



Upskilling IT Report | 2023

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Welcome

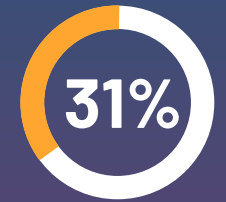
by Markus Bause, VP Product, PeopleCert

The rapid pace of digital transformation is helping to meet changing business needs. Unfortunately, IT organizations around the world are challenged by insufficient skills or resources, managing technical debt, and dealing with budget and funding issues that impact the pace of digital. In addition, technological advances, continuous evolution around existing best practice models, new processes and frameworks, demographic shifts and hybrid working models, and intelligent automation are exacerbating the IT talent crisis. The Upskilling IT 2023 survey produced by DevOps Institute found that 31% of survey respondents said that their IT organization's biggest challenge was a lack of skilled resources. Research firms such as Gartner say that CIOs are very concerned about IT talent attrition or finding qualified candidates to innovate and drive continued growth for their organizations.

With IT organizations unable to hire their way out of this technical talent crunch, both IT leaders and IT team members need to be more intentional about expanding, developing, and learning skills. This is why upskilling and reskilling are invaluable and will play an important role in addressing the IT talent and skill crisis now and in the future. Upskilling and reskilling the IT workforce needs to be prioritized now so that an organization's key products and services can achieve or grow within market opportunities.

But the upskilling journey can be daunting for both the individual and the organization. Year after year, we have seen subtle changes in the rise (or fall) of specific practices, technical topics, and IT automation considerations. We believe these changes reflect the realities of the changes required by the current and ongoing digital transformations. However, two key areas that remain constant are the need to focus on human and leadership skills with the same intent as technical skills.

It's clear from the data that the availability and retention of skilled, passionate, and happy humans will be the key driver of adaptability and competitive advantage. I sincerely hope that the insights contained in this year's report will be of continuing value to its readers.



of survey respondents said that their IT organization's biggest challenge was a lack of skilled resources

Executive Summary

For the past five years, DevOps Institute has produced the annual Upskilling IT report with input from over 8,000 technology professionals globally. Our research has focused on the skills necessary to deliver successful IT outcomes and DevOps practices, and how best to meet those skills within organizations.

In each year's research, we examine major skill capabilities across process, technical, human and leadership domains and uncover the skill gaps facing today's IT organizations. We also address upskilling techniques, trends, and challenges. We have found the pandemic, global economic factors, and other key drivers have impacted these skill priorities, trends, and challenges. While some of this year's research indicates a continuum of last year's Upskilling IT report, other areas have seen a shift in importance.

In this year's research, there was only a slight change in the ranking of must-have skill domains. In 2021, the top three must-have upskilling domains were process (and frameworks), human, and technical. In 2022, technology skills moved into second place in importance ahead of human skills. In 2021 and 2022, the leadership upskilling domain was ranked as the fourth highest priority by our survey respondents. Notably, by mid-2022, the topic of upskilling was gaining traction and making its way onto the board meetings and C-level agendas.

2023 Must-Have Upskilling Domains:

1. Process Framework Skills
2. Technical Skills
3. Human Skills
4. Leadership Skills

IT Organizations are Struggling to Find and Retain Skilled Individuals and Individuals don't Have Time for Upskilling Themselves

Job data and trends show employment rates in the technology sectors remain high, indicating a tight labor market. The U.S. IT job market is robust with high growth, according to data from [Janco](#). Many positions for key skills are unfilled due to a lack of qualified candidates. Concurrent with this talent shortage, the [average salary for all IT positions rose](#) by 5.61% during 2022, with the strongest salary growth in mid-sized enterprises.

While Europe is challenged by the Ukrainian conflict, [the overall unemployment rate](#) is at a low of 6.1%. The lack of skills in key areas led to a [proposal](#) by the European Commission to make 2023 the European Year of Skills. While there are differences among the European countries in terms of the IT job market, the growth for [IT job predictions in Germany](#), for example, look good in 2023. The Q4/2022 tech job postings in Germany exceeded those of key countries in Europe by over 300% on average.

According to [Gartner](#), attrition will remain high in 2023, and the [OECD](#) has stated that hiring new talent is two to three times more expensive than retaining existing employees. This makes retaining existing talent one of the biggest issues. The biggest questions are: Does the existing IT workforce have the necessary skills? What are the priority skills and where should leaders and individuals focus their skill development efforts? In our survey, we found that all leaders (C-Suite Executives, Senior Level VPs, and Directors and Managers within IT) say that insufficient skills or resources were the number one challenge for their IT organization in 2022. At the same time, IT members tell us that there is not enough time, budget, and leadership to build skills.

In this report, we will examine the current trends in global IT upskilling and provide actionable guidance on what continuous improvement must be done around upskilling and reskilling. We will share our findings on skill gaps in conjunction with the priority skills identified by our survey respondents. We are grateful to all survey respondents globally for sharing their priorities, challenges, and situations so that we can analyze and share the trends, challenges, and priorities with others. Enjoy reading.

Continuous Upskilling and Reskilling Within IT is a Must, Today More Than Ever

Several economic forces are creating uncertainty in organizations. Inflation, a looming recession, and a global post-pandemic slowdown are certainly not inspiring optimism. Layoffs at high-profile tech companies, from Amazon to Zoom, are making news headlines. These tech-company layoffs may be the result of excessive hiring during the pandemic, or the tightening of economic factors triggering portfolio and product rationalization. However, solid US labor market statistics - with [517,000 new jobs added in January 2023](#) and unemployment at its lowest level since the late 1960s - indicate that things are not looking so bad.

Additionally, there is good news for IT jobs in 2023. According to [Indeed](#), IT jobs topped the list of the 25 best jobs in the US. The top job slot went to full-stack developer, which offers a median annual salary of \$130,000 and allows for a mostly remote or hybrid workplace. What's more, 23% of IT leaders plan to significantly increase the headcount, 44% plan to somewhat increase their teams, and more than a quarter of the companies expect their IT departments to stay the same. The demand for IT jobs looks strong, but the challenge is there are not [enough IT professionals to fill the vacancies](#).

Winning The Talent War with Continuous Upskilling Around People, Process and Technology

People, process, and technology (PPT) are the essential pillars of any organizational operating model. The PPT framework was developed in 1960 and describes how these three elements work together. Simply put, people do the work, while people use processes to make work more efficient and consistent, and technology supports tasks and is used for automation. Continuous improvement has been used for decades to improve processes, is advocated by all agile approaches including DevOps, Site Reliability Engineering, and other developed practice models, and is a key concept that empowers and shapes the culture and people of high-performing teams ([see Figure 1](#)).

“Upskilling workers is a win-win situation for both employees and employers. Employees benefit from increased job satisfaction and career opportunities, while organizations benefit from improved performance, engagement, and innovation. The demand for upskilling will continue as companies enter new markets, emerging technologies shape the workplace, and companies lean more on skills-based hiring over degrees.”

Dan Schawbel, Author
danschawbel.com
DevOps Institute Podcast

FIGURE 1: CONTINUOUS UPSKILLING AROUND PEOPLE, PROCESS AND TECHNOLOGY



SOURCE: DEVOPS INSTITUTE, DECEMBER 2022 AND LEAVITT, H.J., MARCH, J.G., & MARCH, J.G. (1962). APPLIED ORGANIZATIONAL CHANGE IN INDUSTRY: STRUCTURAL, TECHNOLOGICAL AND HUMANISTIC APPROACHES. CARNEGIE INSTITUTE OF TECHNOLOGY, GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION.

Much has changed since the PPT model was developed. People, their skills, abilities, and knowledge of how to build products and services have changed. New processes (or best practice models) and development models such as Agile, DevOps, ITIL and Scrum have replaced waterfall models, and technologies such as cloud platforms and AI have brought innovation to how IT develops and delivers products and services. But simply put, we still have people developing products and services, using processes to do just that, and applying technology along the way. Digital transformation, or any transformation for that matter, requires IT and business to innovate more efficiently, with improved quality and security. This requires organizations to effectively manage their people, design processes and technologies, and to grow and improve the associated skills to be successful.

Digital transformation, or any transformation for that matter, requires IT and business to innovate more efficiently, with improved quality and security.

“The pace of innovation is relentless for IT leaders. Digital environments work differently and depend on resources with emerging skills. Over 6 decades, one constant has proved to be essential for effective leadership: the ability to integrate people, process, and technology. During rapid and complex change, we sometimes sacrifice this principle and focus on just one thing that will take us to the next step. For example, a new tool promises to automate processes, and reduce the need for technical expertise; or hiring an expert in cutting edge technology means we don’t have to depend on outdated processes.

But the research is clear; the success of one-dimensional approaches is short lived, and we may even lose what we learned before. The success of technology depends on its ability to support processes and people. The success of processes depends on how people use them and automate them. The success of people depends on the ability to do the right things at the right time, using tools to do them efficiently. Removing any one dimension impoverishes the organization, and makes it difficult, if not impossible, to manage. Any short-term focus on a single aspect must be augmented quickly by the other two to be fully effective.”

David Cannon

Executive Vice President , nfniti3

People and Their Human Skills Shape Team and Organizational Culture

Human skills are how we think and who we are, and how we interact with and navigate through situations with others. Unlike technical skills, human skills cannot be certified. They are a collective term used to describe a range of skills and attributes. They may also be referred to as key competencies, soft skills, or social skills. Developing human skills and prioritizing the different skill elements within your organization makes it easier for your people to withstand challenges and achieve their goals - and your organizational goals.

Leadership Skills Are Essential for Guiding and Managing Teams to Do Great Work

As leaders grapple with skills and resource shortages, budget challenges and technology debt, it's also important for these leaders to reflect on their own skills. Diplomacy in dealing with others, resolving conflict effectively, influencing people and culture, and building trust within and across teams are among the top leadership skills. Additionally, [finding and hiring the right talent](#), and helping staff develop their skills are key action items for IT leaders today.

“SUSE is a proud sponsor of the 2023 Upskilling Report recently released by DevOps Institute. At SUSE, we fully acknowledge the value of understanding the top skills and must-have capabilities in the modern-day DevOps landscape. We are continually planning for and recruiting the necessary skill sets that are essential for the future and keep us ahead of the marketplace. We are confident readers will benefit from taking a few moments to review the recent Upskilling Report.”

Kyle Rome
Center of Excellence Director,
SUSE

Leveraging Best-Practices and Process Frameworks to Achieve Consistency and Predictability

DevOps, SRE, Agile and Value Stream Management are common process frameworks and are considered best practices for continuous improvement. These frameworks are often based on lean manufacturing principles used by organizations today. The adoption of these process frameworks achieves consistency, efficiency, and predictable outcomes. The adoption rates of different process frameworks (at the time of the survey in December 2022) are shown in Figure 2.

Acquiring New Technical Skills Can Be Challenging

Today's technology trends such as cloud, AI, virtual agents, RPA, and low-code/no-code will be different tomorrow. Existing technology ecosystems will need to be updated to reduce technical debt, and skills around hyper scalers, container infrastructure, and Kubernetes orchestration will be essential. The technical skills required for a given job continue to grow year after year. Job postings in 2018, when we started our research, looked very different than today. The requirements for key technical skills are dynamic and will continue to change.

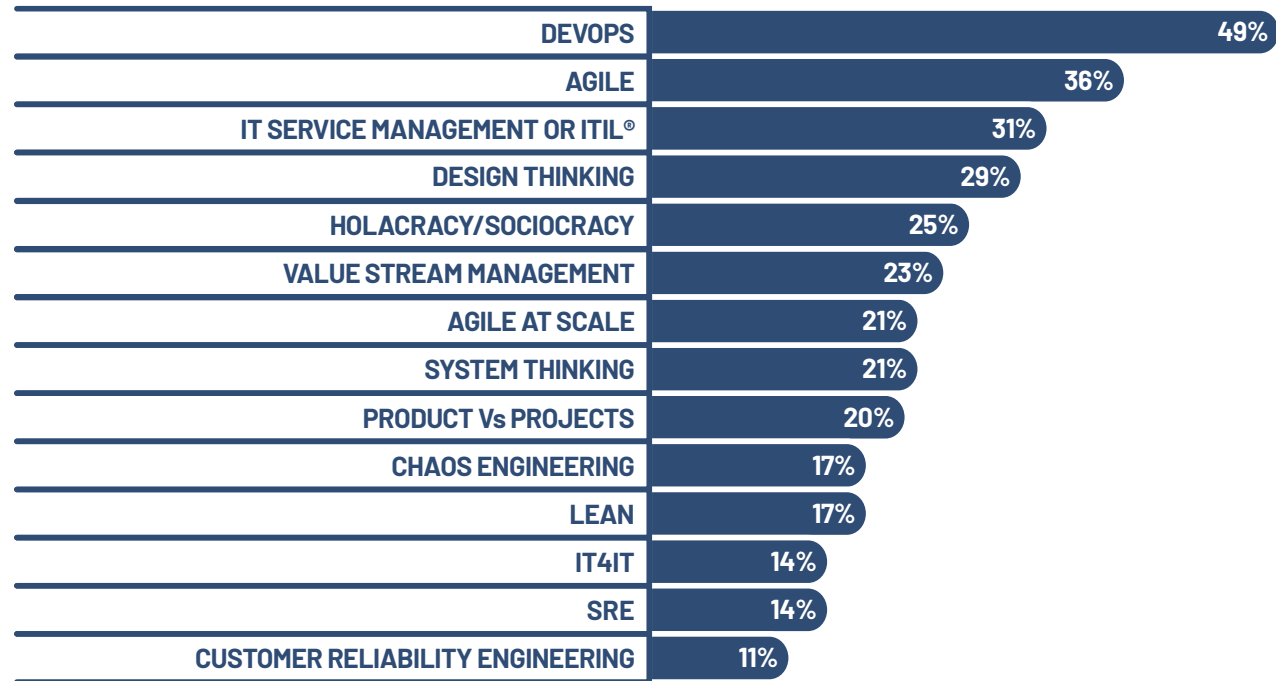
Top Three Process Frameworks

1. DevOps
2. Agile*
3. ITIL®

*While DevOps and ITIL® are both frameworks, Agile can be applied to multiple frameworks, e.g., Lean.

