



The Futurum Group, 2024 Global Mainframe Skills Report: Insights from Industry and Educational Experts

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IN PARTNERSHIP WITH



APRIL 2024



Executive Summary

This report, drawing on the latest data from The Futurum Group, addresses the prevailing narrative surrounding the mainframe workforce—that it is an aging field with dwindling new talent. Contrary to this perception, our findings reveal a dynamic and evolving landscape where mainframe skills continue to grow and diversify, indicating a vibrant future for this critical technological sector. The report delves into various aspects of the mainframe environment, including employment trends, educational resources, investment levels, educational dynamics, and the generational skills gap. The comprehensive data gathered serves as a basis for informed recommendations to enhance the mainframe workforce's sustainability and productivity.

The primary scope of this research focuses on evaluating the current state and future trajectory of mainframe skills, with particular attention to understanding how well the emerging workforce can meet the ongoing demands of this mission-critical platform. The study assesses the availability and development of mainframe skills across different demographics, evaluates the effectiveness of current training programs, and identifies the challenges and opportunities within the industry. By doing so, the research provides stakeholders with strategic insights to help bridge existing gaps and foster a stronger mainframe ecosystem.

The key research findings do not align with an aging workforce narrative. A key takeaway is that finding mainframe skills is no harder for enterprises than finding cybersecurity or AI skills, which will no doubt shock those that seek to decry the mainframe. According to university leaders' reports, the mainframe sector has seen a noticeable 65% rise in skilled workers over the past 5 years. There is strong intent among employers to bolster their teams, with 91% planning to hire new mainframe talent within the next 2 years, reflecting the ongoing critical need for mainframe expertise in modern IT infrastructures. To keep pace with technological advancements, two-thirds of organizations utilize third-party programs for mainframe skill development, signaling a shift toward more specialized and adaptive learning frameworks. The influx of early-career professionals into the mainframe industry challenges the myth of an aging workforce, though the demand for mid-career professionals remains high, highlighting a shortage of deep experience in the field. Moreover, successful recruitment outcomes are closely tied to investment in mainframe resources, with heavily investing companies more likely to meet their recruitment and talent development goals.

Research Methodology

The study looked at the extent to which companies seeking to maintain mainframe operations, universities offering mainframe skills curricula, and students interested in mainframe-focused careers are aligned with respect to skill development and the flow of talent to companies.

Three separate surveys were conducted from February 20, 2024, to March 3, 2024: A reputable population panel management company recruited respondents from 750 businesses, 200 universities, and 200 students interested in mainframe careers from the Americas, EMEA, and Asia Pacific¹ to complete an online questionnaire for their respective surveys. Screening protocols were implemented to ensure that respondents fit the profile required for the study, as were protocols to ensure that respondents completed the questionnaires. The requirements for inclusion in the sample are as follows:

- Company survey:
 - More than 5000 employees
 - In excess of \$100 million in annual revenue
 - Investment in mainframe operations
 - Respondent is a manager or above
 - Respondent works in IT or Human Resources (HR)
- University survey:
 - School offers mainframe curriculum
 - Respondent has been with the university for more than a year
 - Respondent is at least somewhat familiar with the IT curriculum the school offers
- Student survey:
 - Respondent is interested in mainframe studies
 - Respondent's school offers mainframe education either in curriculum or extracurricular programs (e.g., clubs, internships)

The final data files from each survey were downloaded and processed using IBM SPSS software as a statistical analysis tool. Resultant data files were cleaned and errant records removed.

Results from each survey were arrayed in crosstabs against demographic data representing segments of each of the company, university, and student respondent populations. Responses were explored in aggregate for meaningful patterns to assess the current robustness of the mainframe industry. Responses across surveys were explored to gauge the alignment among companies with respect to developing a steady flow of talent to support company mainframe operations.

To look for patterns in the responses as a whole, responses from each survey were stacked against important demographic variables (cross-tabulated) and changes in responses across each demographic variable were checked for statistical significance using a 95% confidence interval. Statistically significant differences in responses across demographic variables were examined for meaning within the context of the study's goals.

(1) Japan and China were excluded from the Asia Pacific sample.



Key Findings

The Futurum Group's research reveals crucial insights into the changing landscape of mainframe technology skills and employment trends. The data reveals positive shifts in the pool of mainframe talent, employer strategies, and educational trajectories that are shaping the future of this critical technological field.

Growth in Mainframe Skills Pool

According to 65% of respondents who were university-based, the study shows a noticeable increase in the availability of skilled mainframe professionals. This trend suggests a growing interest and investment in mainframe education, possibly driven by the enduring importance of mainframe systems in large-scale enterprise environments. However, 61% of the same respondents noted that there is still a significant "skills gap" despite the increased availability of trained professionals. This gap underscores a discrepancy between the skills taught in educational settings and those required in the workplace, pointing to a need for curriculum adjustments and more targeted job training programs.

