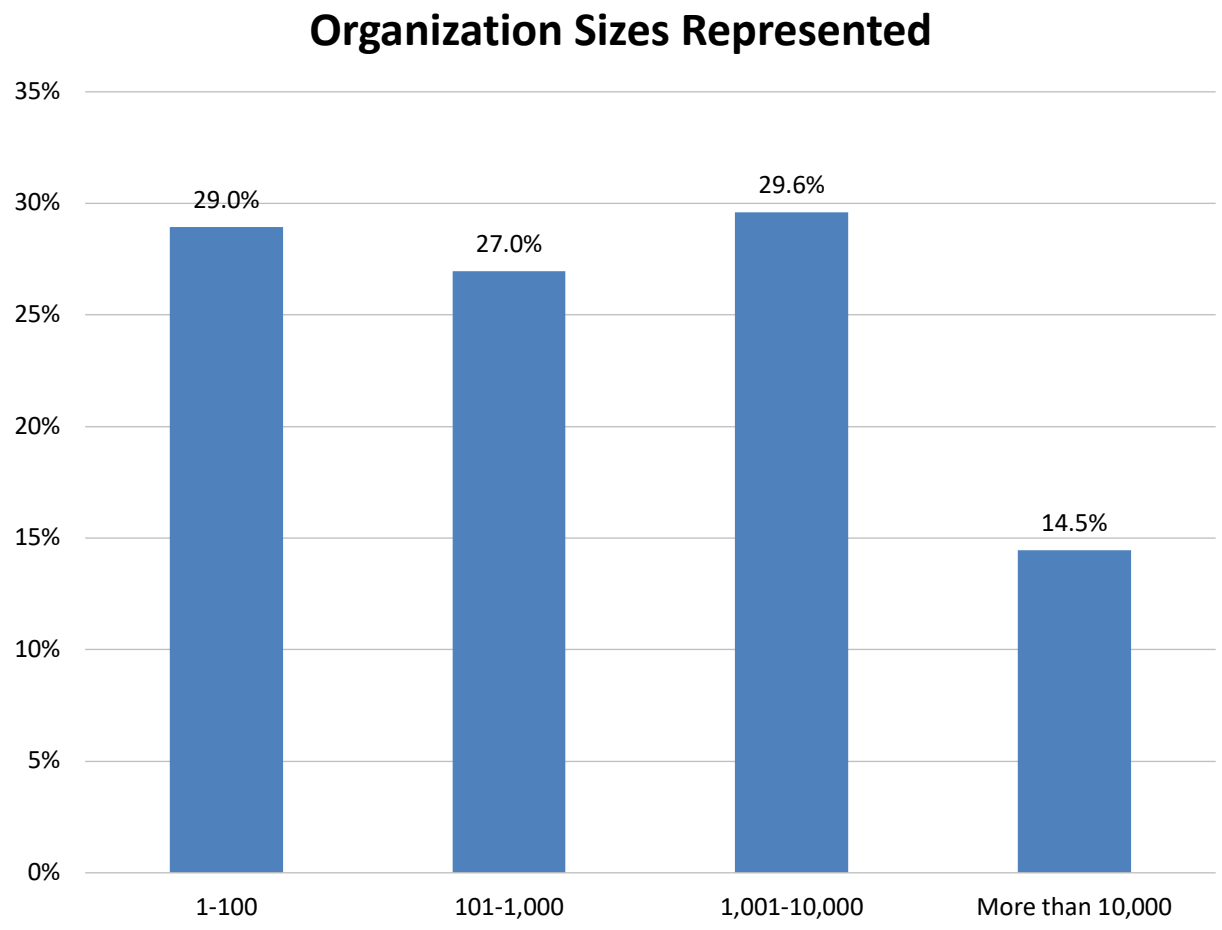

Figure 4 – Organization sizes represented

Analysis and Trends: Business Intelligence Users

Perceived Cloud Advantages and Disadvantages

We surveyed participants about 14 attributes of cloud computing and asked them to describe each as an *advantage*, a *disadvantage*, or *neutral* (neither an advantage nor disadvantage) (fig. 5). In 2024, *reliability* and *access and availability* are the most important *advantages*. A second tier of *scalability* and *ease of use,* followed by *administration* and i*mplementation time*, is next most important. All 14 features are considered advantages by between 50 and 81 percent of respondents. *Customization* and *cost/ROI* are seen as the greatest perceived *disadvantages* of cloud BI, though none of the measures are considered a disadvantage by more than 19 percent of survey participants.

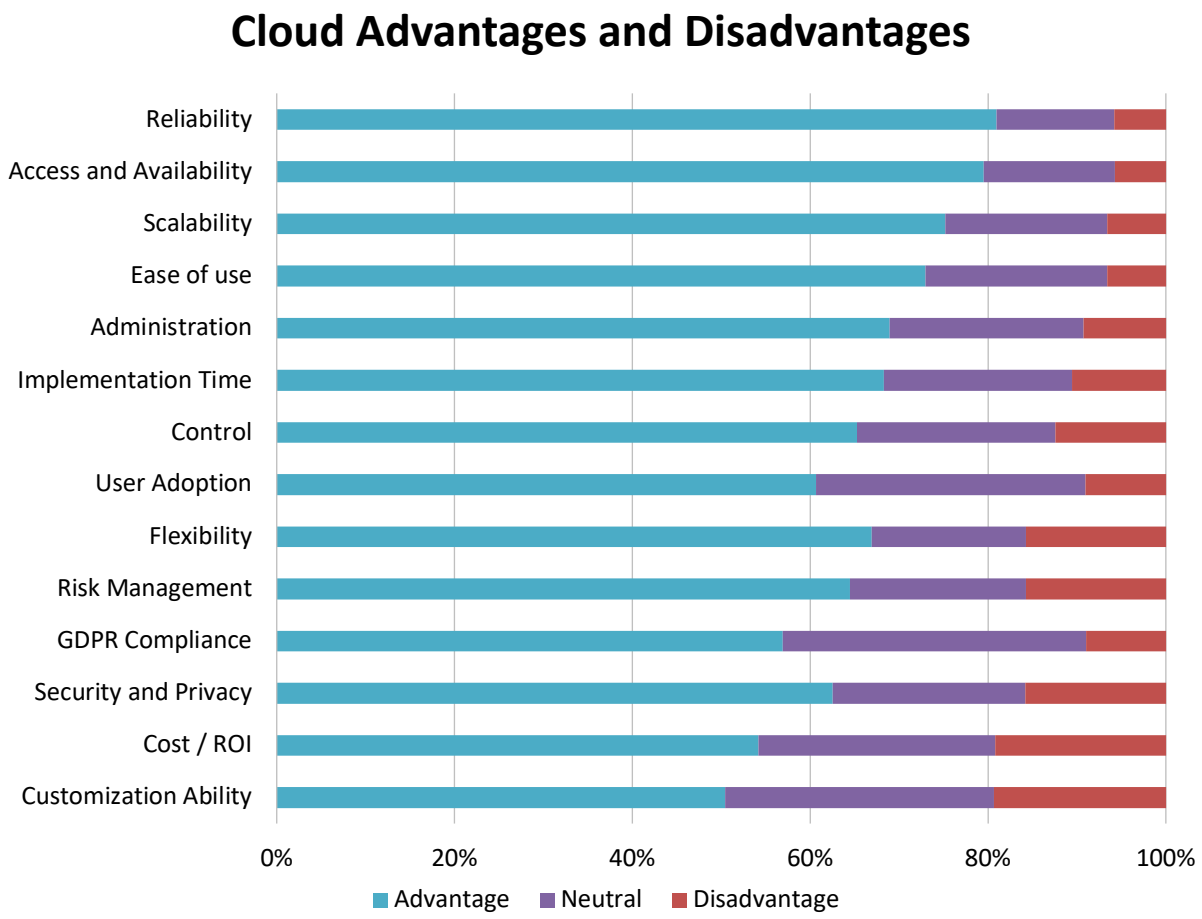

Figure 5 – Cloud advantages and disadvantages

The rationale for this analysis is to present cloud BI (and cloud applications overall) not as a panacea but, instead, as a deployment method that has both advantages and disadvantages. While there appear to be more advantages than disadvantages, organizations need to be cognizant of potential limitations of cloud deployment —such as customization. Additionally, some cloud pricing models, offering use-based pricing, have been known to surprise customers with unexpectedly large and un-budgeting fees.

It is also important to recognize that cloud-based solutions may not always offer the same level of control or security as on-premises solutions. This can be a critical concern for organizations handling sensitive data or operating in highly regulated industries. Another potential drawback is the dependency on the internet; any disruption in connectivity can lead to a loss of access to vital business intelligence tools and data.

Despite these challenges, the flexibility and scalability offered by cloud BI solutions can be highly beneficial for businesses looking to adapt quickly to changing market conditions or to scale their operations without significant upfront investments in infrastructure.

Importance of Cloud Business Intelligence

Cloud and software as a service rank 7th in importance out of 63 topics under our study in 2024 (compared to 6th in 2023) (fig. 6). Over time, cloud/SaaS is a consistent top priority that overlaps with most topics on the list.

