OPPORTUNITY AND RISK REPORT

OPPORTUNITY AND RISK MANAGEMENT

GOALS

Software AG's primary goal is to generate long-term, continuous growth and thereby increase enterprise value. To that end, the Company combines established business activities with an involvement in high-potential new market segments and regions. Its sales models were and continue to be adapted successively from one-time sales revenue recognition at the beginning of a contract to annual revenue recognition. The Company knowingly accepts a temporary dilution of its non-IFRS EBITA margin during the transition period. In order to ensure long-term, sustainable development, Software AG forgoes short-term opportunistic earnings increases and the potentially resulting short-lived positive effects on share price. With a strategy that is based on sustainable, long-term success, the Company strives for balance between opportunities and risks and takes on risks only if the business activities associated with them have a relatively high probability of enhancing the value of Software AG. It is always a prerequisite that Software AG can evaluate risks and that they remain manageable and controllable. Furthermore, risks and opportunities associated with ongoing operations are systematically monitored, for example, by keeping a constant eye on product and service quality and managing exchange rate developments.

ORGANIZATION

A Group-wide opportunity and risk management system enables Software AG to identify potential risks early to assess and minimize them to the greatest extent possible. Risks are to be understood as deviations from planned values. Strictly speaking and in accordance with customary spoken language, risks are defined as negative deviations and opportunities as positive deviations from planned values. By continuously monitoring risks, Software AG can always evaluate the overall status systematically and in a timely manner and better assess the effectiveness of appropriate countermeasures. This includes operational, e.g. risks associated with cyber incidents, financial, economic, legal and market risks. Opportunities are generally congruent to the operational and functional risk structure in all risk areas. Software AG uses various controlling tools for ongoing monitoring of the risk areas identified, which address the development of the entire Company as well as department-specific issues. The Management Board receives ongoing updates on current and future risks and opportunities as well as the aggregated risk and opportunity situation via established reporting channels. Due to the malware attack on Software AG in October 2020, the SecureBiz program was established on January 1, 2021 to optimize and enhance IT security as well as Group-wide policies on threat prevention and mitigation in this risk area.

RESPONSIBILITY

Risks and opportunities throughout the world are managed and controlled by teams at corporate headquarters responsible for pursuing opportunities and preventing risks for Software AG and its subsidiaries. They compile risk and opportunity reports, initiate further development of the risk management system and elaborate risk-mitigating guidelines for the entire Group. They constantly review the functioning and reliability of the system as well as the reporting. Software AG's internal control system (ICS) operationalizes business risks. It consists of internal business policies and practices, as well as Group-wide guidelines on effective internal controls, compliance with which is continually monitored. These policies regulate internal procedures and areas of responsibility at global and local levels. They are designed to provide information for management and to monitor the operating business risks of the Software AG Group. In order to enhance transparency, approval, communication, administration and compliance assessment of the policies are carried out centrally on an ongoing basis. Individual key Group business processes are managed centrally using software applications based primarily on Software AG technology and monitored using preventative automated control mechanisms. Another component of opportunity and risk management is the transfer of operating risks to insurance carriers. This is coordinated globally by the General Services department at corporate headquarters.

STRUCTURE OF THE OPPORTUNITY AND RISK MANAGEMENT SYSTEM

Controlling

Controlling—which is under unified global leadership—monitors operating business risks, such as those relating to Professional Services, in real time and submits management-relevant KPIs continuously to the Management Board. In addition, both operational and strategic risks are analyzed by means of a structured reporting system. It shows developments in all relevant departments using KPIs and reports them continuously, monthly and quarterly (depending on KPI) to the Management and Supervisory Boards. Furthermore, if exceptional circumstances relating to potential business opportunities or risks arise, ad hoc analyses are conducted and reported to the Management Board.

Finance

The Finance department is responsible for establishing all guidelines for financial reporting in accordance with International Financial Reporting Standards (IFRS). All accounting decisions relevant to the Company's financial statements as well as the revenue calculation process are monitored and/or executed by the global Corporate Finance department. This ensures compliance with IFRS accounting policies throughout the Group.

Treasury

Software AG's Corporate Treasury team generates a daily finance status report, weekly assessments of foreign currency transactions as well as summaries of derivatives outstanding. The European Monetary Infrastructure Regulations Report (EMIR) is generated once per month. The CFO receives weekly reports on the Software AG Group's finance status and a summary of credit default swaps for all banks with which the Software AG Group engages in transactions, especially cash investments. The CFO also receives a monthly summary of short and long-term financing. All high-risk foreign-currency and hedging transactions may be conducted only by the Corporate Treasury team, which is directly below the CFO. A global treasury policy prohibits the national subsidiaries from engaging in any high-risk transactions with derivatives. Internal Audit evaluates compliance with this policy on a regular basis. The global process of receivables management is monitored centrally by the Treasury department.

Internal Audit

Software AG's Internal Audit is an active component of the Company's risk management. Through a systematic and targeted approach, it ensures the effectiveness of risk management along with the evaluation and continual improvement of the ICS and the management and supervision processes. It is also geared to the creation of added value for Software AG by rating the efficacy and efficiency of business processes. Internal Audit reports directly to the CEO and operates worldwide.