Investment in Mainframe Resources

Investment levels correlate strongly with recruitment success. The study finds that companies investing at least \$10 million annually in their mainframe environments are more likely to meet their hiring objectives. This significant investment not only supports the operational needs of mainframe systems but also reflects the strategic importance companies place on nurturing and retaining mainframe talent.

Employment Trends

The research outlines a strong intention among employers to expand their mainframe workforce, with 91% planning to hire new talent for mainframe-related positions within the next 1 to 2 years. This anticipated hiring indicates the critical role mainframe technologies continue to play in corporate IT infrastructures, especially as companies increasingly rely on these systems for managing substantial data and transaction volumes. The demand is not just for any talent but rather for individuals who can navigate the nuances of mainframe environments.

Educational and Training Resources

A significant 66% of organizations now utilize third-party learning programs or platforms to enhance mainframe education and skill development. This reliance on external resources is a testament to the evolving nature of mainframe technologies and the continuous need for current, specialized knowledge that traditional academic programs may not fully address. Additionally, the report points out the importance of these educational partnerships in bridging the skills gap.

Generational Skills Gap

The survey further illuminates a generational divide within the mainframe workforce. There is an influx of early-career talent interested in specializing in mainframe technology rather than pursuing generalist roles. However, there is also a pronounced demand for mid-career professionals, with 79% of employers focusing recruitment efforts on this group. This data suggests that although there is new talent entering the field, the expertise and nuanced understanding that come from years of experience are highly valued and in short supply.

Snapshot of Talent Flow

The data provides an encouraging snapshot of the talent flow into mainframe careers. About 76% of students interested in mainframe technology aim to specialize within specific niches of the field, highlighting a trend toward greater depth of expertise over breadth. Moreover, over half of these students have successfully applied for mainframe jobs or internships, signaling healthy entry-level job opportunities and interest among young professionals.

State of Skills Development

Mainframe technology education is robust, with 83% of interested students learning mainframe skills at their university and many supplementing their education online. This dual approach to learning underscores the adaptability of new entrants into the field and their willingness to leverage multiple resources to enhance their employability.

Stability and Trajectory of the Field

The commitment to mainframe value is strong, with 87% of company respondents stating their companies invest at least \$25 million annually in their mainframe platforms commensurate with the value they receive. This level of financial commitment not only ensures the operational stability of these systems but also signals to current and prospective mainframe professionals that there are substantial career opportunities within this technology segment.



Recommendations

The survey results emphasize the need for businesses and educational institutions to collaborate and develop curricula that align with the evolving demands of modern mainframe environments. It suggests strategic measures such as expanding training programs, investing in apprenticeships and bootcamps, focusing on early-career and mid-career professionals, and establishing long-term investments in mainframe technologies. Engaging with vendors who prioritize skill development is also crucial, as hands-on learning and direct customer engagements help new professionals adapt and thrive in mainframe roles. These strategies create a robust framework for sustaining and advancing mainframe capabilities in a competitive technological landscape.

Our key recommendations include:

Enhance Collaboration with Educational Institutions: To address the skills gap, industry-aligned curricula that focus on the specific requirements of modern mainframe environments are critical. Partnerships between businesses and educational institutions should be strengthened to facilitate this alignment.

Expand and Diversify Training Programs: Companies should increase their investment in comprehensive training programs, including apprenticeships and bootcamps, to develop practical, job-ready skills.

Adopt Strategic Recruitment Initiatives: Organizations should adopt a balanced recruitment strategy that targets both early-career and mid-career professionals, leveraging the unique strengths of each group to build a resilient mainframe workforce.

Make Long-Term Investments in Mainframe Technologies: Continued financial commitment to mainframe technologies not only secures operational needs but also signals to potential talent the long-term career opportunities available within the field and the strategic importance of the platform to the enterprise. This investment can also manifest as application modernization and platform currency. Coupled with long-term commitment to admin and developer resources, this approach can help ensure organizations will derive continued value from mainframe platforms for years to come.

Engage with Vendors Committed to Growing Skills in Their Own Workforce: Vendors need to encourage early-career professionals to be quickly integrated into the mainframe sector through hands-on learning and direct customer engagements, rapidly building confidence, accelerating knowledge retention, and gaining practical experience.

