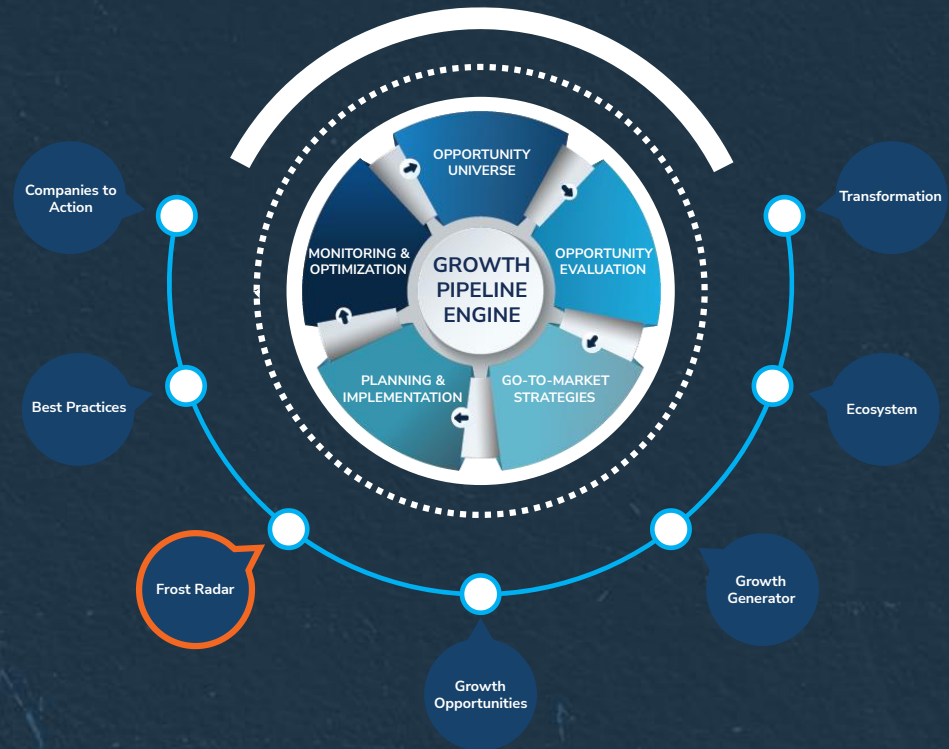# FROST & SULLIVAN

Frost Radar™ : Low Code Application Platforms, 2024

A Benchmarking System to Spark Companies to Action - Innovation That Fuels New Deal Flow and Growth Pipelines

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Strategic Imperative and Growth Environment

Strategic Imperative

- Today's businesses face mounting macroeconomic challenges, a continued need for digital transformation, customer demands for personalized experiences, and a lack of skilled IT resources to deliver on time and within budget. In this challenging environment, businesses must streamline their operations and be as efficient as possible with the fewest possible resources to stay competitive and satisfy customers.

- At the same time, technological disruption caused by the introduction of generative AI (GenAI) into the enterprise is causing companies to focus the majority of their R&D on how best to integrate these capabilities into their low-code application platforms (LCAPs) to ensure that they can sustain growth. AI is also impacting LCAP customers; many use the easy dev environment that low-code provides to experiment with how AI can be used to streamline processes or deliver personalized customer experiences more efficiently.

- LCAPs are visual application development environments that offer drag-and-drop, graphical, and sometimes AI-assisted interfaces that enable developers to quickly create or change web and mobile applications. Such platforms are driving new business models in which non-IT staff are able to create new services and automate their own workflows without waiting for professional programmers to have bandwidth to execute the project. LCAPs can help businesses prosper despite a shortage of professional developers—especially those developing for cloud deployment.

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Growth Environment

- Businesses globally continue to be challenged to find the IT expertise and experience to develop and deploy new services, streamline business processes, and manage the day-to-day workload. The scarcity of IT resources has led companies to seek new ways to streamline operations and close skills gaps.

- Low-code application programming helps businesses on both fronts: it enables employees with little or no programming experience—often referred to as either "citizen developers" or "business technologists"—to create applications and services quickly and easily using drag-and-drop or natural language programming (NLP). At the same time, low-code platform services are often used to automate routine tasks and business processes to streamline operations and mitigate the problem of scarce resources.

