

State of

Worldwide Business Assurance

for SAP solutions – 2021

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Tricentis

Please note the views expressed in this report are not endorsed by SAP.

Contents

Introduction	3
Executive summary	4
SAP environment – trends and organizations’ preparedness	6
Cost vs. benefits among reasons for reluctance to adopt SAP S/4HANA	8
Growing cloud adoption competes with traditional preferences	10
SAP implementation methodologies – finding the best fit	12
SAP updates/versions – awareness and practices	13
Integration between SAP and non-SAP applications	18
SAP business assurance practices and outsourcing trends	20
IT teams or dedicated testing teams are responsible for SAP business assurance quality	22
Outsourcing trends in SAP business assurance	23
SAP business assurance – approach, maturity, and automation	28
Lack of focused business assurance strategy	30
Automation – future of SAP testing	32
Optimizing SAP testing with AI-/ML-based tools	35
SAP business assurance challenges, gaps, and impact	38
Security vulnerability, inability to accurately identify defects, key apprehensions	40
Disintegration between SAP and non-SAP applications can lead to delivery failure	42
Inefficient SAP testing – a major pitfall	44
Case studies	45
Ideal business assurance capabilities – understanding customer expectations	58
Organizations seek a holistic solution covering all requirements of end-to-end testing	60
High quality testing and ability to identify risks associated with SAP releases and upgrades – most prominent customer expectations	61
Concluding remarks	63
Research methodology	64

Introduction

Welcome to the *State of Worldwide Business Assurance for SAP solutions –2021* report. You might be wondering why we decided to conduct an SAP-focused quality study when there are already broader quality reports available—including the well-known World Quality Report by Capgemini and Sogeti. The short answer is that SAP has reached a pivotal point, placing extreme pressure on testing.

With the launch of the SAP Business Technology Platform (BTP), SAP has moved from an ERP company to one supporting full cloud-enabled digital transformation towards what Capgemini calls “The Renewable Enterprise”. What were previously massive monolithic applications are now architected with a clean S/4HANA core as the ERP and multiple cloud extensions. These can be SaaS solutions that address a specific enterprise function (like Ariba for procurement or SuccessFactors for HR). They could also be custom solutions built on the SAP BTP and other public cloud platforms, such as Microsoft Azure, AWS or GCP—based on microservices and leveraging intelligent technologies like IoT, AI, blockchain, etc.

SAP stands out as an extraordinary force in the field of enterprise apps. Its size and market penetration are stunning. Around 1,800 of the world’s largest 2,000 companies are currently SAP customers. Moreover, with the RISE with SAP offer, it is clear that enterprise processes will no longer start and finish with S/4HANA. Rather, they cross multiple applications and platforms and will continue to evolve at the growing speed of the market evolution.

Ultimately, this means that the vast majority of companies are facing extremely complex testing challenges with every update and every upgrade—to SAP as well as to the many interconnected components.

It just so happens that most SAP customers are currently in the midst of two *major* transformations. One is a deployment migration challenge: the move from on-prem to the cloud. The other is

a technology challenge: moving from ECC to an architecture based on S/4HANA and cloud applications and platforms. Both transformations are explored in-depth within this report. In both cases, many organizations are reporting that more than 60% of migration effort is consumed by quality assurance. This is not terribly surprising, given the complexity mentioned above and the scope of these transformations. And once SAP customers move to the cloud, SAP unleashes innovations at an unprecedented pace—on *their* schedule. Customers have no choice but to keep up, which means testing can’t continue to hold them back.

As this report reveals, SAP testing maturity is not yet where it should be. We found that budgeting for SAP end-to-end testing is rare, only about a quarter of enterprises automate a substantial amount of their SAP testing. Such testing shortfalls commonly lead to business impacts ranging from downtime (36%), to work delays (34%), to data issues (28%). But, the good news is that SAP customers appear to be headed down the right path. The majority of respondents are planning to start testing earlier, automate more, and tap advances like AI/ML to achieve the sophisticated, precise testing needed to get the most out of SAP technology.

We hope that this report inspires you to deeply examine—and continuously optimize—your SAP business assurance strategy as well as your broader quality assurance process beyond SAP. Thank you to everyone who participated in this report, both respondents and researchers.



Elisabetta Spontoni,
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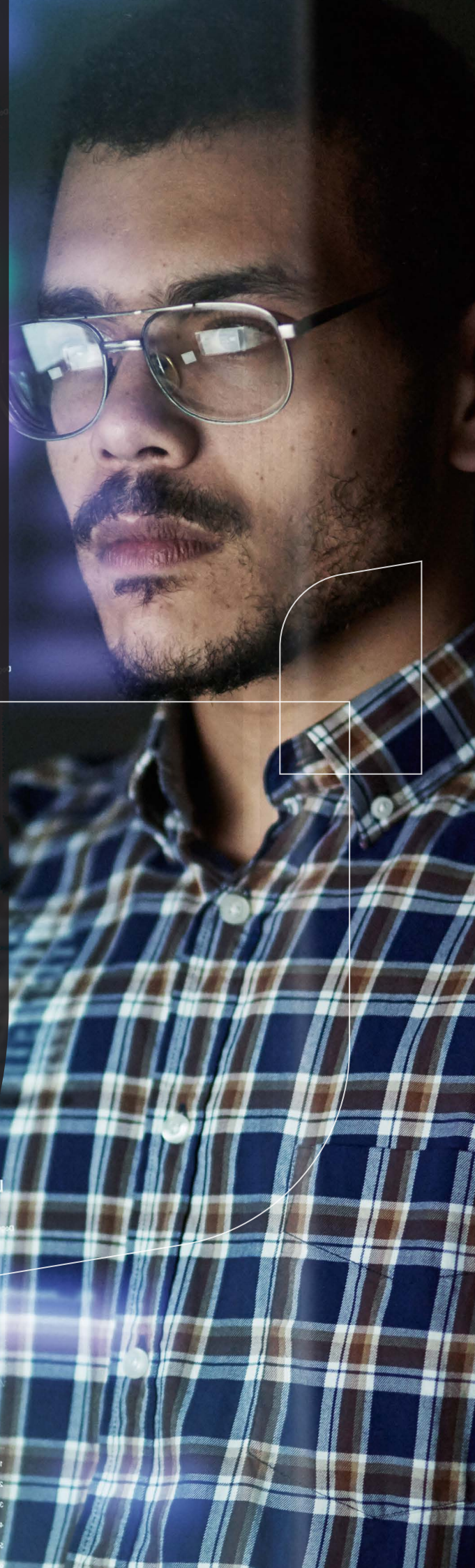
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Executive summary

In a rapidly transforming business and technological landscape, the transformation of SAP platforms are often associated with significant Enterprise Transformations that take advantage of cloud and intelligent technologies to reinvent the business. Organizations are increasingly opting for agile approaches that realize the required changes over potentially a long journey with multiple frequent iterations that requires technical prowess, and the mobilization of multiple departments within an organization, including management, technical experts, and end users. At the same time, growing digitization has led to increased importance of a robust SAP S/4HANA digital core, clean from customizations, with extensions built as microservices in cloud platforms and seamless integration with other SAP and non-SAP applications.



In order to achieve this, organizations need to deploy robust continuous testing processes to ensure that there are no gaps and the processes are executed across these different platforms seamlessly, while guaranteeing the expected business outcomes in a constantly changing environment.

Our study of existing SAP customers assesses the current SAP landscape and focuses on the importance and benefits of strong SAP business assurance practices. It presents an in-depth analysis of organizations' awareness about SAP versions and upgrades, adoption roadblocks, business assurance challenges and gaps, prevalence of automation, and business assurance best practices. In addition, through insights from detailed interviews with industry experts and some interesting case studies, the study highlights the real-world challenges in SAP testing and the role of business assurance partners in helping organizations overcome them.

Owing to the challenges posed by a rapidly transforming SAP landscape and limitation of internal staff, our study shows that organizations are now looking toward outsourcing SAP testing. The availability of requisite skills, latest tools and techniques, and experience of varied business cases is encouraging organizations to utilize the services of specialist service providers. Although many organizations still prefer their internal IT teams and dedicated testing teams to remain responsible for maintaining the quality of SAP business assurance, the overall preference for specialist service providers and system integrators is growing.

Despite the growing awareness and realization about the importance of SAP business assurance, we found that many organizations do not have a focused strategy or a dedicated budget for the same. Our study highlights that majority organizations allocate funds for SAP testing from their IT team's budget. At the same time, our

discussions with industry experts reflect a positive outlook in terms of organizations' strategy and approach for testing. Many organizations confirm that they are planning to increase the use of testing across all stages of project lifecycle in the coming months. They are also exploring the use of automation for SAP testing and agree that it can deliver more than 50% efficiency gains. Advanced technologies such as AI and ML are also likely to gain more traction in this space in the future.

Among the prevalent challenges, security vulnerability and inability of testing to identify defects are among the most critical concerns for organizations. Moreover, limited clarity on business requirements and unavailability of expertise are also among the key factors responsible for inefficient end-to-end testing. Integration of SAP and non-SAP applications during testing is another major roadblock.

Organizations find it difficult to maintain a seamless integration between cloud-based applications, IoT devices, and on-premises applications. Such requirements have further reinforced the need for strong business assurance capabilities, as any defect or miss in the testing procedure could lead to severe financial and operational loss for organizations.

Considering the necessity of SAP business assurance for successful SAP transformation journeys and seamless business operations, our study also delves into the expectations that organizations have from an ideal business assurance solution. Most organizations seek an all-encompassing solution that takes care of end-to-end testing processes and delivers comprehensive, risk-oriented results through proactive understanding and assessment of risks associated with SAP versions and upgrades.

SAP environment – trends and organizations' preparedness

Our assessment of the current SAP landscape shows that despite some inhibitions and challenges in adopting more advanced versions of SAP ERP, most organizations are highly aware of the benefits and importance of moving towards newer versions and automation.

Key Takeaways

- Frequent updates and upgraded or new versions of SAP products, especially those that are cloud-based, empower users with advanced analytics and enable increased efficiency and productivity
- SAP ECC is still the most popular SAP version with 43.2% of surveyed organizations currently using it, followed by SAP S/4HANA with an adoption rate of 33.1%
- Organizations struggle with internally justifying the overall costs involved in moving to SAP S/4HANA as opposed to the expected benefits from this change
- Over 91% of the organizations that have not upgraded to SAP S/4HANA have either already begun the migration or plan to do so in the next 24 months
- Cloud adoption competes with traditional preferences with 51.9% of organizations stating that they host SAP infrastructure in-house, whereas ~42% utilize either public or private cloud (or both)
- Among SAP implementation methodologies, Hybrid (Agile and Waterfall) methodology is the most preferred and accounts for a 36.1% share, followed by pure Waterfall at 27.4%; for non-SAP applications, Agile is the most preferred method with 30.7% share
- More than 64% of respondents indicated that they are 'very aware' about the regular updates/versions released by SAP; SAP community (63.9%) and notifications from SAP (52.8%) have emerged as top information sources for SAP-related updates
- More than 70% of surveyed organizations believe that they are 'completely prepared' or 'mostly prepared' to incorporate frequent SAP changes/updates
- Data migration (43.5%) and data security (42.8%) are the two most prominent challenges that organizations face while moving to advanced versions/updates
- Most organizations now realize the importance of engaging a specialized service provider to overcome the challenges faced in implementing advanced SAP versions/updates, cited by ~91%
- Among the top drivers for partnering with specialized service providers are their technical expertise (44.9%) and process efficiencies (37.7%)
- Use of automation is on the rise with 23.6% of organizations having 'completely automated' their SAP change and release management procedures and 34.1% having 'mostly automated' them

SAP environment – trends and organizations' preparedness

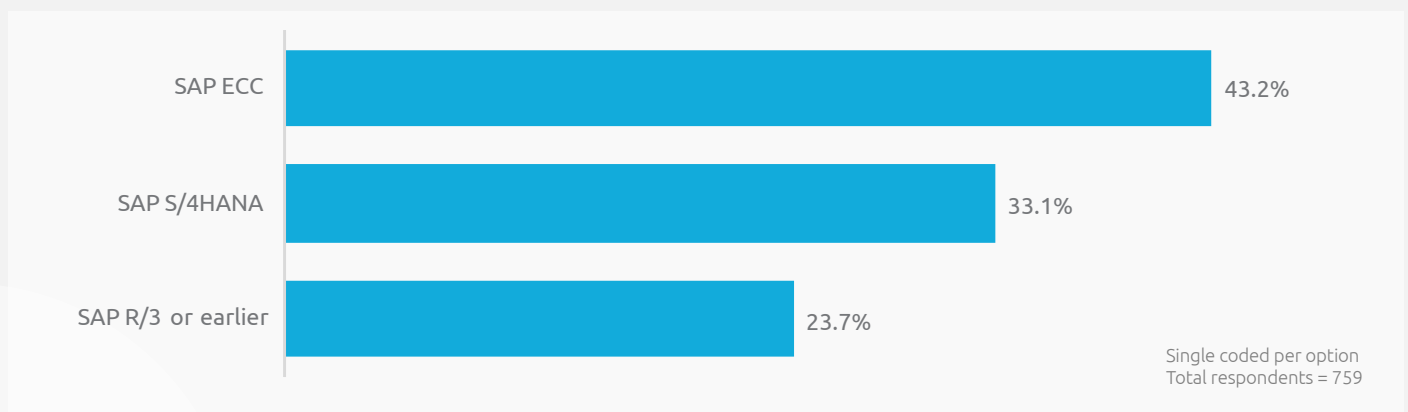
SAP is one of the most popular ERP systems, and acts as the backbone of business processes across departments for organizations globally. While businesses continue to benefit from it, the overall SAP environment has undergone rapid disruption in recent years. Changing business needs, rapid advancement in technology (such as cloud, AI, and ML), and a growing need for integrating new SAP and third-party applications and independent IoT devices with internal corporate applications are just some of the disruptive forces contributing to the dynamics in this space. Others include high volumes of data, and an increasingly agile development environment needed to cope with the speed of change in the rapidly evolving market.

More frequent updates and newer versions of SAP products, especially the cloud-based ones, empower users with advanced analytics and enable increased efficiency and productivity. Simultaneously, these disruptions pose new business process risks, implementation challenges, cost impact, and most importantly, increased levels of complexity for enterprises. This section

of the report discusses the current SAP adoption and implementation trends and organizations' preparedness to deal with the challenges emerging from the changing SAP landscape.

Cost vs. benefits among reasons for reluctance to adopt SAP S/4HANA

SAP's S/4HANA (launched in 2015) is touted to hold multiple benefits over its predecessors. It offers real-time advanced analytics capabilities, simplification of processes, greater productivity and performance, easy transition to cloud, and more. To fully leverage these new capabilities the right approach to moving to S/4HANA is not a technical upgrade, but a business-driven transformation. This is the way to unleash benefits that go much beyond the cost of the transformation. The companies approaching this move from the IT angle only, are not likely to get business buy-in and investment approval and many are still on ECC for this reason. According to the survey results, 43.2% of surveyed organizations currently use ECC. SAP S/4HANA's adoption rate is 33.1% and SAP R/3 or older systems account for the remaining 23.7%. simplification of processes, greater productivity and performance, easy transition to cloud, and more.



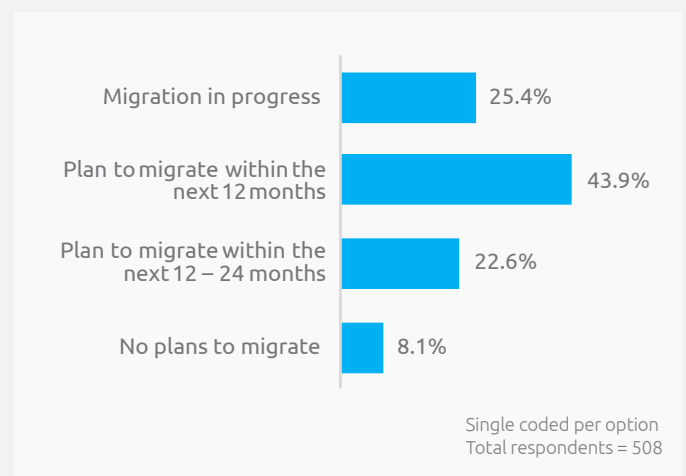
Question 1: Which version of SAP is currently being used by your organization?

Our discussions with industry experts suggest that substantial change management requirements, differences in data structure, and need for considerable knowledge and skills (to work on SAP S/4HANA) are some of the common obstacles slowing its adoption. Additionally, third-party software (e.g., Salesforce or Hyperion from Oracle) and multiple in-house applications are already fully integrated with ECC or other existing SAP systems in many organizations. In such cases, migration to SAP S/4HANA requires extensive and time-consuming integration with all such platforms.

“Although SAP S/4HANA is far more technically advanced, the decision to switch is tough, particularly given the high costs involved. Migrating to SAP S/4HANA entails a significant and fundamental change in operations. Also, it is not always easy to demonstrate an appreciable uplift in value to the top management. Further, specific skills are required to operate SAP S/4HANA, which also makes it difficult for organizations to plan immediate migration.

Vice President – Global IT Business Solutions
at a piping system manufacturer

While many factors have affected the adoption of SAP S/4HANA, SAP continues to invest in its market expansion. The COVID-19 pandemic has also influenced the migration rate, as organizations seek to adapt to changed business requirements and move toward cloud-based technologies. A move to SAP S/4HANA can help them effectively manage enhanced requirements for digitalization, flexibility, and speed. Our survey results also reveal 91.9% of the organizations that have not upgraded to SAP S/4HANA have either already begun the migration or plan to do so in the next 24 months. The survey results show that 25.4% of organizations are already in the process of moving and 43.9% expect to move in the next 12 months. Further, 22.6% plan to move to SAP S/4HANA within the next 12 to 24 months. Only a small number of firms have indicated no plans to move to SAP S/4HANA.



Question 2: What are your plans to migrate to SAP S/4HANA?



The interviewed experts unanimously believe that moving to SAP S/4HANA is not an easy decision. It entails significant investment of time and resources, technical changes, and expertise. It is therefore critical that an organization intending to embark on this journey evaluates all its existing resources, business needs, and deployment channels to ensure smooth and effective transition of its core ERP functionalities.

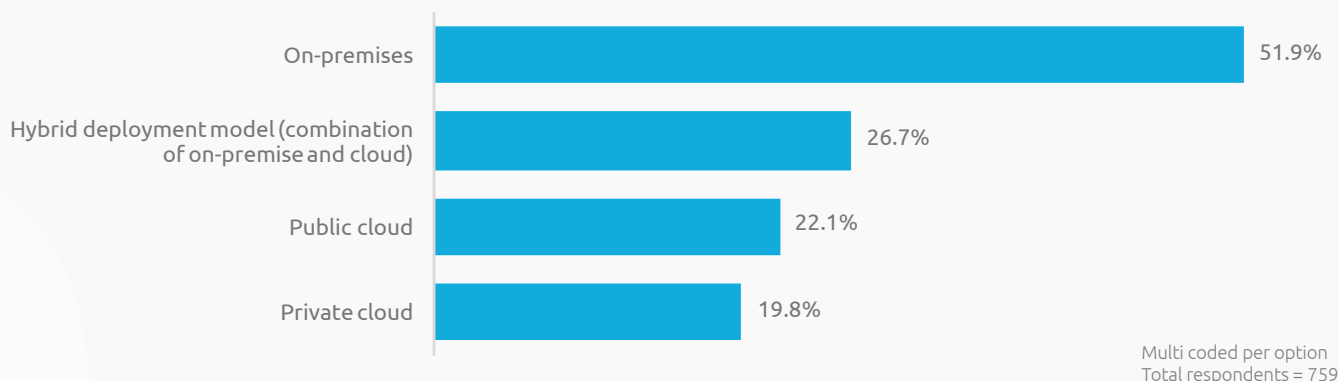
Growing cloud adoption competes with traditional preferences

The amount of data that organizations work with on a day-to-day basis is increasing tremendously. According to IDG, global data volume is expected to reach 175 zettabytes by 2025. A survey by the organization also revealed that data volumes are growing at a monthly rate of 63%.¹ In order to efficiently manage and optimally utilize this data, organizations need to have a strong supportive infrastructure, either on-premise or on cloud. The recent advancements in technology and newer versions of SAP in the market make it critical for organizations to choose wisely between the two.

The size of an organization and the required level of customization are important factors that influence the decision about a preferred mode. Additionally, other parameters such as data security, infrastructure scalability, and ease of access to the newest updates/changes are also critical in helping organizations choose between an on-premise and a cloud-based solution.

Our survey results show that 51.9% of organizations host SAP infrastructure in-house, whereas ~42% utilize either public or private cloud for the same. Although public cloud is considered a low-cost and scalable option, access to fewer software features, limited control, and fewer customization options limit its adoption. On the other hand, private cloud provides greater flexibility, control, and functionality, albeit at higher cost.