FIGURE 2: DEVOPS, AGILE AND ITIL® ARE THE TOP THREE PROCESS FRAMEWORKS IN USE TODAY

QUESTION: WHICH DISCIPLINE(S) FRAMEWORK(S) DOES YOUR ORGANIZATION PRIMARILY APPLY WITHIN YOUR IT ENVIRONMENT TODAY?(SELECT ALL THAT APPLY)



UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 N=1385

Report Highlights

Hiring skilled knowledge workers for IT is a talent war in today's tight job market. From our survey, we know that 31% of IT executives and leaders cite insufficient skills and resources as the top challenge facing their IT organizations. Below are some key findings from our 2023 survey.

Similar to Last Year's Research:

Skills gaps continue to impede innovation and progress across the enterprise. Around the world, IT organizations are finding that they are not achieving their full potential because of skills gap. Such gaps impact the ability to meet customer expectations, reduce the quality of products and services, delay time to market, and allow competitors to gain market share. The recent wave of quiet quitting and resignations have caused additional challenges for organizations.

Skills gaps remain costly. According to [PwC](#), the talent shortage and skill gaps in the U.S. alone is expected to cost \$8.5 trillion by 2030.

There are many programs in place to build skills. The data shows a slight increase in the number of upskilling programs, with 68% of our survey respondents saying their company has an upskilling program, while 18% are still developing one. 9% do not have one, and 4% do not know if their company has an upskilling program.

The barriers to upskilling or skills development remain the same. The top three barriers to upskilling are lack of time (44%), lack of budget (40%), and making upskilling a priority (30%).

Top 3 Barriers to Upskilling



lack of time



lack of budget

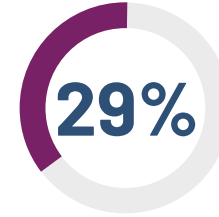


making upskilling a priority

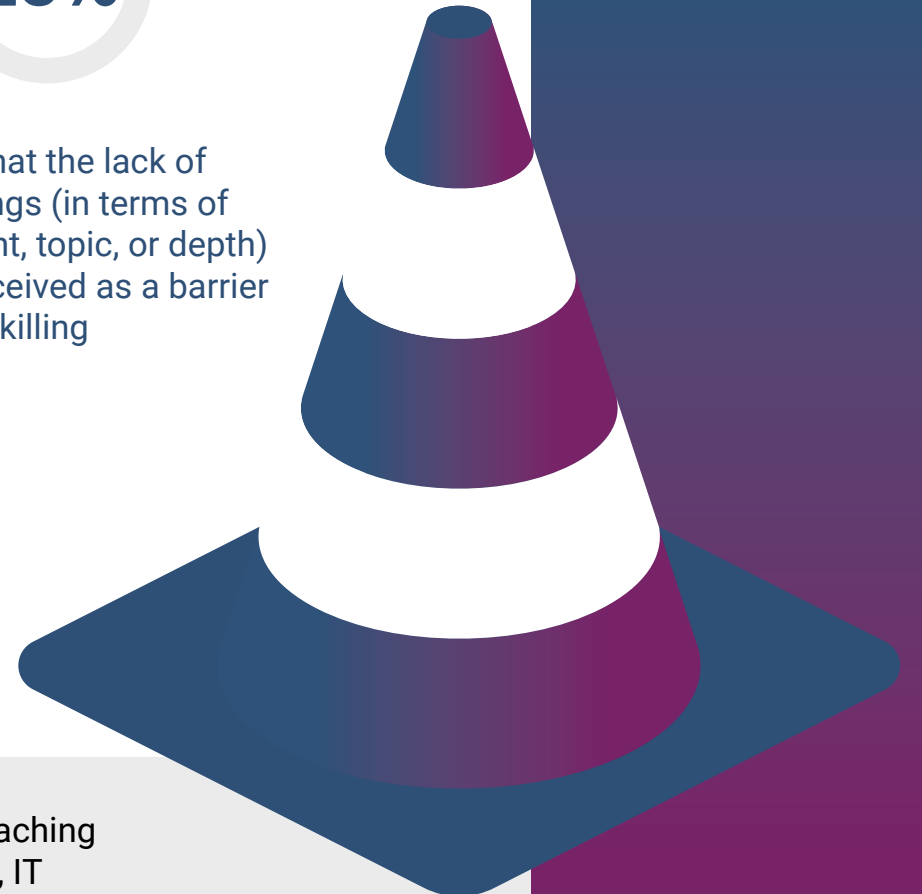
Additionally many see a 'lack of upskilling offerings' as a barrier. When we asked what the current barriers to upskilling are in 2022, 29% said that the lack of offerings (in terms of content, topic, or depth) is perceived as a barrier.

Organizations see some uncertainty in their upskilling programs. While last year 41% of our survey respondents said they were evaluating their upskilling program, this year 44% of survey respondents are assessing their upskilling program.

Certifications are seen as very valuable. Getting a certification is no longer the issue, as again over 64% of respondents said that certifications are valuable. The challenge is to determine which certification will provide the best return and results.



said that the lack of offerings (in terms of content, topic, or depth) is perceived as a barrier to upskilling



Bottom line: Assessment of upskilling programs is one part but this must be coupled with coaching individuals and take steps to offer individuals the time for training and upskilling. Additionally, IT leaders must ensure that the existing upskilling and training opportunities provide the appropriate topics, content, and depth. IT organizations should leverage the upskilling priorities shared here and drive a skill-based learning program to meet their staffing needs.

What is Different from Last Year:

C-level is aware of the skill gap challenge. As we dive deeper into the various challenges IT organizations face, we find that C-level executives and other leadership roles are very aware of the skill gap and resource challenges.

Learning is happening. 60% of our survey respondents have learned a new skill in the past 12 months, and 58% of those have applied the newly learned skill to their role.

We are back to a balance of in-person and virtual learning. While the pandemic shifted upskilling and learning programs entirely towards digital or virtual learning, our respondents are now finding a balance between in-person events and virtual learning.

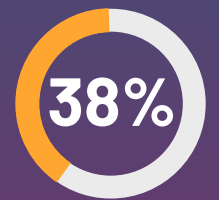
Active learning is very attractive. While passive learning mechanisms such as attending a training class or being part of an event are passive learning mechanisms, active learning mechanisms such as peer learning, expert coaching, and experiential learning such as working on projects and shadowing others are attractive alternatives for our respondents.

Skills-building has matured into a more systematic approach. Our survey data shows that organizations primarily monitor a team or individuals' weaknesses and help plan for future needs (38%). Other ways to manage skill gaps include aligning skill needs with desired business outcomes (31%); gathering needs from individuals and/or teams (25%); and contracting for the right skills (5%).

Career satisfaction is good, and while salary is important, so are personal and social factors. There is a slight shift in how the responses vary when asked what changes would improve career satisfaction. Last year, financial factors seemed to be more important than personal or social factors, while this year, the answers for both are the same.



have learned
new skill in
past 12 month



monitor a team or
individuals' skills
and plan for
future skills

Bottom line: While the pandemic and the post-pandemic periods have caused turmoil, there are many positive aspects to the state of IT skills development. For the remainder of 2023, IT leaders should ensure that they continue on the positive path of balancing hiring for both technical and human skills and continue to align skills needs with desired business outcomes. Individuals will need to continue to consider their career satisfaction, balancing salary with opportunities for development and growth, as well as their personal needs.

What's New This Year:

New sourcing models are emerging. Freelancing, quiet hiring, adjacent skill development, and sourcing candidates outside of technology hubs are just a few alternatives for finding new talent. Companies such as [Unilever](#), [Google](#), [Meta](#) and [UST](#) have been able to create a flexible, blended, workforce where freelancers and full-time employees work together for a common cause for tech-centric, project-based work. The demand for today's IT knowledge worker is creating new sourcing models to expand the talent pipeline within IT.

Businesses are setting budgets and developing internal upskilling programs. There are several examples of large companies such as Amazon, Walmart, Verizon, PwC and Google that have established comprehensive skills development and training programs. Other companies, such as Salesforce and InfoSys have developed company-specific learning programs to update their employees' skills and capabilities – all at no cost to the employee.

Free skills training offers great value. We have seen an explosion of skill-focused education, learning, skills-building, etc. across many dimensions. A great example is [SKILup IT Learning by DevOps Institute](#). In addition, several cloud providers are offering free training on their technology with certification options.

Most of the training budget is spent on technology training. We know that lack of budget is a challenge for training and learning opportunities. But we also found that when the budget is available, it is first for training in technology and tool development training, then for developing skills around process frameworks, and finally for developing human skills.

Employees are willing to spend their own money on skills-building. To understand how IT organizations fund IT staff development, we asked how it is funded. To our surprise, while 33% set a training budget that is then used for all essential upskilling/training, and 32% say that their company typically reimburses for training, 26% of employees indicated they fund their own training.



employees willing to fund their own training



typically reimburse training costs



set a training budget

Bottom line: We know that people want to learn and grow at work, regardless of economic and market conditions. This almost always means that employees are asking themselves and their managers, "How can I do my job better so that I can get promoted, get paid more, or land my next dream job?" A critical question for leaders to ask is, "How can I create an environment for my employees to expand and grow?" [According to Anthony Klotz, who coined the terms](#) the great resignation and quiet quitting, these trends will plateau in [2023](#) as companies improve employee retention.

Upskilling The IT Workforce

Throughout the history of IT, the IT workforce has been viewed as individuals with a wealth of technical skills and knowledge. While there is a wide variety of IT roles, and the most in-demand technical roles range from [site reliability engineers to computer systems analysts](#), the challenges of hiring and retaining IT professionals will accelerate the need for upskilling.

Why Upskilling is Essential:

To retain the existing employees and the skills and talents they represent, companies need to offer career advancement and development.

According to a [study done by Pew Research](#), 33% of those who quit a job did so because there was no opportunity for advancement.

In a post-pandemic economy, job seekers value upskilling. A [LinkedIn Global Talent Study](#) in August 2022 showed that candidates value work-life balance, flexible work arrangements and upskilling.

Employees stay not just because they are getting paid well. While compensation is important when considering a change in work environment, a [PWC study shows](#) that meaning, competence and autonomy also matter to employees.

We know that IT organizations are challenged by talent gaps and that an organization's skills portfolio is increasingly important as a driver of business growth and competitive differentiation. At the same time, there is far less agreement about which skills and competencies make the difference. While knowledge workers tend to be highly educated, many of these skills are more generic. In the IT labor market, however, increasing attention is being paid to specific skills such as the ability to analyze data, solve problems, work in teams, lead and manage, master specific technologies and more. While these skill areas are not necessarily new, our annual survey explores what types of skills are important for success in IT organizations.

As in our previous research, we continue to use five distinct skill capabilities that include human, process frameworks, and technical, leadership and automation skills with the same definitions of criticality. These skill capabilities for IT staff are powerful categories that are essential for developing the skills, knowledge, and capabilities of individuals and teams. They are the starting point for developing an organizational or individual learning pathway to provide the greatest chance of success within an evolving IT organization ([see Figure 3](#)).

FIGURE 3: IT SKILL CAPABILITIES DEFINITIONS

HUMAN SKILLS

This skill capability includes emotional intelligence, psychological safety, dynamic learning, happiness at work, diversity and inclusion and a growth mindset.

PROCESS FRAMEWORK SKILLS

This skill capability includes a variety of different process frameworks applied within IT organizations.

TECHNICAL SKILLS

This skill capability includes a variety of technical skills essential within modern IT organizations.

LEADERSHIP SKILLS

This skill capability includes key leadership skills to lead and manage modern IT teams.

AUTOMATION SKILLS

This skill capability focuses on IT automation themes and topics to improve how work gets done and can be seen as technical skills.

SOURCE: DEVOPS INSTITUTE

Top Must-Have IT Skill Capabilities

This section seeks to inform the ongoing debate by addressing some questions about the different skills needed to deliver IT products and services. Such an understanding is important for recalibrating skills pathways, reforming curricula, developing appropriate assessments, and upskilling agendas, developing management processes, and providing the types of incentives most likely to encourage the development of the required skills. The IT skill capabilities ranked in order of importance can be seen in Figure 4.

Criticality of Skills Definitions

Critical (must-have): Skills required for an individual to accomplish projects that are high-priority, high-value, or high-risk.

FIGURE 4: BREAKDOWN IN PRIORITIES ACROSS SKILL-BUILDING CAPABILITIES

QUESTION: HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING MAJOR SKILL CATEGORIES FOR MODERN IT ENTERPRISE ORGANIZATIONS IN THE FUTURE?



see major skill category as critical (must-have)

UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 N=1385

Chapter 1

Process Framework Skills

The continuous drive to accelerate, improve, and introduce new products and services to meet market forces has accelerated the adoption of a variety of process frameworks.

These IT process frameworks (i.e., best-practice models) ensure alignment between the way IT services are delivered and the value they enable, with the benefits ranging from improvements in availability, reliability, compliance, security, performance, and resource utilization to in cost, response time and the elimination of waste. Different frameworks and best-practice process models (e.g., Agile, DevOps, ITIL®) are applied in different ways and at different levels within the IT organization (or beyond) (see Figure 5).