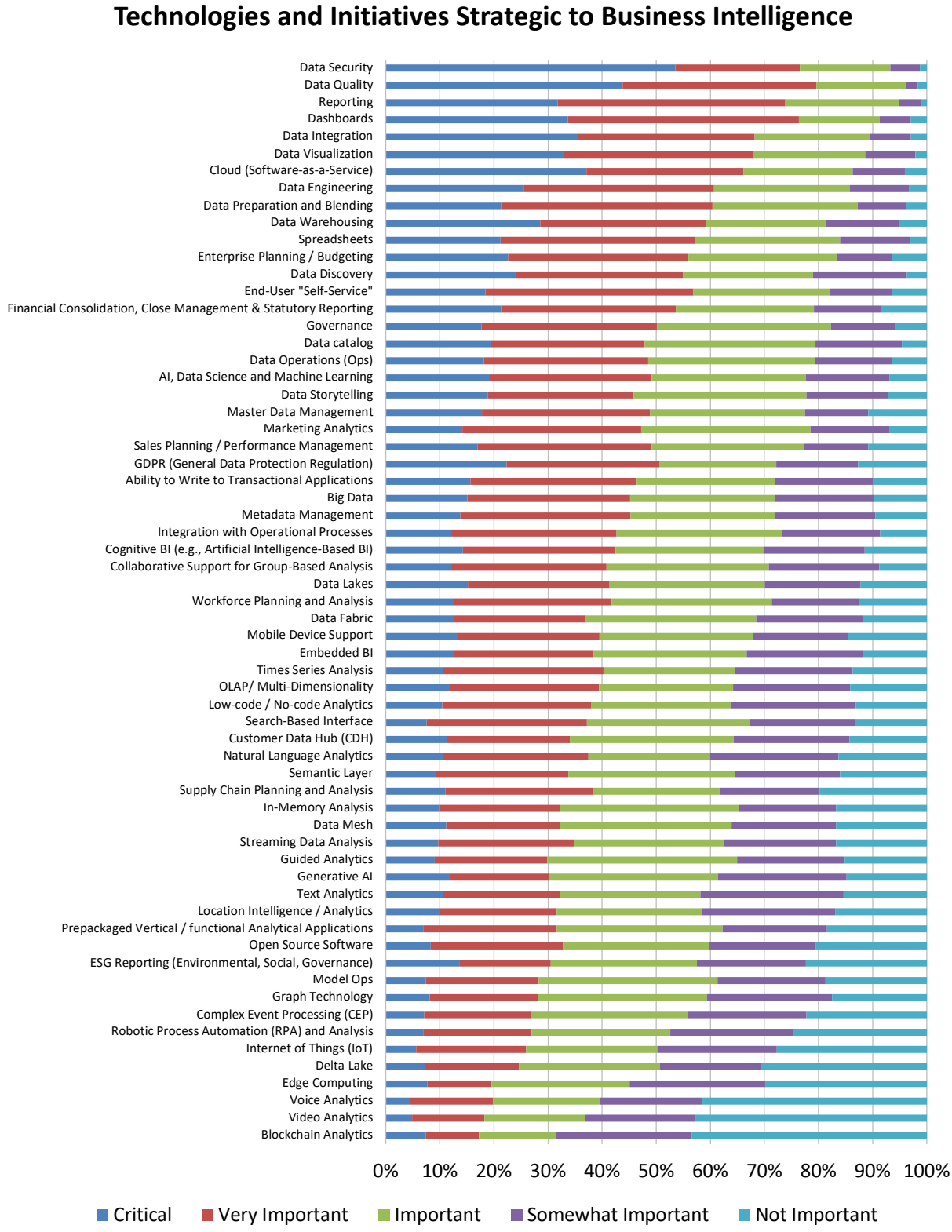

Figure 6 – Technologies and initiatives strategic to business intelligence

In 2024, respondents from the support-centric *BICC* function are most likely to report *current use* (84 percent) of cloud BI / analytics solutions (fig. 7). Possible reasons for strong BICC involvement might range from requirement gathering to product selection to deployment assistance. After BICC, executive management, R&D, and sales and marketing are the most likely current users (67-68 percent). IT (42 percent) and finance (52 percent) are less likely *current users* and are, surprisingly, 22 percent and 17 percent likely to have *no plans* for cloud BI / analytics use respectively.

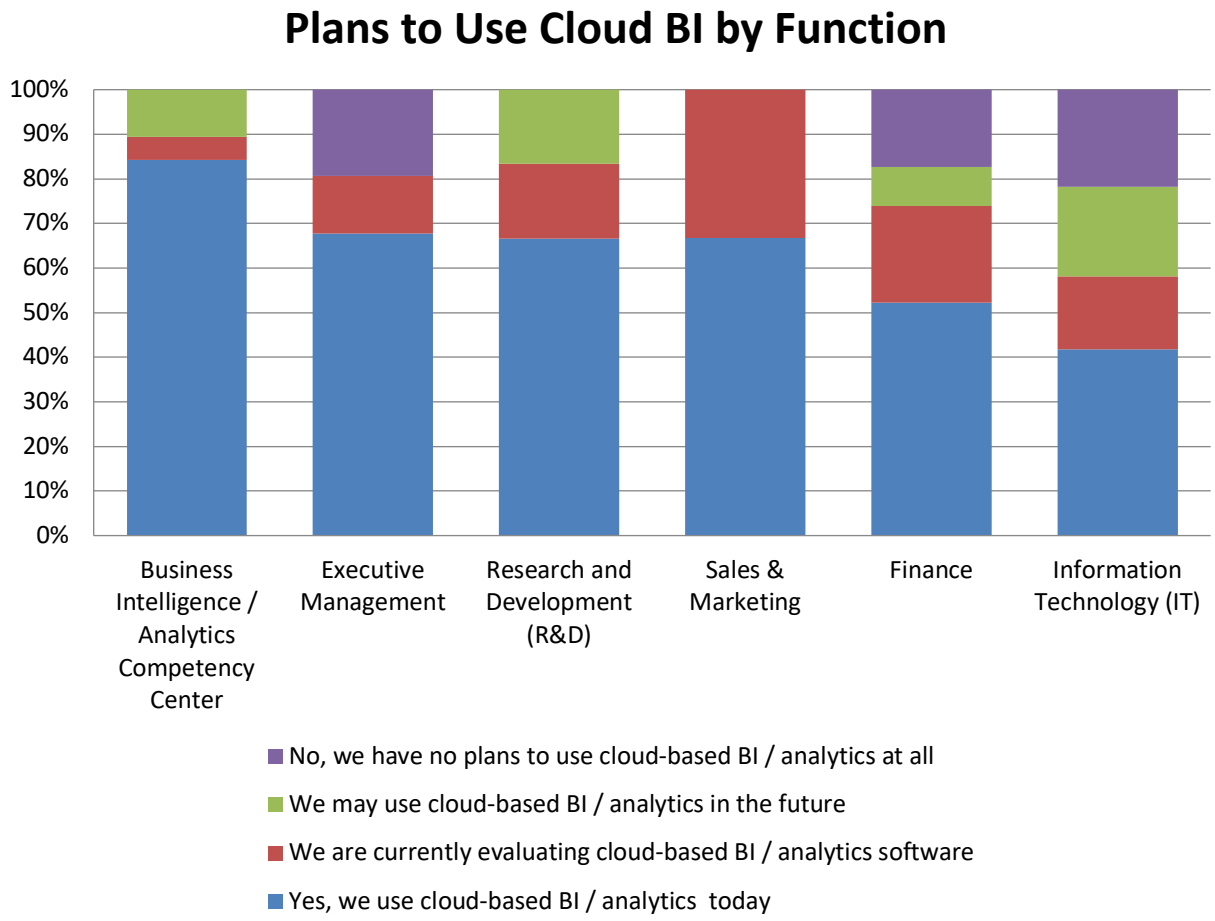

Figure 7 – Plans to use cloud BI by function

Respondents in large organizations (1,001-10,000 employees) and very large (> 10,000 employees) organizations are most likely to *currently use* cloud BI (67 and 62 percent respectively), compared to 54 percent of midsize (101-1,000 employees) and 49 percent of small (1-100 employees) organizations (fig. 8). Midsize organizations report the highest percentages of *currently evaluating* and *may use in the future* (21 and 15 percent respectively). Small organizations are most likely (27 percent) to have *no plans* in 2024, while midsize, large, and very large organizations (10, 13 and 14 percent, respectively) are less likely to have *no plans.*