21CS: Investing in the Workforce of Tomorrow

21CS is actively investing in its workforce to nurture and develop mainframe skills, emphasizing hands-on learning and mentorship for early-stage professionals. New hires at 21CS experience an intense yet supportive introduction to mainframe technologies, quickly moving past initial apprehensions through engagement with modern programming environments such as Java and Linux on mainframes. The company facilitates a smooth transition into the mainframe world by coupling comprehensive training sessions with real-life customer interactions, fostering practical knowledge and swift acclimatization. By prioritizing direct mentoring and practical experience over theoretical study, 21CS is successfully preparing a new generation of mainframers, ensuring they are well-equipped to meet current technological demands and contribute effectively in their roles. [For more on what 21CS is doing to foster mainframe skills within its own workforce, check out this video.](#)

IBM Z Global Skills Accelerator Program

The [IBM Z Global Skills Accelerator program](#) is designed to develop proficient Mainframe System Administrators and Application Developers, equipping new hires and current employees with essential skills and knowledge without requiring prior IT experience. The program provides a comprehensive learning experience that combines over 300 hours of educational content with practical, on-the-job training. Participants also receive mentoring and success coaching, including specific guidance for managers, which collectively ensure effective skill development and application in real-world scenarios.

Structured as a competency-based program, it is crafted in collaboration with global employers and spans a broad spectrum of mainframe functionalities. The curriculum not only focuses on technical skills but also emphasizes essential soft skills such as communication, teamwork, problem-solving, and agility in the workplace. This holistic approach prepares participants to meet the diverse challenges of today's IT environments.


The program offers flexible training schedules that accommodate work commitments while providing a guided workplace environment for hands-on learning. This dynamic setup allows participants to immediately apply their new skills, ensuring that knowledge transfer is practical and translates into skills and competency.

Coaching and mentoring form a cornerstone of the program, with regular coaching sessions aimed at consistent improvement and interactions with IBM Subject Matter Experts to enhance professional growth. This comprehensive support system has successfully aided more than 85 employers worldwide in building a sustainable and skilled workforce for IBM Z, highlighting the program's effectiveness in fostering long-term career development in the mainframe ecosystem.

Engage with Broadcom Mainframe Skills Programs

Broadcom's Mainframe Education initiative provides a comprehensive range of learning resources tailored for individuals at various stages of their mainframe careers, encompassing virtual instructor-led training and no-cost, self-paced, web-based courses across multiple skill levels. These educational offerings facilitate skill acquisition and offer digital badging to validate and showcase learners' competencies.

Central to Broadcom's efforts to enhance mainframe workforce skills are the Mainframe Workforce Resiliency Programs, which span early careers to seasoned professionals. The Vitality Residency Program aims to cultivate new mainframe learners through a detailed curriculum that extends up to a year, combining theoretical knowledge with practical experience. Participants engage in a residency phase where they work onsite with customers, gaining hands-on experience and insights under expert guidance, thus preparing them to tackle real-world mainframe challenges proficiently.



Concurrently, the Mainframe Expert Program addresses immediate skills shortages by placing highly knowledgeable professionals within client organizations. These experts, well-versed in mainframe technologies and Broadcom's product suite, require minimal onboarding for speed to value and provide essential services such as solution optimization and one-on-one mentoring. Their involvement not only speeds technology adoption and mitigates risks but also boosts operational efficiency and fosters a culture of continuous improvement.

Broadcom's strategy synergistically combines immediate expert intervention with long-term talent development, ensuring robust support for customer needs while fostering future mainframe expertise. This approach highlights Broadcom's commitment to the sustainability of the mainframe ecosystem and its dedication to customer success.

In summary, the mainframe skills landscape is set to evolve with an increasing focus on nurturing a diverse and skilled workforce. Broadcom's educational and residency programs represent pivotal steps toward empowering individuals to excel in the mainframe domain. These initiatives, along with Broadcom's strategic acquisition of CA Technologies and ongoing investments in its Mainframe Software Division, underscore its commitment to advancing software solutions and shaping a resilient, innovative mainframe ecosystem for the future.

Looking Ahead

Through these results, the future of the mainframe landscape looks optimistic for the current state and prospective future of the mainframe workforce. Surfacing that mainframe skills are no harder to find than skills relating to AI and cybersecurity upends the pervasive narrative around mainframe skills.

Contrary to the aging workforce narrative, The Futurum Group's research highlights a vibrant and evolving mainframe sector characterized by growing pools of skilled professionals, significant investment in training and development, and solid recruitment initiatives. These findings showcase a critical shift toward a more dynamic, diverse, and technologically advanced mainframe workforce that is well-equipped to meet the demands of modern IT infrastructures.

There are many key areas for ongoing development, such as enhancing collaboration with educational institutions to align curricula with industry needs, expanding training programs to include practical, hands-on experiences, and strategically targeting recruitment to balance the infusion of new talent with the retention of experienced professionals. Additionally, the research emphasizes the importance of substantial investments in mainframe technologies, which not only fulfill operational needs but also highlight the lucrative and stable career paths available within the field. By addressing these strategic areas, stakeholders can ensure the sustainability and growth of the mainframe ecosystem, ultimately leading to a stronger, more resilient technological landscape. This forward-looking approach is crucial for maintaining the relevance and effectiveness of mainframes in supporting large-scale enterprise environments and for preparing the next generation of mainframe professionals to thrive in an increasingly competitive tech world.

Important Information About this Report

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