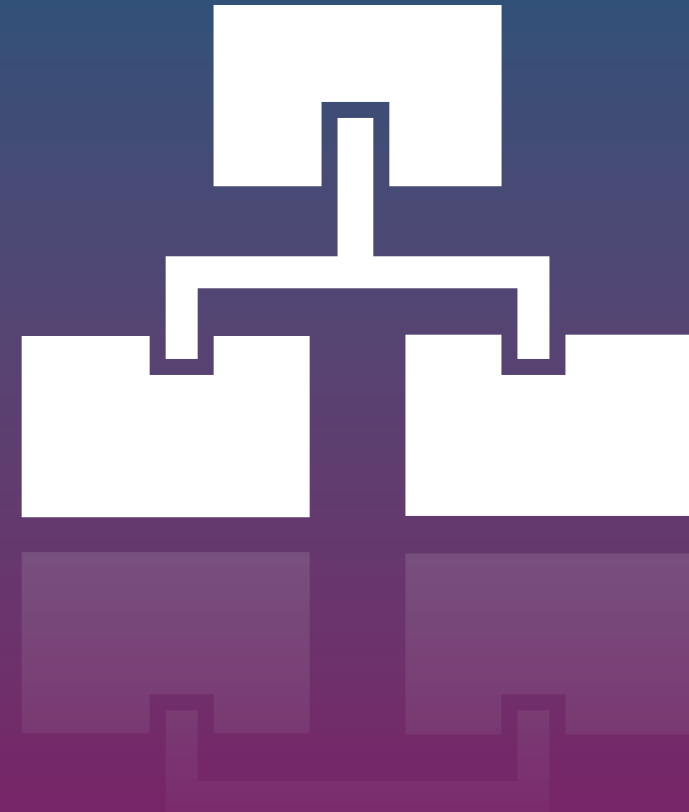
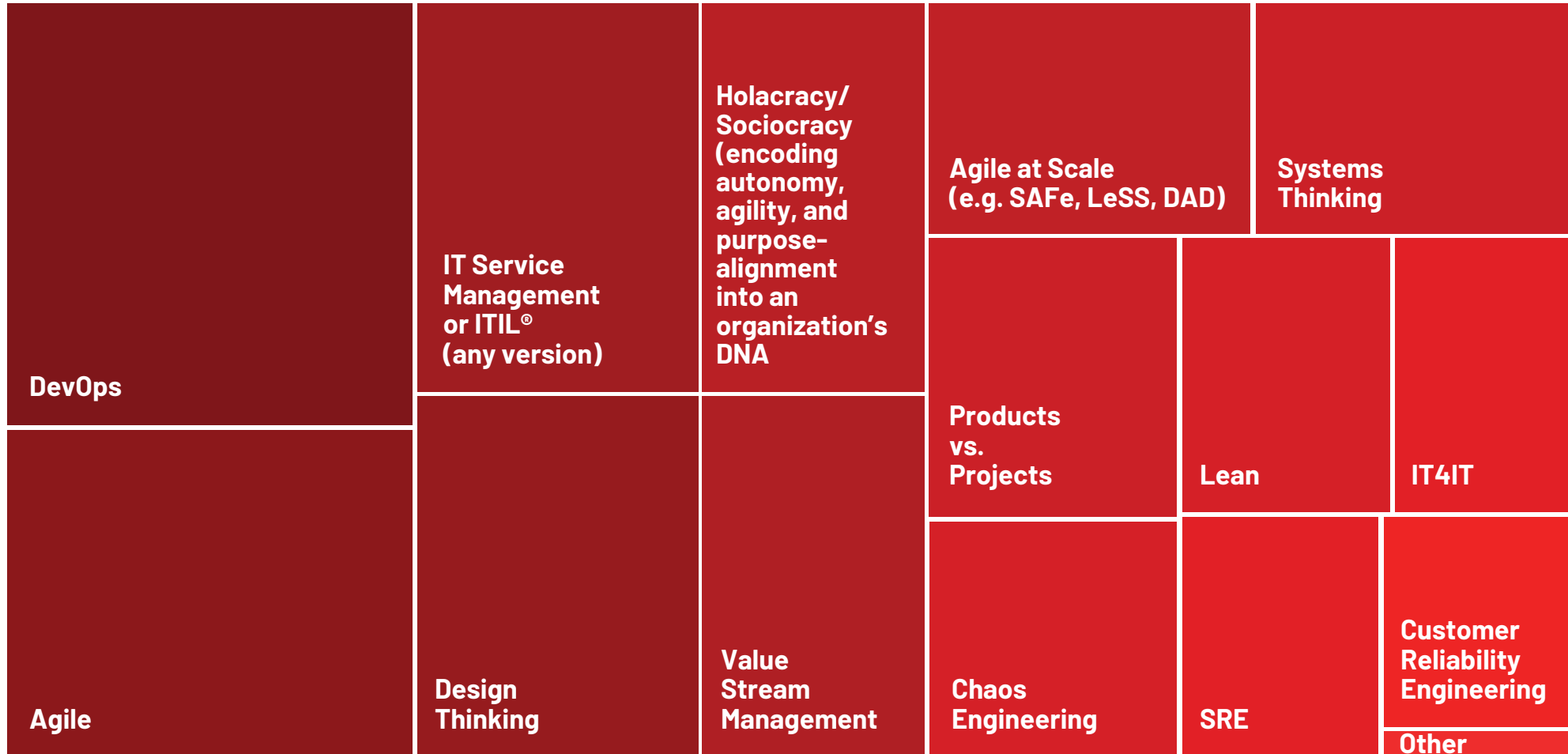


FIGURE 5: IT ORGANIZATIONS CONTINUE TO USE A COMBINATION OF PROCESS FRAMEWORKS

QUESTION: WHICH DISCIPLINE(S) OR FRAMEWORK(S) DOES YOUR ORGANIZATION PRIMARILY APPLY WITHIN YOUR IT ENVIRONMENT TODAY?(SELECT ALL THAT APPLY)



SOURCE: UPSKILLING IT 2023 SURVEY. DEVOPS INSTITUTE. DECEMBER 2022 | N=1385

Analyzing Must-Have vs. Skill Gaps

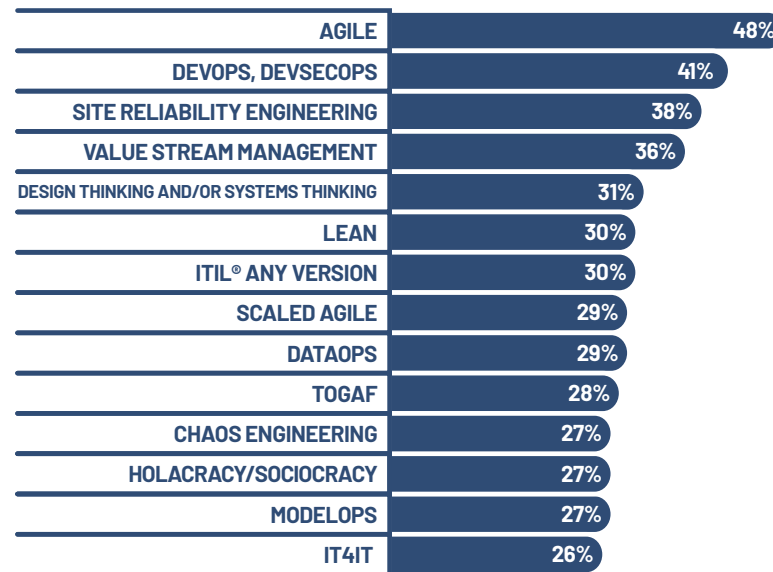
To determine the needed upskilling around process framework skills, we have analyzed both the skills gaps and the responses to the question, “How important do you think different operating models will be in the IT enterprise organization in the future?” (see Figure 6).

FIGURE 6: 2023 PROCESS FRAMEWORK SKILL GAPS

QUESTION: HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING TECHNICAL SKILLS WITHIN THE IT ENTERPRISE ORGANIZATION IN THE FUTURE?

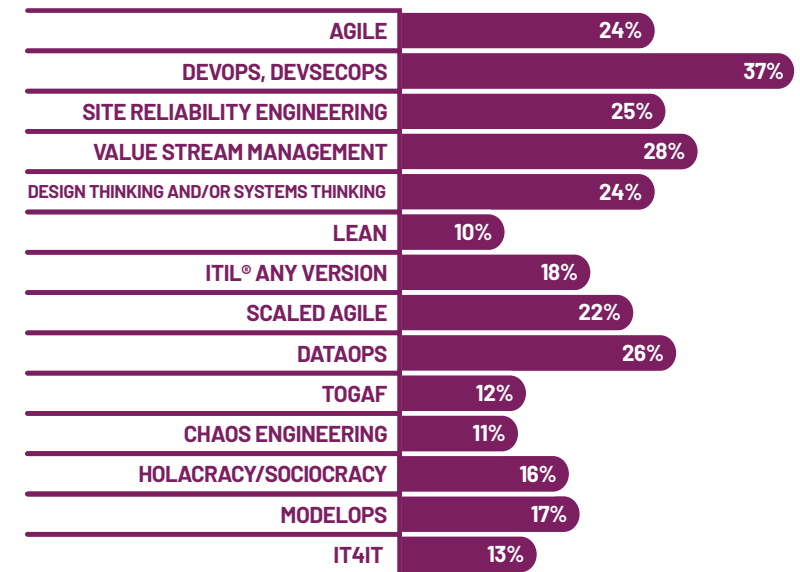
QUESTION: SELECT THE TOP THREE TECHNICAL SKILLS GAPS WITHIN YOUR TEAM TODAY (PLEASE SELECT UP TO 3 RESPONSES THAT APPLY BEST).

2023 PROCESS FRAMEWORK IMPORTANCE



Vs

2023 PROCESS FRAMEWORK SKILL GAPS



UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 N=1385

The Three Process Framework Upskilling Priorities

Agile and DevOps/DevSecOps are still rated as the most important frameworks for global IT organizations to have in the future. However, SRE, design thinking and/or systems thinking and Value Stream Management (VSM) are also part of the mix of best-practice process frameworks.

While there is some overlap between the different process frameworks, awareness of the differences is important to facilitate the selection of relevant approaches. Some process frameworks provide limited 'how-to' support for carrying out implementation, as they tend to be too generic to provide sufficient detail to guide an implementation process. Other process frameworks are very specific with descriptions of roles, steps, tasks and metrics to measure implementation. For almost all of them, it is essential to address the barriers and enablers to putting the process frameworks into practice. The following are the key process framework upskilling priorities we identified from our research.

Priority 1: Continue to Close the Skill Gap within DevOps and DevSecOps

When we look at the skill gaps reported by our survey respondents, we see that there are still gaps within DevOps and DevSecOps. As organizations continue to expand their adoption of DevOps and DevSecOps, this is not surprising. The demand for skills and knowledge around these frameworks will continue as there is no point at which organizations are done.

“During transformations, organizations need to be careful to prioritize process frameworks such that strong and sustainable foundations are put in place first, so that they don't have to back track as the transformation evolves to higher levels of performance and integration across framework.”

Marc Hornbeek
Engineering DevOps Consulting

Most Important Process Frameworks

for Global IT Organizations

1. Agile*
2. DevOps, DevSecOps
3. Site Reliability Engineering
4. Value Stream Management
5. Design Thinking and/or Systems Thinking

Priority 2: Recalibrate your Process Framework Skills Towards Product Thinking and Customer Experience

The world remains too dynamic, and the reality is that customers want value now. The pressure on IT teams is to deliver value in the face of complexity, technology debt, competing frameworks, a plethora of goals and metrics, and the pressure feels heavy and constant. Traditional IT projects have operated in more stable, less dynamic conditions. There, it remained effective to form short-lived project teams to deliver pre-defined requirements. The shift to delivering customer-centric software and services however requires a product mindset.

Fifty-four percent of our survey respondents said that customer experience skills, such as understanding how customers interact with the organizations, are a critical must-have skill. In addition, 47% said that product thinking is a critical skill for the future. Product thinking equips team members with the ability to be customer-centric, to continuously sense and adapt the path to fit the evolving landscape of applications and services, and to remain effective in highly dynamic conditions.

Product thinking does not need to be applied only to external customers. An example is the use of product thinking in the emergence of platform engineering teams. These teams have made the developer their customer and have arisen from the need to build a product for the developers to ensure their productivity and effectiveness.

“Platform engineering is the discipline of designing and building toolchains and workflows that enable self-service capabilities for software engineering organizations in the cloud-native era. Platform engineers provide an integrated product most often referred to as an “Internal Developer Platform” covering the operational necessities of the entire lifecycle of an application. There are 2 key qualities every platform engineer needs to be successful: a product mindset and great communication skills. You have to understand that developers are your customers, the users of the product you ship (the platform) and listen to their needs. You have to be a great communicator, both to ensure developer adoption and get executive buy-in for C-level support. You also should understand cloud-native technologies like Kubernetes and Terraform or CI/CD workflows, but ultimately, communication and treating your platform as a product are what will set you apart from the rest.”

Luca Galante
Product at Humanitec

Priority 3: Continue to Add Additional Disciplines to Your Process Framework Skills

Site Reliability Engineering (SRE) is essential for modern IT teams. SREs create a bridge between development and IT operations by applying a software engineering mindset to the broad aspects of infrastructure and systems administration domain. It is the third highest priority must-have skill.

“Consistently working on fundamentals, keeping a continuous learning curve and connecting the dots was critical to develop expertise on Site Reliability Engineering. The best way to become an expert is to apply the principles and practices in real time use case and derive value. It has taken over 4 years to get to that state and I truly believe that repetition and practice is a pre-requisite to mastery.”

Suresh GP

Managing Director, TaUB Solutions

Design Thinking and/or systems thinking are applied to solve a problem. This topic ranks high in both priority and gaps. The concept of design thinking is based on a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions that can be prototyped and tested.

DataOps is the third most critical skills gap today. While DevOps and DevSecOps enable teams to continuously integrate and deploy applications, these innovations have not been matched by efforts to create value from the growing volume, variety, and velocity of big data. Unfortunately, organizations have struggled to operationalize big data in the same way that DevOps has improved code deployment.