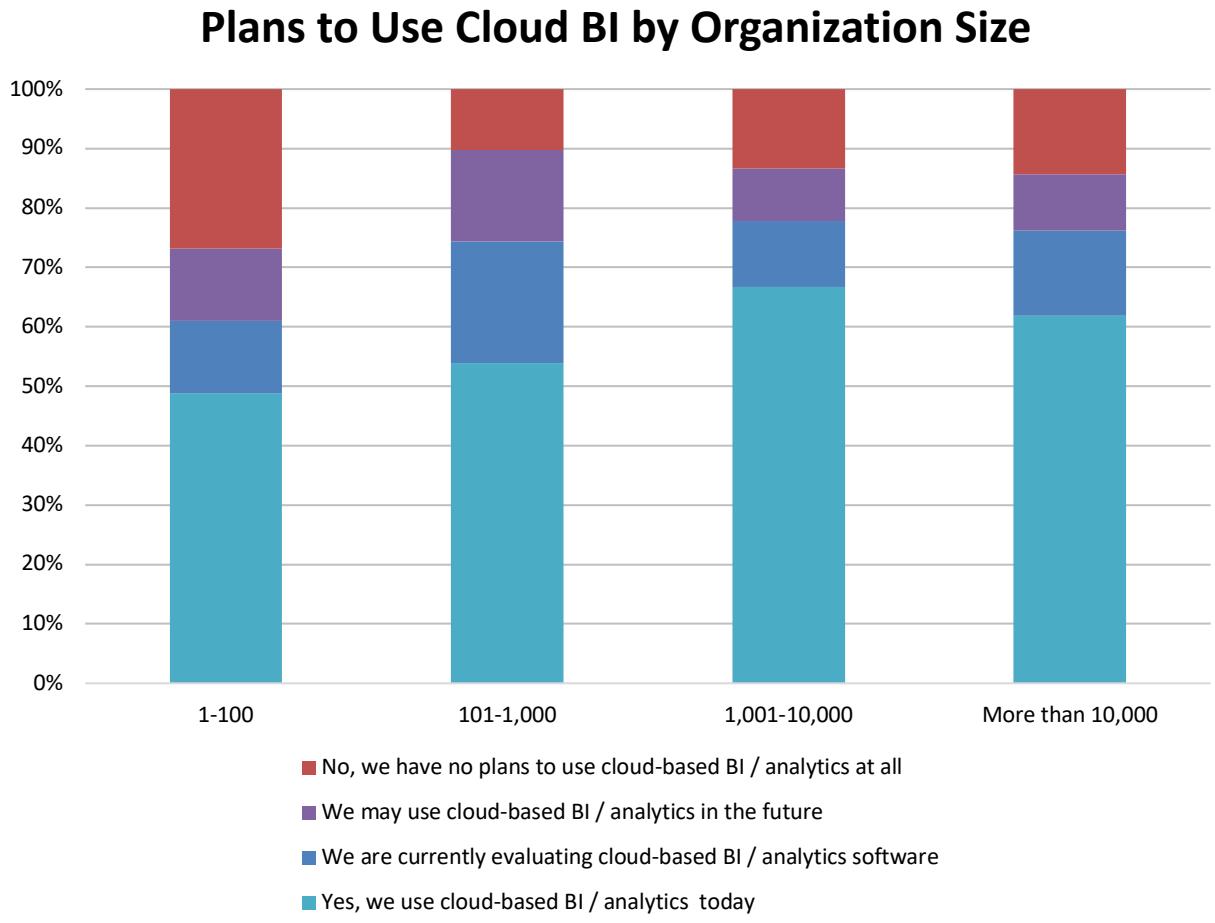

Figure 8 – Plans to use cloud BI by organization size

Current use and future plans for cloud BI / analytics vary broadly by industry in 2024 (fig. 9). This year, large majorities of respondents in *consumer services* (80 percent) and *healthcare* (70 percent) currently use cloud BI / analytics. *Healthcare* respondents are also 10 percent likely to be currently evaluating, and 10 percent likely to say they may use in the future. *Technology* and *business services* respondents are the next most likely *current users* (58-59 percent), with further numbers evaluating or considering future use. *Education* (36 percent) and, surprisingly, *retail and wholesale* (29 percent) are the least likely industries to be current users, though retail respondents are 29 percent likely to be *evaluating*, and none have *no* plans for future use.

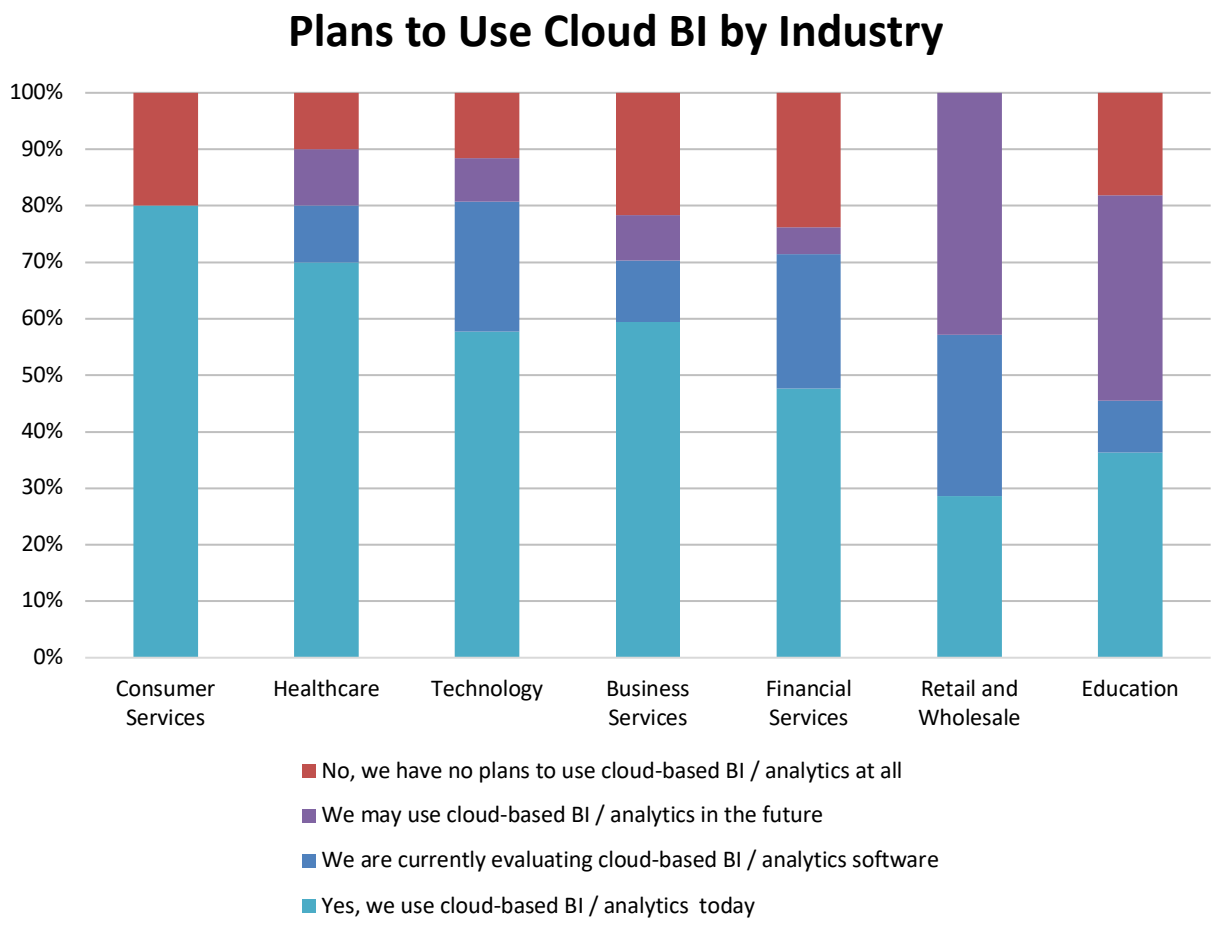

Figure 9 – Plans to use cloud BI by industry

Cloud Business Intelligence Feature Requirements

We asked respondents to describe the importance of 34 cloud BI feature requirements in 2024 (fig. 10). This year, *data quality* stands out as the top feature; with 39 percent *critical* and 78 percent combined *critical* and *very important* scores. The next four most important features, *data visualization*, *data governance, data preparation*, and *ad-hoc query,* are *critical* to 29-32 percent of respondents. While some features, such as *production (pixel-perfect) reporting* offer examples of parochial interest, 26 of 34 features are at least *very important* to 40 percent or more respondents, and all but two, *video analytics* and *voice analytics,* are at least *important* to half or far more respondents.

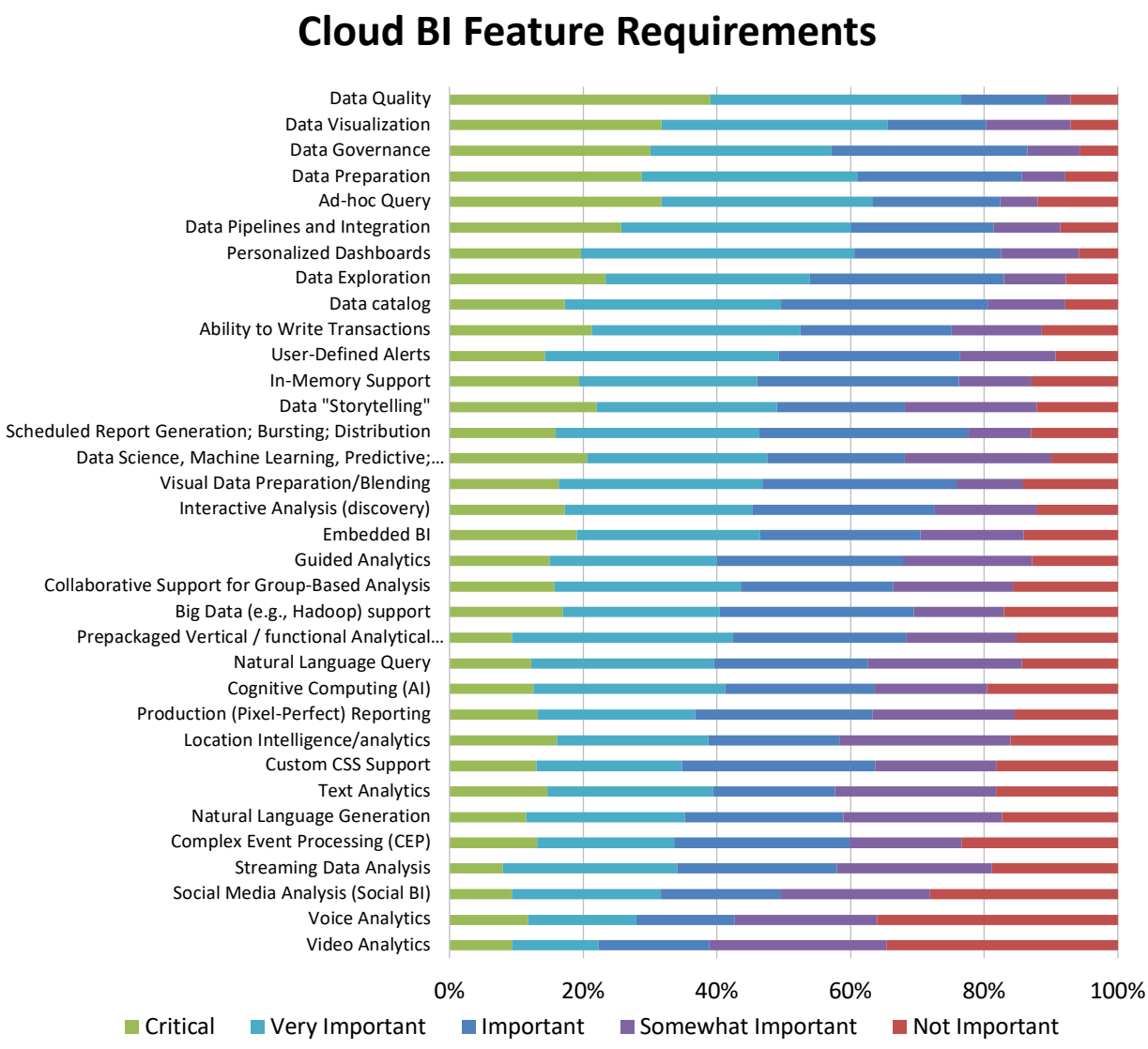

Figure 10 – Cloud BI feature requirements

In 2024, a selection of cloud BI features under our study stand at or near all-time high levels of importance among respondents (fig. 11). Top performers on a historic basis include *data quality*, which moved to the top place (with the lone 2024 score of *very important*), while *data visualization* and *ad-hoc query* fell well below average 2019-2024 performance. Other strong performers at or near historic highs include *data preparation, data governance, ability to write to transactional systems, data catalog*, and *big data support*.