Among the surveyed organizations, 26.7% shared that they use a Hybrid model, i.e. a combination of on-premise and cloud. The model allows them to manage their core system and applications on internal servers and, at the same time, enjoy SAP improvements/upgrades without paying the higher charges of a full-scale in-house software license.



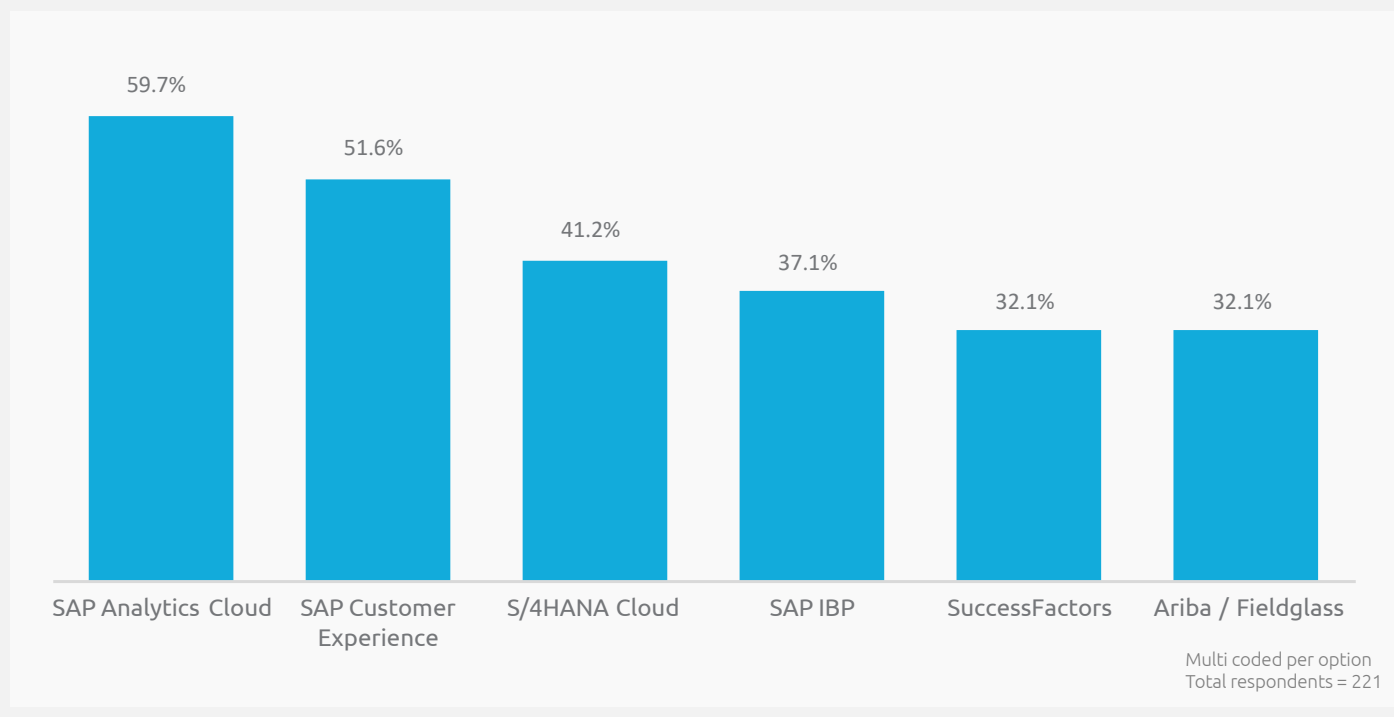
Question 3: How is your SAP infrastructure housed/managed?

¹ <https://www.dataversity.net/the-impact-of-data-growth-on-enterprises>

Our conversations with industry experts reflect that by running applications on cloud, organizations can secure a much higher return on their investment than by operating their own application server and hardware. One of the biggest concerns with the usage of cloud has been data security. However, advancement in cloud technology and focused data security teams have provided growing assurance of a secured data environment to cloud users.

We expect the adoption of cloud-based SAP solutions to grow, owing to the inherent cost advantage and enhanced security features of cloud-based solutions and the ongoing digital disruptions. In fact, SAP has also released cloud-based modules/solutions for all critical business functions, including customer experience, human resources, accounting and finance, and supply chain management. It has also recently issued its 'RISE with SAP' cloud offering to encourage organizations to shift towards cloud.

Of the different cloud-based SAP applications, our survey results suggest that Analytics Cloud, which combines business intelligence (BI), augmented analytics, predictive analytics, and enterprise planning in a single solution, is the most popular application and is used by 59.7% of respondents. This is followed by SAP Customer Experience (51.6%) and S/4HANA Cloud (41.2%). In addition, SAP has further expanded its portfolio by acquiring companies such as SuccessFactors and Ariba that offer new-generation cloud solutions to address specific lines of business.



Question 4: Which cloud SAP applications are you currently using?

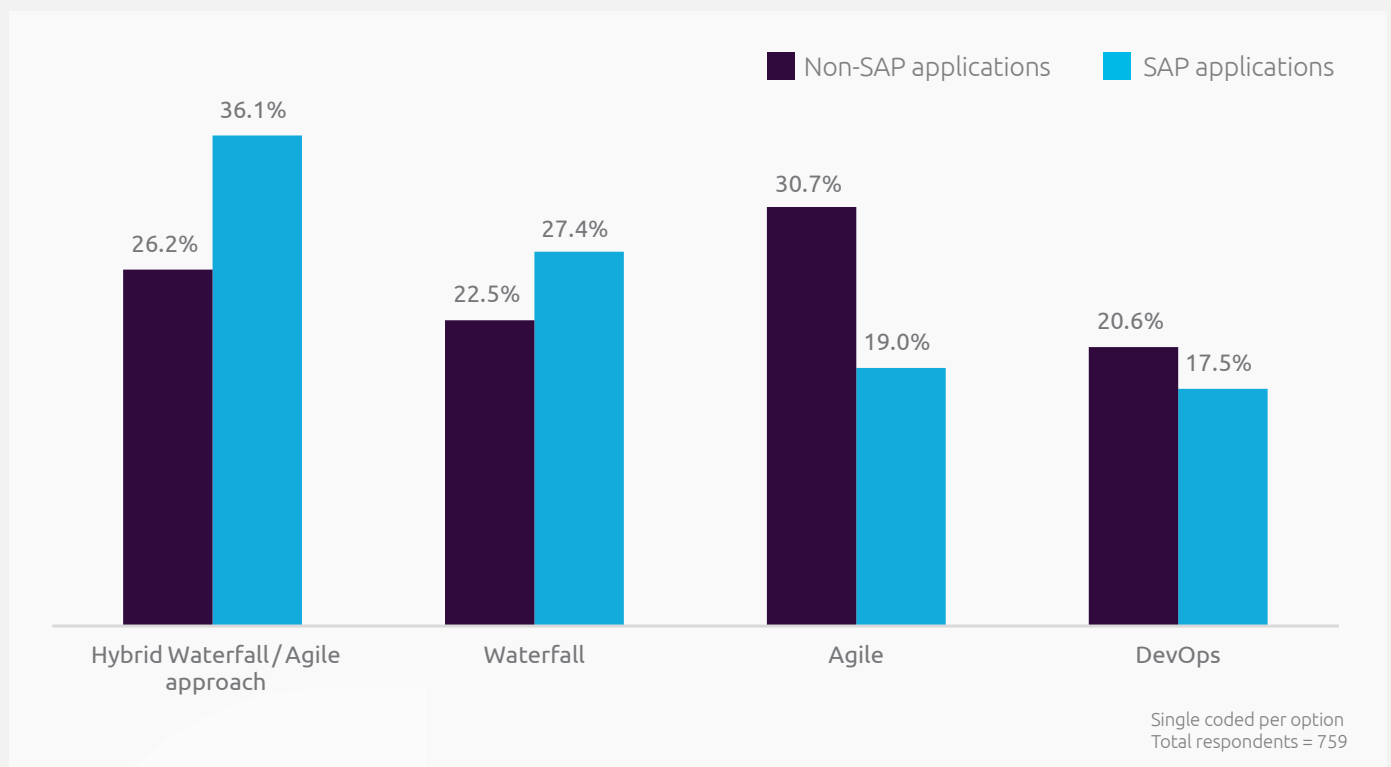
SAP implementation methodologies – finding the best fit

The adoption of Agile and DevOps methodologies for non-SAP applications is on the rise, but Waterfall and Hybrid are still the most popular methodologies for SAP implementation. According to our survey results, Hybrid (involving both Agile and Waterfall methodologies) accounts for a 36.1% share in the methodologies used for SAP implementation, followed by pure Waterfall, which accounts for a 27.4% share.

On the contrary, for non-SAP applications, Agile is the most prominent development methodology with over 30% respondents indicating it is their

preferred option. DevOps methodology also has a higher share in the non-SAP applications space (20.6%) compared with that in SAP (17.5%). It is important to note that the numbers on DevOps adoption are based on the survey results and might also be impacted by the respondents' understanding of the methodology.

Higher adoption of the Hybrid model for SAP can be attributed to the fact that it combines the advantages of the Waterfall method (for large-sized applications such as SAP) and Agile, enabling faster implementation wherever possible.

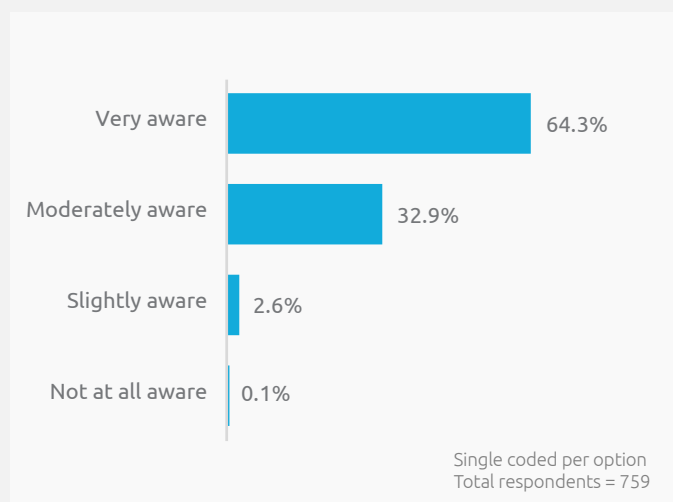


Question 5: Which implementation methodology is the most frequently deployed for SAP and non-SAP applications at your organization?

SAP updates/versions – awareness and practices

Awareness directly impacts organizations' ability to realize the latest capabilities

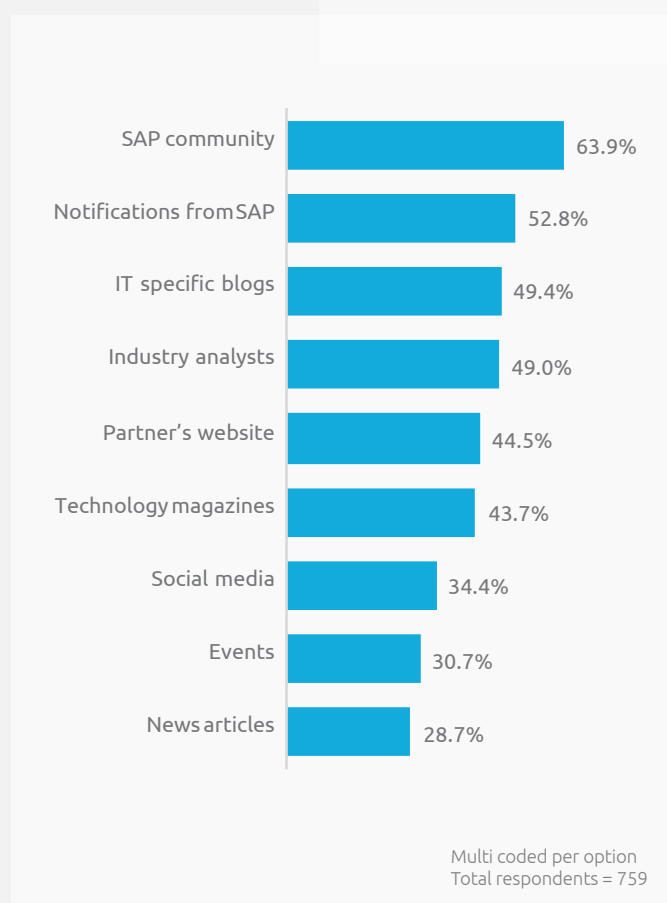
Driven by the rapid disruptions in technology, SAP has significantly increased the frequency at which it introduces new updates. Considering this velocity, awareness of the changes is the first step to being able to implement the updates and optimally benefit from them. Our survey results suggest that despite the high frequency of updates, organizations have been able to keep themselves abreast with these changes. More than 64% of respondents indicated that they are 'very aware'



Question 6: How aware are you about the regular update/versions released by SAP?

about the regular updates/versions released by SAP and 32.9% indicated that they are 'moderately aware'. Only 2.7% stated that they keep little or no track of the developments.

Among the various modes of engagement, SAP community (63.9%) has emerged as the most dominant source of SAP's update-related information for respondents, followed by notifications from SAP itself (52.8%). IT-specific blogs are the third most used option (49.4%), closely followed by industry analysts (49%).



Question 7: What sources do you rely on to get information on different SAP updates?

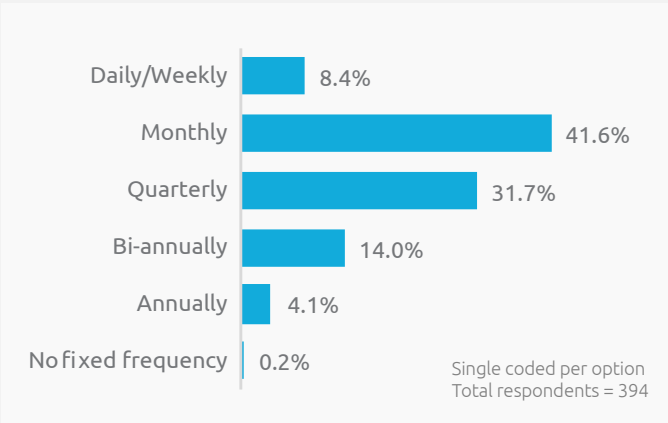


Monthly or quarterly update implementation more prevalent

While most of the updates on cloud infrastructure are pushed automatically, on-premise infrastructure needs deliberate action from organizations to implement different SAP updates. Our survey shows that 41.6% of organizations incorporate updates to their on-premise SAP applications on a monthly basis and 31.7% do so on a quarterly basis. The frequency of updates may depend on the criticality of update, the testing required post the incorporation of update, and customer preparedness.

“ The scope of updates and/or upgrades has shifted from merely correcting omissions to enhancing features. They are more peripheral than core considerations. In such cases, it is more important to consider the business value that can be derived from such updates. This evaluation should be conducted by experts who can systematically analyze all potential updates and assess their relevance to the business.

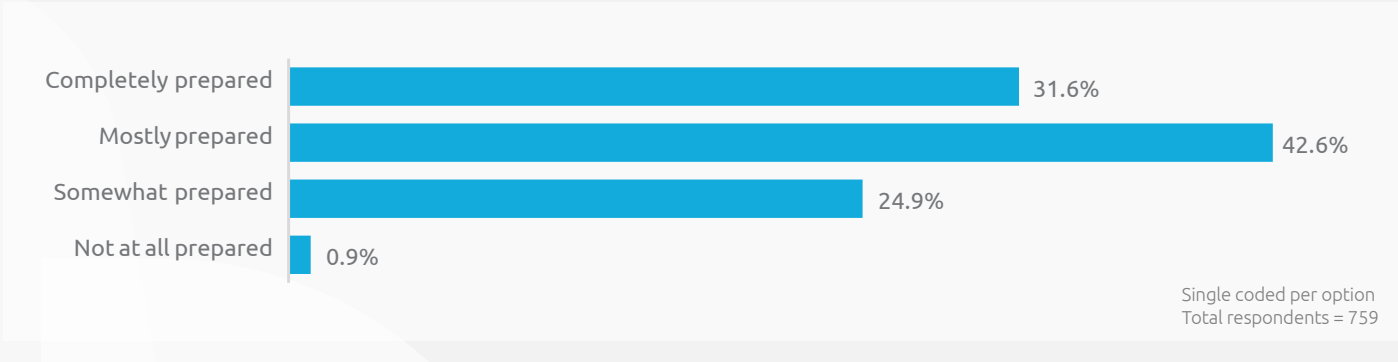
Vice President – Global IT Business Solutions
at a piping system manufacturer



Question 8: What is the frequency of SAP updates for on-premise SAP applications in your organization?

Most organizations indicate a high level of preparedness

Implementing frequent SAP changes/updates requires due diligence and specialized skill sets. Our survey results indicate that about three quarters of organizations believe they are ‘completely prepared’ or ‘mostly prepared’ to incorporate frequent SAP changes/updates. However, ~25.8% of respondents have indicated lack of preparedness to deal with these changes. Our discussions with experts suggest that a key factor for low preparedness of organizations could be less than optimal understanding of their SAP systems and lack of necessary skills/tools.



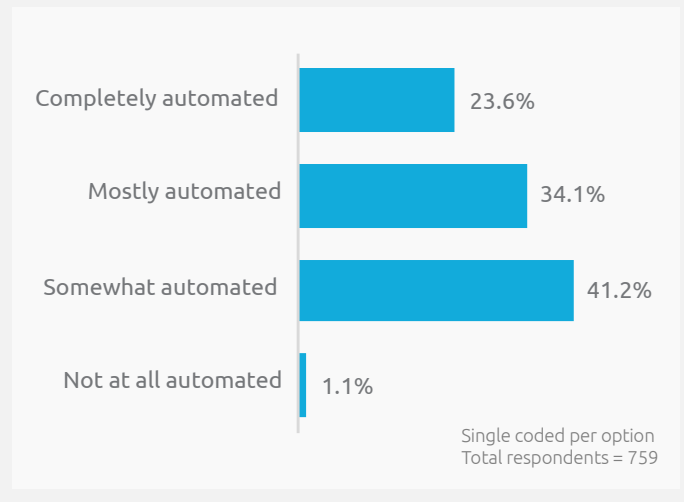
Question 9: How prepared is your organization to incorporate these frequent changes/updates?

Automation to accelerate and optimize SAP changes/updates

Use of automation in SAP change and release management can be instrumental in expediting the process. Several third-party automated tools claim to eliminate the need for manual operation and rapidly implement approved changes across the overall SAP system. With a growing need for faster implementation and higher efficiency, demand for automation in this space is likely to increase. Our survey results indicate that 23.6% of organizations have 'completely automated' their SAP change and release management procedures and 34.1% have 'mostly automated' them. At the same time, ~42% of organizations still lag in terms of automation for SAP changes/releases, leaving significant scope to further optimize their SAP processes.

“Once you have established well-defined and documented processes and expected outcomes, it makes perfect sense to have automation for updates and version upgrades. It is a one-time investment that makes performing repetitive tasks much easier. However, it is vital to have a well-built business case and thorough knowledge for making such an investment.

Vice President Finance – Supply Chain and Operations at a window coverings and architectural products manufacturer

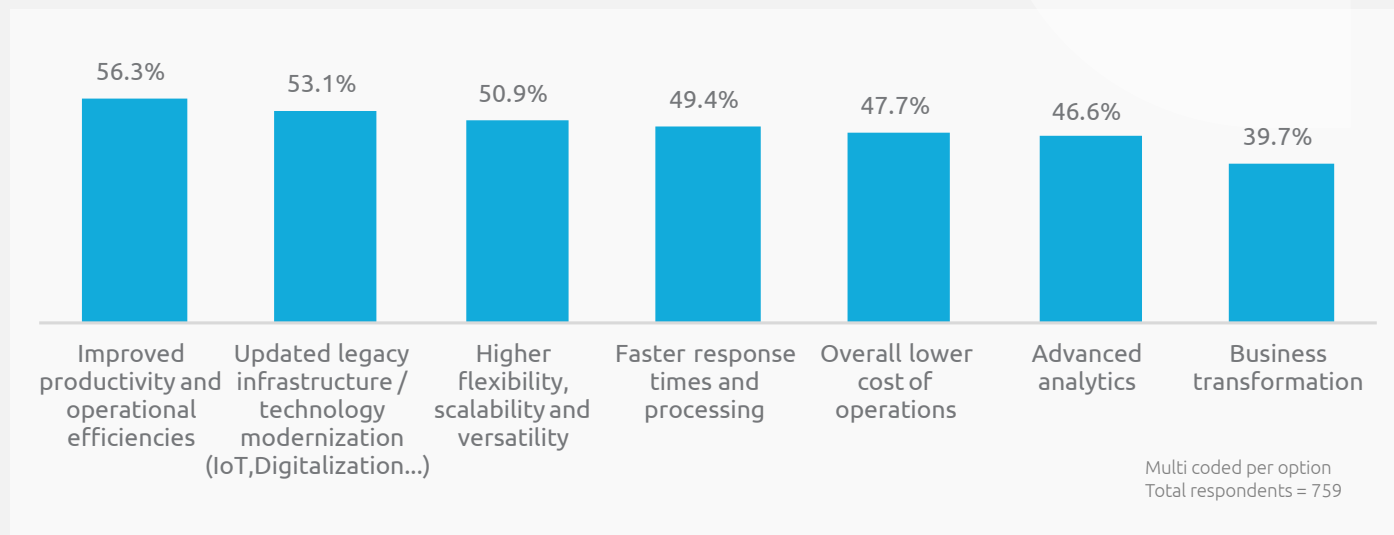


Question 10: To what extent is SAP change and release automated at your organization?