“DataOps is critical for cloud-native technologies. Specially when it comes to software security and observability. Unlocking the power of Data, by using modern practices like DataOps is essential for better business outcome. One practical example would be data-driven pipelines which introduce concepts like progressive delivery for quick experimentation & feedback.”

Garima Bajpai

Founder Canada DevOps
Community of Practice

ModelOps helps to support your organization's Artificial Intelligence (AI) journey. AI is one of the top must-have technology skills and organizations are applying AI within IT and across the business. A related practice is that of ModelOps. It enables data scientists and IT professionals to collaborate and communicate effectively while automating machine learning and AI models. We expect this area to grow both in priority and in the size of existing skill gaps.

Value Stream Management (VSM) gets your teams obsessed with the value they add. Another challenge to overcome is the skills gap seen in VSM, which is the sixth largest gap on average. DevOps principles create higher-performing organizations, but understanding what is improving requires thinking and working as value streams, which means getting teams obsessed with the value their work creates for the customer and being able to measure how their experiments are accelerating that flow to be realized in the hands of the customer.

"VSM is often viewed askance because it originated in lean in the 1990's and this makes it seem like old hat. Our team simply views VSM as more proven and credible."

Suresh GP

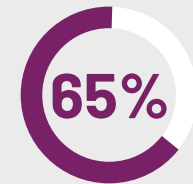
Managing Director, TaUB Solutions

Ideas for upskilling your process framework skills:

Get certified. For 65% of our survey respondents, certifications are very valuable, and 34% say they are somewhat valuable. There is a wide range of **certifications** available, and it is important to distinguish between extending knowledge or moving to a more advanced state for all of the certifications.

Join a community. Communities are a great way to network and grow while learning what others have done. There are many communities for different best-practice, process and/or frameworks, including the **DevOps Institute community** of ambassadors, partners, and learners.

Value Ratings for Certifications



very
valuable



somewhat
valuable

Chapter 2

Technical Skills

Develop Your Technical Skills to Accelerate Your Organization's Digital Journey

Digital technology initiatives remain the top priority for many boards, and IT teams are at the heart of these initiatives with software engineering and technology innovation and management. According to [Gartner](#), overall IT budgets will grow by 5.5% in FY2023.

With such a small budget increase, IT teams must ensure that they have the technical talent to develop digital products that satisfy customers, partners, and employees. The following are priorities to consider as you develop or update your technical skills plan for 2023. The details are based on evaluating the survey responses of must-have technical skills and existing technical skills gaps (see [Figure 7](#)).

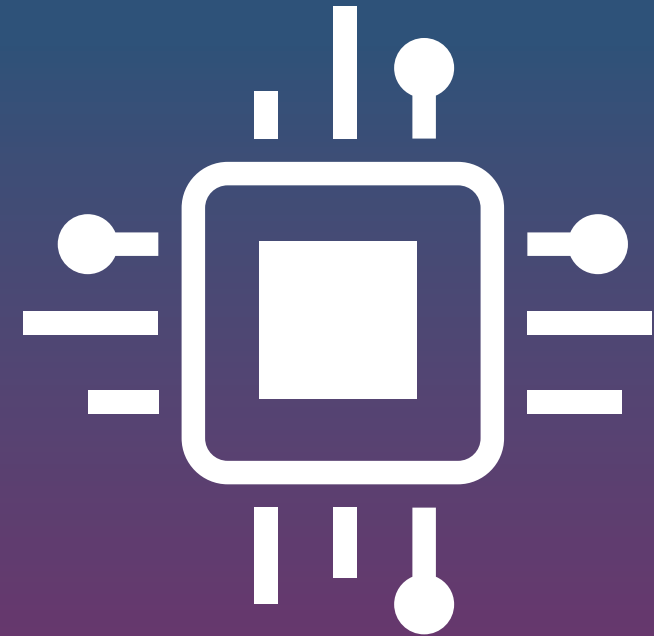
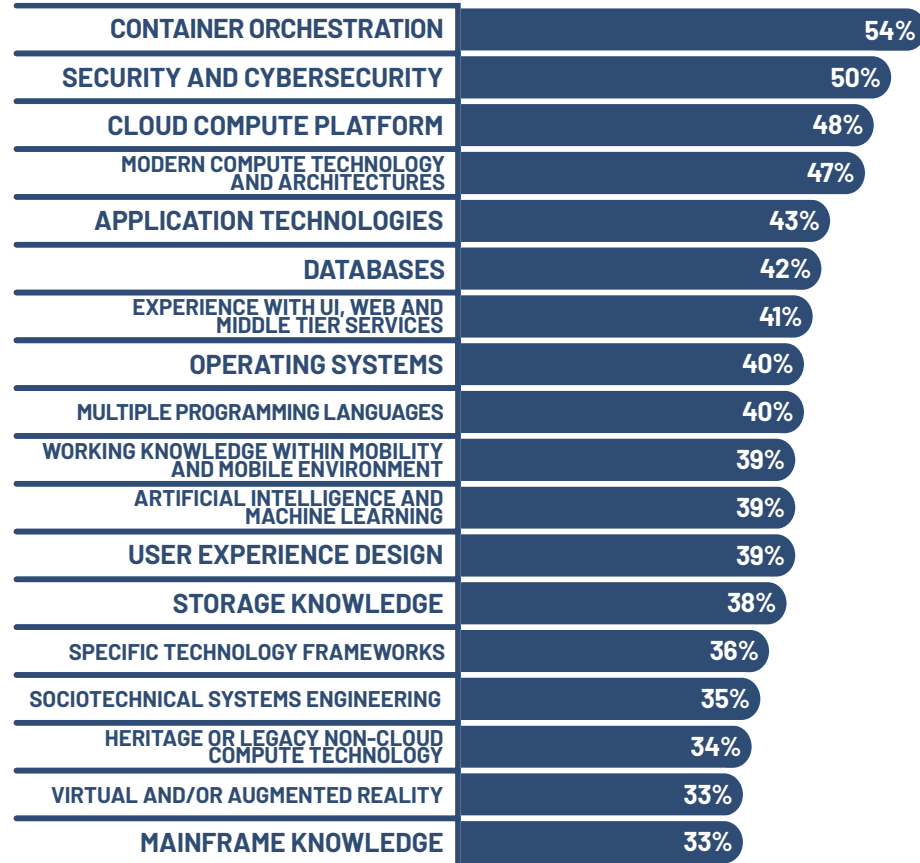


FIGURE 7: TECHNICAL MUST-HAVE SKILLS Vs SKILL GAPS

QUESTION: HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING TECHNICAL SKILLS WITHIN THE IT ENTERPRISE ORGANIZATION IN THE FUTURE?

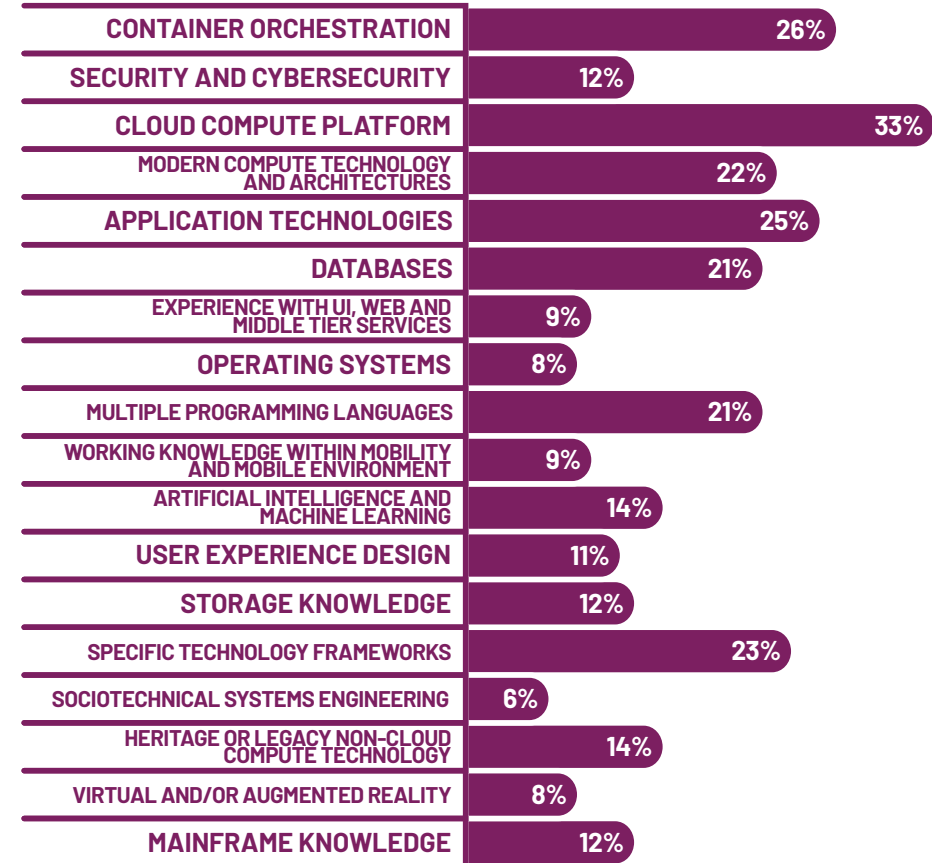
QUESTION: SELECT THE TOP THREE TECHNICAL SKILL GAPS WITHIN YOUR TEAM TODAY
(PLEASE SELECT UP TO 3 RESPONSES THAT APPLY BEST).

2023 TECHNICAL MUST-HAVE SKILLS



Vs

2023 TECHNICAL SKILL GAPS



UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 N=1385

Priority 1: Keep Your Cloud Skills Up to Date

Cloud computing has become mainstream, with major players such as AWS (Amazon Web Services), Microsoft Azure and Google Cloud Platform. And while the adoption of cloud computing is still growing, it is important to keep up to date with these skills as more and more businesses move to a cloud solution and the cloud ecosystem. However, it is important to broaden your skills as your organization's needs evolve. The following basic cloud service platform skills should be continuously updated.

Container orchestration for container lifecycle management. Container orchestration is the automation of the operational tasks required to run containerized workloads and services. This includes a wide range of objectives that software teams need to manage the lifecycle of a container, including provisioning, deployment, scaling, networking, load balancing and the most important technical skill to have for 2023.

“Container orchestration is the conductor that transforms the chaos of isolated containers into a symphony of seamlessly coordinated applications, enabling organizations to unleash the full potential of their modernized infrastructure.”

Madhu Kumar Yeluri

Principal Cloud Architect / Product Owner (Containers)
T-Systems International

Security in the cloud is essential and you should have the right skills to manage and configure it. This includes topics such as identity and access management (IAM) and securing data as essential skills to have when offering cloud services. Security and cybersecurity ranked as the second most important skill to have (50%).

Knowledge of application programming interfaces (API) technologies (e.g., REST APIs, web applications, microservices, React, Kafka) for integration. These technologies allow services and applications to interact and exchange data. For 43% of our respondents, the ability to code APIs and the connections used to integrate workloads in the cloud is a must-have technical skill.



container orchestration ranked as the most important technical skill to have



security and cybersecurity ranked as the second most important technical skill to have

Understand modern computing architectures such as Infrastructure as Code, serverless computing and multi-cloud. Different cloud models (such as multi-cloud), architectures such as Infrastructure-as-Code (IaaS) and technologies such as serverless require skills to understand how to apply them and where they work well. These technical skills are the fourth most important skill for our survey respondents (47%).

Much of the cloud environment uses artificial intelligence (AI) and machine learning (ML): As a cloud expert, you need to understand the basics of AI and machine learning. Thirty-nine percent of our survey respondents have said that machine learning and artificial intelligence are must-have skills.

Priority 2: Complement Cloud Skills with Other Technical Skills

Database skills are essential, as database-driven applications require knowledge of SQL and data structure concepts, and data schemas. Our survey respondents ranked this skill as the sixth highest must-have skill (42%).

Programming language skills, making it the eighth highest must-have. For 40% of our survey respondents, knowledge and skills around programming languages is a must-have skill which makes this skill the eighth highest must-have skill. Cloud computing and building applications in the cloud requires knowledge of common programming languages and the ability to write code to build, deploy and manage applications. The most common programming languages include Java, JavaScript, and Python, which are well suited to cloud-based software.

High Ranking

Must-Have Technical Skills



database



programming language



machine learning and artificial intelligence

Cloud financial management to understand cost and potential savings.

This involves managing and optimizing the costs and workloads of the cloud computing environment. **FinOps**, which is defined as “... an evolving cloud financial management discipline and cultural practice that enables organizations to achieve maximum business value by helping engineering, finance, technology, and business teams to collaborate on data-driven spending decisions,” is an area of growth and development.

Cloud orchestration to connect and interact between workloads. This requires the skill of a variety of programming technologies to manage the connections and interactions between workloads on public and private cloud infrastructure.

Performance management, testing and analysis for effectiveness and efficiency. Whether it is testing the performance of cloud environments, setting OKRs, KPIs and analyzing various insights, it requires analytical skills as well as communication and problem-solving skills.

Platform engineering to empower the developers. Platform engineers see the developer as their customer and build internal platforms for these developers to use throughout the lifecycle of an application. This role requires a variety of skills including knowledge of technologies related to Kubernetes, containerization and infrastructure, and familiarity with DevOps best practices and CI/CD tools.

“One of the biggest challenges of learning new technical skills is the potential to become lost in the learning process. This is where having a mentor can be invaluable. A mentor can provide guidance and support, helping you to navigate the learning process and stay on track towards achieving your goals. By embracing the continuous learning principle and seeking out mentorship, DevOps personnel can ensure that they remain at the forefront of their field and are well-equipped to handle whatever challenges come their way. This not only benefits the individual, but also the organization as a whole, as a more knowledgeable and skilled team is better able to deliver high-quality results and drive business success.”