- The introduction of AI—particularly GenAI—into low-code platforms has dramatically increased the ease with which developers of any skill level can create new applications and services. Many LCAP providers are introducing NLP that allows citizen developers (using speech) to tell the platform what they want it to do, and the platform executes it. Most platforms now have AI development assistance, using data to determine the next best action to create an app that does what the user wants it to do. Leading vendors are even incorporating capabilities such as intelligent document processing that scans a document or even a sketch of a proposed user interface (UI) and generates the appropriate code using AI to execute the form or the interface electronically. GenAI has transformed low-code development over the past 12 months.

- AI also can expose security vulnerabilities and prevent an app from being deployed until the developer resolves the issue, thus protecting companies and data and ensuring corporate compliance. This is especially important as cyberthreats continue to plague businesses, and business applications continue to generate and process significant amounts of sensitive customer data that requires protection.

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Growth Environment (continued)

- With the continued drive to streamline operations, enhance security, and mitigate skill and resource gaps, LCAP use will accelerate in the next two to three years. Frost & Sullivan estimated 2023 LCAP market revenue at approximately $60 billion globally and expects that to increase at a compound annual growth rate of 31.5% through 2027.

- Historically, vendors offering LCAP used proprietary protocols and back-end programming that makes it impossible to port an LCAP application or service written in one platform to another environment. This created a significant vendor lock-in issue. Today, some vendors are tackling this with APIs and connectors that enable porting of applications into different environments. Continuing to tackle the lock-in issue will be key to sustained growth, and embracing hybrid and multicloud application deployments will be crucial for LCAP vendors to retain customers over time.

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Frost Radar™: Low-Code Application Platforms, 2024

Source: Frost & Sullivan

Frost Radar™: Low-Code Application Platforms, 2024
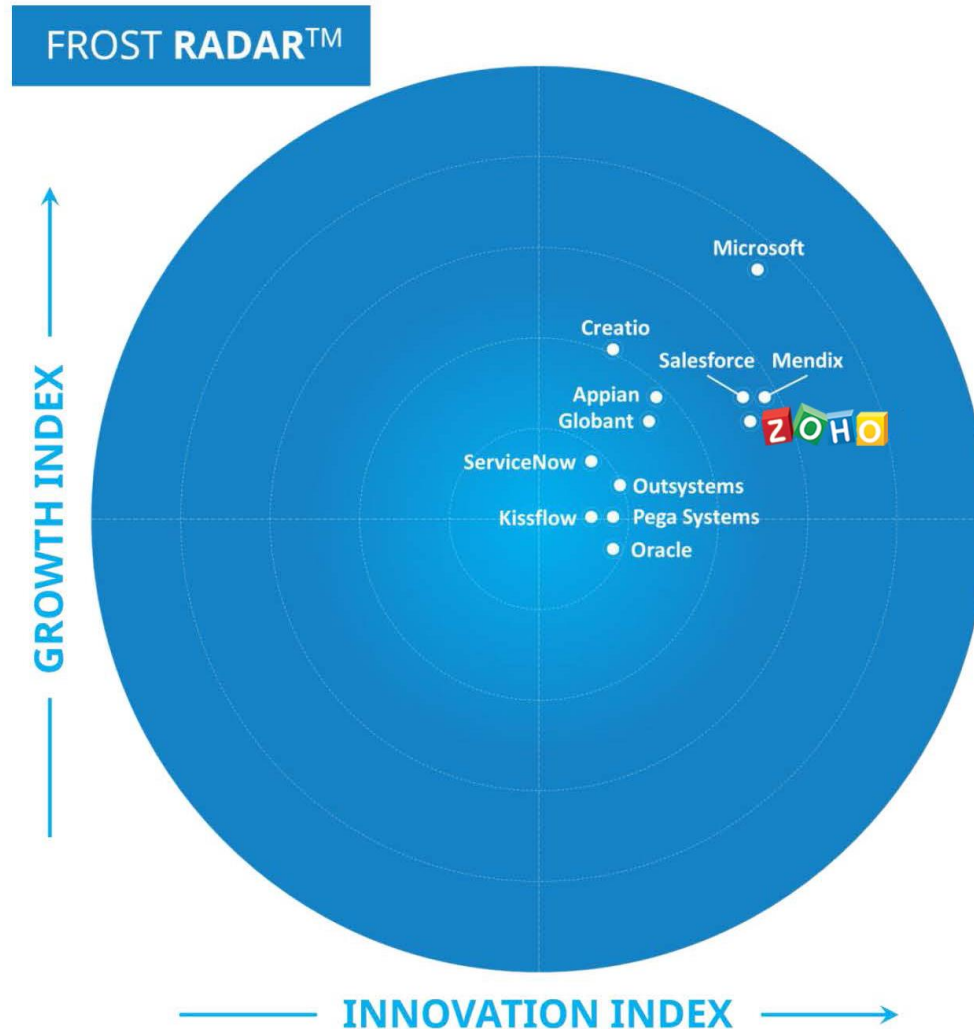
Frost Radar™ Competitive Environment