Enhanced productivity and technology upgrades – top two benefits of advanced SAP versions/updates

Despite the challenges in upgrading or implementing an update, advanced SAP versions/updates provide multiple benefits for organizations, not only on the technology front but also in terms of productivity and flexibility. Our survey results indicate multiple benefits of advanced SAP versions/updates, with the most prominent being improved productivity and operational efficiency (56.3%). Other key advantages include faster response time and processing, improved cost efficiency, and advanced analytics.

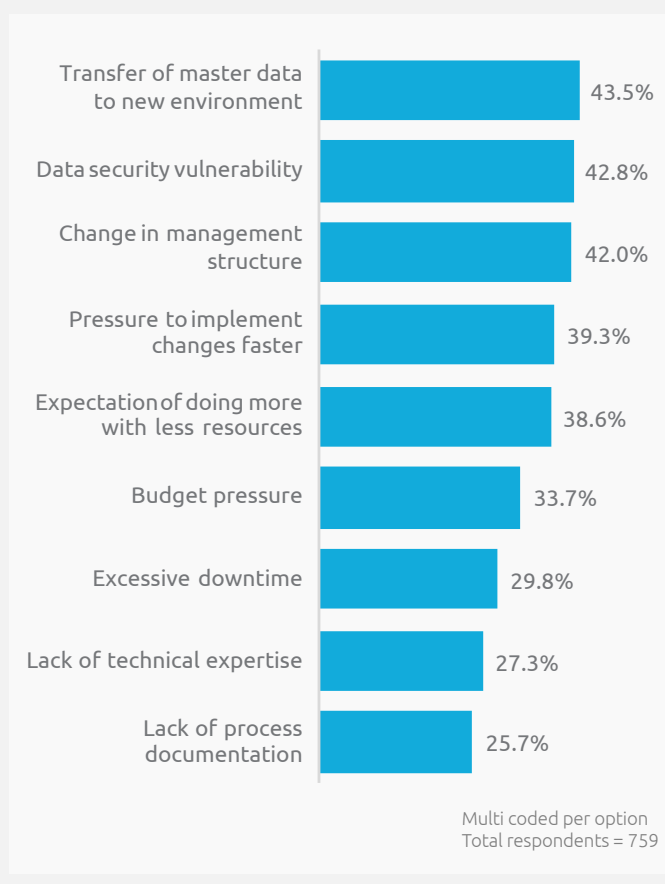




Question 11: What key benefits are achieved from implementing advanced SAP version/updates?

Data migration and security concerns hold back organizations from migrating to advanced SAP versions/updates

While multiple benefits encourage organizations to implement advanced SAP versions/updates, several associated risks/challenges act as hurdles in this journey. Integrating a new update or moving to a new version can be a highly complex process and requires proper planning, resource allocation, and assessment, as lack of extensive evaluation and understanding may result in multiple challenges and business risks. Our survey results indicate that data migration (43.5%) and data security (42.8%) are the two most prominent challenges that organizations face while moving to advanced versions/updates. Any loss of master data or data security breach can prove extremely damaging; hence, these aspects have to be meticulously evaluated before migrating to advanced updates/versions. Other challenges encountered include changes in management structure and resultant changes in priorities, pressure to implement changes faster, inadequate resource availability, and budget constraints.



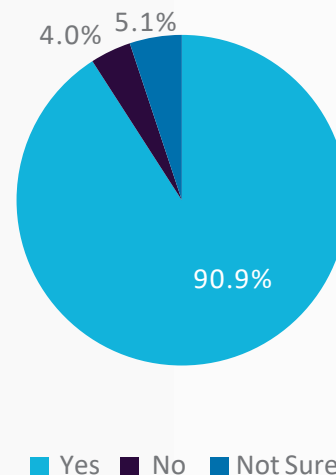
Question 12: What are the key challenges you face while implementing advanced SAP version/updates?

Overwhelming majority believes specialized service providers can help overcome challenges

Our survey results indicate that most organizations now realize the importance of engaging a specialized service provider to overcome the challenges faced in implementing advanced SAP versions/updates, with ~91% of respondents citing this. Specialized service providers bring both functional and technical expertise, which organizations' internal staff may lack and is required to deal with various challenges. A deeper analysis of survey results indicates that 44.9% of respondents believe that service providers bring additional technical expertise, 37.7% believe they enable process efficiency, and 34.8% believe them to be instrumental in ensuring business operation continuity.

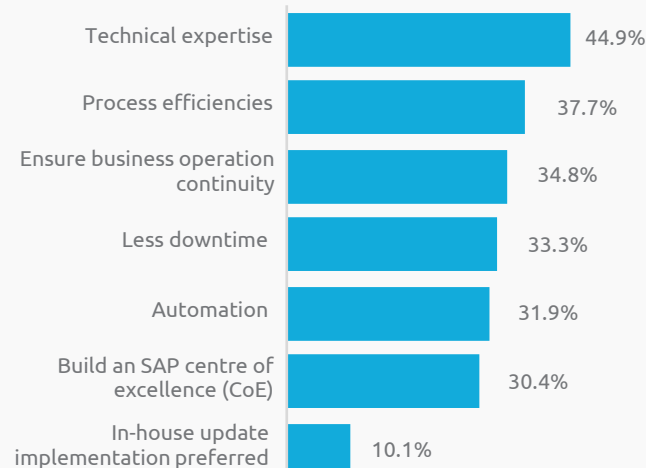
“When we had to integrate our acquired company on our ERP platform, we preferred to move to SAP S/4HANA. We realized that we must do so to save cost and effort, as we might otherwise have to switch to SAP S/4HANA from ECC in the next two or three years. The challenge was that we didn't have the competency for cloud solutions. Engaging a specialized service provider that handled the upgrades in hardware and implemented the system helped us achieve our objective.

Vice President Finance – Supply Chain and Operations at a window coverings and architectural products manufacturer



Single coded per option
Total respondents = 759

Question 13: Do you feel that a specialized service provider can help overcome these challenges?



Multi coded per option
Total respondents = 759

Question 14: What are the key drivers to work with a specialized service provider to overcome the challenges experienced while implementing advanced SAP version/updates?

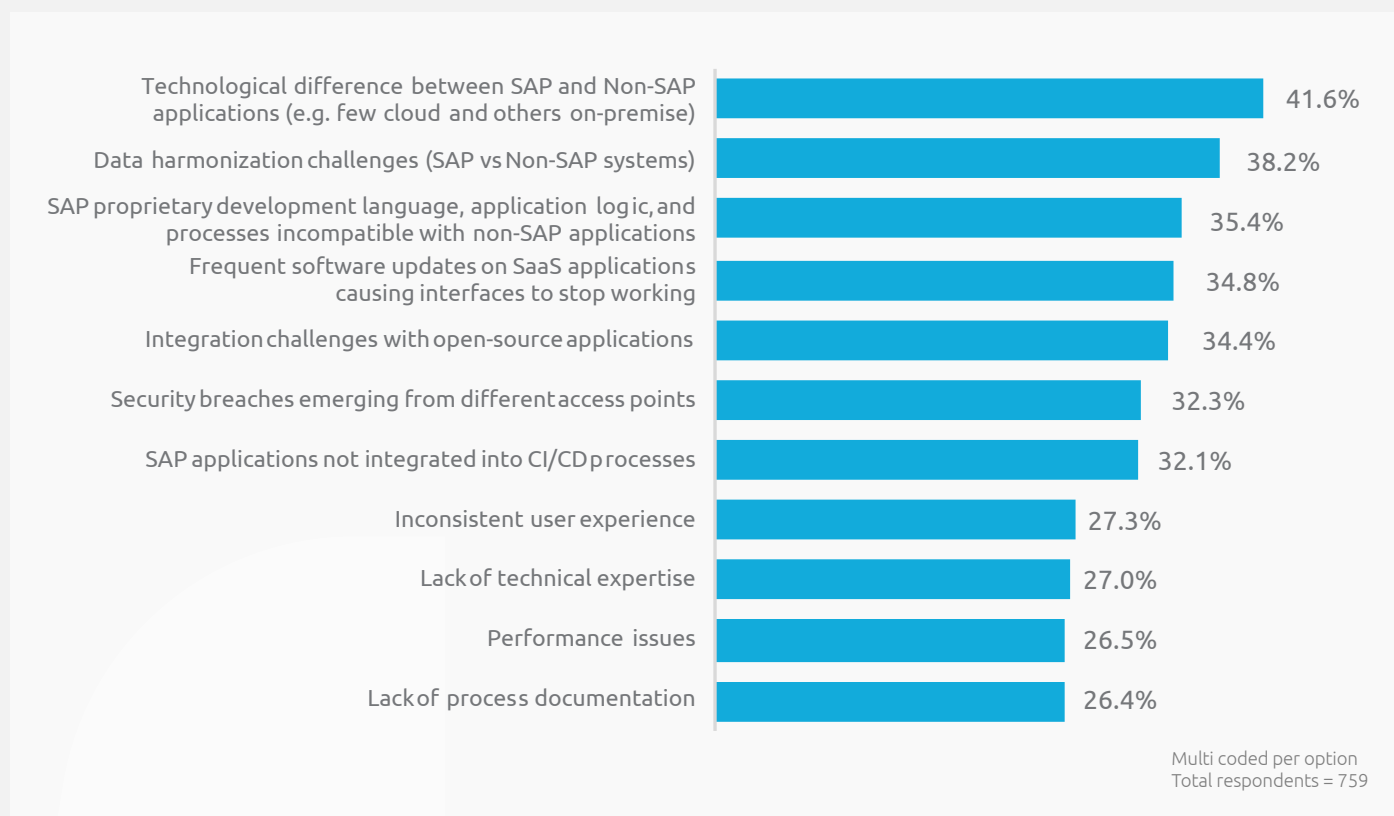
Integration between SAP and non-SAP applications

Technological differences, data harmonization, and non-compatibility – key challenges in the integration of SAP and non-SAP applications

In today's connected world, a large number of IoT devices, external supplier/vendor portals, and third-party applications are integrated or are required to be integrated with organizations' internal SAP systems. Integrating SAP applications with non-SAP counterparts presents challenges because it requires substantial system/application customization on virtual or physical infrastructure. Moreover, using traditional integration tools, such as an integration platform-as-a-service (iPaaS) or an API management system, involves considerable complexity, especially in the event of an extension of workflows to cloud or their scaling to support

third-party applications and systems such as IoT, AI, machine learning, or industry 4.0. Despite several advancements in the SAP ecosystem, organizations face many challenges in securing the requisite integration.

Our survey results indicate technological difference (41.6%) between SAP and non-SAP applications (with a few being on cloud and others on-premise) is the most prominent integration-related challenge faced. This is followed by data harmonization challenges (38.2%) and non-compatibility of SAP proprietary development language, application logic, and processes with non-SAP applications. Other obstacles include integration challenges with open-source applications, frequent software updates on SaaS applications causing interfaces to stop working, multiple access points enabling security breaches, and SAP applications not integrated into CI/CD processes.



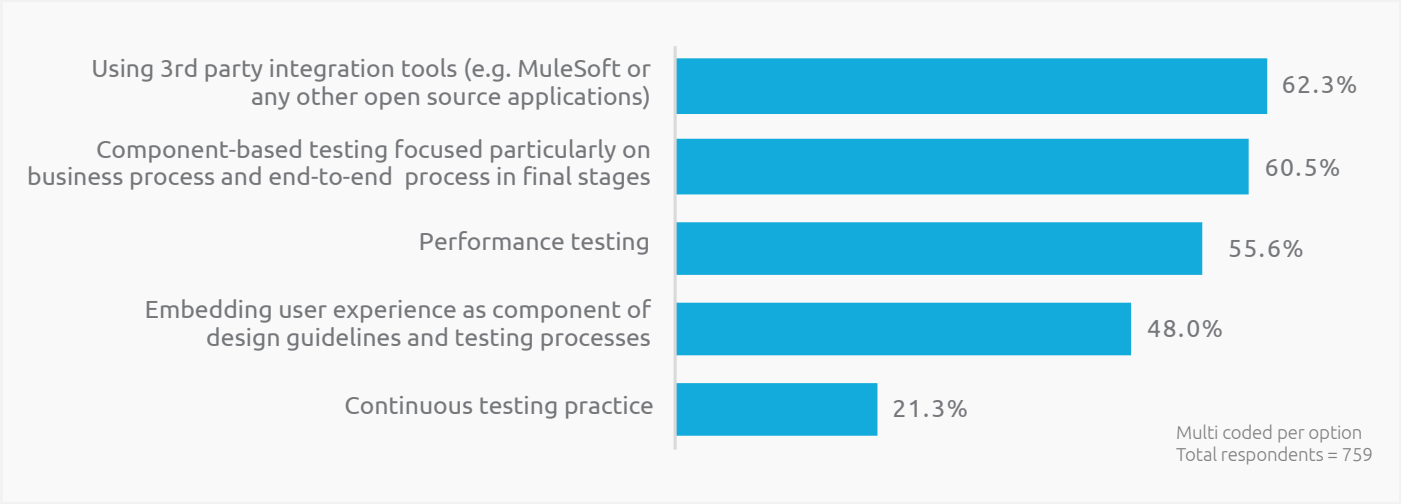
Question 15: What are the integration challenges being faced between SAP and non-SAP applications?

Third-party integration tools – most trusted solution to overcome integration challenges

Our survey results reveal that third-party integration tools (62.3%) are considered most effective in helping organizations deal with the challenges of integrating SAP and non-SAP applications. Other prominent solutions include component-based testing focused on business processes and end-to-end processes in final stages (60.5%), performance testing (55.6%), and embedding user experience as a part of design guidelines and testing processes (48%).

“How to integrate SAP with a third-party software/application is one of the biggest issues we face. They have different technologies. SAP uses SAP technology for integration, whereas CPI is on cloud. Connecting with a specialized integrator is also challenging, as you have to make all the three – SAP, third-party applications, and the specialized service provider – work together. However, involvement of the SAP middleware tool can help simplify the integration process.

Vice President – Global IT Business Solutions
at a piping system manufacturer



Question 16: What measures are taken to overcome integration challenges

Our in-depth assessment of the SAP environment provides a clear view of the developments/ changes that are taking place currently and are likely to continue in future. The ongoing digital disruptions are paving the way for further changes, both technological and functional. While offering new opportunities, these changes will require organizations to take focused and strategic steps to mitigate the risks/challenges emerging from them. Robust/end-to-end testing or SAP business assurance practices will be core to these steps as they play an instrumental role in ensuring the smooth integration and optimization of upgrades and new releases. The following section focuses on the existing SAP business assurance/end-to-end testing practices.

SAP business assurance practices and outsourcing trends

The growing complexity of enterprise application environments and rapid developments in cloud infrastructure and other technologies have made efficient business assurance critical for successful SAP transformation. Our survey results reflect a growing trend toward the adoption of specialist service providers for business assurance as organizations strive to minimize risks and optimize their ERP systems.



Key Takeaways

- Although the role of multidisciplinary teams in testing processes has been growing, 45.6% of organizations hold their IT department responsible for ensuring the overall quality of SAP business assurance
- The high complexity of tasks in the current and future SAP landscape demands specialized skillsets and expertise, for which many organizations are either looking to engage with specialist service providers or already have one for SAP implementation, testing, and business assurance support
- Our survey results show that 36.2% of respondents rely on specialist testing service providers for SAP business assurance and 27.4% use a Hybrid model, which includes both an in-house team and an external partner
- Experts believe that due to their exposure to other clients, specialist service providers bring greater objectivity, broader understanding, and a more widespread experience of methods to enable the timely detection of potential flaws/risks and mitigation strategies
- API testing/component testing is the most dominant use case for specialist testing service providers with 45.1% of respondents using a specialist testing service provider for this, closely followed by performance testing with 43.7%
- Around three quarter of respondents who use a Hybrid model to meet their SAP business assurance needs indicated that less than 50% of their overall SAP business assurance tasks/processes are managed by a specialist testing service provider
- Organizations using a Hybrid model are likely to increase the share of specialist service providers in their overall SAP business assurance efforts, with about 50% of respondents indicating increased use of SAP business assurance specialists over the next 24 months
- A majority of the organizations that currently use an in-house model for SAP business assurance are planning to utilize specialist testing service providers over the next 36 months

SAP business assurance practices and outsourcing trends

In the previous section we saw how digital disruption has led to an unprecedented level of change in the overall SAP environment. It also showed how extremely high update frequency, newer versions, integrated systems, cloud infrastructure, and numerous other factors have made transformations and operations more challenging than ever. Consequently, the importance of testing has increased multifold, with the realization that the success of any SAP implementation depends significantly on efficient and robust SAP business assurance/end-to-end testing processes.

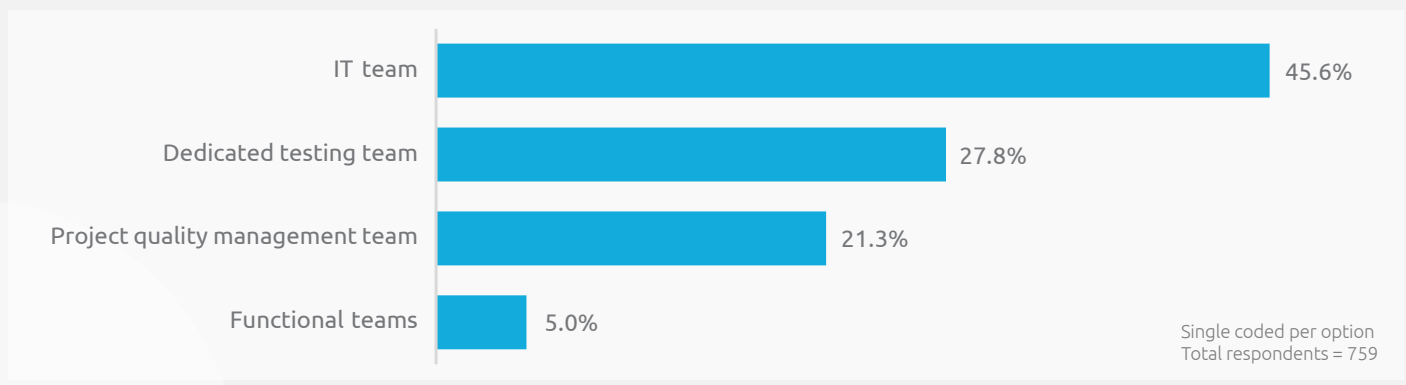
The changing times have created a pressing need for organizations to take a more focused and structured approach to running end-to-end SAP testing processes. This will enable them to reduce/eliminate any business risks that might emerge from the implementation of SAP updates and from changes originating from other areas of the IT landscape. To fulfil the evolving SAP testing needs, organizations have been relying on different best practices, such as involving dedicated multidisciplinary teams and hiring specialist service

providers that might help them realize the full value of their SAP investments and mitigate any business operation failure risks.

To understand how organizations are reacting to changing SAP testing needs, it is imperative to first understand their existing practices. In this section, we have assessed the existing methods organizations use for SAP business assurance, the responsible departments, and the current or planned future use of specialist service providers.

IT teams or dedicated testing teams are responsible for SAP business assurance quality

Although the role of multidisciplinary teams in testing processes has been growing, the IT department is responsible for ensuring the overall quality of SAP business assurance in most organizations. Be it coordinating different departments to ensure robust testing, evaluating automation options, or engaging with specialist service providers, the IT department plays a critical role. Our survey results indicate that 45.6% of organizations hold their internal IT team responsible for the overall quality of SAP business assurance/end-to-end testing. Further, 27.8% of organizations have dedicated testing teams for end-to-end SAP testing and 21.3% rely on the project quality management team.



Question 17: Which team is responsible for overall quality of SAP business assurance/end-to-end testing? ²

² IT Team refers to the IT department which is responsible for all the technology related decision of the organization; Dedicated testing team refers to a specific team that only performs the SAP testing tasks; Project quality management team refers to the team responsible for overall project quality checks and tests; Functional teams refer to user testing teams within the various functional departments such as accounting, marketing, finance, HR.

The complex landscape of IoT devices, third-party applications, advanced SAP versions/updates, need for speedy implementation, and criticality of ERP systems to core business functions have pushed organizations to look for specialist service providers for their SAP business assurance needs. These specialist service providers help organizations achieve efficiency and ensure robustness in their SAP testing processes by identifying automation opportunities, key risk areas and mitigation strategies, and formulating other customized best practices. Here is an in-depth assessment of the current and future trends around the prevalence of such specialist service providers.