Najib Radzuan
Founder, DevOps4Me Global

Chapter 3

Human Skills

Time to Prioritize Human Skills to Foster a Human Connection Among Your Teams and Your Culture

Human skills refer to a set of skills that complement academic, best-practice, process and/or framework and technical skills. Our survey respondents report that they give specific weight to these skill areas in hiring decisions, and more generally, these skill areas appear to be necessary for the IT workforce to function effectively.



Priority 1: Encouraging and Supporting Collaboration, Creativity, Diversity and Inclusion is a Must

Human capabilities are how we think and who we are, and how we interact with and navigate through situations with others. The recruitment market is on fire for people with technical skills, and the pace of technological change is accelerating. But it is important to remember that it will take people with high learning capacity and curiosity to take advantage of new technologies, operating models, or whatever comes next. When we compared the must-have human skills with the skills gaps, we found the following (see Figure 8):

“Every company can exist without technology, but no company can exist without people. No matter how advanced technology becomes, it will never totally replace humans.”

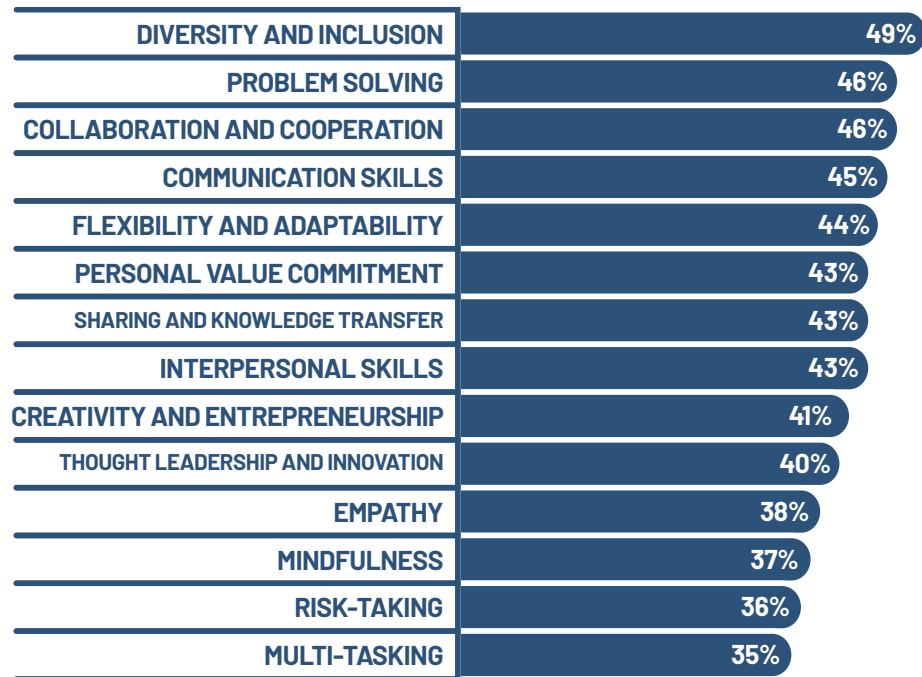
Jacob Morgan
Author, Speaker, and Futurist

FIGURE 8: HUMAN MUST-HAVE SKILLS Vs SKILL GAPS

QUESTION: HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING HUMAN SKILLS WITHIN THE IT ENTERPRISE ORGANIZATION IN THE FUTURE?

QUESTION: SELECT THE TOP THREE HUMAN SKILL GAPS THAT ARE MOST APPARENT WITHIN YOUR IT ENTERPRISE ORGANIZATION TODAY. (PLEASE SELECT UP TO 3 RESPONSES THAT APPLY BEST).

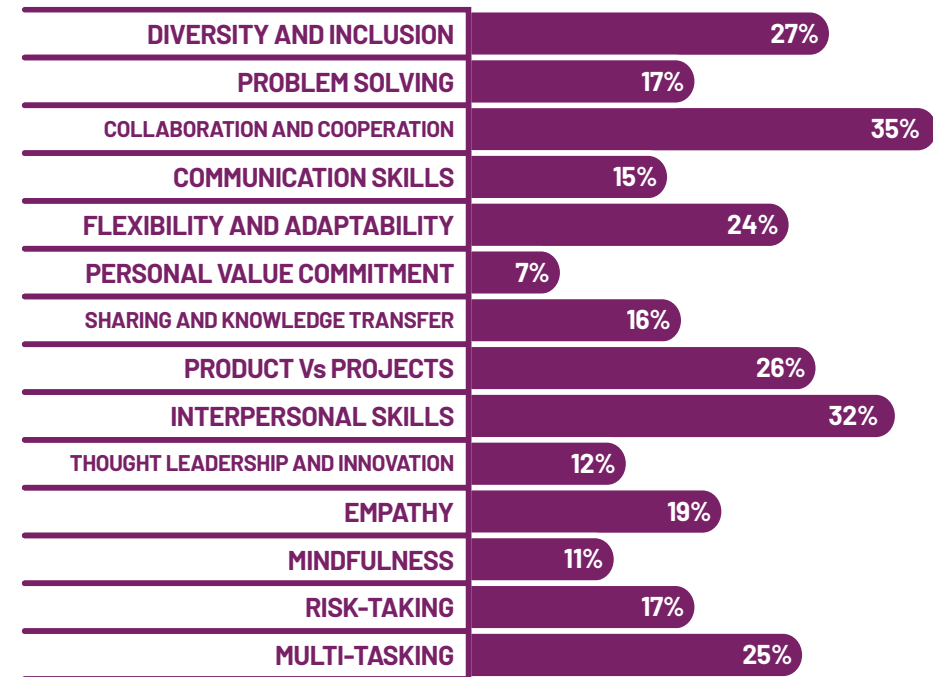
2023 HUMAN MUST-HAVE SKILLS



see major skill category as critical (must-have)

Vs

2023 HUMAN SKILLS GAPS



see major skill category as critical (must-have)

SOURCE: UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 | N=1385

Priority 2: Driving and Fostering Innovation as a Team

Collaboration and cooperation, creativity and entrepreneurship, and diversity and inclusion are the biggest human skills gaps. In today's IT environment, we have many different generations and backgrounds working side by side to innovate and apply their skills and knowledge.

Ideas for Upskilling:

Don't be afraid to **foster a healthy debate**, because discussions around different ideas drives innovation.

Make sure people find a purpose that drives them more than a paycheck.

Inspire and nurture the creativity of future generations.

Priority 3: Become Someone who Others Want to Work With

Interpersonal skills include communication, relationship building, and listening, and are cited as a major gap (26%). There are very few jobs where someone works 100% alone. This skill allows you to interact positively with others. You could be a brilliant at your job, but if you're unpleasant and difficult to work with, the value of those technical skills will be limited.

Ideas for Upskilling:

Improve your communication skills by understanding different **communication styles**.

Make sure you have some face-to-face meetings in office or hybrid workplaces.

Provide communication training for everyone.

Top 3 Human Skills Gaps

1. Collaboration and Cooperation
2. Interpersonal Skills
3. Diversity and Inclusion

Chapter 4

Leadership Skills

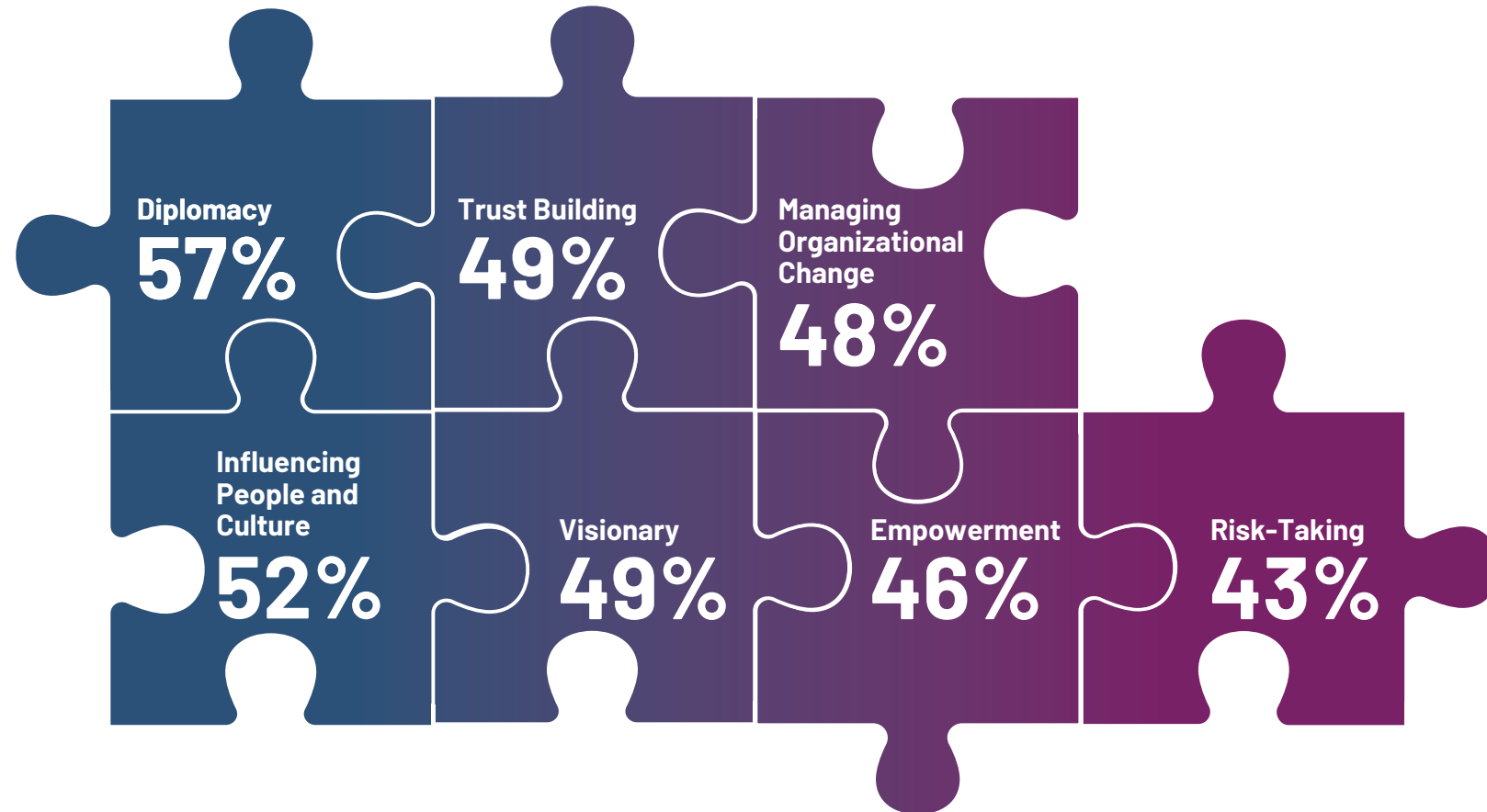
Develop Your Leaders to Lead and Manage

What are good leaders? Think about the best leaders you have ever worked alongside. How would you answer the question, 'What behaviors did they exhibit that made you admire them?' We asked our respondents to rate the importance of various leadership skills within the IT enterprise organization in the future (see Figure 9). While there is a lot of research on the topic of leaders vs. managers, the differences and the challenges, thought leaders on the topic agree that organizations need **both**.



FIGURE 9: The Seven Qualities IT Leaders Must Have

QUESTION: HOW WOULD YOU RATE THE IMPORTANCE OF THE FOLLOWING LEADERSHIP SKILLS WITHIN THE IT ENTERPRISE ORGANIZATION IN THE FUTURE? (SELECT ALL THAT APPLY)



SOURCE: UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 | N=1385

Diplomacy is working with people to achieve goals. Fifty-seven percent (57%) of survey respondents selected diplomacy as a leadership skill. The most common definition is ‘understanding each other’s point of view and finding common ground, rather than working through or around people’. Effective diplomacy requires honesty, respect, and the ability to recognize and value differences to build social capital and form trustworthy relationships with other parties. There are some ways for leaders to practice diplomacy, including holding honesty and trust as key values across the culture, recognizing and valuing different opinions, and being open and willing to change one’s approach.

Influencing people and culture by changing leadership styles. For 52% of survey respondents, having a leader who can influence people and culture is an essential skill. Today’s business world and the digital pace of many organizations, including IT, requires a move away from Taylorism the adoption of values and principles inspired by Westrum and Transformational Leadership models. In these models, leaders work closely with teams to design and adopt a company culture based on empowerment, ownership and shared responsibility. Both models focus on positively motivating and inspiring individuals in a positive way.

Trust motivates and, indirectly, retains team members. Trust is the third most important skill according to our survey respondents. [Research](#) has shown that employees who trust their leader are more motivated to work and less likely to leave.

“There has never been a better time to be an IT leader but success today takes a new mindset, skill set and tool kit. These are the skills that are differentiating the high performing leaders today and position you as a future-ready IT leader. This allows us to show up different, to move beyond our traditional order taking comfort zones and become highly coveted strategic partners and trusted advisors. These skills can be learned. Be intentional, take small steps, your initial small wins will build confidence and momentum.”

Dan Roberts

Host, Tech Whisperers Podcast & Author,
Confessions of a Successful CIO,
CEO, Ouellette & Associates

The Westrum Leadership Model

Westrum leadership model supports positive climates. In 2004, Ron Westrum published “A Typology of Organizational Cultures” where he introduced three organizational culture models, “Pathological”, “Bureaucratic”, and “Generative”. Each are characterized by seven cultural criteria related to authority and leadership, communication, and collaboration, supportive or punitive environment, and employee’s behavioral response to the models.

Transformational Leadership

The concepts of transformational leadership were introduced by James Downton in 1973. In 1985, Bernard Bass later introduced better ways for measuring the impact of transformational leadership on people and organizations. Transformational leadership believes that employees are inspired to deliver their best and feel engaged when leaders demonstrate ethics, authenticity, accountability, and empathy. Leaders understand the importance of trained employees and relay the decision-making process down to teams to give them the ability to be more creative and innovative.