- Today's LCAP market is fragmented, with at least 250 vendors offering platforms. LCAPs can be segmented into a few major categories, with some providers offering capabilities across multiple categories and others focusing on a single segment. Categories include:

  o IT-centric rapid development

  o Business process management (BPM)/robotic process automation (RPA)

  o Software-as-a-service (SaaS)-centric/SaaS extension

  o Customer/user experience

- Frost & Sullivan has identified 12 market leaders with platforms that offer the scalability, availability, and security features to support the needs of midsize to large enterprises. These vendors stand out considering the growth—based on service adoption— and innovations related to the platform itself. Vendors assessed for this Frost Radar™ offer low-code development and/or automation; low-code integration-only platforms were not assessed.

- Microsoft is the clear Frost Radar™ leader. The company has led the market in GenAI application development with the integration of Copilots into the Power Platform in the last year. This integration significantly increases the capability of citizen developers or business technologists to create solutions that improve productivity.

- Mendix has made strides in enhancing its LCAP since the 2023 LCAP Frost Radar™. The company has made great progress in enhancing its GenAI capabilities, including AI-assisted development and AI-augmented applications. It also has actively grown its partner ecosystem with leading cloud and IT vendors, such as AWS and Red Hat, creating additional growth opportunities.

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Frost Radar™ Competitive Environment (continued)

- Appian also expanded its platform capabilities over the last year and integrated additional AI capabilities. Its LCAP is now able to manage low-code development, BPM/RPA, and process mining into a platform that also includes a data fabric. While offering a strong service, the company does not invest as much into R&D as some competitors, and its growth—while sustained—has not been as robust as that of other providers.

- Kissflow is an India-based LCAP provider primarily targeting small and medium-sized businesses. Its platform integrates well into larger enterprise systems of record (such as ERP or financial systems) and extends the functionality of those service suites. The company made progress over the last year at integrating AI into its platform, including launching AI-assisted development and access to external data sources to enhance data modeling for customers.

- Creatio and Globant are newcomers to the Frost Radar™ in 2024. Both offer full-featured LCAP platforms with significant integration of GenAI. Creatio, like Salesforce, targets businesses in the customer experience and customer relationship management (CRM) sectors with a no-code platform that uses intuitive, drag-and-drop wizards and NLP to create custom apps and services to streamline CRM workflows. Globant serves a wide variety of consumer-based industries, such as travel, hospitality, entertainment, and sports, though its LCAP can be used in any industry. It is the sole LCAP that offers intelligent document processing to create UIs from a user sketch.

- Zoho has made good progress on its AI capabilities since the 2023 Frost Radar™. The company reinvests approximately 60% of revenue into R&D, and the fruits of that investment are evident in that it enables businesses to build and integrate apps and services as well as analyze and use data—all within a single platform. Surprisingly, however, a rollout of RPA that was planned for early June 2024 did not happen, impacting its Innovation Index score for 2024.

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Frost Radar™ Competitive Environment (continued)

- Outsystems has long been a leader in the LCAP space. Its focus in the last year has been primarily on AI integration into the platform, as well as on data integration and governance. The company was somewhat behind competitors in terms of AI integration in the 2023 LCAP Frost Radar™, but it has made a push for AI feature rollouts over the last 12 months. The result is a more competitive, AI-integrated platform that remains a leader in the space.

- Oracle has a mature LCAP: its APEX platform. While the company has been one of the fastest-growing infrastructure-as-a-service providers, its LCAP has not enjoyed as strong a growth trajectory. The company did ramp up its platform enhancements over the last 12 months, with several GenAI features launched and the ability to choose from multiple large language models (LLMs) integrated into the platform.