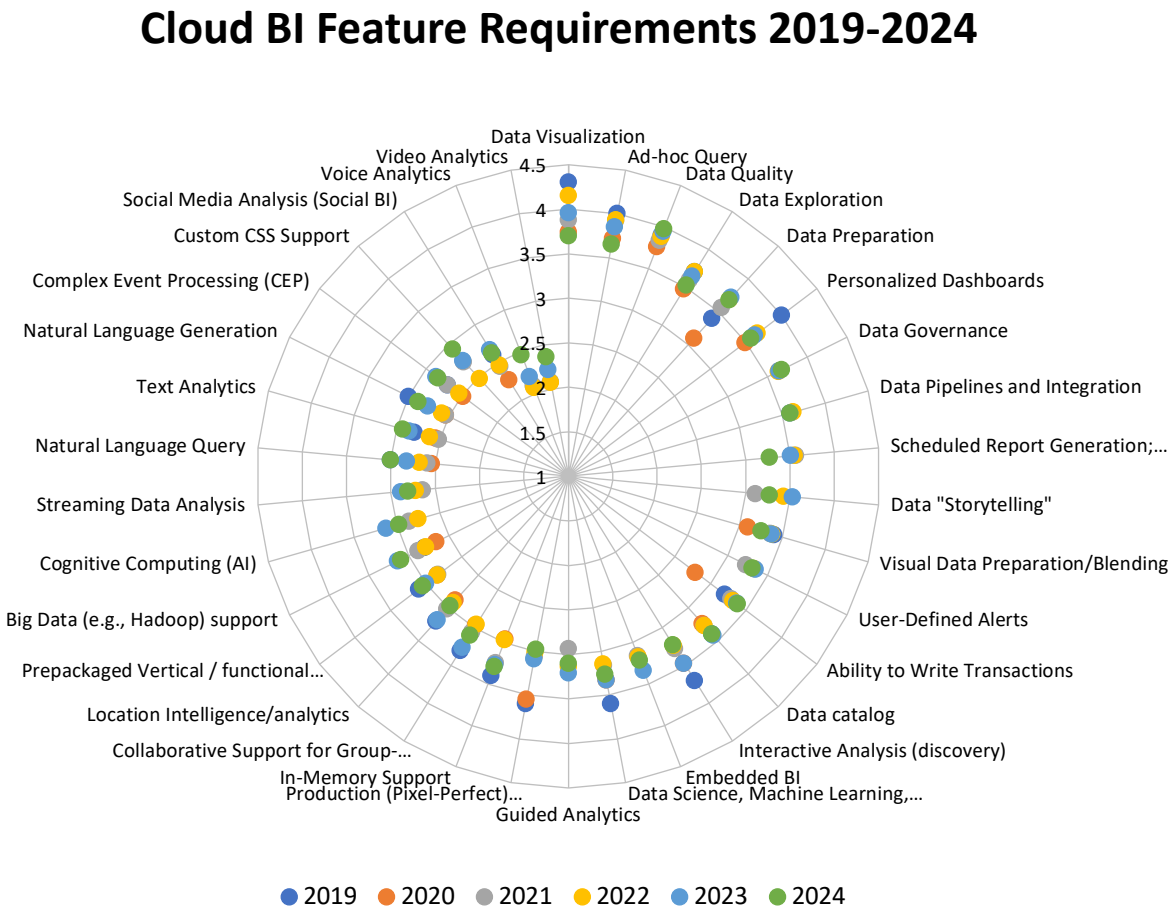

Figure 11 – Cloud BI feature priorities 2019-2023

Third-Party Cloud Application Data Connectors

We asked respondents to check a list of 41 cloud application data connectors they would like their cloud BI application to accommodate (fig. 12). The most-specified connector is *Microsoft Teams* (43 percent), followed by *Salesforce* (39 percent), *Microsoft OneDrive* (37 percent), and *Google Analytics* (36 percent). Fewer than 30 percent of respondents report interest in the remaining connectors. The 19 lowest-ranked connectors are requested by fewer than 10 percent of respondents.

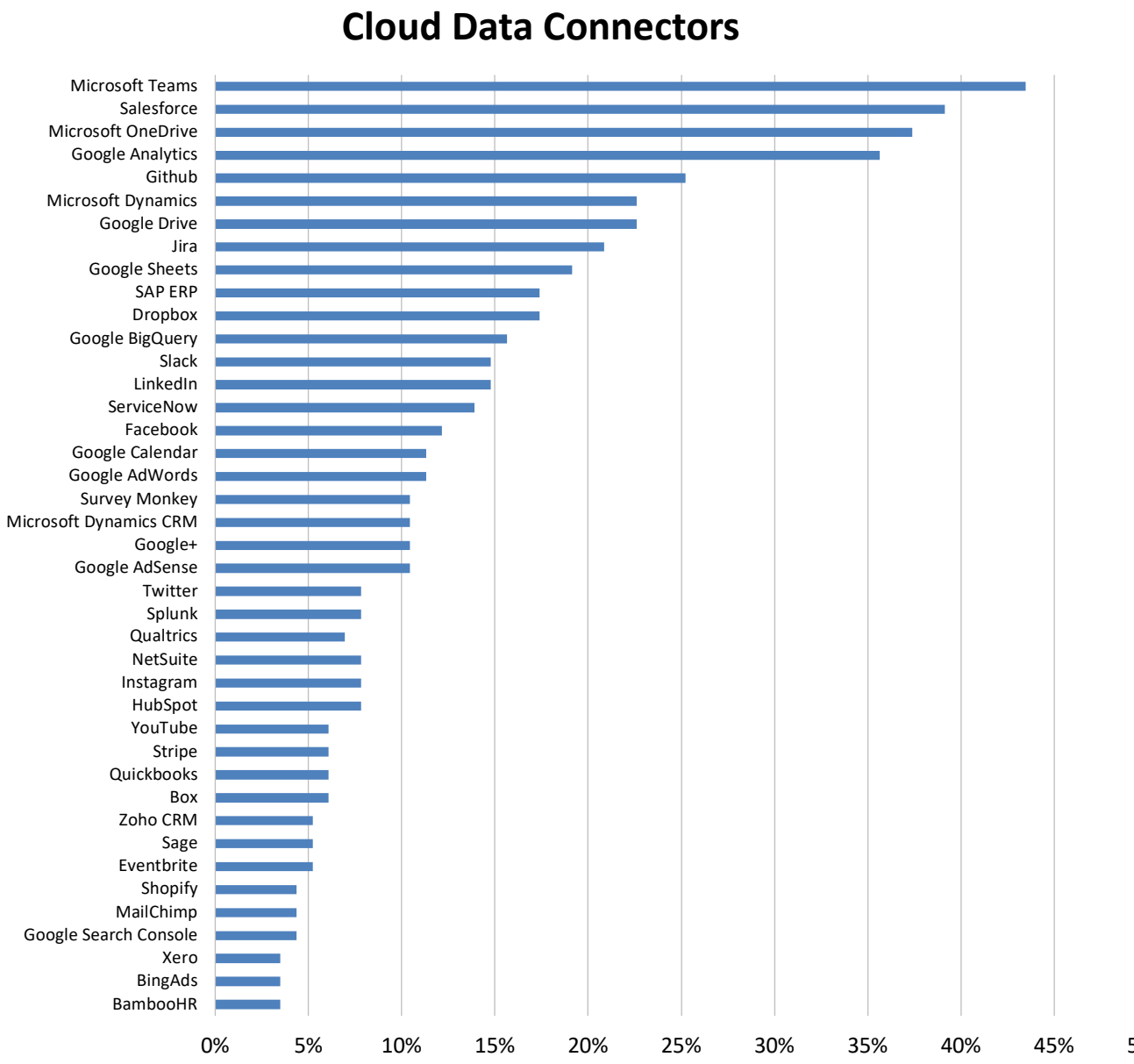

Figure 12 – Cloud application data connectors

Industry and Vendor Analysis

Industry and Vendor Analysis

For each of the last 12 years, we asked our industry community of respondents to describe the importance of cloud BI (fig. 13). In 2024, we observe measures of *critical* importance rebound to equal an all-time high 83 percent. This increase, which compares to a 68 percent critical score in 2023, fully offsets year-over-year declines in scores of *very important* and *important*. For a third year, no participant in the industry survey says cloud BI is *not important*. 2024 scores are reflected in the upward trend line (which follows only *critical* scores) and shows the rise of cloud BI importance across the history of our dedicated study. Industry sentiment tracks with and remains ahead of user sentiment in 2024.