Vision and managing change are linked. Our survey respondents ranked vision and managing change in the top 5 most important skills IT for leaders. While change usually brings something different or new, it must also bring something better. Change is linked to the vision of how IT leaders adapt strategy, culture, operating models, and technology to meet the needs of their business counterparts. “Change management seeks to facilitate and achieve the successful implementation of transformation processes, which involves working with and for people to accept and assimilate change and reduce resistance to it.” How to manage change is beyond the scope of this study, but [here](#) are some great resources for mapping and understanding how to initiate and drive change across products and teams.

Embrace psychological safety to encourage risk-taking in yourself and others.

For 43%, the ability to take risks is an essential leadership skill. The concept of psychological safety was first introduced by [Amy Edmondson, Professor of Leadership and Management](#) at Harvard Business School. She says “A leader’s job - whether at the top of an organization or somewhere in the middle—is to create a safe space for people to speak up, make mistakes, and bring their full selves to work. In a team with high psychological safety, team members feel confident that no one on the team will embarrass or punish anyone else for admitting a mistake, asking a question, or offering a new idea.” [Here](#) are some resources on how to build psychological safety as a leader.

“A leader’s job - whether at the top of an organization or somewhere in the middle—is to create a safe space for people to speak up, make mistakes, and bring their full selves to work. In a team with high psychological safety, team members feel confident that no one on the team will embarrass or punish anyone else for admitting a mistake, asking a question, or offering a new idea.”

Amy Edmondson

Professor of Leadership and Management
Harvard Business School

Chapter 5

Automation Skills

Overall, automation skills are a top must-have skill capability.

The goal of automation in the cloud (and in general) is to reduce human effort across multiple management areas. The following are key automation management areas in which you should develop your skills.



IT Automation Requires the Ability to Identify Opportunities to Reduce Human Assistance

IT automation is applied from application development to infrastructure deployment and within other workflows and processes. The main objective is to eliminate manual tasks and ensure that things are done in a repeatable way. As a result, IT staff can focus on outcomes rather than processes. Automating tedious, repetitive tasks improves the productivity of all employees and can eliminate errors while reducing waste. Automation skills vary greatly depending on the existing or planned IT automation tools. The most important skill is the ability to identify where there are opportunities to take repeatable tasks, processes or procedures and make them run autonomously. Forty percent of survey respondents ranked automation skills as the fifth most important skill.

The Benefits of Automation are as Follows:

Automation provides efficiency. Automation is a critical undertaking because it enables, changes, and adopts the way IT and other business units operate. Processes, tasks, and decisions are key targets for automation work. The goals of automation are to get work done faster, free up people to focus on more innovative issues, and eliminate human error.

Automation is a subset of innovation. Automation accelerates the delivery of IT infrastructure and applications by automating manual processes. The potential applications of automation are almost limitless.

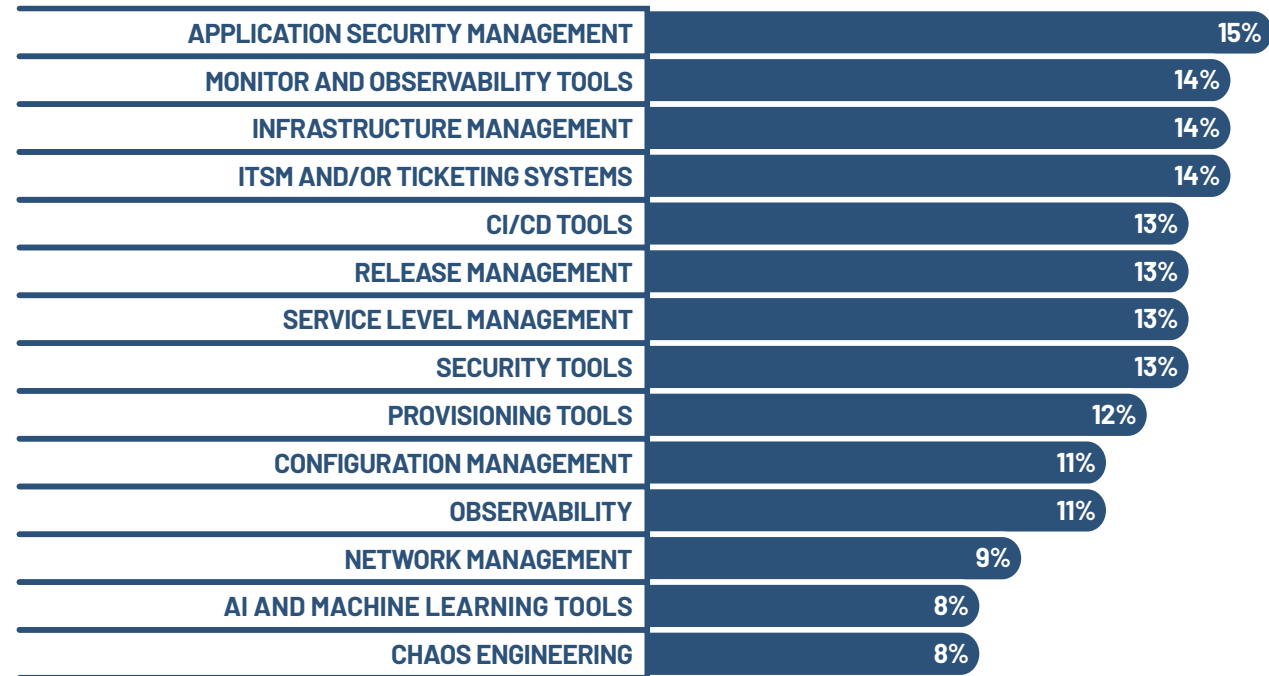
The Future is Continuous Automation Across Everything

Automation across software and applications can be done at the plan, design, test, code, deploy, release, and operate stages. The goals of automation should be to reduce technical debt, increase velocity and incorporate security for quality and reliability. The completeness and sequence of these phases can be compromised, but it is essential that there is an automation path through these sequences. Consider the following on the topic of automation:

The democratization of technology and automation is happening. Prior to innovations such as AI, RPA, low-code/no-code solutions, investment in and use of technology and automation tools consisted of applications and solutions typically implemented by the IT department. Today's organizations are seeing a tremendous increase in the number of business technologists, data scientists and citizen developers who can leverage and select technology within and for their business teams and initiatives. This is changing the role of IT and with it the skills required to become more of a coach, advisor and/or consultant.

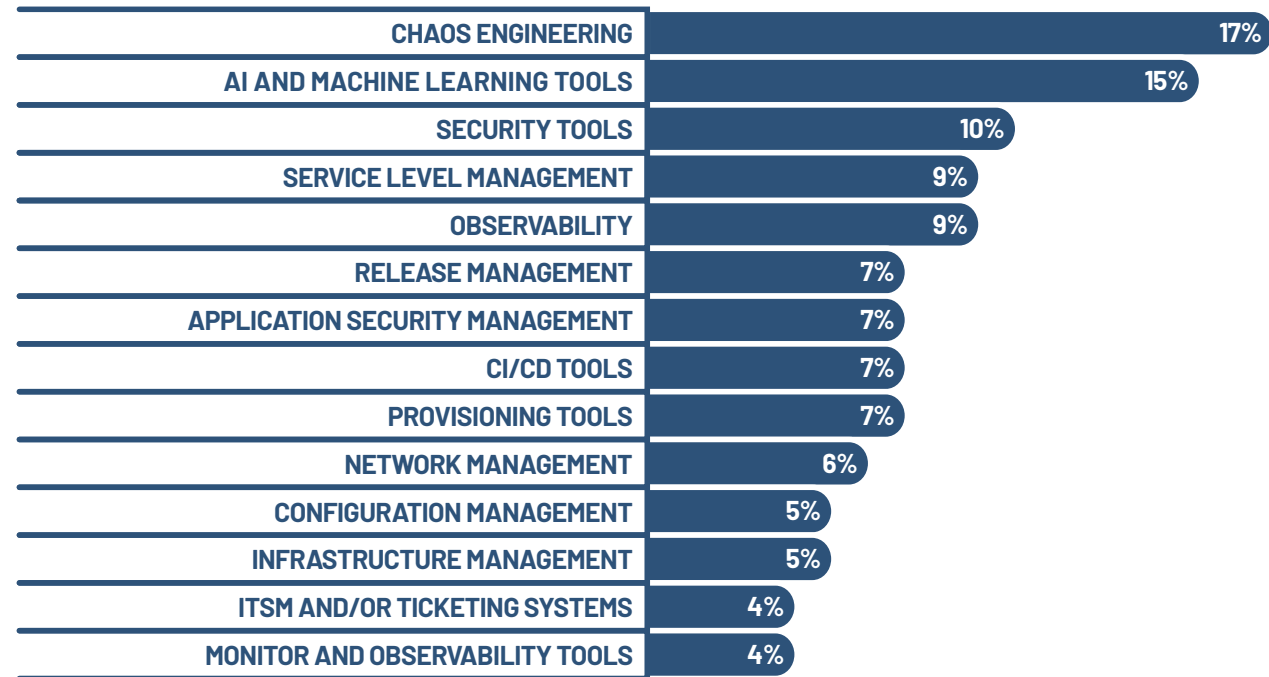
Organizations have many IT automation priorities. The adoption of the different IT automation tools varies. The point here is not to decide which IT automation tools to implement, but rather to get a perspective on which are a must-have or critical category of automation to adopt. Figure 10 shows the automation tools which our survey respondents are currently reworking or transforming. Figure 11 shows the automation tools that IT departments are planning to implement in the near future.

FIGURE 10: THE TOP 14 IT AUTOMATION TOOLS WHICH ARE CURRENTLY REWORKED OR TRANSFORMED



SOURCE: GLOBAL SRE REPORT 2022 N=235

FIGURE 11: THE TOP IT AUTOMATION TOOLS PLANNED FOR THE FUTURE



SOURCE: GLOBAL SRE REPORT 2022 | N=235

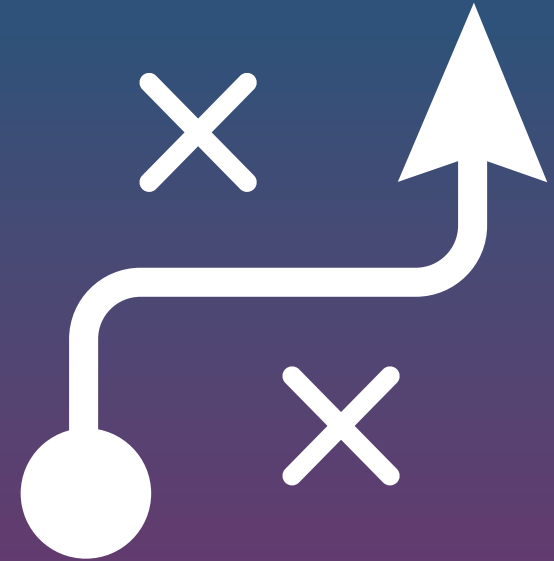
Chapter 6

Conclusions

Getting Upskilling Right

Upskilling is easier said than done because developing upskilling programs requires effort, strategy, budget, design, planning and continuous improvement.

Congratulations, great progress has been made in moving the upskilling needle (see Figure 12). While our 2020 research indicated that upskilling programs were in the early stages, IT organizations appear to have made great progress. This great progress needs to continue, and those organizations that are still in assessment mode (44%) or design mode (21%) today should be moving into implementation and delivery mode (29%) or adapting the learning journey for impact (5%).



Upskilling Program Modes

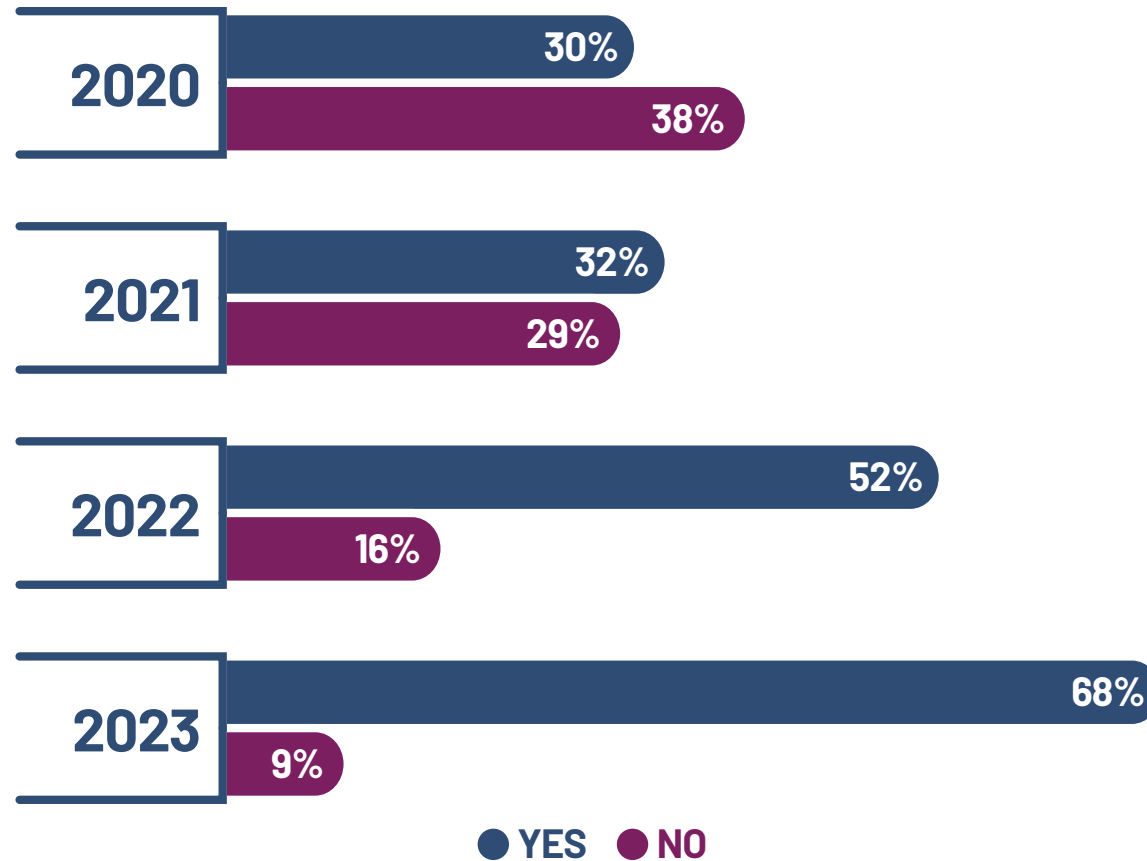
Within IT Organizations



At what stage is your upskilling program today?