- Pega Systems also offers a robust LCAP that focuses on CRM. The company remains focused on AI decisioning and workflow automation for customer service and sales. Its latest platform release, Infinity 24, integrates GenAI capabilities into the platform to help automate common customer service activities. Pega's growth has been more modest than competitors in recent years, affecting its Growth Index score on the Frost Radar™.

- ServiceNow has enjoyed strong growth of its platform based on use, but it continues to be slower to develop and launch associated AI capabilities. The majority of its AI functionality has been integrated through partnerships rather than platform enhancements, setting it behind its nearest LCAP competitors on the Innovation Index.

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Companies to Action
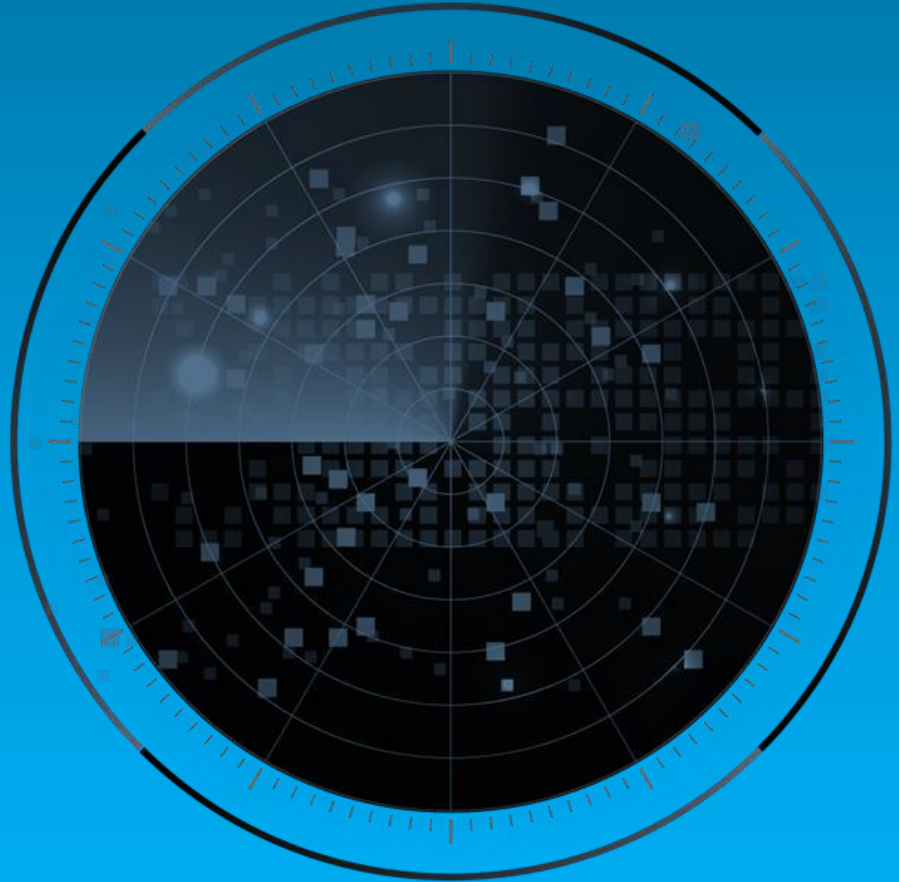
Zoho

INNOVATION

- Zoho bases its low-code platform on its own proprietary technology stack, enabling complete integration of the platform with all other Zoho services. This gives Zoho Creator low-code users the ability to build applications and integrations, as well as access full-featured dashboards, from a single console.

- Having its own technology has allowed the company to focus directly on enhancements based on market relevancy and customer demands. Its technological innovations have resulted in more than 25 patents.

- All Zoho services—including the Creator platform and the applications users make using Creator—run on its infrastructure, which is architected for enterprise scalability. Zoho Creator offers customers horizontal scalability as well by provisioning front-end servers to the environment. This allows the Creator infrastructure to increase overall throughput. It also enables automatic scaling of applications, from user request management to compute infrastructure and storage.

- Zoho has a 28-year history of dedication to innovation, with an industry-leading 60% reinvestment of revenue into R&D. The last 12 months have underscored this commitment, with nearly 30 platform enhancements for the Creator low-code platform being introduced—more than any other vendor on the LCAP Frost Radar™.