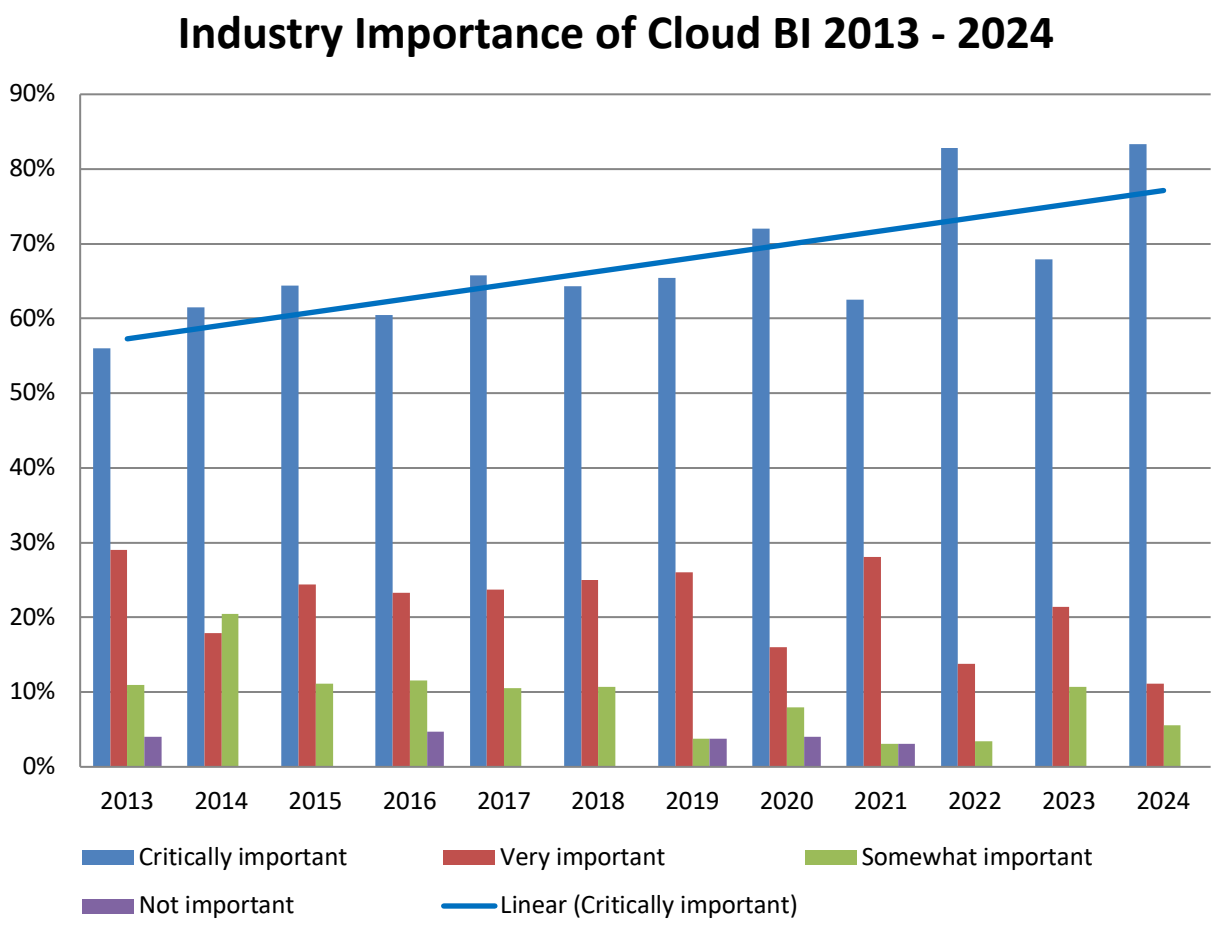

Figure 13 – Industry importance of cloud BI 2013-2024

In our 2024 study, 94 percent of our vendor industry sample *currently supports software as a service (compared to 82 percent in 2023)* (fig. 14). The remaining 6 percent of our industry sample reports *no plans* to support SaaS going forward, indicating full maturity that reflects the overwhelming industry transition to software as a service. Despite the year-over-year decline from 86 percent in 2022, 2024 continues a five-year upward trend that saw just 66 percent SaaS support as recently as 2020. It may be interesting to compare this finding with current and planned user rates for cloud BI (fig. 13), which puts industry support levels ahead of current use and planned adoption of cloud BI.

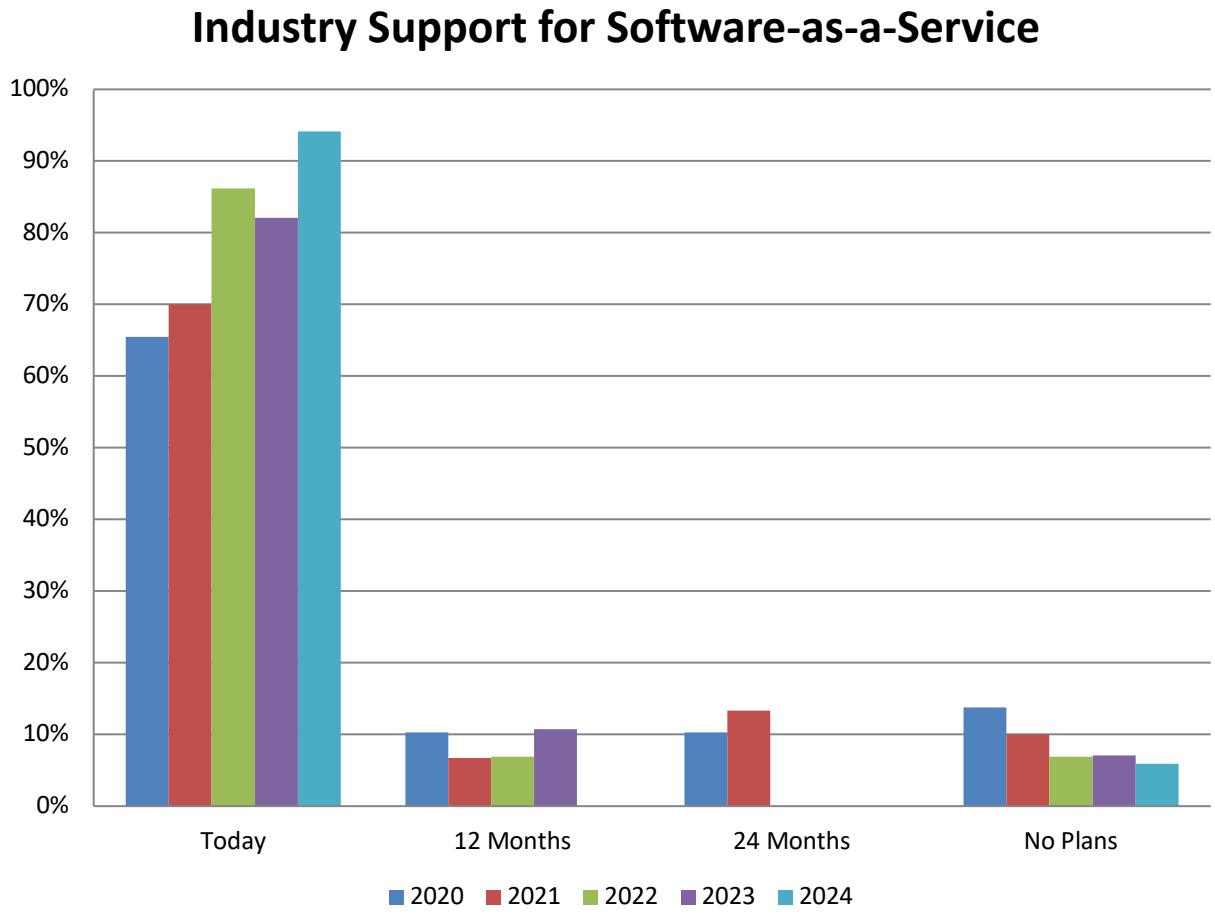

Figure 14 – Industry support for software as a service

We asked industry respondents to describe their support for *cloud-based BI* versus *traditional (on-premises)* business intelligence features (fig. 15). As it has over time, our industry sample increasingly reports far higher levels of support for *cloud* versus *traditional* on-premises deployment that makes a near-irresistible roadmap for cloud adoption. The top dozen features, 95-100 percent cloud-supported, are by comparison just 68-84 percent on-premises-supported today. Along with increasing differentiation,

this chart affirms that, for some time, cloud development has been at the expense of on-premises server or desktop support. With end-user feature requirements (fig. 35) well covered, and cloud deployment preferences defined (fig. 25), we expect more diminishing if not accelerating levels of on-premises use and support to continue.

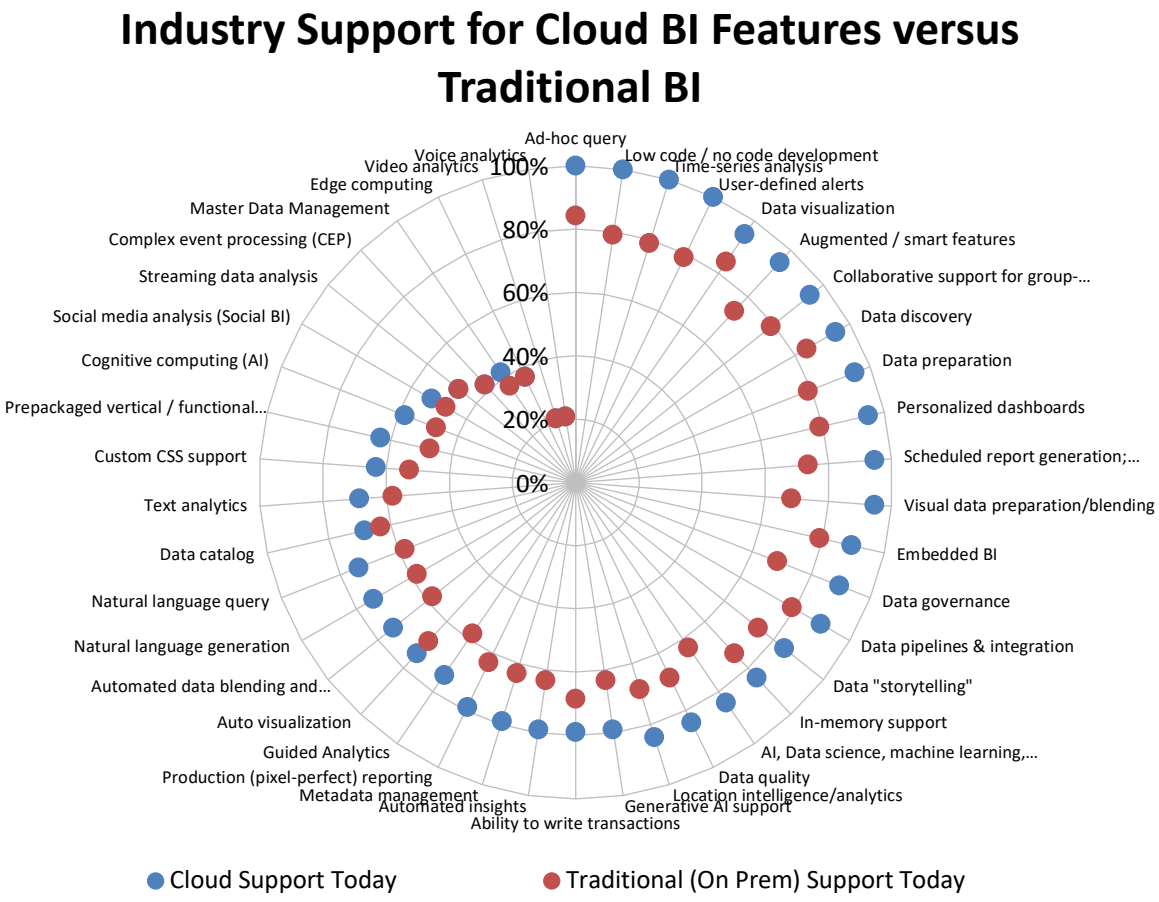

Figure 15 – Industry support for cloud business intelligence features versus traditional BI