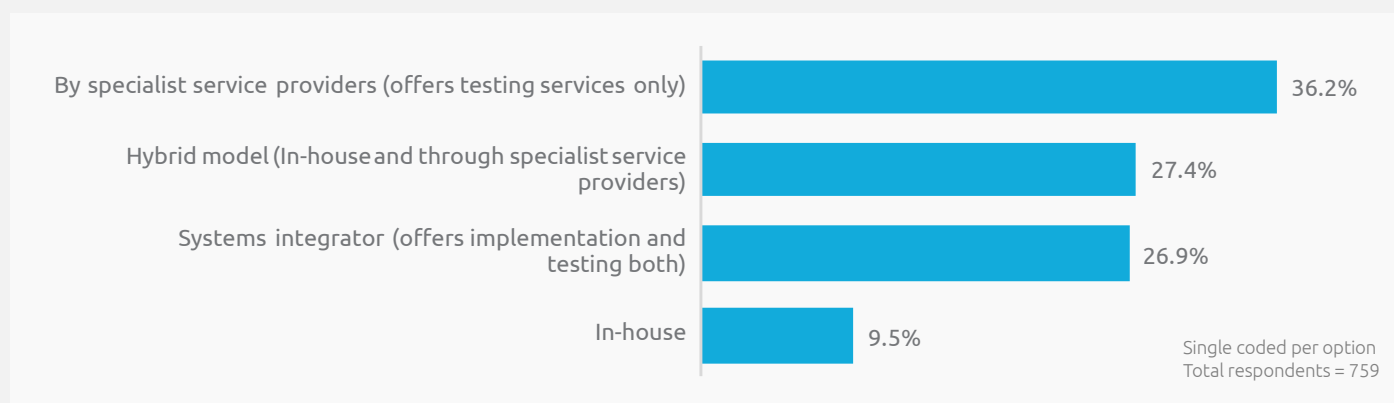
Outsourcing trends in SAP business assurance

Preference for specialist service providers

Organizations find it challenging to manage frequent changes across the complex SAP landscape. The high complexity of such tasks demands specialized skillsets and expertise. Owing to the lack of necessary resources and skills within internal teams, organizations are now increasingly looking for specialist service providers who can bring in the required expertise and perform end-to-end testing of SAP systems in a more effective manner.

Our survey results indicate strong prevalence of specialist testing service providers with 36.2% of respondents relying on them for SAP business assurance. Further, 27.4% use a Hybrid model, which includes both an in-house team and a specialist testing service provider. Our discussions with industry experts suggest that the need for streamlining end-to-end testing processes and automation is a key driver for organizations to engage with specialist service providers. They bring the required process and technical expertise. In addition, their experience with other clients opens new avenues to optimize testing processes and enables a greater level of efficiency. Specialist service providers also bring greater objectivity, broader understanding, and a more widespread experience of methods to ensure timely detection of potential flaws/risks and mitigation strategies.

Our survey results also show that engaging with system integrators for both SAP implementation and testing is another common practice, with 26.9% of respondents leveraging them to meet their testing requirements. Interestingly, less than 10% respondents completely rely on in-house testing, suggesting a strong presence of external partners in this space.



Question 18: How is SAP business assurance/end-to-end testing being conducted in your organization?

“In my view, deploying a Hybrid model is the best, as it leverages both in-house expertise and that of an external party who may be more objective and have broader thinking and understanding of probable errors. Also, an external service provider holds the experience of other business cases from the industry, which can provide a better idea about the possible flaws and ways to improve or enhance the overall testing process.

Vice President Finance – Supply Chain and Operations at a window coverings and architectural products manufacturer

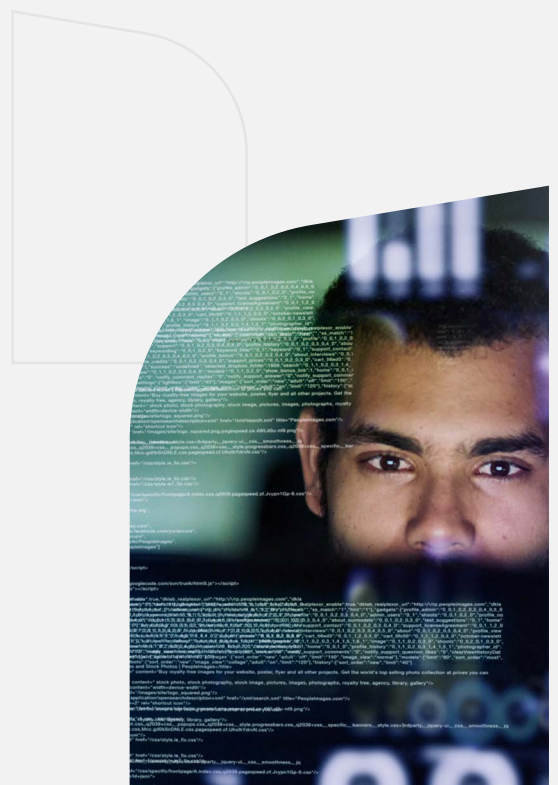
“The majority of organizations now use a Hybrid model where an internal team holds the accountability and ownership of testing, along with the support and expertise of a service provider. Consulting a service provider for SAP testing is a great value add because they can help to build test cases, test scripts, test data, test execution, and perform error correction. It is like throwing it over the wall and getting your work done. However, complete outsourcing may not always be preferred.

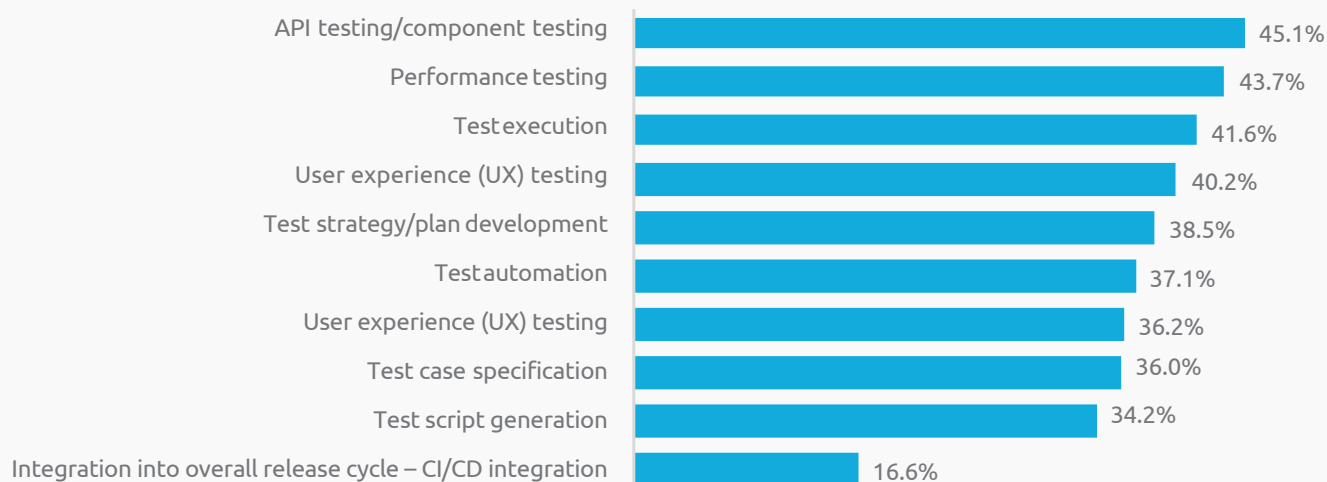
Vice President and CIO at a medical devices manufacturing company

Specialist testing service providers being used across the SAP implementation lifecycle

Multiple factors, including the level of internal expertise, resource availability, launch timelines, and budgeted cost, determine the stages/processes a specialist SAP testing provider may be hired for.

Our survey results indicate API testing/component testing as the most dominant use case for specialist testing service providers, cited by 45.1% of respondents. This is closely followed by performance testing with 43.7%. Experts suggest that API testing is one of the most challenging parts of the overall testing process because it determines the expected functionality and performance of applications on which the overall success of software depends. Many organizations typically lack the technical expertise in this area. Unless an organization has a dedicated and skilled internal technical team, specialist service providers emerge as the most suitable option to run tests because they bring strong technical expertise and extensive past experience.





Multi coded per option
Total respondents = 483

Question 19: For which of the following activities do you engage with specialist service providers?

“Specialized service providers are mostly engaged for API testing, as end business users do not understand the technicalities involved in application development. They are rather more concerned about the final output derived from operating these backend applications. Third-party testing service providers build several virtual test cases to assess application performance. They can even develop automated testing scripts to reduce the number of manual tasks involved.

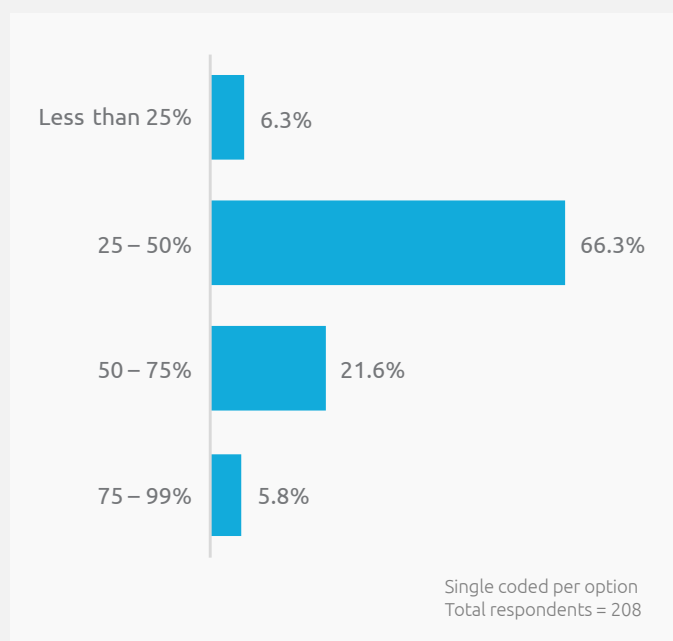
Vice President – Global Business Systems at a welding products manufacturer

“In a Hybrid SAP testing model, some procedures are performed internally. For others, a third-party expert is leveraged. While the structure may differ from one organization to another, we prefer our in-house team to design and conduct unit tests. However, we prefer to work with specialist service providers to provide assembly and system integration and to train our internal business team for user acceptance testing.

Senior Director, Enterprise Applications – SAP at a power generation company

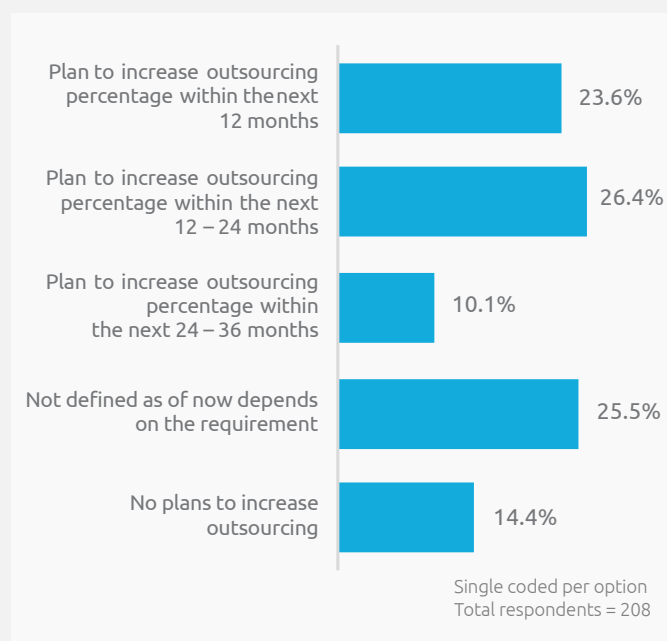
In addition to the key activities where specialist service providers are typically used, it is also interesting to look at the quantum of their involvement in testing processes, specifically among organizations that use a Hybrid model.

Around three quarter of respondents who use a Hybrid model to meet their SAP business assurance needs indicated that less than 50% of their overall SAP business assurance tasks/processes are managed by a specialist testing service provider. Further, 21.6% respondents who use a Hybrid model agreed that they use a specialist testing service provider for 50-75% of such tasks and only 5.8% of respondents said that they use them for more than 75% of the tasks/testing requirements.



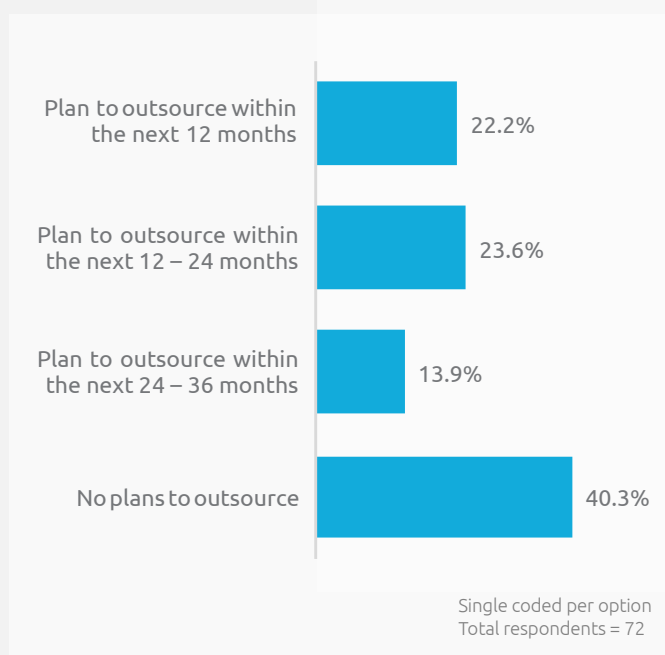
Question 20: What percentage of your SAP business assurance/end-to-end testing is currently managed by a specialist service provider?

Currently, the overall penetration of specialist service providers among organizations that use a Hybrid model for SAP business assurance looks low. Our survey results indicate that organizations using this Hybrid model are likely to increase the share of specialist service providers in their overall SAP business assurance efforts. About 50% of respondents indicated increased use of specialist service providers for SAP business assurance over the next 24 months. At the same time, 25.5% of organizations stated that it depends upon the requirement and is not defined as of now.



Question 21: What are the organization's plans for increasing the use of specialist service providers for SAP business assurance/end-to-end testing in the next 1-3 years?

Additionally, the analysis of organizations that currently use in-house models for SAP business assurance indicates that a majority of them are planning to utilize specialist testing service providers over the next 36 months. Our survey results show that 22.2% of respondents plan to use a specialist service provider in the next 12 months, 23.6% plan to do so in the next 12-24 months, and 13.9% in the next 24-36 months. This reflects a growing realization of the added value that a specialist testing service provider brings to the table.



Question 22: What are the organization's plans for using a specialist service provider for SAP business assurance/end-to-end testing in the next 1-3 years?

Overall, we are witnessing growing traction for specialist service providers in the SAP business assurance space and the trend is likely to continue due to the technical and functional expertise that these providers offer. They possess the necessary skills, tools, and expertise required for identifying possible test scenarios, risks, and mitigation strategies that businesses may lack.



SAP business assurance – approach, maturity, and automation

Although organizations now realize the importance of engaging a business assurance specialist service provider for ensuring successful SAP implementation, they are still evolving in terms of their approach, use of technology, and readiness for automation.



Key Takeaways

- Over two-third of surveyed organizations do not have a dedicated budget for SAP end-to-end testing and among those that have a budget (32.9%), the distribution of budget is scattered across various teams
- Around three quarters of respondents who admitted having a dedicated budget indicated less than a 15% share for SAP end-to-end testing in their overall department budget. About 8% of organizations have set aside more than 20% for testing
- About half of the surveyed organizations conduct SAP testing at project preparation (51.4%) and business blueprint development (51.3%) stages, indicating the introduction of SAP testing in early phases of the implementation lifecycle. It helps them identify and mitigate critical issues/risks early to minimize the costs/delays that may occur due to late-stage corrections
- Indicating a growing trend toward organizations looking to start SAP testing at early stages, 62.1% of respondents were not performing SAP testing at project preparation. 61.4% of respondents who were not conducting SAP testing at business blueprint stage are planning to start it over the next 12 months
- Over a quarter (26.6%) of the surveyed organizations have an automated SAP testing system in place, while 29.9% still rely on a manual approach, and 43.5% of organizations use a combination of manual and automated SAP testing
- The extent of automation for organizations already using it suggests significant scope for expansion, with more than 60% of the organizations using automation in SAP testing automating less than 50% of their SAP testing processes
- More than 50% of respondents use automation for regression testing, 47.2% conduct automated API tests, 46.1% automate their functional testing procedures, and only 32% use automation throughout the entire SAP testing lifecycle
- About 60% of respondents have suggested that a fully automated testing process can bring more than 50% efficiency gains in SAP testing processes and 36.2% of respondents expect the efficiency gains to be in the range of 25% to 50%
- Only about a quarter of surveyed organizations currently use AI/ML to automate SAP testing. Lower adoption can be attributed to the lack of required technical expertise, limited understanding of benefits against costs, and the absence of success stories/examples around the usage of AI/ML in SAP testing

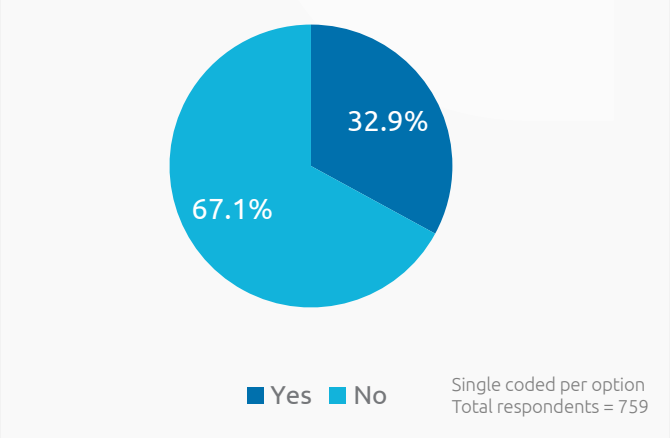
SAP business assurance – approach, maturity, and automation

Most organizations now realize the importance of a robust business assurance process in ensuring the success and efficiency of SAP platforms. Despite the realization, their level of maturity, approach, use of technology, and readiness for automation are some of the critical aspects that still seem to be evolving. In order to better understand the reasons for this and the trends in these areas, it is imperative to first assess the availability of a focused budget for SAP testing, methodologies used, prevalence of testing at different stages of the SAP implementation lifecycle, extent of automation, and other related areas.

Lack of focused business assurance strategy

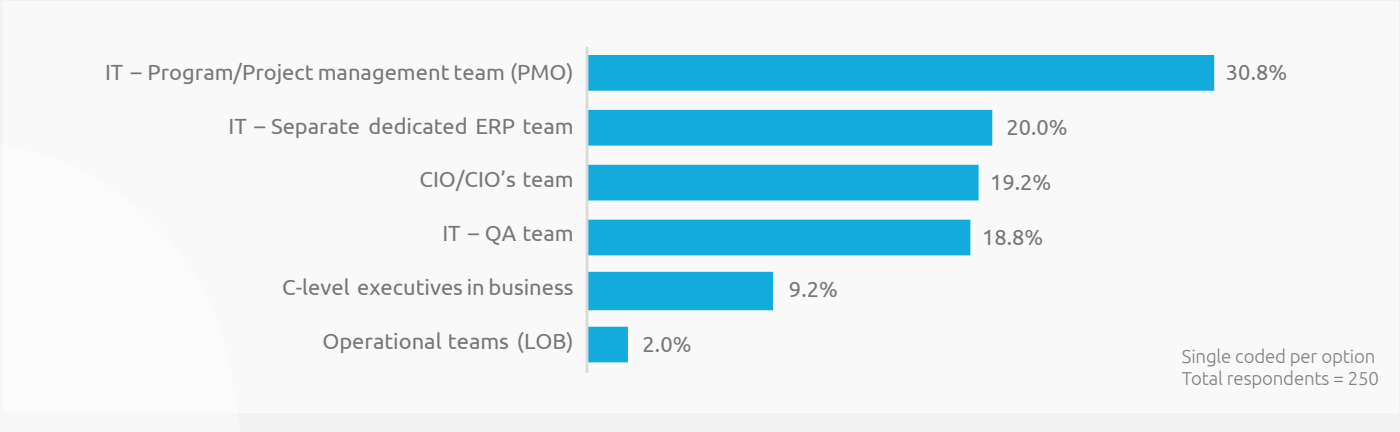
Overwhelming majority do not have dedicated budget

Despite acknowledging the importance of SAP business assurance, many organizations do not maintain a separate SAP testing budget, suggesting the lack of a focused strategy around it. Our survey results indicate that over two-thirds of organizations do not have a dedicated budget for SAP end-to-end testing.