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Zoho (continued)

INNOVATION

- Most notably, Zoho recently

  - launched assisted application development through Zoho's generative AI engine, Zia Open AI, allowing users to give conversational prompts that the Zia engine turns into applicable field suggestions for the application;

  - enabled use of Figma—an open toolset for web design and development—within the Creator platform, allowing users to quickly create widgets for applications with minimal effort; and

  - introduced metrics that enhance the IT department's ability to analyze usage behaviors and patterns and aid in calculating ROI.

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Zoho (continued)

GROWTH

- Zoho continues to enjoy strong revenue growth of between 20 and 30% year over year, a testament to its strong product set—including the Creator platform. The company serves more than 100 million users across at least 700,000 customer organizations.

- To facilitate continued growth and adoption of the Creator low-code platform, the company has a three-pronged approach.

  o It is working with internal product partners to offer bundled solutions that include Creator, as well as to create pricing incentives and co-marketing initiatives with other Zoho products. This leverages Zoho's existing market penetration for other technology products.

  o It maintains a strong customer focus. Each one has a customer success manager who acts as a trusted advisor, offering personalized onboarding and training assistance and support as well as ongoing help, collaborating with users to design tailored solutions to optimize application architecture and ensure optimal services. This ongoing support ensures that customers' end users are comfortable with the Creator platform and are well-equipped to leverage the platform successfully.

  o Zoho works with a growing partner community that includes more than 700 independent software vendors, system integrators, and managed service providers in 120 countries. The Zoho partner program offers opportunities for engagement and education of partners to enhance joint sales, extending the company's geographic reach. In 2022, Zoho launched its Jumpstart program for partners, where Zoho directly implements partner customer solutions, helping to onboard them on the Creator platform and easily learn to build and scale their solutions. Zoho projects that the Jumpstart program will indirectly increase revenue by approximately 20% in 2024.

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Zoho (continued)

FROST PERSPECTIVE

- Zoho has long been a stealth player in the low-code market, offering a robust service that helps customers extend their Zoho applications and create new services that benefit the business. In 2023, the company undertook significant marketing efforts to increase awareness of low-code technologies and Zoho as a provider in key target markets, including the United States, Asia-Pacific, and the Middle East. Zoho reports that these effort will continue, enabling the company to earn greater market share of the low-code market.

- The company's autonomy—being private and taking no equity funds—allows its focus to be primarily on a customer's needs and well-being. The Zoho "privacy-first" mantra resonates with customers that enjoy knowing that their data will not be shared or sold, and helps customers have more peace of mind regarding the data that they share with the Creator platform.

- To ensure that its platform continues to be successful as it penetrates these key markets, making strides in certain areas will be crucial. The company reported in late Q1 that RPA would be launched by its summer conference, which happened in late June. To date, RPA does not appear to have been launched. Since numerous competitors offer this capability, launching RPA will be important to maintaining competitiveness, especially in the North American market where low code is becoming more mature.

- The public cloud deployment options for Creator are limited to the Zoho Cloud. While a high percentage of customers report comfort with this option, adding public cloud deployment options will increase growth and adoption of the platform, since nearly half of businesses report to Frost & Sullivan that they use a hybrid cloud that includes public cloud deployments.

Zoho (continued)

FROST PERSPECTIVE

- Increasing the GenAI assisted development capabilities by developing new small-language models and nano-language models will push Zoho further ahead of competition in the low-code market.

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Best Practices & Growth Opportunities

Best Practices

1 Integration of GenAI for autonomous process optimization, code generation, and anomaly detection is quickly becoming LCAP table stakes. Natural-language code generation is a best practice, with intelligent document processing for app ideation being leveraged by the savviest providers.

2 Creation of industry-specific LCAP solutions is becoming more common, with many market leaders embracing the trend. Solutions include pre-built app templates, APIs, and connectors for commonly used industry services, and governance components based on industry regulations. LCAP vendors should develop industry-specific tools, components, and services to be at the forefront of the market.

3 Many top vendors are leveraging AI not only for streamlining processes and app creation, but also for security, particularly in terms of identifying and mitigating bugs and code issues that can introduce vulnerabilities if deployed. Using AI to mitigate code vulnerabilities is a best practice that should be continued and expanded to ensure the security and compliance of apps created and deployed through LCAPs.