The industry vendor community highly supports the great majority of cloud BI architectural features that users need and want today (fig. 16). The top six, *cloud database connectors, multitenancy, support for NoSQL, open client connector, RESTful / Web services, and relational database support,* are currently supported by about 88 percent of our 2024 industry sample. A second tier consisting of *connectors to on-premises applications, cloud application connectors, and multi-dimensional database support is* supported by more than 80 percent. All but four of 17 features are supported by at least 60 percent of vendors. The greatest 12-month investment is expected for *streaming data support* and *automatic upgrades.* We see industry architecture features support well ahead of user demand (fig. 41).

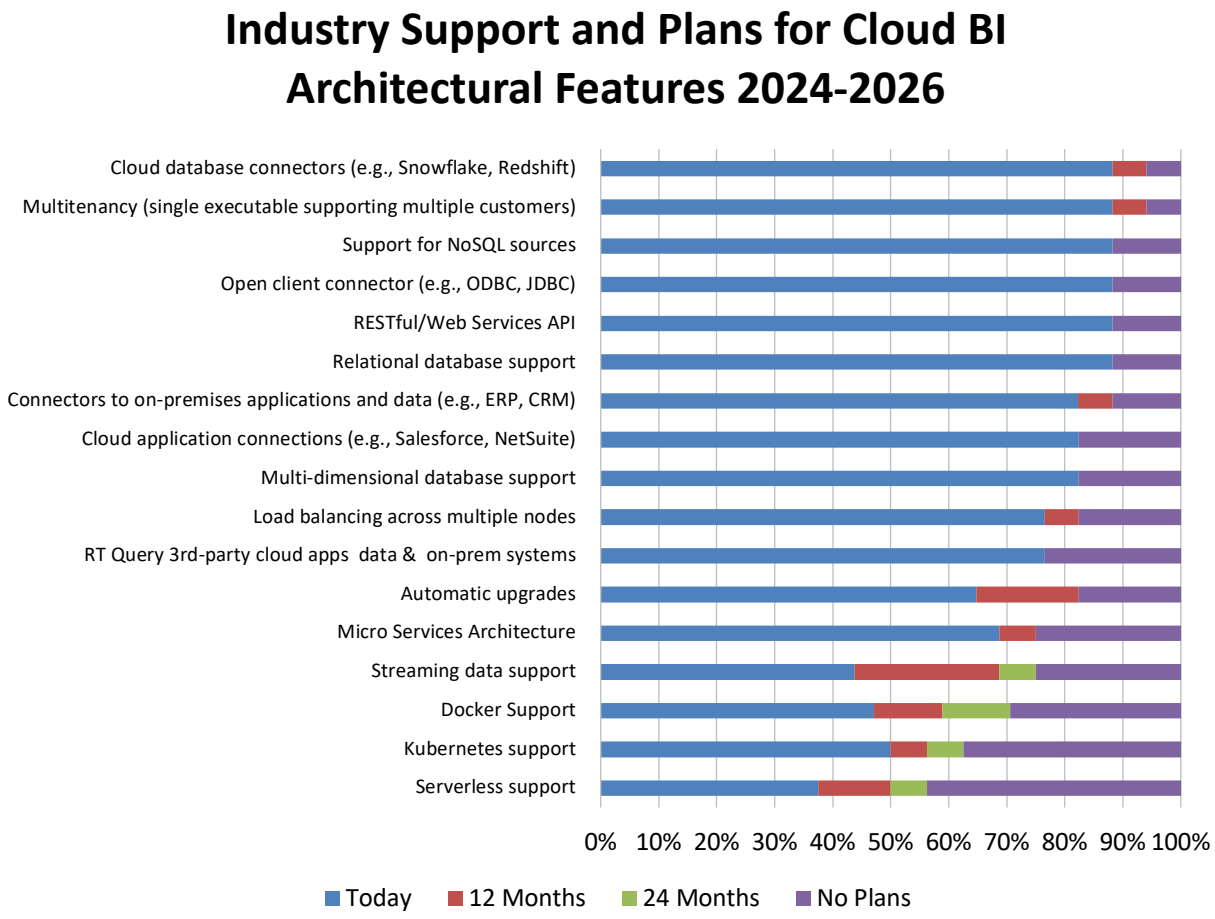

Figure 16 – Industry support and plans for cloud BI architectural features 2024-2026

We asked vendor industry respondents to describe their support for *desktop* versus pure *cloud-based administration and design* (fig. 17). In our 2024 study, we find 88 percent cloud-based support, meaning that just 12 percent of tools (compared to 13 percent in 2023) still require *desktop-based administration*. For the past three years, support for *cloud-based administration* held at 88-90 percent of our vendor sample. We believe this represents a nearly mature state of migration from desktop to cloud-based administration and design.

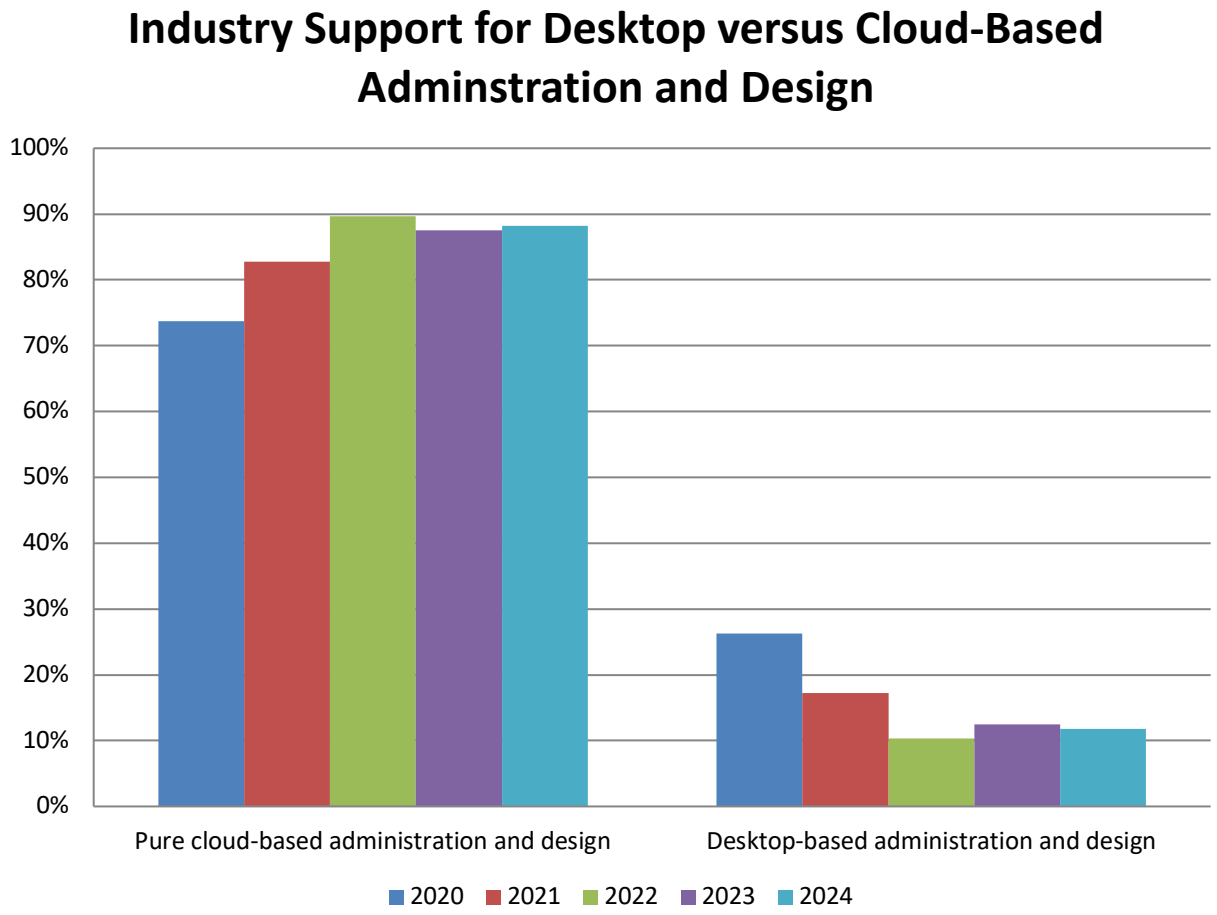

Figure 17 – Industry support for desktop versus cloud-based administration and design

Industry support and future plans for cloud security standards and specifications remain specialized and largely incomplete in our 2024 sample (fig 18). The top three security standards (*SOC 2*, OAuth, and OWASP) have between 69-72 percent industry support this year. Among higher-ranked standards, the greatest 12-month investment plans are for *CSA (24 percent), SOC 2* (17 percent), BYOK (19 percent), and Fedramp (17 percent). In the likely event of specialized requirements and third-party or in-house standard support, at least eight security specifications are expected to remain unsupported by more than half of the industry sample with no plans for development. This finding sufficiently aligns with user preferences, where security requirements are admittedly modest and fragmented.