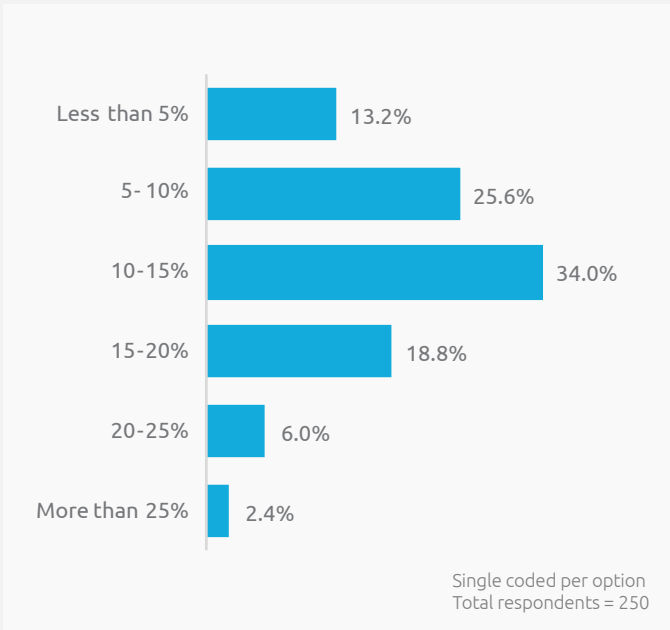
Question 23: Do you have a dedicated budget for SAP end-to-end testing?

Further, there is a wide range of approaches in terms of the function or department that holds the budget among organizations (32.9%) that claim to have a dedicated budget for SAP end-to-end testing. Our survey results suggest that among such organizations, the program/project management team (PMO) is the budget holder for 30.8% of respondents, while a dedicated ERP team holds the funds for 20%. Further, the core IT/technology department still plays a critical role in this space for many organizations. Only in 11.2% of organizations with a dedicated budget, either C-level executives in business (other than CIO) or an operations team (LOB) have control of the budget.



Question 24: Which department/function holds the budget for SAP end-to-end testing?

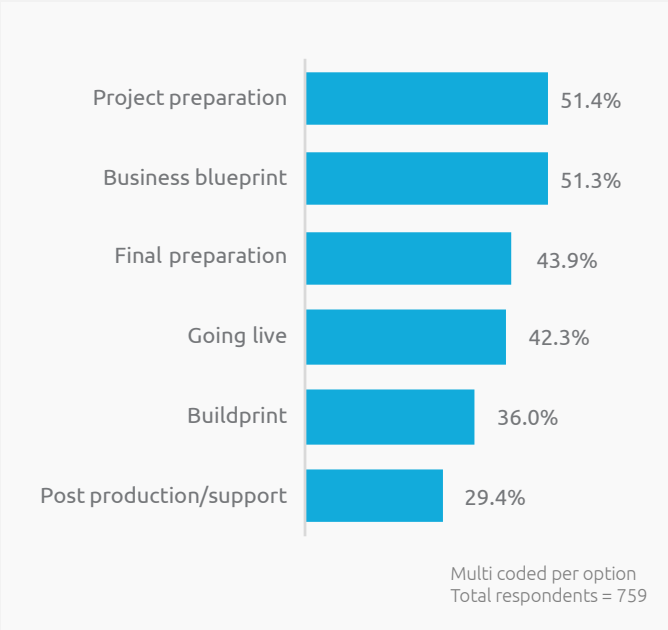
To better understand the criticality of SAP end-to-end testing for the organizations that claim to have a dedicated budget, we also analyzed the percentage of budget set aside for it. About three quarters of the respondents who admitted having a dedicated budget indicated less than 15% share for SAP end-to-end testing in their overall department budget. About 8% of organizations have set aside more than a 20% share for testing. According to industry experts, one of the reasons for maintaining a low budget for ERP testing could be the possibility that internal IT teams mostly perform ERP tests and replicate the same testing scenarios based on their past experience.



Question 25: What percentage of budget is allocated to department/functions for end-to-end testing of the ERP solution?

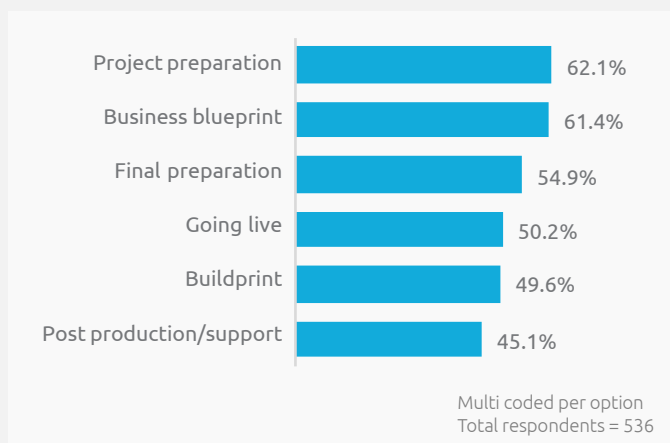
Unified approach for SAP testing across different stages

Use of SAP testing across all phases of the project lifecycle is an industrialized approach. Indeed, our survey shows testing across all stages, with about half of the surveyed organizations conducting SAP testing at project preparation (51.4%) and business blueprint development (51.3%) stages. This indicates the introduction of SAP testing in the early phase of the implementation lifecycle, which helps identify and mitigate critical issues/risks early to minimize the costs/delays that may occur due to late-stage software corrections. Additionally, 43.9% of organizations run testing at final preparation stage and 42.3% at the go-live stage



Question 26: At what stages is SAP testing currently being performed at your organization?

In order to understand the near-term plans of organizations for conducting more robust SAP testing, we further analyzed their intent to start conducting testing at those stages where they have not been performing so far. Our survey results clearly indicate a growing trend towards organizations looking to start SAP testing at early stages, with over 60% of respondents agreeing to start SAP testing at project preparation (62.1%) and business blueprint (61.4%) stages. Additionally, more than half of the respondents plan to start testing at final preparation (54.9%) and go-live (50.2%) stages in the next 12 months.



Question 27: In the next 12 months, do you have any plans to involve SAP testing for the following phases?

“Proactively involving a specialized service provider at the blueprinting stage can be very helpful, as service providers have pre-existing knowledge and understanding of test designs and business requirements. However, it is highly critical to evaluate their expertise, industry experience, and the tools and techniques that they use before determining their involvement.

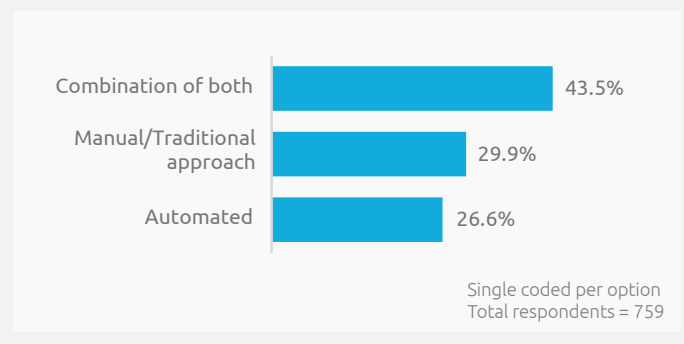
Senior Manager – SAP Globe Parts and Program Delivery at an agricultural equipment manufacturer and distributor

Automation – future of SAP testing

Limited prevalence of automation in SAP testing

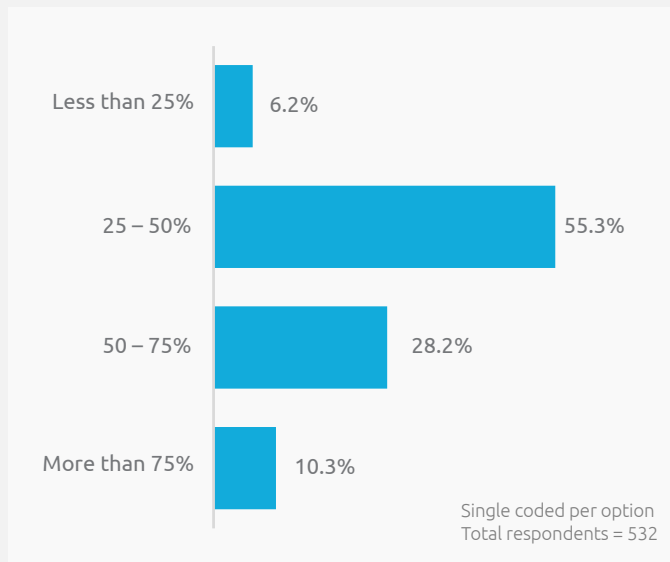
A need for faster implementation, growing complexity, and the lack of skilled resources have influenced organizations' shift towards the use of automation in SAP testing. However, its adoption is inhibited by multiple factors, including cost constraints, lack of resources to build scenarios or develop test data for an automation system, and lack of understanding among top management of the potential value that automated SAP testing can generate.

Our survey outcome suggests that around a quarter of surveyed organizations have an automated SAP testing system in place, while 29.9% of organizations still rely on a manual approach. Additionally, 43.5% of organizations use a combination of manual and automated SAP testing. We further analyzed the adoption of different methods against the respondents' perception regarding the success of existing SAP testing approach in their organizations. Interestingly, of the organizations where respondents feel that SAP testing is unsuccessful, 34% use a manual/traditional approach. At the same time, those organizations where respondents claimed that SAP testing is successful, only 29% use manual testing.



Question 28: How are SAP testing services being performed at your organization?

Although immense automation opportunities exist for firms using a completely manual approach for SAP testing, a deeper look at the extent of automation for organizations already using it suggests significant scope for expansion there too. Our survey reveals that more than 60% of the organizations using automation in SAP testing have less than 50% of their SAP testing processes automated. Only 10.3% of organizations have more than 75% of their SAP testing processes automated.



Question 29: What percentage of SAP testing processes at your organization is automated?

Our discussions with experts reflect a consensus around automation being a critical success factor for meeting dynamic SAP testing needs. Experts believe that the key to enhance its prevalence is to build a strong business case for benefits against cost and to have a more focused strategy at top management level.

“Many misleading beliefs restrict business heads from embracing automation in SAP end-to-end testing. The misconceptions include that ‘it is only the IT team’s responsibility’ and ‘testing is not very complex so may not require automation’. There’s also a general reluctance to shift to automation, a belief that there are no issues with manual testing, and lack of understanding about how automation works. Building a strong business case in support of the IT team and business, highlighting the benefits of automated testing and how it will increase the bottom line, may motivate business leaders to contemplate automation in testing.

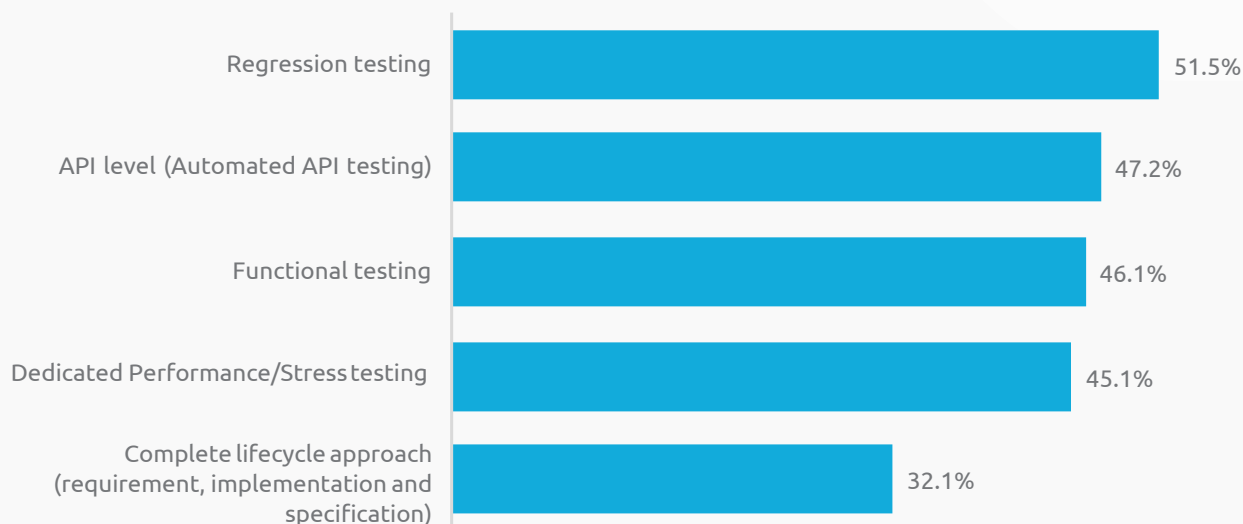
Vice President – Global IT Business Solutions
at a piping system manufacturer

Automation use can be high in regression testing because it is run on the same scenarios/existing functionalities so no new scenarios are created. The key need is to validate if the existing processes continue to work after the upgrade and that machines can run these checks, although some human intervention may be needed.

Organizations may be reluctant to automate functional testing because it requires some level of human judgment and inputs. Experts suggest that one of the key challenges is the perception of functional staff regarding a computer’s understanding of their needs and their lack of trust in it.

In our survey results, among the organizations where some form of automation in SAP testing exists, 51.5% of respondents mentioned using automation for regression testing. Further, 47.2% of organizations conduct automated API tests and 46.1% automate their functional testing procedures. The results suggest that only 32% of organizations use automation throughout the entire SAP testing lifecycle.





Multi coded per option
Total respondents = 532

Question 30: What is the level of automation embedded in your system?

“ There is a huge potential for automation in regression testing as organizations do not build any new scenarios or use cases while running it. All the use cases/scenarios already exist and a system needs to check if the existing processes work even after the upgrade or if they are broken. Additionally, automation can play a very critical role in API testing, where users are unaware of background developments and machines can run tests without much human intervention.

Vice President – Global Business Systems at a welding products manufacturer

“ Regression testing is one of the areas where leveraging automation could prove to be highly beneficial. It involves many redundant tasks that may not require any human intervention and can be completely performed through automation. Use of automation can enable testing tasks to be completed 20-50% faster. However, testing the performance of automated testing is also necessary to ensure 100% accuracy and reliability.

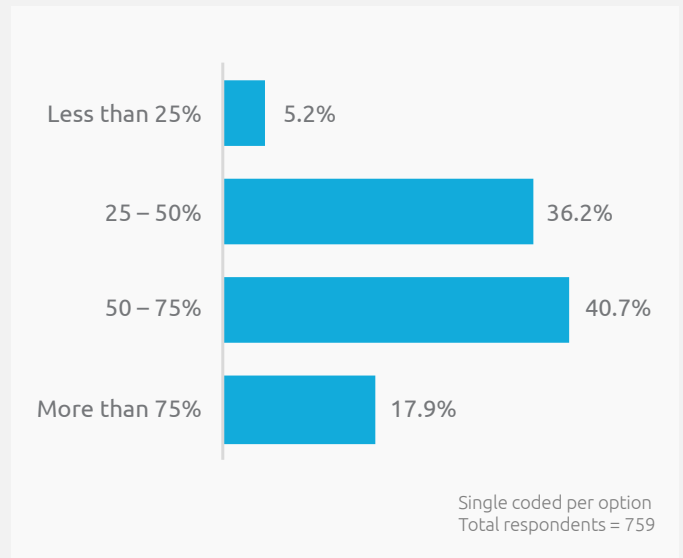
Director/Service Owner – Enterprise IT Services, Revenue Management at a pharmaceutical distributor

Fully automated SAP testing can result in immense efficiency gains

We estimate that, on average, a large organization can save up to US\$15 million per year by deploying fully automated SAP testing processes. Our survey results also suggest that a fully automated SAP testing process can lead to high efficiency gains. Around 60% of respondents suggested that a fully automated testing process can bring more than 50% efficiency gains in SAP testing processes. Further, 36.2% of respondents expect the efficiency gains to be in the range of 25% to 50%, with only 5.1% considering them to be less than 25%.

“Whenever an organization is running a functional test, regression test or any other test required for upgrades, it pulls out people from their regular jobs, taking at least 25% of their time towards testing-related tasks. In any major implementation, as much as 50-100% of their time could be dedicated to testing. Additionally, organizations must increase their headcount. For instance, in our firm, we had to bring 10% extra staff for customer services to ensure smooth testing. We were able to reduce about 25% of such overheads and efficiency loss through automation and we are yet to completely implement automation across the SAP testing processes.

Vice President Finance – Supply Chain and Operations at a window coverings and architectural products manufacturer

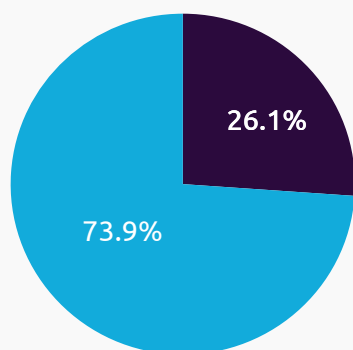


Question 31: What is the estimated % efficiency gain from fully automating the testing process?

Optimizing SAP testing with AI-/ML-based tools

AI-/ML-based tools yet to get a foothold in SAP testing processes

Advancements in AI- and ML-based tools have expedited automation across business processes, with the software testing segment also undergoing change. However, organizations have demonstrated limited adoption of these technologies for the automation of SAP testing. Our survey results indicate that only about a quarter of surveyed organizations currently use AI/ML to automate SAP testing. Lower adoption can be attributed to the lack of required technical expertise, limited understanding of benefits against costs, and the absence of success stories/examples around the usage of AI/ML in SAP testing.



■ Yes ■ No

Single coded per option
Total respondents = 759

Accuracy, business process improvement, and identification of critical risk areas – key benefits of AI/ML technologies in SAP testing

AI and ML can identify the smallest of errors/risks, which may be easily missed in a manual approach. Additionally, such technologies help improve efficiency by automating tedious tasks and streamlining business processes. Our survey respondents indicated enhanced accuracy in results (50.2%), business improvement (47.8%), and identification of critical risk areas (47.8%) as the most prominent benefits of deploying AI/ML technologies for SAP testing.

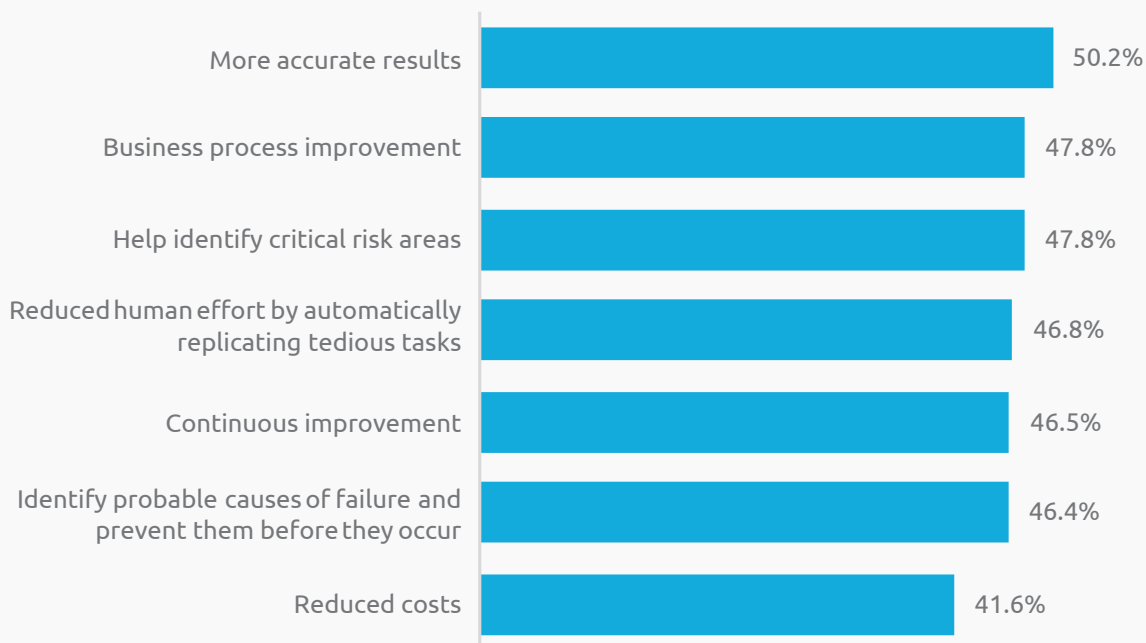
Question 32: Are you using AI/ML tools for automating your SAP testing processes?

“ Although we are in the initial phase of incorporating RPA tools into our system, we have been able to save more than 1,000 hours of FTE support in the past six to nine months. We have automated some of our manually performed tasks using automation tools and we are going to continue to do so. We may also explore the utilization of ‘SAP Bot store’ in our environment.

Vice President – Global Business Systems at a welding products manufacturer

“ Use of AI will certainly be an enabler for automated testing and will enhance the speed and accuracy of testing results. It will help detect the minutest of issues/risks and consequences that are otherwise not identifiable in manual testing with its limited scope. However, the cost of achieving these objectives will ultimately determine the extent of market demand for them.

Vice President Finance – Supply Chain and Operations at a window coverings and architectural products manufacturer



Multi coded per option
Total respondents = 759

Question 33: What are the key benefits achieved by or expected of using AI/ML in the SAP testing process?