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Source: Frost & Sullivan

Growth Opportunities

1 LCAPs will enjoy significant growth over the next four years with a compound annual growth rate of nearly 36% as companies seek to mitigate effects of scarce resources and IT skills gaps, streamline business operations, and increase their competitiveness in a tightening market.

2 As businesses experiment more with AI-based solutions, LCAP providers must be ahead of the enterprise in terms of AI—particularly GenAI—integration into their platforms. Doing so enables customers to leverage AI for streamlining of business processes internally, while also creating customer-facing, AI-based apps and services that improve the customer experience.

3 While leading LCAP vendors have made progress toward overcoming lock-in and embracing hybrid and multicloud deployment scenarios, this is a key area for vendors to embrace in the coming years in order to continue their strong growth. Enterprise hybrid cloud deployments will continue for at least the next five years, so LCAP vendors must increase public cloud partnerships and create APIs and connectors that enable hybrid cloud app deployment.

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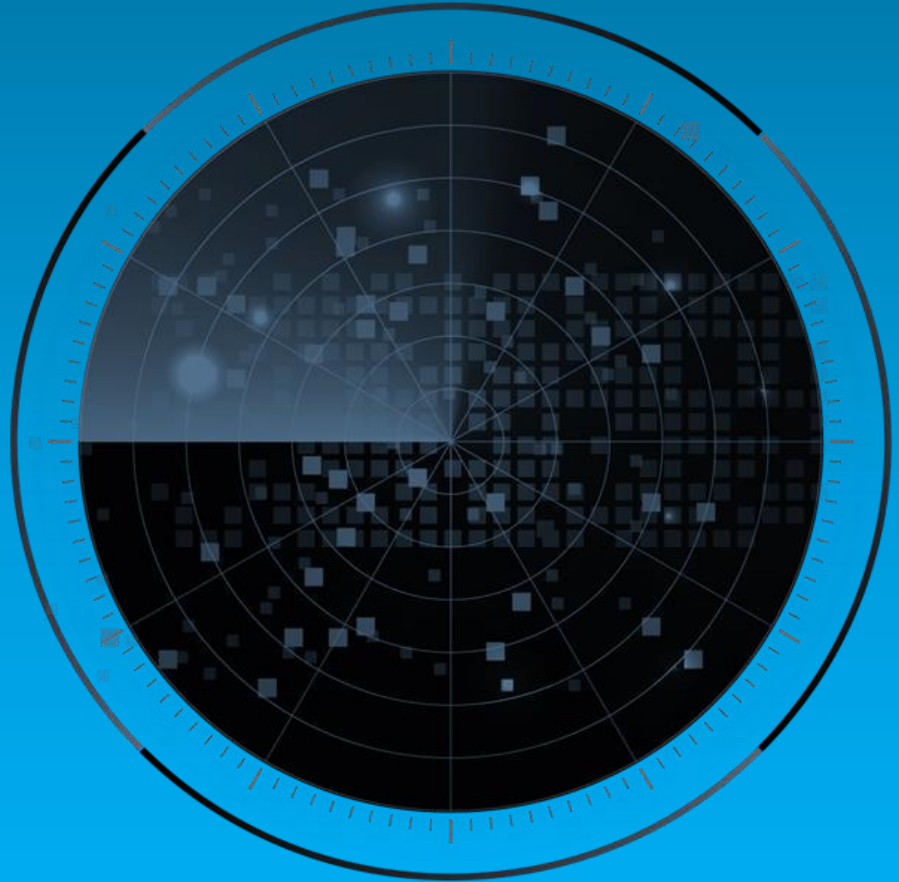
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Frost Radar™ Analytics

Frost Radar™: Benchmarking Future Growth Potential
2 Major Indices, 10 Analytical Ingredients, 1 Platform

Growth Index

Growth Index (GI) is a measure of a company's growth performance and track record, along with its ability to develop and execute a fully aligned growth strategy and vision; a robust growth pipeline system; and effective market, competitor, and end-user focused sales and marketing strategies.

GI1

MARKET SHARE (PREVIOUS 3 YEARS)
This is a comparison of a company's market share relative to its competitors in a given market space for the previous 3 years.

GI2

REVENUE GROWTH (PREVIOUS 3 YEARS)
This is a look at a company's revenue growth rate for the previous 3 years in the market/industry/category that forms the context for the given Frost Radar™.