FIGURE 12: IT ORGANIZATIONS HAVE MADE REAL PROGRESS ON UPSKILLING

QUESTION: DOES YOUR ORGANIZATION HAVE A FORMAL UPSKILLING (TRAINING) PROGRAM FOR IT TEAM MEMBERS?



SOURCE: DEVOPS INSTITUTE UPSKILLING IT SURVEYS | 2020 N=468 | 2021 N=885 | 2022 N=1142 | 2023 N=1385

Upskilling Is Not a One-off Process, Done Once and Forgotten

As technology, working models, and the demographics of IT teams continue to change, upskilling needs to be ongoing to stay ahead, and upskilling programs need to be continually updated and made attractive. In summary, upskilling engages and improves the retention of the existing team members, enables employee growth in terms of personal and professional development, and helps an organization to achieve its goals. Upskilling is owned by both the management team and the employee. Here are several steps to improve upskilling in IT.

Step 1: Create a Strategic Upskilling Plan

Creating an upskilling program involves the steps of aligning, assessing, mapping existing skills and understanding skills gaps. The long-term needs of an organization should drive the skill requirements, compare these requirements with current skills and determine the best way to fill the gaps.

The Key Tasks Are:

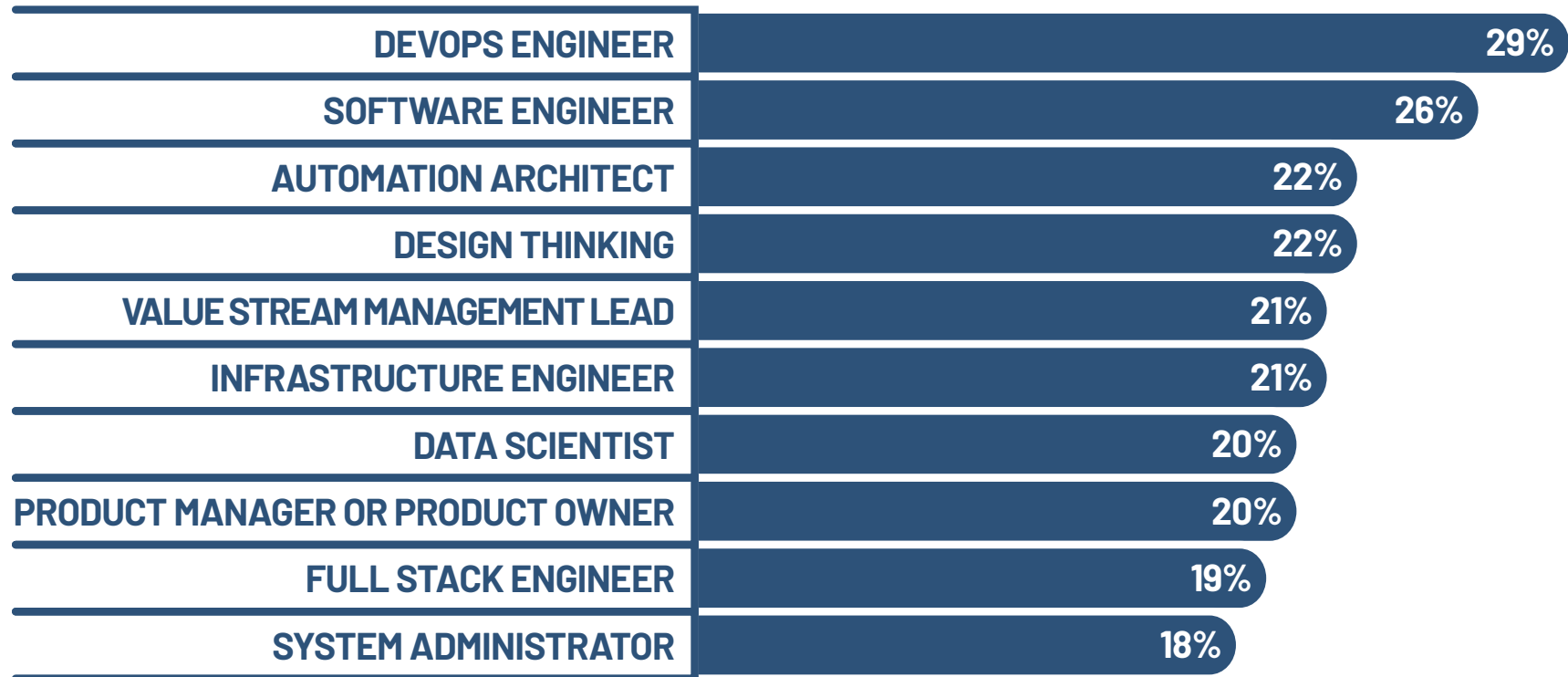
Identify the skills needed to achieve business results: Leaders should formulate the talent plan that will deliver on the business plan. This should be a detailed plan, quantified in terms of resources, including the different types of roles required and the skills required by teams within IT and by each of those roles. Today, 31% of our survey respondents match skills requirements to intended business outcomes.

Map existing skills across IT functions: The next step is to match demand with existing skills across the key capabilities (or skill domains) in the function of the IT organization. For example, 51% of our survey respondents say that process framework skills and 46% say that technical skills are important; skill-based assessments of the existing teams can provide the necessary insights.

Understand the skill gaps: Use the findings from our research to begin to identify categories of skill gaps across the key capabilities of process frameworks, technical, leadership, and human skills. Be aware that similar-sounding titles may require different skills. For example, look at the top 10 job titles that IT organizations have recently hired (or are you planning to hire) in 2023 (see Figure 13).

FIGURE 13: THE TOP 10 JOB TITLES OR ROLES HIRED OR RECRUITED

QUESTION: FOR WHICH JOB TITLE(S) HAVE YOU RECENTLY HIRED (OR ARE YOU PLANNING ON HIRING)? (SELECT ALL THAT APPLY)



SOURCE: UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 | N=1385

Step 2: Update the Upskilling and Learning Programs

There is a huge opportunity to improve upskilling programs: 19% of our survey respondents admit to being dissatisfied with their company's upskilling program, 25% are neither satisfied nor dissatisfied, 33% are satisfied and 22% are very satisfied. In addition, 30% said that upskilling is not a top priority for management, and 29% said that a lack of content, breadth, or depth is a barrier to upskilling in their organization.

Here are Some Key Things to Consider:

Improve employee satisfaction with upskilling by refreshing your upskilling model. The somewhat low satisfaction with existing upskilling programs may be due to the state and quality of the existing programs. One way to improve this is to adopt a different upskilling framework that matches how your team members prefer to learn. The top five upskilling frameworks preferred today are virtual learning via online events, conferences, classes, self-study materials, ad hoc learning available, self-paced (48%), face-to-face (in person) learning via events, conferences, classes, chapter meetings, boot camps (46%), peer learning, buddying, workflow shadowing, pair programming (40%), coaching (34%), and experiential learning which includes trying new roles, working on projects or specific problems (31%). When combined, these different frameworks become powerful ways to upskill people.

Make sure that learning and applying skills happens, because 'practice makes perfect': 60% of our survey respondents told us that they had learned a new skill in the last 12 months. When we asked these respondents whether they had applied the new skill in their role, 58% said they had, 39% said that they had applied it partially and 3% they had not. As the old saying goes 'practice makes perfect'. Ensuring that your team members use the skills they have learned in their day-to-day work or allowing them to join a project to practice their new skills, will ensure that continuous learning takes place.

Have you Applied a

New Skill

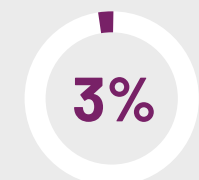
in Your Role?



yes



partially



no

Microlearning provides better knowledge retention: A wide range of research and case studies have shown that [microlearning](#) is more effective as the retention of the learned is improved when new information is learned in small chunks. In fact, according to a study conducted by the BBC, microlearning produces 17% greater transfer, is 30% cheaper and delivers almost twice the ROI of a traditional learning approach. DevOps Institute has implemented some microlearning as part of its SKILup IT Learning product.

“Since our initial launch of this program six months ago, over 10% of our learners who have purchased a subscription have gone on to attend an event or completed a certification through DevOps Institute and that number continues to grow. Most of our members are taking advantage of their free learning and are successfully experiencing the robust content that both expands their knowledge and amplifies their personal and professional upskilling journey.” Kara Flanagan, Director of SKILup IT Learning.

Partner with organizations to extend your upskilling program: Companies such as Microsoft have teamed up with LinkedIn to announce a [new “Skills for Jobs” program](#), offering access to 350 courses and six new Career Essentials Certificates for six of the most in-demand jobs in the digital economy. Other companies such as [Verizon](#), [Walmart](#), [SalesForce](#) and [InfoSys](#) have developed internal upskilling programs to improve skills in IT and other functional areas. DevOps Institute offers its [business solutions](#) to map out the best plan to support an IT organization to accelerate change, upskill and reskill, attract, engage, and retain talent.

“We believe the greatest challenges facing businesses isn’t tech, it’s humans. Whether your cloud strategy is GCP, AWS or Microsoft, our recognized unbiased, vendor-neutral DevOps and IT educational resources and certifications will meet your organizational and IT needs. Our Business Solutions help IT teams develop their DevOps and other expertise ensuring both technology and people work better enabling your engineering team to be left to focus on the tech stack. To find out more, check out our [Business Solutions](#).”

Joanne Quarterman
Sales Director at DevOps Institute

Step 3: Adopt and Facilitate Continuous Learning

It is important to establish a budget to ensure that key training takes place and continuous learning should be part of an individual's job. While 40% of our survey respondents cite a lack of budget as the second biggest challenge to upskilling, the lack of time is the biggest issue.

Here are some things to consider:

Work experience is one of the best forms of training. This on-the-job work experience requires that work tasks are presented to employees as learning opportunities. For example, being asked to lead a distributed project is a great opportunity to develop an individual's leadership skills if it is presented and perceived as a great opportunity to develop.

Leaders must provide powerful learning experiences through continuous feedback. If management can identify, monitor, and provide feedback on the development opportunities associated with a particular assignment or activity, then that assignment can be a powerful learning experience. It's largely a matter of how a manager or leader frames and presents the task and the employee's attitude toward receiving it. NOTE: Feedback should be ongoing, and not just a one-off communication each year during the annual performance review.

Make skills training part of the job, introducing learning by doing. We have heard from our community that acknowledging a need for training can reveal performance issues. As a result, people may not choose training even if it would be helpful. One way to work around this is to make skills training the default, with the option to opt-out if the employees' skills are sufficiently advanced. Peer learning, buddying, workflow shadowing, pair programming, job rotation and shadowing are attractive upskilling methods for 40% of our survey respondents.

Adopt the 70/20/10 model¹. This model is used in the learning and development community. It suggests a proportional split of how people learn effectively. The results of a survey showed that people learn best when they get 70% from challenging tasks, 20% from developmental relationships, and 10% from coursework and training. While this model has some critics, every organization should adopt the best levels of optimization.

Make sure your team members know where to go for upskilling. A small percentage (4%) of our survey respondents do not know that the company has an upskilling program. So there may be team members who are willing to learn but do not know if a program exists, and therefore may not be able to learn. Make sure that you communicate upskilling opportunities frequently and prominently and make them easily accessible.

Make the link to career progression clear. While 67% of the survey respondents are satisfied with their careers, we also found that they would like to see changes in personal or financial factors to further improve their satisfaction. [Robert Half's 2023 Salary Guide](#) will provide some insight into salary ranges for retaining or hiring technology professionals across industries. Moving to a different role with a higher salary will incentivize employees to upskill.

Make sure your leaders model upskilling. Thirty percent (30%) of our survey respondents say that upskilling is not a priority for the management. It is essential that leaders and managers act as role models and motivate their team members to take advantage of different upskilling opportunities. If budgets are not available, alternative upskilling frameworks such as mentoring or coaching can be a successful way of learning.

70/20/10

Model



challenging
tasks



developmental
relationships



coursework
and training

Step 4: Own Your Upskilling and Learning Path

Take ownership of your upskilling journey. Many people think of upskilling too narrowly, as simply improving or developing their technical skills. The breadth and depth of skills go beyond technical skills. Individuals should think more broadly and intentionally about the different skill sets and focus on the top must-have skills that are interesting and exciting. Combine your own upskilling development plan with the team's gaps or needs. Look at the DevOps Institute's skills outlook (see Figure 14) to help you prioritize.

Be more thoughtful and holistic about the training you receive through your job. Formal classroom training is not the only form of training. In many cases, it's the least effective because students rarely return to their jobs and immediately apply all the knowledge/skills they've just acquired.

Ask for feedback on your job performance to identify development needs. Don't wait for your manager, team member, or business client to give you feedback on your performance. Invite others to give you feedback. Once others know that you welcome feedback, you will receive more of it. Feedback is a key mechanism for measuring skill development and targeting development needs.