Despite the market availability of numerous tools and solutions for end-to-end testing, SAP testing can be complicated. Testers and end-users face many challenges during implementation, integration with third-party applications, and because of inefficient testing. In order to optimize the available testing solutions, organizations must first understand the various challenges that emerge across different stages and identify potential solutions for them.



SAP business assurance challenges, gaps, and impact

Organizations face several challenges in executing efficient end-to-end testing or while utilizing the services of a business assurance service provider. These challenges affect their overall business assurance capability, leading to gaps and loopholes, which can cause severe impact, including downtime and even loss of business.



Key Takeaways

- With the vast amount of data that organizations work with on a day-to-day basis, data security or vulnerability in terms of information breaches is the biggest challenge faced by 32% of respondents when implementing SAP business assurance/end-to-end testing services
- Other operational and business-related challenges that affect SAP business assurance include inaccuracy in identification of defects (29.8%), a lack of required expertise (29%), and communication gaps between testers and business teams (29%)
- In order to mitigate risks and overcome challenges in testing, around 31% of organizations believe in strengthening their internal testing environment, specifically ensuring robust internal capabilities, teams, structures, and processes. On the other hand, 24.8% partner with external firms providing robust end-to-end business process testing services
- Ensuring efficient testing while integrating SAP applications with non-SAP applications and IoT devices is one of several key concerns among SAP users. About 56.5% of survey respondents believe that incompatibility of SAP and non-SAP applications is one of their biggest roadblocks in ensuring a streamlined, well-integrated ERP
- Our survey results suggest that 47.4% of respondents find understanding the landscape of SAP and non-SAP applications a major concern at testing stage. Also, 46.9% of respondents state that understanding the data flow between applications is a key challenge during the testing stage
- More than half of the survey respondents stated that they use system integration testing as a key tool to overcome integration challenges at the testing stage, while 47.2% of respondents establish connections with third-party QA teams with extensive SAP testing expertise
- Over 35% of organizations have witnessed severe downtime or loss of productivity because of gaps in SAP testing and 34% say they have experienced delay in task completion

SAP business assurance challenges, gaps, and impact

An increasingly complex and dynamic SAP environment has made business assurance more challenging. Organizations across the globe are trying to embed the latest SAP end-to-end testing tools and techniques into their underlying implementation process. But they face a host of challenges, such as downtime, lack of expertise and prohibitive costs, as well as disintegration of SAP and non-SAP applications, which can cause their entire system to crash. This section will focus on the key challenges faced by organizations when implementing SAP business assurance, with specific focus on challenges emerging from the integration of SAP and non-SAP applications, and potential solutions to these challenges.

Security vulnerability, inability to accurately identify defects, and key apprehensions

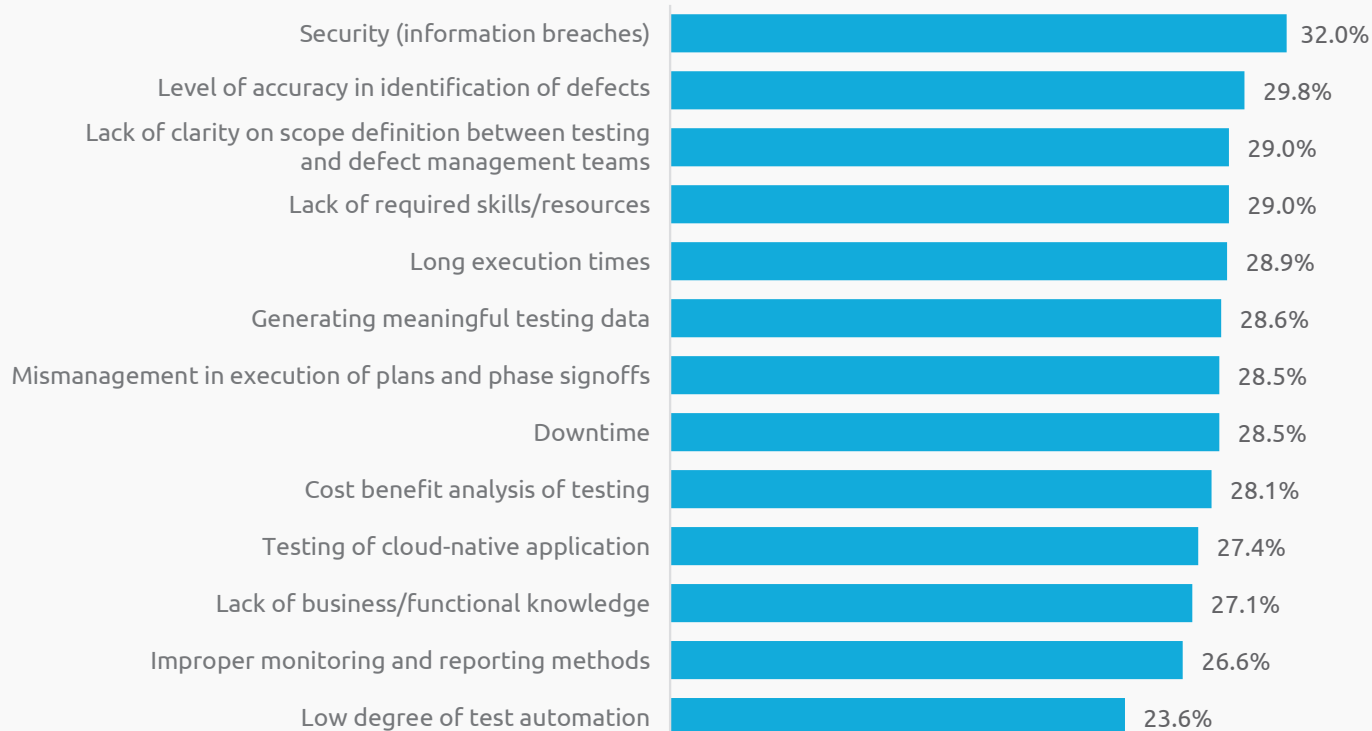
According to our SAP Business Assurance Report, 'security' (mostly information breaches) is the biggest challenge faced by respondents (32%) when implementing SAP business assurance/end-to-end testing. Organizations generate vast amounts of data that must be stored securely. Hence, testing teams face constant pressure to install and maintain robust systems to prevent unauthorized access and minimize risk to sensitive data.

“In testing, a problem can arise in any area or at any stage. Testing can be done during implementation, cutover, stabilization, and when a system is in use (while in production). While errors can be fixed during implementation, fixing them in production can be challenging. Any fault therein may not only lead to loss of brand value but also of good talent.

Vice President and CIO at a medical devices manufacturing company

Other operational and business-related challenges that affect the SAP business assurance process include inaccuracy in identification of defects (29.8%), a lack of available expertise (29%), and communication gaps between testers and business teams (29%). Any shortfall in testing may also rapidly and severely impact internal and external systems. Consequently, it is extremely important to ensure complete accuracy when identifying any defects. Addressing these challenges requires extensive knowledge and expertise, continuous communication, and adoption of best practices in testing.





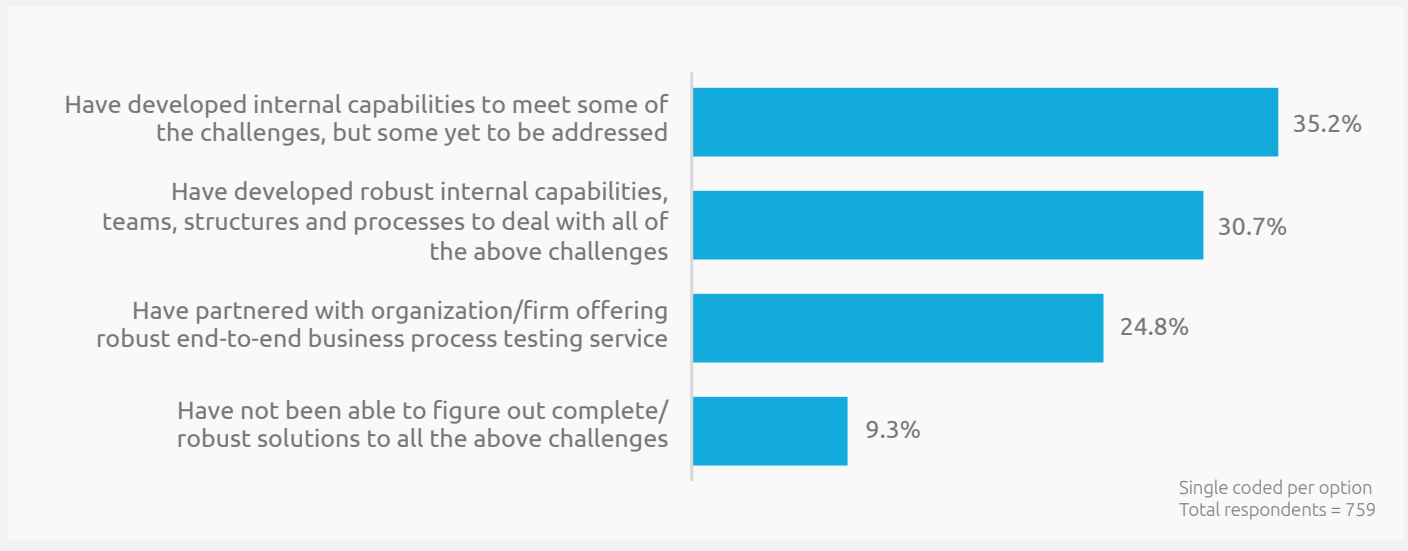
Multi coded per option
Total respondents = 759

Question 34: What are the major challenges faced while implementing SAP business assurance/end-to-end testing services?

Most organizations believe in strengthening internal capabilities

Organizations across industries follow several practices to mitigate the risks posed by the above-mentioned challenges. As a common practice, organizations focus on strengthening their internal testing environment, specifically ensuring robust internal capabilities, teams, structures, and processes to overcome the problems. According to our survey, around 31% of organizations have taken such an approach. Meanwhile, many businesses (35.2%) have partially built internal systems to deal with these challenges but have yet to address some of the areas.

Further, some organizations (24.8%) partner with external firms providing robust end-to-end business process testing services. Their highly skilled external SAP testers possess comprehensive expertise to handle a wide range of use cases, understand different testing requirements, and ensure the availability of testing tools. An external SAP business assurance provider acts as a custodian to ensure quality, reliability, efficiency, and transparency. Our survey also found that 9.4% of respondents have so far been unable to identify the correct means to overcome these problems. Connecting with a specialized service provider could provide a ready solution to such firms.



Question 35: What measures are being taken by your organization to overcome these challenges?

Disintegration between SAP and non-SAP applications can lead to delivery failure

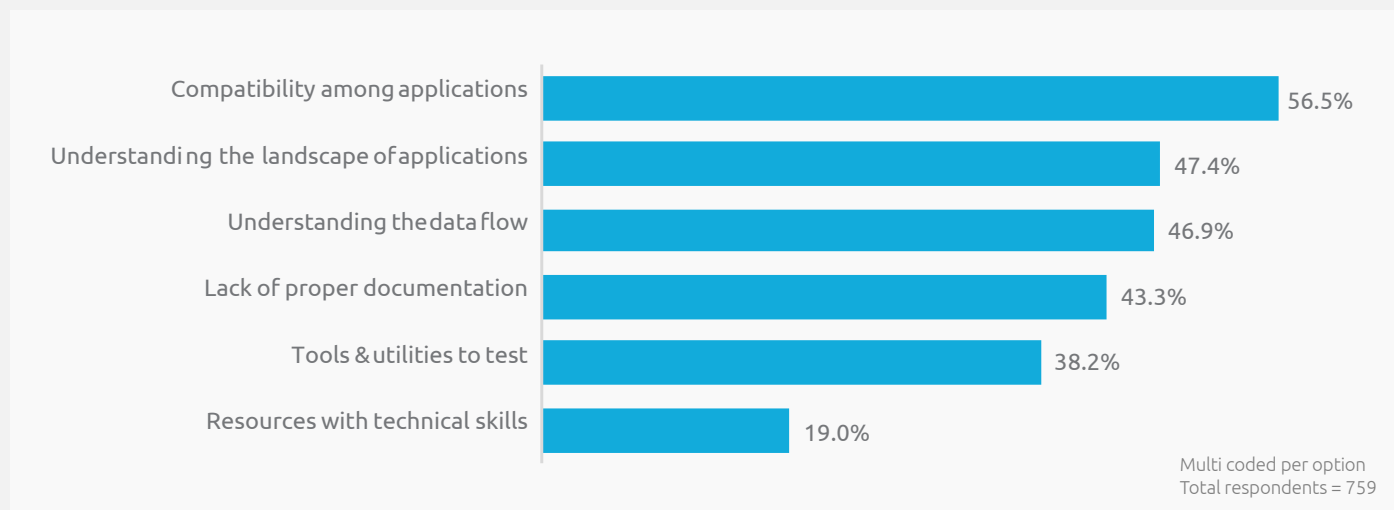
Without proper integration of all applications, organizations cannot fully capitalize the benefits of a robust ERP system. Ensuring efficient testing while integrating SAP applications with non-SAP applications and IoT devices is one of several key concerns among SAP users.

In their efforts to secure seamless integration, organizations encounter many obstacles during testing. The most prominent challenge is the incompatibility of SAP and non-SAP applications, which mainly occurs due to differences in technologies used for on-premises and cloud-based integration. Some 56.5% of respondents cited it as their biggest problem.

The evolving IT environment within organizations requires them to adopt emerging technologies for ongoing change processes. Evaluating the multiple layers on which different applications run in the IT space is also vital for organizations to ensure

successful integration. According to the survey results, 47.4% of respondents find understanding the landscape of applications a big concern at testing stage. Experts assert that it is difficult to simulate the real environment of a third-party application in production as there is no test or quality system embedded in third-party applications, unlike in SAP systems. Although testers create duplicate test scenarios to assess the required connection, there are scenarios that may only be identified after a system goes live.

It is equally important that testing techniques take into consideration the requisite flow of data between applications. According to experts, there are differences in terminologies, definitions, and structures used in SAP and non-SAP applications. Any change/update may require complete synchronization; and ensuring error-free integration is extremely challenging. According to our survey findings, 46.9% respondents state that ensuring adequate integration in data flow during testing is an area of concern for them.



Question 36: What key challenges are being faced by your organization at the testing stage due to integration of SAP applications with third party non-SAP applications, IOT devices, etc?

“ Integrity and compatibility of data is one of the biggest challenges faced at the testing stage during the integration of SAP and non-SAP applications. SAP and non-SAP applications could be hosted on different platforms/servers, such as on cloud or on-premises. Additionally, there is a difference in the terminologies used. For instance, traditional versions of SAP and third-party systems use similar terminology and definitions, which differs in SAP’s advanced version – SAP S/4HANA.

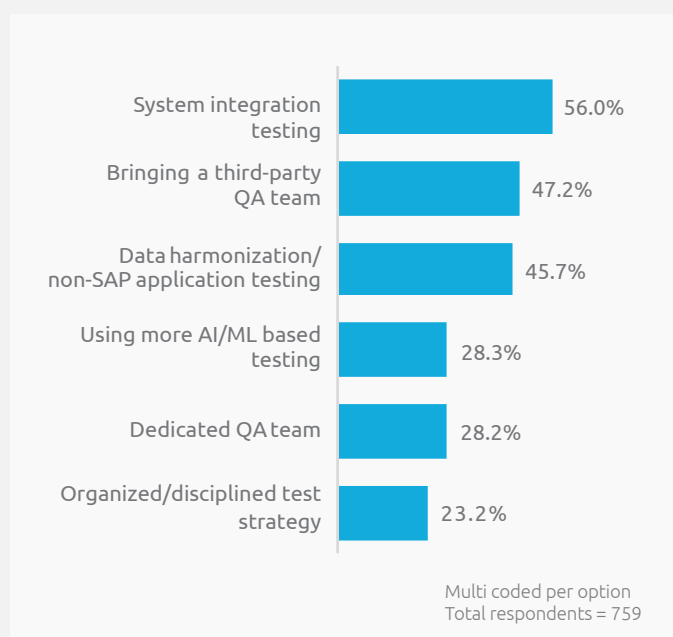
Vice President and CIO at a medical devices manufacturing company

System integration testing is the most preferred preventive measure

To ensure successful SAP testing, organizations must have a strong understanding of the interrelation between different sub-systems, modules, and applications. A robust system

integration testing regime, for both SAP and non-SAP applications, helps to identify potential defects and confirm that all applications work as per expectations without disturbing the functions of other existing processes. The survey results further establish this fact, as 56% respondents stated that they use system integration testing as a key tool to overcome integration challenges at the testing stage.

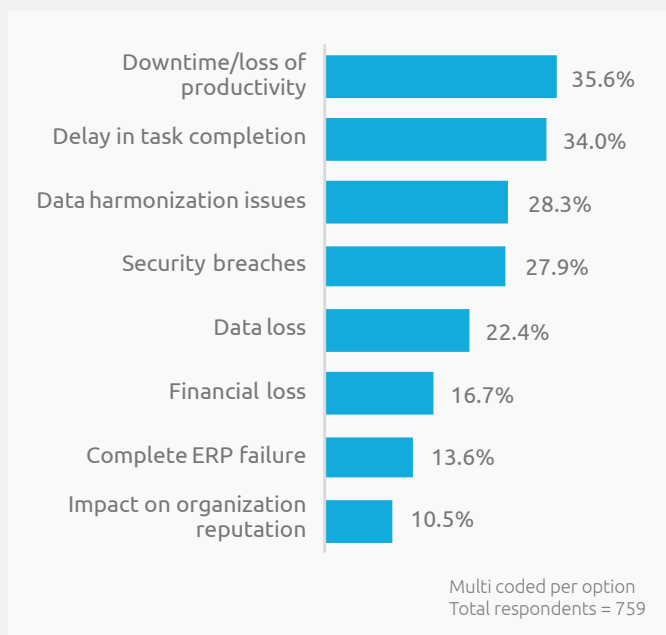
A significant number of organizations (47.2%) are also looking to establish connections with third-party QA teams with extensive SAP and testing expertise. The services of these external partners ensure streamlined and essential data mapping between all applications through the use of optimum tools. Additionally, many organizations (45.7%) use data harmonization testing to overcome integration challenges at the testing stage. Other steps taken include using AI-/ML-based testing, establishing a dedicated QA team, and pursuing a comprehensive, well-planned test strategy.



Question 37: What measures are being taken by the organization to overcome integration challenges at the testing stage?

Inefficient testing—a major pitfall

End-to-end testing and quality assurance are the most basic requirements for successful SAP implementation. Any negligence or shortfall during testing could prove very costly. As per the survey findings, a large number of organizations (35.6%) have witnessed severe downtime or loss of productivity because of gaps in testing. Some organizations (34%) said they had experienced delay in task completion. Other negative outcomes include issues in data harmonization (28.3%), security failure (27.9%), and reputational loss (10.5%).



Question 38: As a result of inefficient business assurance/end-to-end testing processes, has your organization experienced any of the following in the last 12-24 months?

Case studies

The importance of robust SAP business assurance processes can also be judged with the help of case studies exemplifying the serious consequences of inefficient or non-existent testing.

Case study 1: Multipronged cost of one missed exception in SAP S/4HANA implementation

This case study shows how a single missed exception during the testing phase can have not only financial but multiple other implications for an organization post the implementation of SAP.

A US-based manufacturer of window coverings and architectural products had a highly customized version of SAP. When it later acquired a business it decided to move from SAP ECC to SAP S/4HANA in an effort to streamline operations and integrate the new business's ERP platform into its own. This made practical sense as, after assessing its requirement, the company realized that implementing SAP ECC would not be viable because it would need to upgrade again and move to SAP S/4HANA in the next few years.

Therefore, to avoid unnecessary effort and cost, it decided to implement SAP S/4HANA itself. The project was a three-and-a-half-year greenfield implementation, which included the revision of several practices. The implementation was taken live at about 20 operational facilities. Although the decision to move to SAP S/4HANA was a wise one, the process lacked efficient business assurance, which in turn cost the company in more ways than one.

Gaps

The company receives and fulfils over 40,000 custom orders every day out of multiple plants. Each of these plants operates at a certain fixed capacity, but at times the company moves orders to another plant if one is unable to fulfil a requirement or has limited capacity. This was not a common occurrence before the implementation of SAP S/4HANA, however the frequency of such instances increased post-implementation, which resulted in multiple hiccups in the ERP system. It turned out that the design was not considering this scenario and therefore the system was not tested nor optimized for managing such a requirement.

The missed exception

The company had not tested for situations that would require orders to be moved from one plant to another, let alone proactively knowing that such situations would increase and the functionality for this might be needed more often. Consequently, the orders had to be manually cancelled and then re-entered for different plants, which had further repercussions.

Consequences

The impact ranged from increased effort and cost to delayed order fulfilment and more, as illustrated here.

Increased effort

A significant number of extra employee-hours were required for the company to manually manage and move orders from one plant to another. The IT and customer service teams also had to undertake extra tasks.