GI3

GROWTH PIPELINE
This is an evaluation of the strength and leverage of a company's growth pipeline system to continuously capture, analyze, and prioritize its universe of growth opportunities.

GI4

VISION AND STRATEGY
This is an assessment of how well a company's growth strategy is aligned with its vision. Are the investments that a company is making in new products and markets consistent with the stated vision?

GI5

SALES AND MARKETING
This is a measure of the effectiveness of a company's sales and marketing efforts in helping it drive demand and achieve its growth objectives.

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Frost Radar™: Benchmarking Future Growth Potential
2 Major Indices, 10 Analytical Ingredients, 1 Platform (continued)

Innovation Index

Innovation Index (II) is a measure of a company's ability to develop products/ services/ solutions (with a clear understanding of disruptive Mega Trends) that are globally applicable, are able to evolve and expand to serve multiple markets and are aligned to customers' changing needs.

II1

INNOVATION SCALABILITY
This determines whether an organization's innovations are globally scalable and applicable in both developing and mature markets, and also in adjacent and non-adjacent industry verticals.

II2

RESEARCH AND DEVELOPMENT
This is a measure of the efficacy of a company's R&D strategy, as determined by the size of its R&D investment and how it feeds the innovation pipeline.

II3

PRODUCT PORTFOLIO
This is a measure of a company's product portfolio, focusing on the relative contribution of new products to its annual revenue.

II4

MEGA TRENDS LEVERAGE
This is an assessment of a company's proactive leverage of evolving, long-term opportunities and new business models, as the foundation of its innovation pipeline. An explanation of Mega Trends can be found here.

II5

CUSTOMER ALIGNMENT
This evaluates the applicability of a company's products/services/solutions to current and potential customers, as well as how its innovation strategy is influenced by evolving customer needs.

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Next Steps: Leveraging the Frost Radar™ to Empower Key Stakeholders
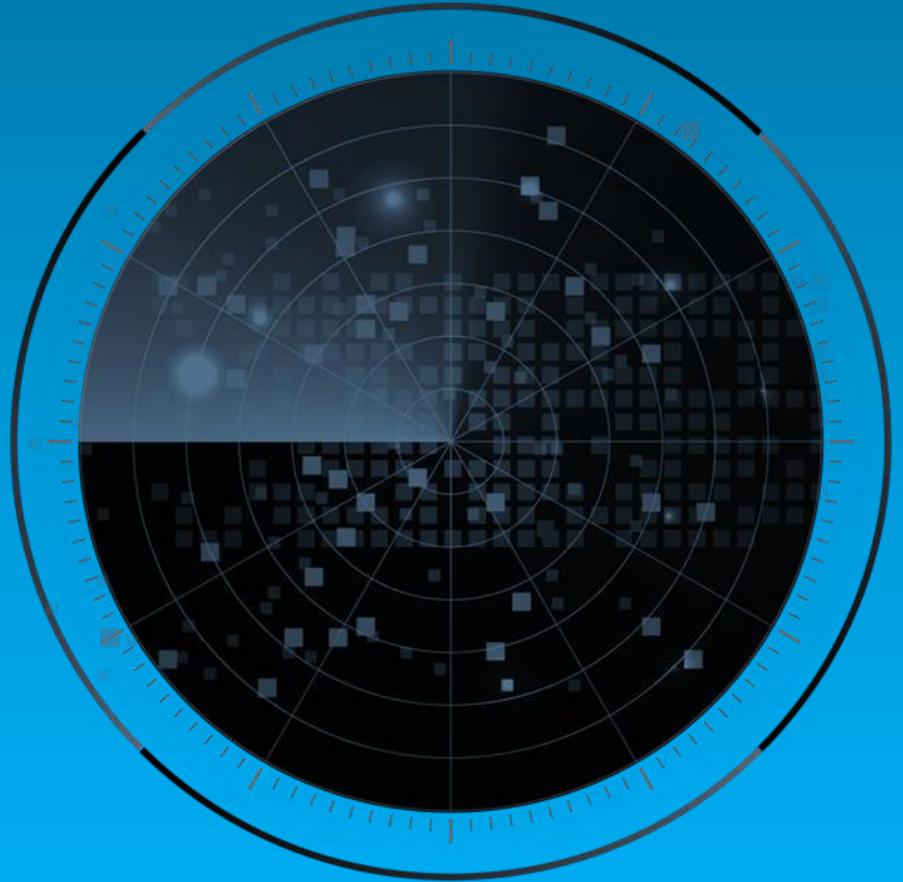
Significance of Being on the Frost Radar™

Companies plotted on the Frost Radar™ are the leaders in the industry for growth, innovation, or both. They are instrumental in advancing the industry into the future.