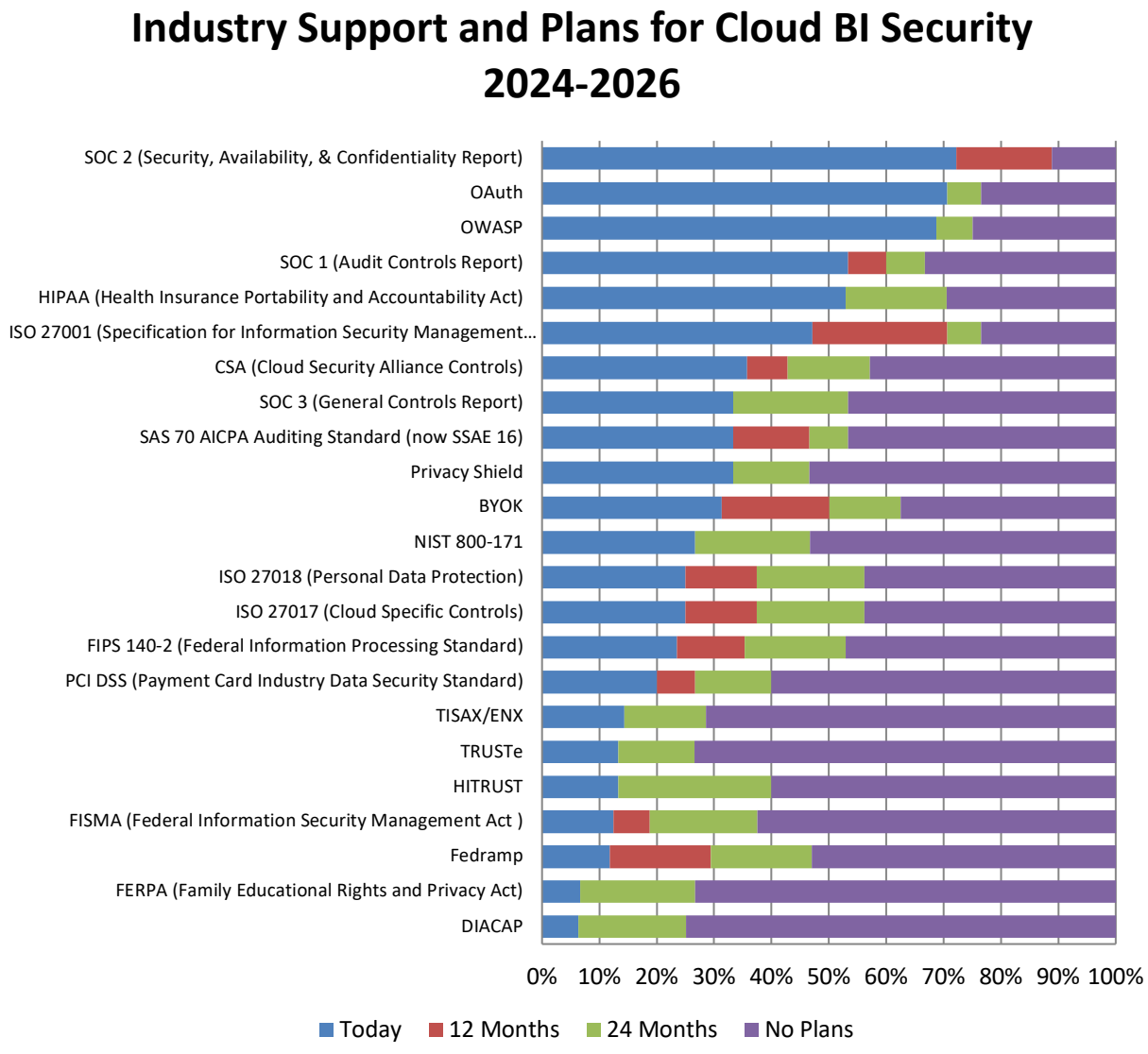

Figure 18 – Industry Support and Plans for Cloud BI Security 2023-2025

In a reflection of vendor as well as user preference, 100 percent of our industry sample offers cloud BI *subscription* models in 2024 (up from 96 percent in 2023) (fig. 19). This year, *free trial (try and buy)* (71 percent current support) replaces *managed service* (67 percent) as the second most supported licensing model. The *On-premises option* is slightly more supported today at 69 percent but includes *no* plans for future investment. *Freemium* and *pay-per use* are currently supported by about one-third of the industry sample with some plans for future investment. *Perpetual license + annual maintenance* is supported by 40 percent, but like *on-premises option,* is in a longer process of being discarded with no future investment plans. Though our user sample skews toward cloud-ready vendors (fig. 58), the provider industry is plainly leading the charge toward *subscription licensing (*see following chart).

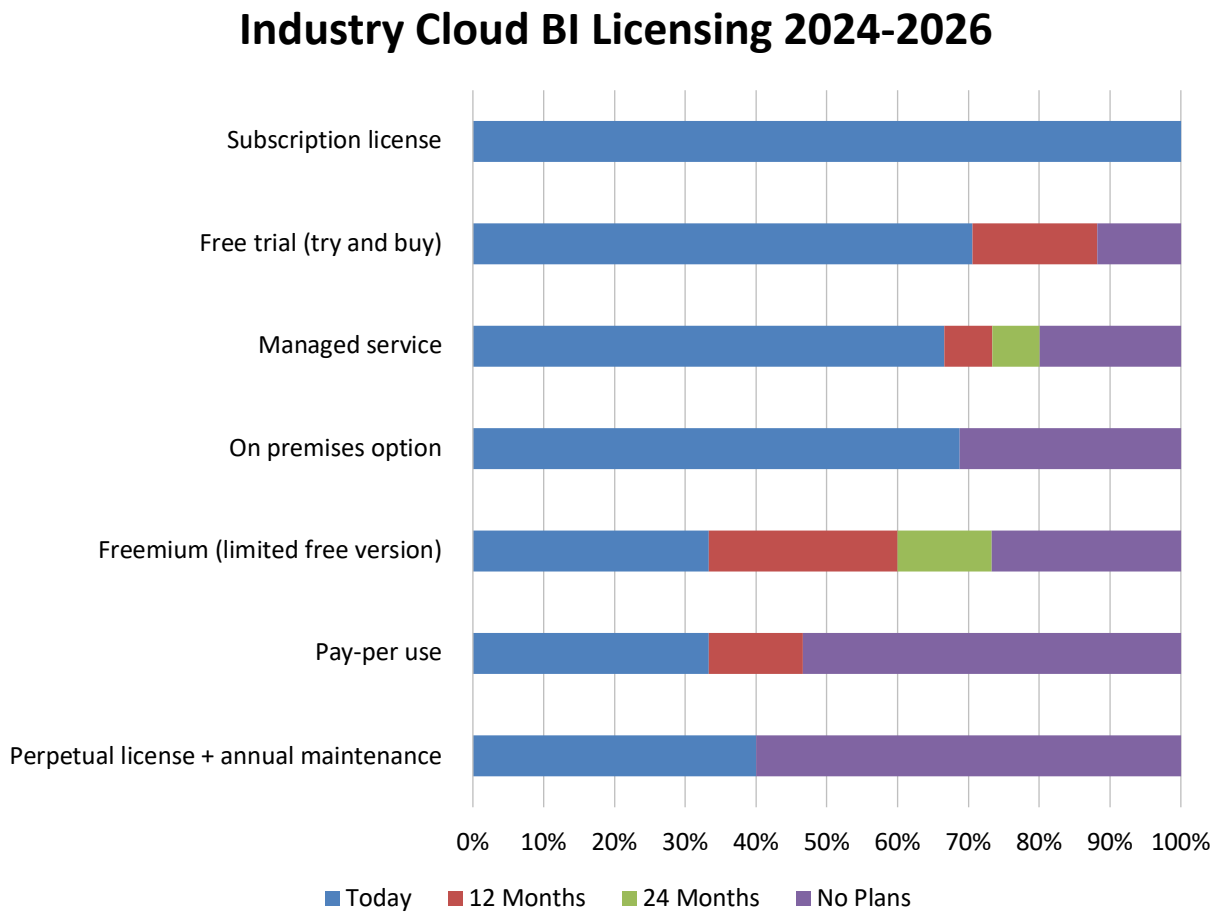

Figure 19 – Industry Cloud BI Licensing 2024-2026

Across all 13 years of our dedicated cloud BI study, we observed ebbs and flows of support for licensing preferences (fig. 20). An obvious case is an increase over time in the provision of *subscription* licensing, a demand only partly reflected in user requirements (fig. 58). While *free trial (trial and buy)* and *freemium* options see some sustained historical levels of higher attention, the remaining options, particularly the *on-premises option* and *perpetual license + annual* maintenance, are noticeably in decline. As the summary chart (fig. 75 above) shows, all options remain available, though most are slowly receding.