Continue your certification journey and manage your certifications. For 64% of our survey respondents, certifications are very valuable and 34% say they are somewhat valuable. Your choice of certification plan should be based on your own and your team's plan. Some certifications are free and for some, you must pay. Our research shows that 32% of organizations typically offer reimbursement for upskilling and certifications. 26% of survey respondents say that upskilling is mostly self-funded.

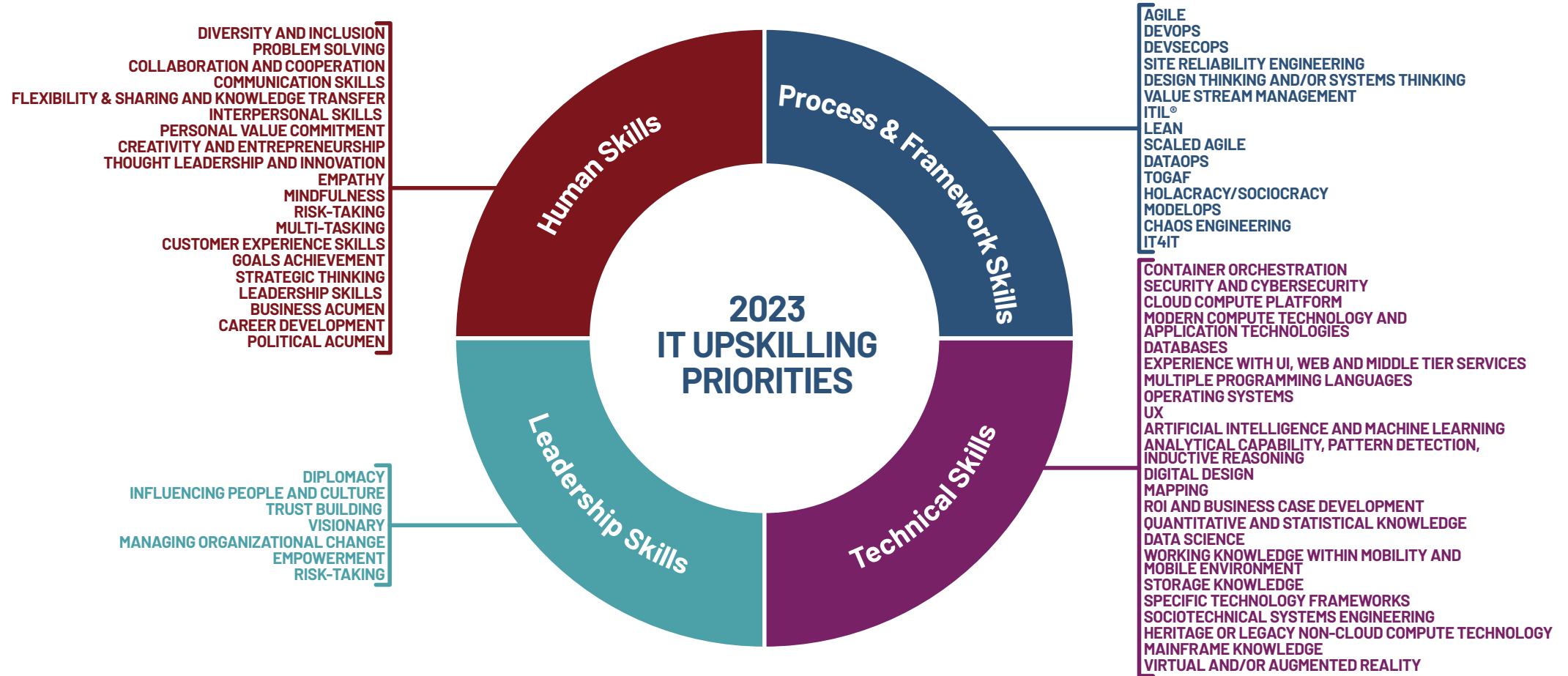
Join a community for inspiration, learning and connecting. There are many different communities for IT professionals to join. While there are different opinions and some hesitations about joining a community, there are many different benefits such finding mentors, increase your visibility, have access to community resources and get fresh and new perspective. The DevOps Institute today has over 180,000 [community members](#) and more than [200 Ambassadors](#).

“Being a part of various technology communities, including the DevOps Institute community, has been a game-changer for me. The connections, knowledge sharing, and opportunities for growth that come from being involved in a community are priceless. It's not just about what you can learn, but also about the relationships you build and the impact you can make. I highly recommend joining a community, and the DevOps Institute community is an excellent place to start.”

Adit Modi

Cloud Architect and
Community Leader at Digital Alpha

FIGURE 14: DEVOPS INSTITUTE IT SKILLS OUTLOOK



SOURCE: UPSKILLING IT 2023 SURVEY, DEVOPS INSTITUTE, DECEMBER 2022 | N=1385

Want More from DevOps Institute?

DevOps Institute is a global learning community that empowers the people who power IT – helping you develop both the professional and personal expertise to make the most of DevOps in both your business and your career.

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Instrument Design

For this research, the writer designed one questionnaire script and one brief interview script. The questionnaire for the survey takers from the companies consisted of 37 closed questions related to DevOps skill priorities and importance within their teams or jobs. The first part of the survey focused on the key skill domains and detailed skills within the domains—the second part of the questions focused on DevOps topologies, hiring situations, and challenges. The last part of the questionnaire consisted of demographic questions related to company size, region, the professional role of the participants, and the IT environment.

If you have questions on our survey methodology, please contact:
customerservice@devopsinstitute.com

Sponsors and Support

The DevOps Institute extends a special thank you to the following partners for helping make this year's survey possible: Platinum Sponsor Rancher by SUSE and support from Keysight and PeopleCert.

Acknowledgments

DevOps Institute would like to thank the many people who have provided their thoughts, ideas, inputs, and guidance on this year's report. This work is not possible without including and connecting with subject-matter experts, partners, and friends worldwide. We are incredibly grateful to them for their willingness to share, collaborate, discuss, critique, and contribute to this report. We also want to thank a few individuals who went above and beyond to help us with the survey and the publication of the report: Jaida Olvera, Ingrid Sides, Luke Sneddon, and Christina Majic. And finally, a huge thank you to all the people who have completed our survey, which is the foundation of our work.

Methodology

Global Upskilling IT 2023 Report is the fifth report capturing the perspectives of individuals that are involved in recruiting, hiring, or working within IT enterprise organizations. We set out to understand the must-have, nice-to-have, and optional skills within key skill categories. After extensive research around skill capabilities, we determined the following skill categories from the previous years. The target population for this survey was the community of IT practitioners, hiring managers, team leaders, consultants, human resources, and other individuals who are familiar with the different frameworks such as DevOps, SRE, and Agile. We targeted all industry verticals and all company sizes. We promoted the survey via online promotions, short research webinars, social media, presentations during major events, press releases, and our networks. We designed our survey questions with input from various team members and industry experts. We tested our survey questions extensively to ensure good constructs, and we leveraged SurveyMonkey Enterprise as our survey and design instrument. We collected primary data from our survey respondents. Our goal was to achieve a sample size of 2,500 individual responses targeting key geographic areas such as the Americas, EMEA, and the Asia Pacific region. The survey was open from September 1, 2022 until December 31, 2022. We received a total of 3,052 responses of which 1,385 were complete responses.

Authors and Biographies

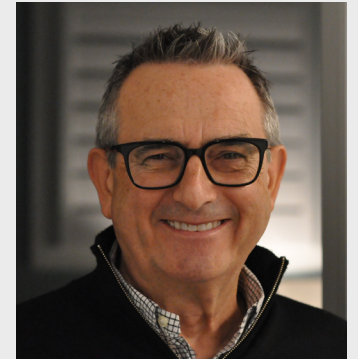
Eveline Oehrlich is Chief Research Officer at the DevOps Institute. As former VP and Research Director at Forrester Research, Eveline led and conducted research around a variety of topics including DevOps, Digital Operational Excellence, Cognitive Intelligence and Application Performance Management for 12 years. She is the author of many research papers and thought leadership pieces and a well-known presenter and speaker. She has more than 25 years of experience in IT. Her passion is to help companies transform their IT organization, processes and tools towards high-performing teams, enabling their business partners to achieve better business results. She has helped some of the largest enterprises across the world to adopt new strategies, workflows and automation within their journey toward a digital business.

Herb VanHook has extensive experience in information technology – as a user, a vendor, and an industry analyst. Herb left BMC Software in 2022 after 17+ years, serving in multiple roles, most recently as Vice President of Corporate Strategy, but also including stints as Vice President of Common Technology Services and interim CTO positions. Herb was an executive sponsor to major BMC accounts, a member of BMC's Thought Leadership Council, BMC's representative to the World Economic Forum (WEF), an advisor to U.S. Federal Cloud2 Commission, and an expert witness in IP litigation. Previously Herb was with META Group, Inc. (prior to their sale to Gartner), as a research analyst, service director, Executive Vice President of Research and Fulfillment, and Interim President and Chief Operating Officer. Herb started his career at IBM, and worked in systems engineering, development, and product manager roles. In addition to his contributions to this report, Herb spends his time in an advisory capacity to technology investors.

Julia Spencer Pape is a Research Associate at the DevOps Institute. Her primary duties are to plan and conduct research, manage data, provide support during research interviews and assist across the entire research publishing process. She has contributed to multiple research projects and plays a key role to reach the research goals for DevOps Institute. She has been in IT market research for over 15 years. In prior years, she served as a Senior Advisor at Forrester Research and led the Application Development and Delivery Executive Leadership Board Council.



Eveline Oehrlich



Herb VanHook



Julia Pape

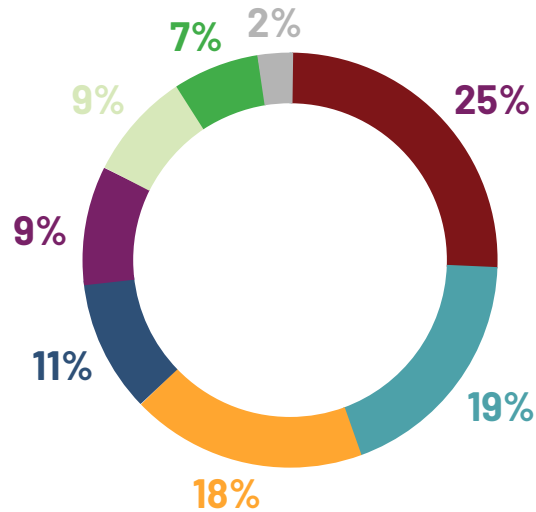
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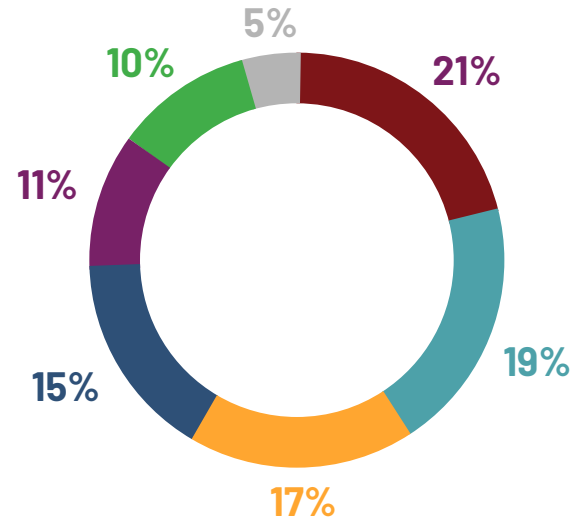
Demographics

Area of Work



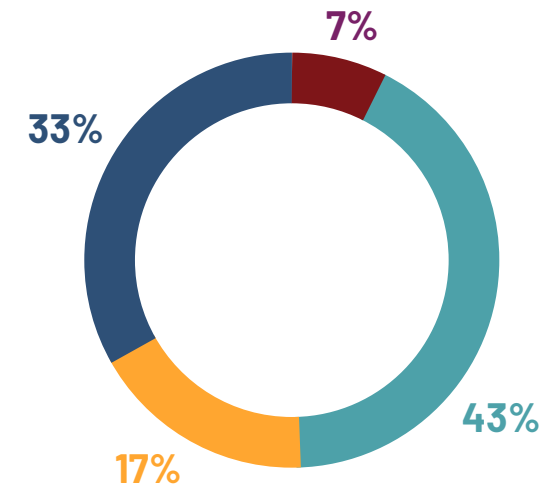
- Application or Software Development/Engineering (includes all aspects of application development, design, testing, QA, etc.)
- IT Infrastructure (non-cloud and/or cloud compute, storage, network, platforms)
- IT Operations (includes all aspects of operations)
- Security (includes all aspects of security)
- Service Desk or Service Support
- CIO, CTO, CXO or other C-Level...
- Business Team (any function outside...)
- None of the Above

Role



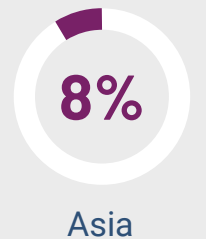
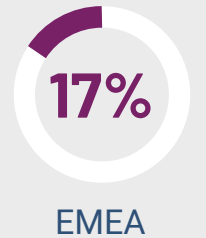
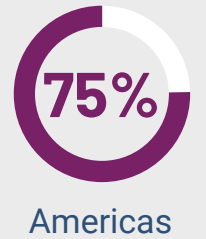
- Team Leader/Supervisor
- Management (e.g. senior manager, manager)
- Individual Contributor/Practitioner
- Senior Management (e.g. senior/vice president, director)
- External Consultant/Contractor/Coach or alike (full-time or part-time)
- C-Suite Executive
- Human Resource Professional (in charge of staffing and/or recruiting)

Company Size



- Large Enterprise (> 50,000 employees)
- Enterprise (>1000 to <50,000 employees)
- Small and Medium-Sized Business (>500 to <1,000 employees)
- Very Small Business (<499 employees)

Regional Response Distribution:



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