GROWTH POTENTIAL

Your organization has significant future growth potential, which makes it a Company to Action.

BEST PRACTICES

Your organization is well positioned to shape Growth Pipeline ™ best practices in your industry.

COMPETITIVE INTENSITY

Your organization is one of the key drivers of competitive intensity in the growth environment.

CUSTOMER VALUE

Your organization has demonstrated the ability to significantly enhance its customer value proposition.

PARTNER POTENTIAL

Your organization is top of mind for customers, investors, value chain partners, and future talent as a significant value provider.

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Frost Radar™

STRATEGIC IMPERATIVE	LEVERAGING THE FROST RADAR™	NEXT STEPS

STRATEGIC IMPERATIVE

- Growth is increasingly difficult to achieve.

- Competitive intensity is high.

- More collaboration, teamwork, and focus are needed.

- The growth environment is complex.

LEVERAGING THE FROST RADAR™

- The Growth Team has the tools needed to foster a collaborative environment among the entire management team to drive best practices.

- The Growth Team has a measurement platform to assess future growth potential.

- The Growth Team has the ability to support the CEO with a powerful Growth Pipeline™.

NEXT STEPS

- **Growth Pipeline Audit™**

- **Growth Pipeline as a Service™**

- **Growth Pipeline™ Dialogue with Team Frost**

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Frost Radar™ Empowers Investors

STRATEGIC IMPERATIVE	LEVERAGING THE FROST RADAR™	NEXT STEPS

STRATEGIC IMPERATIVE

- Deal flow is low and competition is high.

- Due diligence is hampered by industry complexity.

- Portfolio management is not effective.

LEVERAGING THE FROST RADAR™

- Investors can focus on future growth potential by creating a powerful pipeline of Companies to Action for high-potential investments.

- Investors can perform due diligence that improves accuracy and accelerates the deal process.

- Investors can realize the maximum internal rate of return and ensure long-term success for shareholders.

- Investors can continually benchmark performance with best practices for optimal portfolio management.

NEXT STEPS

- **Growth Pipeline™ Dialogue**

- **Opportunity Universe Workshop**

- **Growth Pipeline Audit™ as Mandated Due Diligence**

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Frost Radar™ Empowers Customers

STRATEGIC IMPERATIVE	LEVERAGING THE FROST RADAR™	NEXT STEPS

- Solutions are increasingly complex and have long-term implications.

- Vendor solutions can be confusing.

- Vendor volatility adds to the uncertainty.

- Customers have an analytical framework to benchmark potential vendors and identify partners that will provide powerful, long-term solutions.

- Customers can evaluate the most innovative solutions and understand how different solutions would meet their needs.

- Customers gain a long-term perspective on vendor partnerships.

- **Growth Pipeline™ Dialogue**

- **Growth Pipeline™ Diagnostic**

- **Frost Radar Benchmarking System**

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Frost Radar™ Empowers the Board of Directors

STRATEGIC IMPERATIVE

LEVERAGING THE FROST RADAR™

NEXT STEPS

- Growth is increasingly difficult; CEOs require guidance.

- The Growth Environment requires complex navigational skills.

- The customer value chain is changing.

- The Board of Directors has a unique measurement system to ensure oversight of the company's long-term success.

- The Board of Directors has a discussion platform that centers on the driving issues, benchmarks, and best practices that will protect shareholder investment.

- The Board of Directors can ensure skillful mentoring, support, and governance of the CEO to maximize future growth potential.

- **Growth Pipeline Audit™**

- **Growth Pipeline as a Service™**

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Next Steps

Transformation **Ecosystem** **Growth Generator** **Growth Opportunities** **Frost Radar™** **Best Practices** **Companies to Action**

Engage:

Growth Dialog

Join:

Growth Council

Participate:

Growth Council Think Tanks

Apply:

Companies to Action

Does your current system support rapid adaptation to emerging opportunities?

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Source: Frost & Sullivan

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