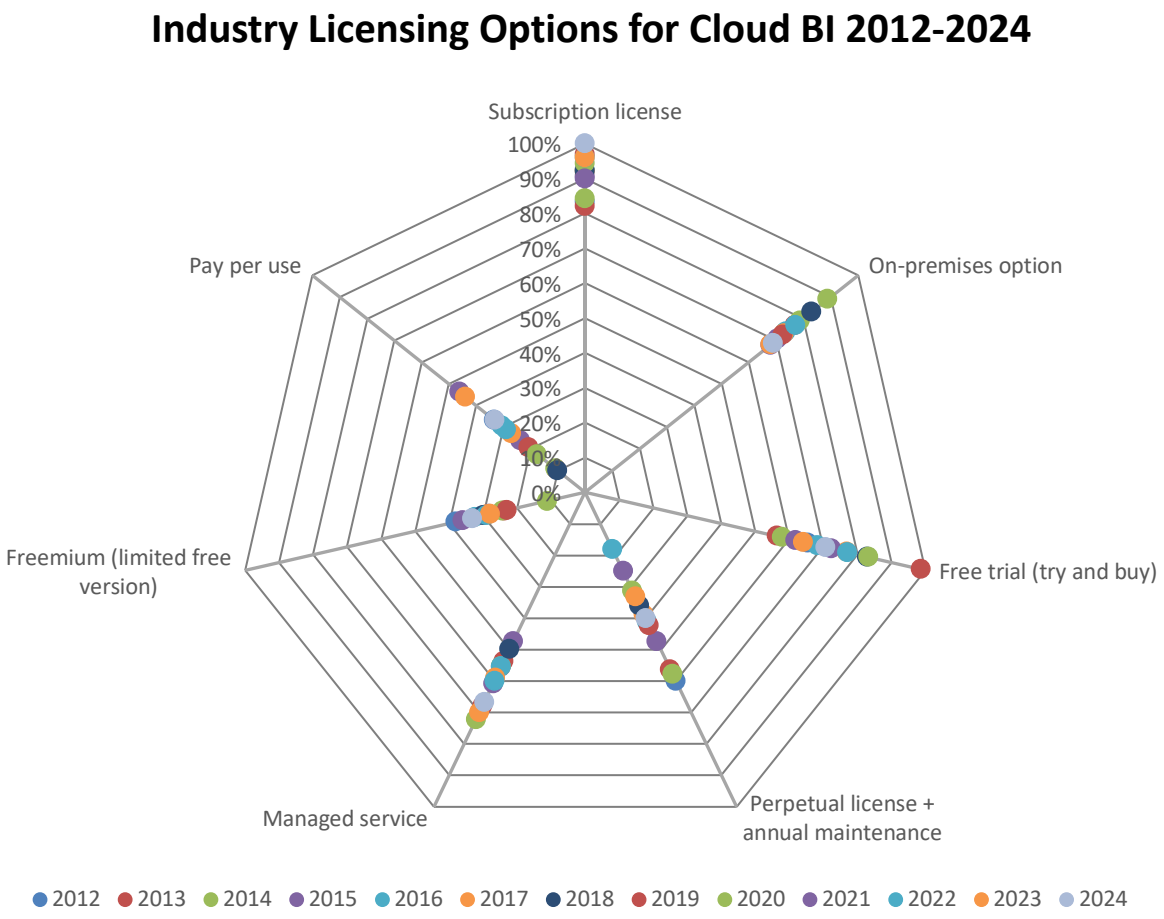

Figure 20 – Industry licensing options for cloud BI 2012-2024

In our 2024 industry sample, support for third-party data sources is strongest for *Salesforce* (75 percent) (fig.21). A tier of about 63 percent secondary support applies to *Google Analytics, Google BigQuery, Jira, Microsoft Dynamics, SAP ERP, ServiceNow*, and *Dropbox.* A third tier of greater than 50 percent support includes *Google Sheets, NetSuite, Quickbooks, Sage, Slack*, and *Twitter.* Support thereafter declines to 50 percent or far less in many cases. Support levels do not always align with current user demand (fig. 52), where demand is highest for *Microsoft Teams* (and where we might expect native application use).

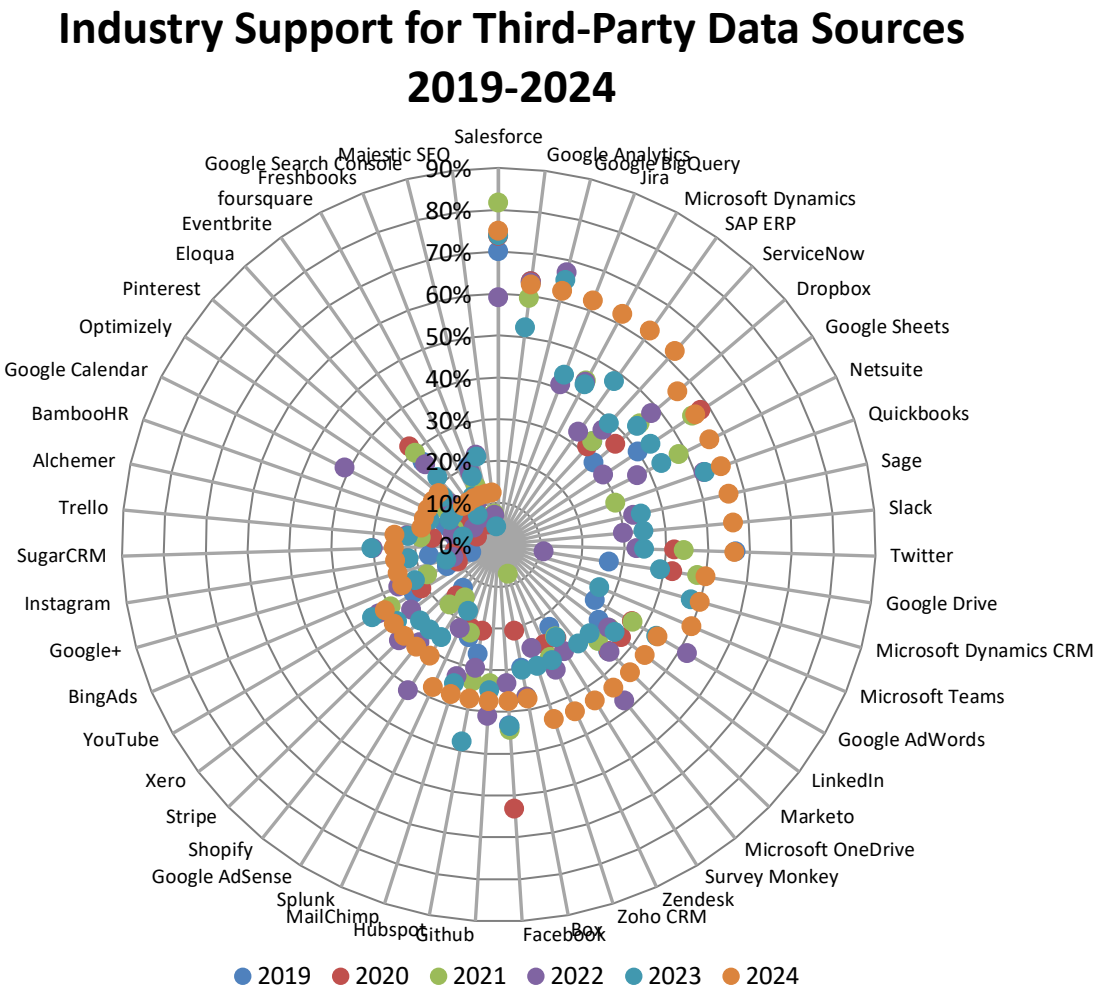

Figure 21 – Industry support for third-party data sources 2019-2024

Cloud Business Intelligence Vendor Ratings

In rating the vendors, we considered cloud BI features, cloud architecture, cloud security, and web data connectors, as reported by suppliers and weighted by user priority of capabilities (fig. 22). Vendors have at least 50 percent of specified functionality to be included in ratings.

The top few vendors had similar scores, with minor differences among them. The variations within the next 15 were somewhat greater, but still relatively modest.

The top vendors are Domo (1st), Palantir (1st), Qlik (2nd), Zoho (3rd), Google (4th), and Incorta (5th).

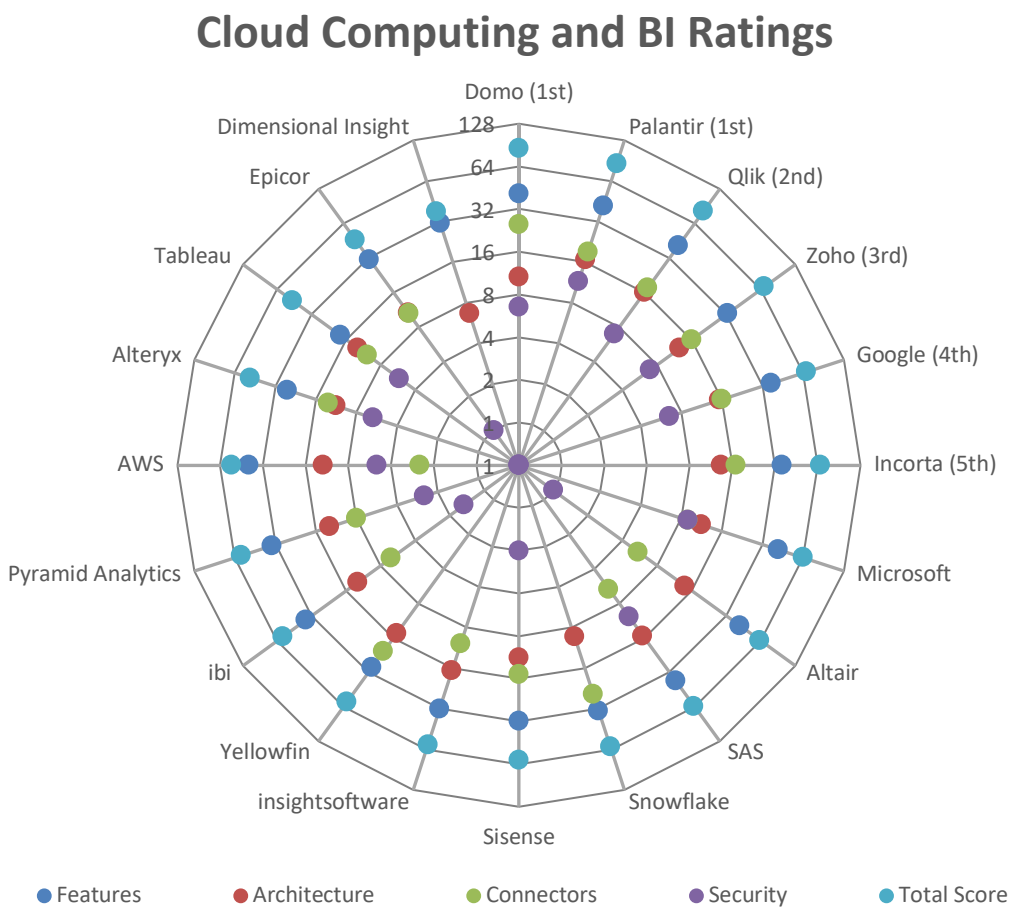

Figure 22 – Cloud business intelligence vendor ratings