Delayed fulfilment

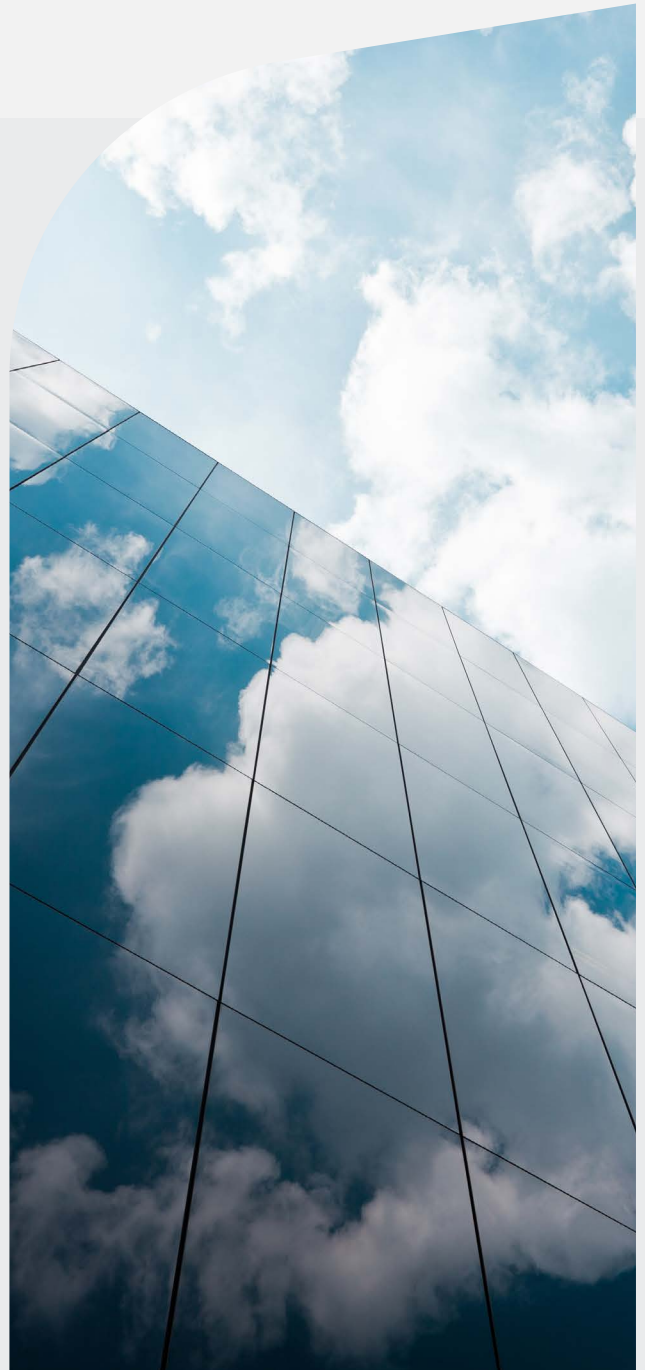
The added manual efforts resulted in increased turnaround time and delayed order fulfilment.

Dip in customer satisfaction

With delayed fulfilment of orders, the company's on-time delivery score of more than 96% reduced to between 70-80%.

Financial loss

All the gaps and outcomes cost the company a loss of close to US\$5 million.



Case study 2: Business perils of lack of well-defined requirements and business assurance

This case study shows how an SAP ERP system can fail to fulfil its true purpose in the absence of well-defined requirements during testing and implementation and can leave operations impaired and business at risk.

In the event of mergers and acquisitions, a lack of efficient change management, expectation setting and open conversations can leave businesses vulnerable to big risks. When a US-headquartered multinational manufacturing company acquired a B2C company, which already had a custom-built ERP of its own, it sought to migrate the acquired business to its standard SAP ERP. However, a lack of business assurance in the migration process ultimately had serious repercussions.

The acquired company had an agile approach, as part of which it generated several quotations for each of its customers. Its existing ERP tool was customized to do this and the business had similar expectations from the acquirer's ERP platform if it were to migrate to it. In order to meet the acquired company's expectations, the manufacturer integrated some additional tools with its core ERP. However, in doing so, it left some

gaps and loopholes, which were later exposed in some serious business aftermath.

Gaps

Despite its belief that the practice of sharing multiple quotations with each customer was unnecessary and did not add much value to the business, the manufacturer agreed to provide the required customizations in its ERP, with the help of some additional tools. Although the integration was completed, the acquired company had failed to provide all the scenarios at the time of testing, leaving the system only partly equipped to perform as desired.

Failure to define requirements and lack of efficient business assurance

At this point, the discussion had shifted from 'whether or not the need for a capability for churning out several quotations was relevant' to that about 'their failure to detail and test all the scenarios and still expect the system to meet all their requirements'. What followed, reflected the failure of this implementation from an end-to-end business standpoint.

Consequences

Not having properly considered the requirements of integrating the B2C company led to following concerns.

Redundancy of effort

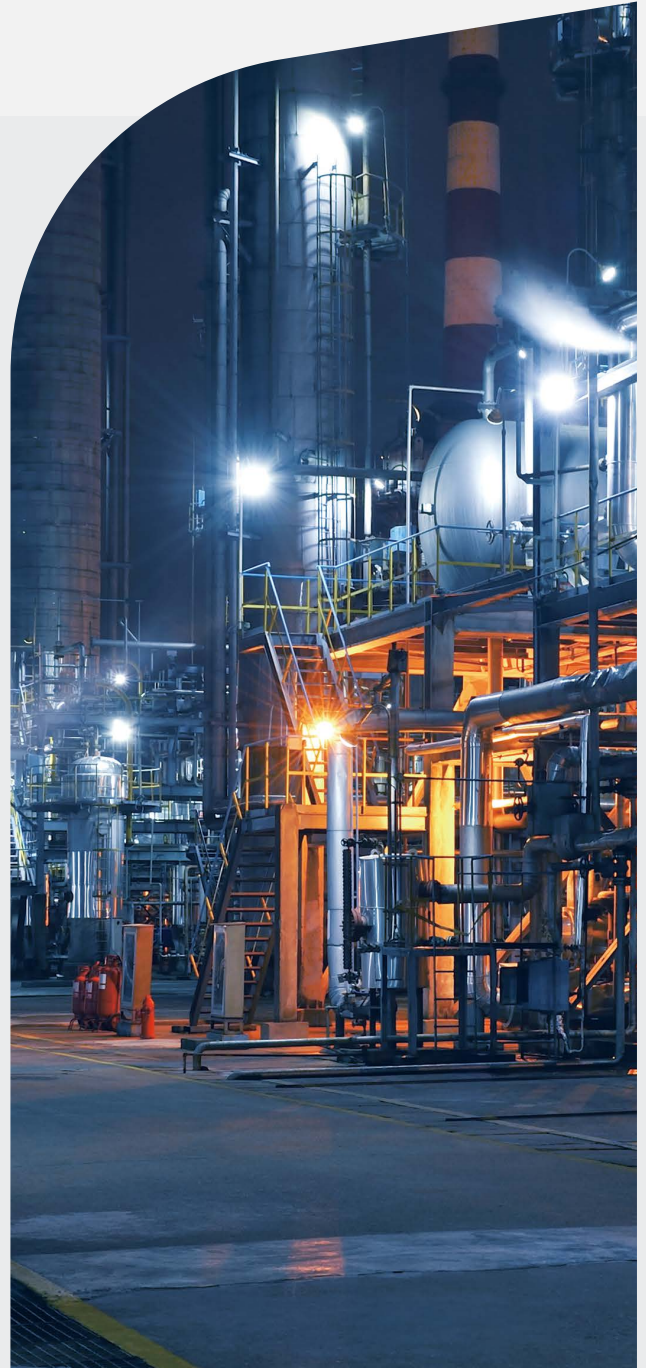
Employees switched to a manual, MS Excel-based process, maintaining records in Excel spreadsheets and later making entries into the ERP platform. The process was cumbersome and required more human effort.

Delays in order fulfilment

The manual approach slowed the purchase-to-delivery process and resulted in delays and errors in order fulfilment.

Risk of losing customers

Delayed or erroneous delivery can significantly impair brand reputation, especially in a B2C environment. Such experiences can lead to customers switching to other brands and the company had created a big risk in this instance.



Case study 3: One mistake in testing the SAP system led to a post-implementation three-day outage

One mistake – missing out on one basic aspect during testing – brought the whole ERP system down for three days for a global industrial aluminum producing firm. This case study highlights the importance of an efficient business assurance strategy for SAP implementation.

A US-headquartered global industrial-aluminum manufacturing conglomerate planned to implement SAP ERP for its global operations. It began by piloting the system at two of its biggest plants, with thousands of employees and over US\$700 million revenue. Considering the scale of operations, the company had planned extensive testing cycles, including two integration testing cycles.

The company had set a tight timeline for the testing cycles. After the completion of the first round of testing, it realized that two rounds would not suffice and decided to add a third round, postponing its implementation goal by a few months. The company had also involved a third-party tool for testing. Despite all the planning, something went wrong, leaving employees overworked and the system crippled for days.

Gaps

As the company worked its way through the three testing cycles, it was so strongly focused on ensuring accuracy in electronic data interchange (EDI) and the manufacturing execution system (MES) that it completely missed out on one very crucial aspect – volume testing.

The missing link

About 200 trucks entered and exited the plant each day and had to be weighed during their arrival and at departure. This formerly manual task and record keeping took 20 minutes per truck. Although the task was then automated, the functionality was not tested for volume capability.

The employees were not prepared for the impact of this one missed aspect. So, when the platform went live, the transition from manual to automated weighing in and out of the trucks did not go as expected. There were confusions around the counting and tagging of packages, making the whole process prone to errors and discrepancies.

Consequences

Immediately after go-live, it became evident to the employees at the plant that they could not rely on the system for recording the movement and weighing of trucks. On the first day itself, the platform stopped responding after 6-7 hours of operations and the outage continued for three consecutive days. This was a big hit to the plant's operations and led to the following consequences.

Need for manual intervention

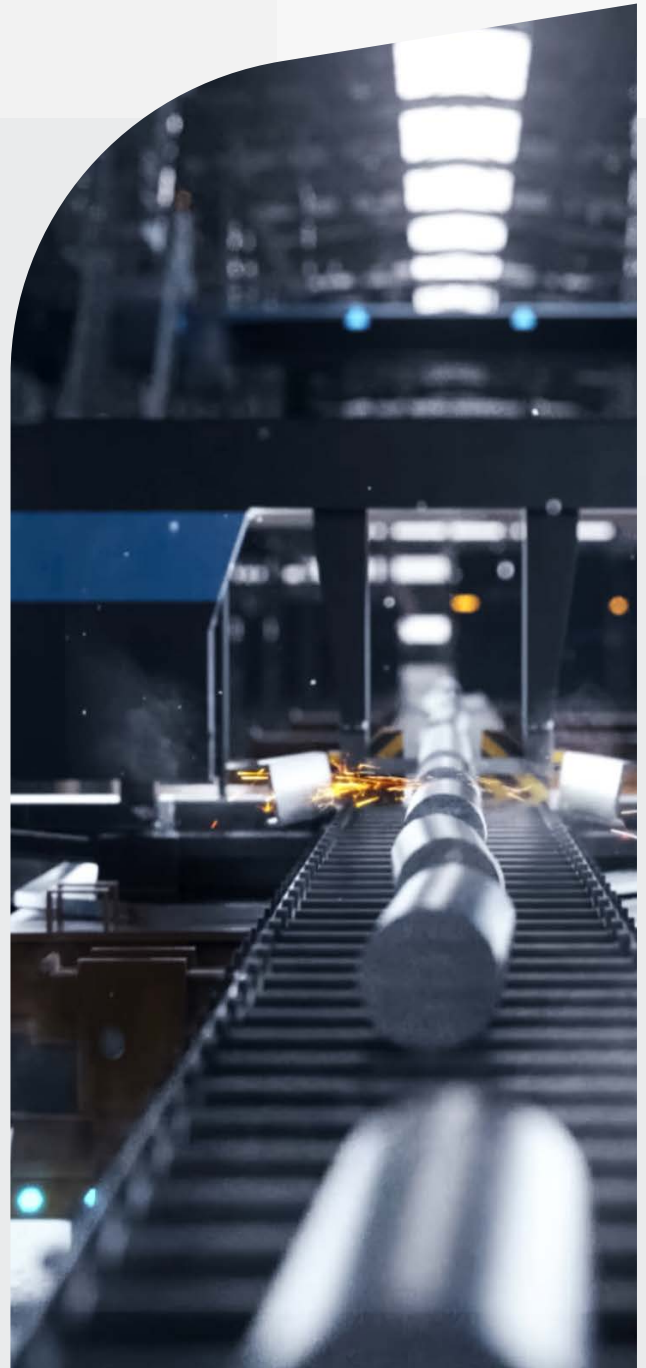
The staff had to switch to manually managing the entire shop floor. It took a few weeks for the company to put the system back in place. Until then, the entire weighing in, recording of entry and exit and stock management had to be done manually with pen and paper.

Delayed shipments for a key client

At the same time as the outage, the company was working on producing some metal plates for one of the popular brands of a large automobile company. The shipments for this project were stalled for a while and then significantly delayed, causing the company significant reputational damage.

Financial loss

As a result of the outage and delayed order processing, the company suffered a huge financial loss.



Case study 4: Business risks posed by the lack of comprehensive long-term scenario testing

This case study highlights the importance of a holistic, long-term approach for end-to-end testing, including load testing for peak scenarios that may be rare yet probable, in SAP implementation; and how the lack of an effective business assurance process can lead to such aspects being overlooked.

A large US-based medical devices manufacturer had multiple ERP systems in place when it decided to implement SAP. It had a contract management system, customer relationship management (CRM) system, business warehouse (BW) system, material requirements planning (MRP) system, and so on. This meant that the organization dealt with significant data flow volume on a daily basis.

Taking into account the extent of this data flow and in its efforts to streamline systems, the company took great care to conduct end-to-end testing during the implementation of SAP. It meticulously tested the movement of data to and from its other existing systems. It also conducted load testing, pushing several transactions at once to ensure there were no hiccups when the system experienced extra load. Despite all this, its business

assurance process fell short, leading to some challenges post implementation.

Gaps

The company had tested the systems for effectiveness post implementation, ensuring that the data from various systems seamlessly moved from one to another, without impacting any of the processes. Its business operations witnessed different kinds of peak periods and the company had factored in the load for such scenarios during testing, but only for a daily or weekly load.

Inability to look ahead

While the company had tested for all short-term and known scenarios, it had not considered testing for long-term load, one-off scenarios, and seasonal peaks, such as for quarter-end or year-end activities. This did not occur to anyone, as the testing done at that time seemed good enough. The system continued to function well for about six months after it went live, until one day when it suddenly came crashing down.

Consequences

What had begun as a well-planned, secured project had suddenly fallen flat, affecting the business operations. The company then saw the following consequences, in addition to realizing that it should have had a more robust business assurance process.

Impeded operations

When the system crashed, it affected the production process and warehouse operations. From picking and packing to shipping products, what earlier took three to four seconds was now taking 15 to 20 minutes.

Jeopardized brand value

Considering the nature of its business, the company must ensure its products reach its customers (patients or medical practitioners) in time. However, with the delayed warehouse operations, the company had to either switch to more expensive, last-minute manual alternatives to meet the delivery expectations or risk damaging its brand value.

Financial loss

The products that had to be urgently shipped using alternative ways cost the company close to US\$2 million.



Case study 5: Impact of lack of business stakeholder involvement in implementations

This case study highlights the importance of the involvement of users or business stakeholders, along with technical experts, in the business assurance process of any SAP implementation.

A large B2B manufacturer had involved a third-party SAP consulting partner to provide external technical expertise on an implementation project alongside its internal implementation team.

Any loopholes in SAP systems are often a result of negligence during the implementation process. This case throws a spotlight on the importance of ensuring equal participation of both technical experts and business stakeholders in any SAP implementation. It demonstrates how critical it is for an organization's internal stakeholders or users to participate in the planning and testing phase to ensure a holistic implementation approach.

The manufacturer's implementation project had a set timeline and planned testing cycles. Everything seemed to be in place. Still, things went wrong.

Gaps

While the external consulting partner offered technical expertise to the process, the participation of internal stakeholders and on-the-ground users of the SAP system was of equal importance to ensure its successful implementation and efficiency. However, the lack of their involvement in the implementation process went unnoticed, until it caused some gaps in business operations.

The flaw in the process

Had the company's business executives been actively involved in the planning and testing phases they would have brought in many business scenarios that needed to be tested and incorporated in the system. However, they were not involved. Various business operation-specific scenarios, including one that involved a large customer and the company's unique order processing method for it, remained neglected. The external consultant and technical experts were not apprised of the uniqueness of order processing for the specific customer. The system was not tested for volume and delivery schedules.

Consequences

It was too late when the company realized that the lack of their involvement in the testing and implementation process had caused loopholes in the system. The missed business-specific scenarios had already started impacting the business.

Order-processing and delivery delays

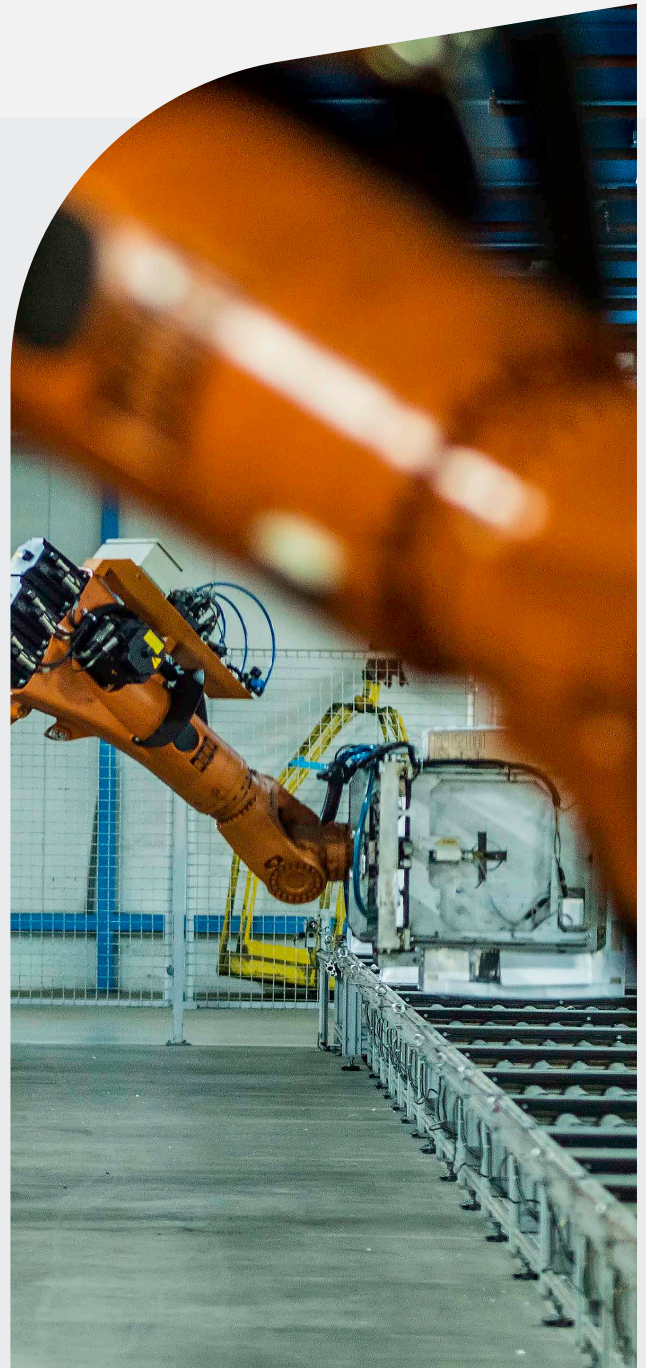
The company's unique order-processing system was not factored in during testing, which later caused confusions. This led to delay in order processing and delivery to the specific customer. In fact, some of the orders just went missing and could not be delivered at all.

Inability to meet customer demands

With the delayed and missed orders, the company found itself unable to meet customer demands and expectations.

Revenue loss

The company could not efficiently process and deliver the orders for one of its large customers and had to bear a loss of close to US\$10 million. The potential financial loss could have been much more if the company had ended up losing the customer due to this failure in the system implementation approach.



Case study 6: Cost of inefficient change management and lack of user acceptance in SAP implementation

This case study shows how lack of buy-in from business stakeholders and on-the-ground acceptance of a system can impact its testing, implementation, and post-implementation use, resulting in business loss.

A large US-headquartered agricultural machinery manufacturer first implemented SAP in 2016. Its SAP journey began at one of its biggest locations – Germany – where it manufactures one of its most popular brands. Although the company now has a wide portfolio of streamlined SAP solutions, a few years back it had come across difficulties in integrating a vendor invoice management system into its core SAP system.

As part of its Germany-based operations, the company has several schedule-based agreements with vendors. The agreements enable the company to avail itself of significant discounts on bulk purchases, for which the payments are made early or in advance. This involves extensive accounts payable invoicing, tracking, and management, for which the headquarters planned to roll out an SAP solution. However, the Germany-based brand, which was an acquired company, had its own invoice management tool at that time.

The replacement of this tool with the SAP solution brought some unforeseen implementation- and acceptance-related challenges for the company.

Gaps

The company manufactures thousands of units at its Germany-based plant every day, for which it directly purchases large quantities of raw material. The German operations earlier utilized a legacy tool for invoicing and vendor management, which the headquarters planned to replace with an SAP solution to consolidate everything into one centralized system. However, there were differences between the expectations of business stakeholders and on-the-ground users in Germany and what was being offered to them in the form of this integrated solution.

The disagreement

As part of the SAP implementation process, the headquarters expected the business stakeholders in Germany to get their vendors to reorganize and consolidate invoices structure-wise, image-wise, etc., as the existing invoice format could not be used in the SAP system. This led to resistance from employees in Germany to accept and adopt the new system. While the company has a large internal team for SAP-related projects, it has never involved a third-party specialist for testing and implementation. Had the company involved a business assurance specialist, the consequences could have been avoided through an effective change management and testing process.

Consequences

Due to the disagreement between technical and business teams and the resulting challenges in SAP implementation, the company faced several consequences, ranging from delayed payments and increased labor to financial loss.

Increased backlog

The user resistance to the system led to an increase in the number of outstanding invoices that could not be paid on time. The delay in payment of invoices led to further repercussions.

Reputational risk

The financial impact of delayed payments (loss of discount) was an internal concern, however what the company feared more was reputational damage.

Financial loss

Within four and half months of this implementation project, the company suffered a loss of over US\$1.5 million.



Ideal business assurance capabilities – understanding customer expectations

The many challenges that organizations face in efficiently executing a testing plan and ensuring an error-free outcome can lead to loopholes in the system, which if left unattended can have serious business impact. Considering the risk and outcomes of inefficient testing, organizations have specific expectations of their business assurance service providers.

Key Takeaways

- Many organizations nowadays seek a comprehensive business assurance service that covers the entire gamut of testing, starting from understanding business requirements to providing post-production support
- According to 48.2% of respondents, an ideal business assurance solution is the one that offers comprehensive end-to-end business process testing, including complete integration
- Around 44% of respondents expect an ideal business assurance solution to deliver test scripts that aptly meet business needs
- Experts believe that specialized service providers may have pre-built testing scenarios and scripts and can help organizations to achieve excellence in testing. In addition, service providers have the ability to quickly modify test scripts in line with business requirements
- Other expectations for an ideal SAP business solution include high-quality testing (41.4%) and availability of automated skills and tools (41%)
- More than 50% of respondents consider high-quality testing as an 'extremely important' criterion for an efficient business assurance solution
- In addition to quality of testing, the ability to perform an exhaustive assessment of risks associated with implementation of any new release or upgrade is 'extremely important' for 49.3% of organizations, followed by the ability to create accurate test scripts (48.3%)

Ideal business assurance capabilities – understanding customer expectations

The previous section shows how inefficiencies in business assurance/end-to-end testing can result in significant losses for organizations. To prevent such negative outcome and determine what could be considered efficient business assurance, it is important to understand the key expectations of organizations from SAP business assurance.

Organizations seek a holistic solution covering all requirements of end-to-end testing

Most organizations look for a comprehensive business assurance service that covers the entire gamut of testing, starting from understanding business requirements to providing post-production support. As per our survey, 48.2% of respondents believe that an ideal solution is the one that offers comprehensive end-to-end business process testing, including complete integration.

Such robust testing expertise and tools are not always available within organizations. Therefore, leveraging an external partner becomes more important. Industry experts also concur that consulting a specialized organization with the requisite skills, experience on varied business cases, thorough understanding of business requirements, integration challenges and testing scenarios, dedicated QA team, and availability of automated skills and tools is crucial to ensure successful end-to-end SAP testing.

“In my experience, having the required skills, ability to build a scenario, a test plan, linking all the components between business requirement and system design, and incorporating these into a test plan is of utmost importance. Precisely, an understanding of business requirements to make a system live is key. The availability of testing tools and technologies is secondary.

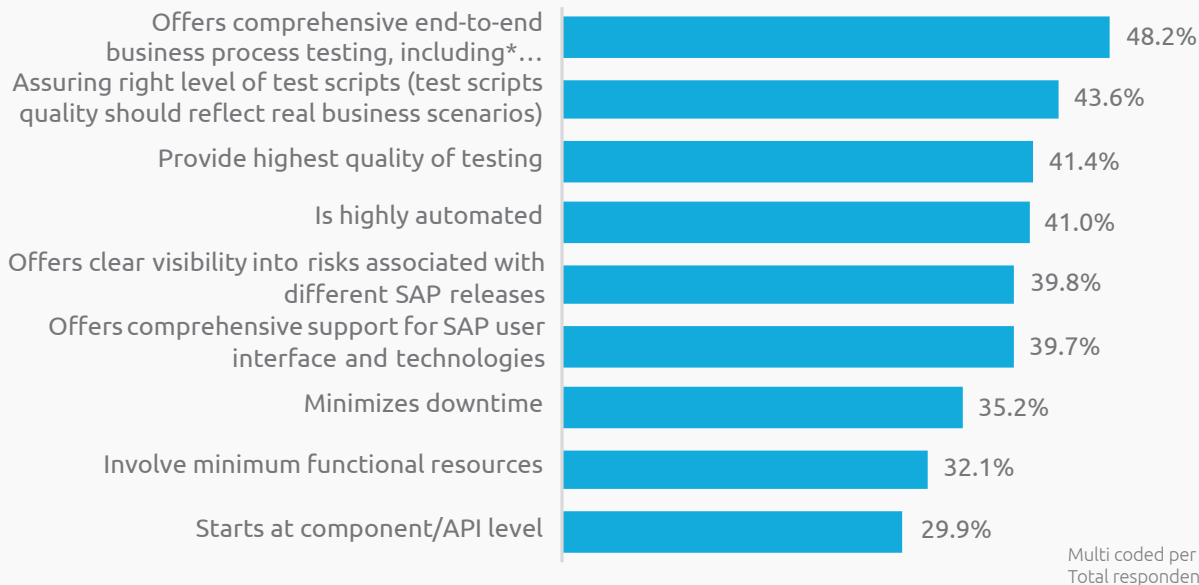
Vice President – Global IT Business Solutions
at a piping system manufacturer

Around 44% respondents expect an ideal business assurance solution to deliver test scripts that aptly meet business needs. Experts believe that organizations can achieve this through consulting with specialized service providers that may have pre-built testing scenarios and scripts. Such service providers have extensive expertise and can quickly modify test scripts in line with business requirements.

“Correct documentation of test cases, as per business requirements, is critical. Test scripts must be created such that the input aligns with the expected output and must guarantee that data correctly gets inserted in the required fields. Lastly, while creating a test script, writers should take into consideration system access (such that the right people have the right level of access) and scope for automation in future.

Vice President and CIO at a medical devices
manufacturing company





Question 39: What are your expectations from an ideal SAP business assurance/end-to-end testing solution?
(* including offers comprehensive end-to-end business process testing, including assessment of non-SAP applications/devices integrated into SAP systems)

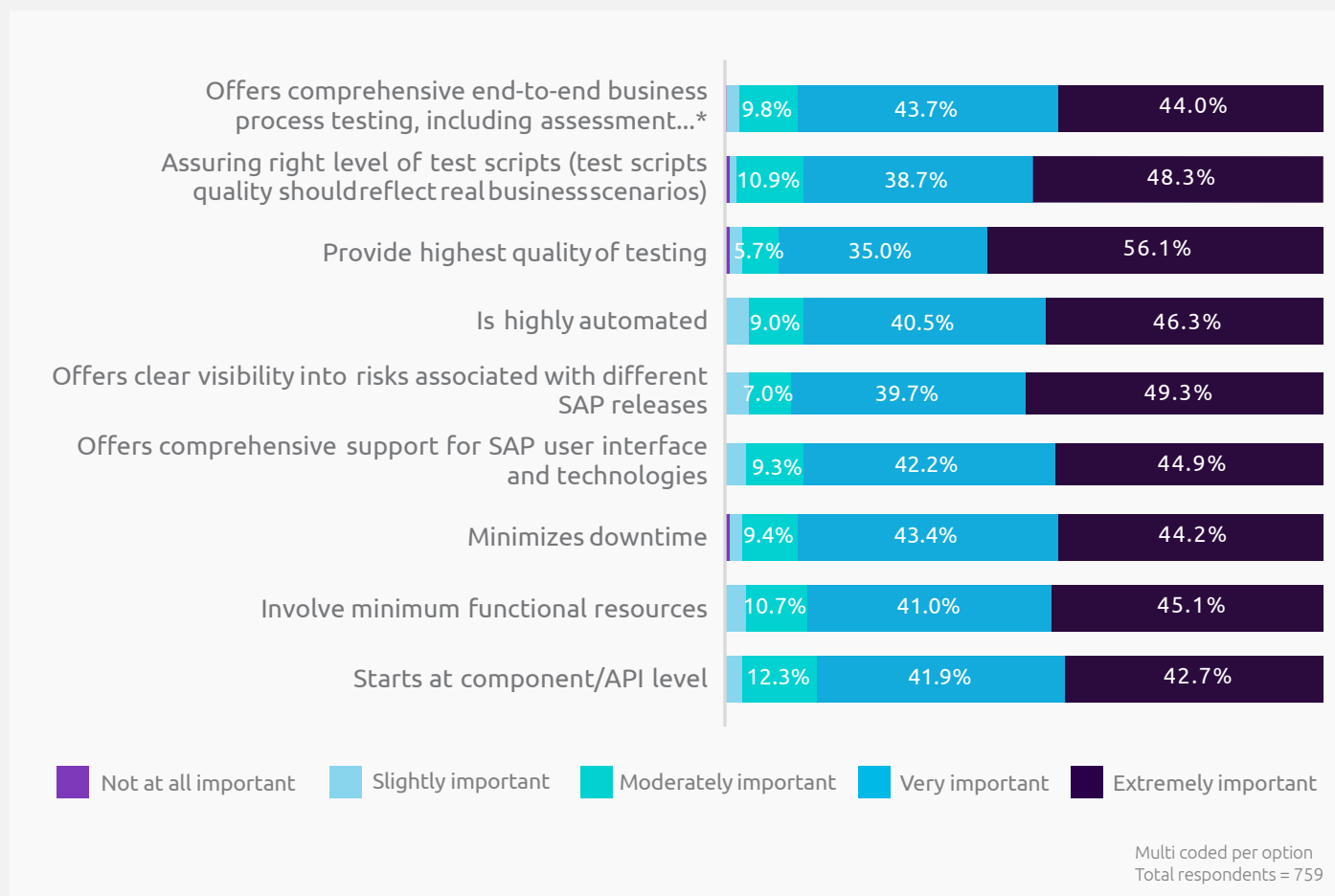
Delivery of the highest quality of testing (41.4%) and the availability of automated skills and tools (41%) are among the other factors that organizations expect from an ideal SAP business assurance solution.

“A business assurance service should not only offer comprehensive scenario planning for immediately known events and obvious events but bring a broader perspective about long-term impact – quarterly, annually, regionally, or seasonally. Further, regular testing alone may not be enough. Negative testing, in addition to regular testing, can be extremely beneficial because it helps to proactively identify cases that may cause system failure or downtime.

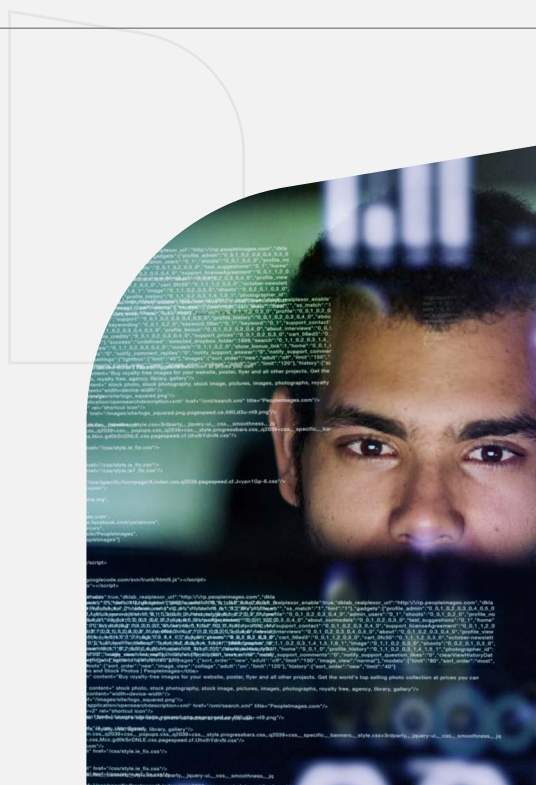
Vice President and CIO at a medical devices manufacturing company

High quality testing and the ability to identify risks associated with SAP releases and upgrades – most prominent customer expectations

Successful SAP implementation requires comprehensive, risk-oriented testing across the project lifecycle. An ideal business assurance solution must provide the highest quality of testing, cited as ‘extremely important’ by 56% of survey respondents. Other than quality, the ability to perform an exhaustive assessment of risks associated with implementation of any new release or upgrade is of utmost importance for many organizations (49.3%), followed by the ability to create accurate test scripts (48.3%).



Question 40: Rate the following parameters based on importance within a business assurance solution?
(* including offers comprehensive end-to-end business process testing, including assessment of non-SAP applications/devices integrated into SAP systems)



Concluding remarks

Although awareness about SAP's new versions and upgrades is increasing, organizations can potentially face multiple challenges in its testing and implementation. In order to ensure seamless operations and to optimize the benefits of these upgrades, organizations require robust end-to-end processes. Our survey results also show that organizations are increasingly seeking ways to conduct seamless and efficient testing to enhance their overall ERP system, yet many of them lack the expertise to do so.

Given the challenges of a complex SAP environment and the pressing need for robust testing capabilities, the role of business assurance service providers has become increasingly vital to ensure smooth business operations. Our study shows that in the absence of coherent and efficient business assurance practices and specialized business assurance capabilities, organizations may expose themselves to several risks, ranging from impaired operations and delivery delays to financial loss and reputational damage. Therefore, leveraging the support and expertise of a specialized business assurance partner is a ready solution for organizations that aim to stay relevant and successful in a fast-changing, complex environment.

Research methodology

An integrated research methodology, combining desk research, quantitative survey, and in-depth expert discussions, was used to collect data/information for the report. The collected data/information was analyzed to reveal relevant insights and build the overall report.

Phronesis Partners, an independent market research company, deployed an integrated research methodology, combining desk research, in-depth expert interviews, and quantitative surveys to generate a robust outcome.



Desk research

Desk research was conducted across tech journals, industry associations, SAP communities, published surveys/reports, press releases, and other relevant sources to assess existing adoption rates, challenges, strategies, and plans for SAP implementation and testing. Based on the outcome of this desk research, key focus areas for further analysis were identified.

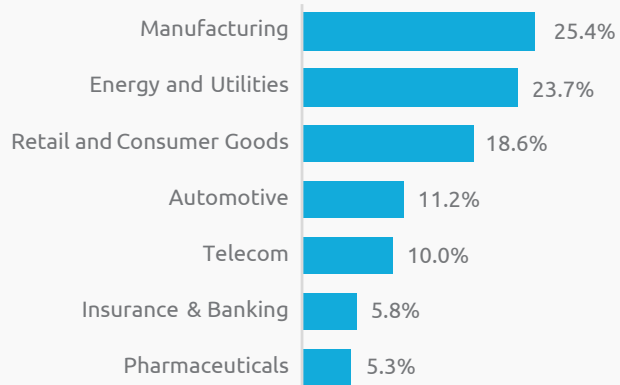
Quantitative survey

To build an in-depth understanding of organizations' existing status, planned strategies, challenges, and expectations related to SAP implementation and testing, a quantitative survey covering 759 respondents from organizations with revenue over US\$1 billion was conducted. All the respondents for this survey were involved in SAP implementation and testing within their organizations, with designations including IT director, CIO, CTO, information security head, and head of SAP operations. The respondents were chosen from across 17 countries spanning 5 continents and represented multiple industries, including automotive, energy and utilities, pharmaceuticals, retail and consumer goods, telecom, insurance and banking, and manufacturing.

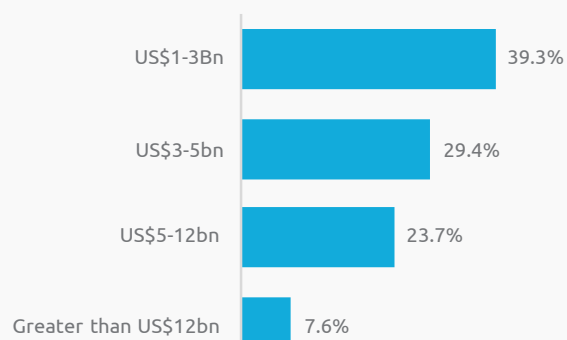
Expert interviews

The findings from desk research and quantitative survey were further strengthened through in-depth interviews with 8 SAP industry experts from varied geographies and sectors. Each discussion lasted for 60-75 minutes and provided experts' views on the current and future outlook for SAP implementation and business assurance practices, use of technologies and automation in SAP testing, and key issues and best practices associated with SAP business assurance.

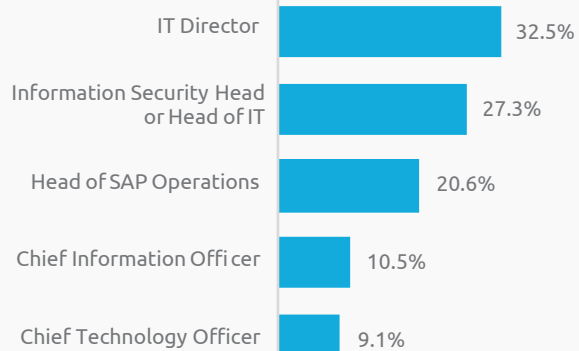
Quantitative survey demographics



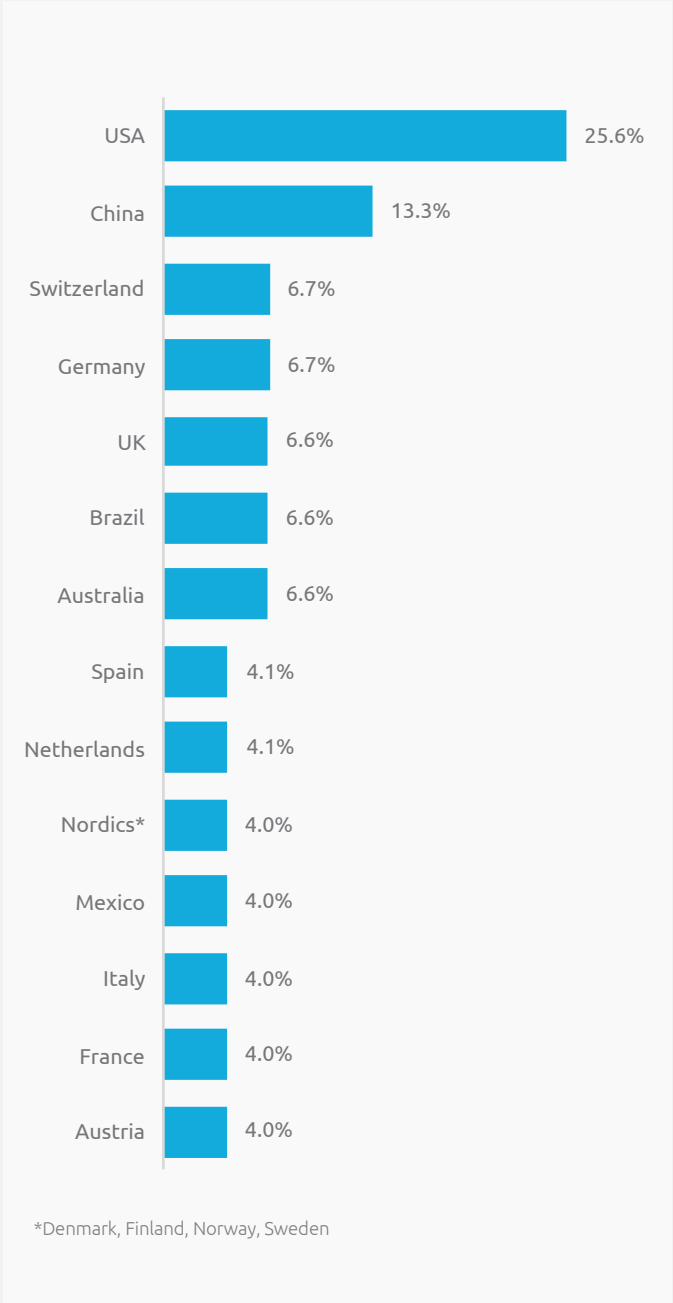
Breakdown by sector



Breakdown by revenue



Breakdown by designation



Breakdown by country



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