RISK MANAGEMENT IN THE FINANCIAL REPORTING PROCESS

The risk of financial reporting errors was largely eliminated through implementation of the following processes:

- There are detailed, globally uniform IFRS-compliant accounting guidelines such as the Accounting Guideline and Revenue Recognition Guideline. In addition, there are guidelines on bookings, annual recurring revenue (ARR) and on Net Retention Rate. Their application is mandatory. Compliance with these standards is monitored by Corporate Finance and verified by Internal Audit.
- The national subsidiaries' accounting departments are monitored by the local Finance, Controlling, and Administration (FC&A) managers, who are in turn supervised by regional FC&A managers. Software AG's national subsidiaries report their figures on a monthly basis to Corporate Accounting, which is part of the Corporate Finance team, using the Office Plus system (management informations system, MIS). The figures from the national subsidiaries are consolidated using the SAP BCS software tool and fed back into the MIS. Corporate Controlling and the Corporate Finance team then analyze these monthly reporting results. Any deviations that may arise are communicated monthly to the national subsidiaries and/or Corporate Accounting and corrected by the most efficient channel.
- Worldwide separation of the functions of generating and reviewing accounting figures is guaranteed by segregation into two areas: Corporate Finance and Corporate Controlling. The two departments are led by different managers who report independently of each other to the CFO.
- All internal Group supplier and service relationships are centrally coordinated and legally regulated through cooperation agreements. Central departments within Corporate Finance and Corporate Controlling handle internal service allocation. In addition, an intercompany transactions policy standardizes internal Group approval processes throughout the world. The revenue recognition process is rigorously monitored by means of globally managed approval processes as of the commencement of contract negotiations. The Global Deal Desk (GDD) is a preventative internal control system and is employed worldwide. All quotes associated with the intent to close a sale with a customer go through this approval process, in which the Legal department as well as Corporate Finance, Corporate Controlling, the CFO and the CRO are also involved.
- Internal Audit continually reviews all key customer contracts worldwide with a view to compliance with the approval process and correct representation in accounting.
- A global policy regulates access rules for the local and central accounting programs; these are monitored by the corporate IT department.
- Only employees of Corporate Accounting have access to the data from the SAP BCS consolidation program.
- All Group reports are reviewed by a second person in Corporate Finance in accordance with the dual-control principle.
- External experts are commissioned on a regular basis to evaluate such complex matters as stock option plans, pension provisions, legal risks and purchase-price allocations within the framework of acquisitions.

STRATEGIC RISK AND OPPORTUNITY MANAGEMENT

The strategic risk and opportunity management (ROM) system is composed of a central interdisciplinary core team of directors from Corporate Finance, Internal Audit and Legal who report to the CFO in this function. A manager from the relevant field of expertise serves as risk advisor and is responsible for assessing, monitoring and managing identified strategic risks. The risk advisors are recommended by the core team and chosen by the responsible member of the Management Board. Biannual risk evaluations are conducted by the core team with each of the risk advisors. Risks are evaluated according to a uniform valuation system. The system determines the risk category based on the potential impact on Group EBIT for the next three years. This impact is calculated taking into account the risk-mitigating measures taken by management.

Expected impact on EBIT in the next 3 years (cumulative)	Risk category
€20 to €50 million	low
€50 to €200 million	medium
> €200 million	high

The impact on EBIT over the next three years is divided into three categories. An impact of up to €50 million on Group EBIT in the next three years is categorized as low risk. An impact on EBIT between €50 and €200 million is categorized as medium risk. And, risks affecting EBIT by more than €200 million in the next three years are categorized as high risk.

In a separate step, these impacts on EBIT in the next three years are categorized according to the risk advisors' estimated probability in three risk levels.

Probability	Risk level
0% - 33%	unlikely
34% - 66%	likely
>66%	highly likely

Probability between 0 and 33 percent is valued at an unlikely risk level, between 34 and 66 percent at likely and above 66 percent at highly likely. The risk categories and levels are aggregated and assigned an equivalence marker based on expectation values. These are then assigned to one of three cumulative risk signal levels.

Risk signal	Risk relevance
green	insignificant
yellow	medium
red	significant

All strategic risks and opportunities are evaluated based on this uniform risk matrix. Risks and opportunities not considered of strategic nature are not included in the risk matrix. All Software AG managers are responsible for reporting newly identified strategic risks and opportunities to the core team at corporate headquarters. The team then informs the Management Board for advice on possible strategies for handling them. The core team reports to the Management Board regularly about the ongoing development of the identified risks and opportunities. The Management Board regularly presents the ROM system to the Audit Committee of the Supervisory Board and discusses with it the level of the identified risks and opportunities as well as appropriate measures for managing them.

Based on the risk advisors' submitted EBIT impact for the next three years as well as their probability, the expectation value for each strategic risk is calculated taking into account the risk-mitigating measures. The overall interdependency between individual strategic risks is then evaluated and aggregated with the sum of expectation values for all strategic risks. The result is the total expectation value for all strategic risks. This value is compared against Software AG Group's risk-bearing capacity, which is determined every six months; and risk reserves are calculated. This ensures the efficacy of the ROM system and the ICS.

Internal Audit regularly reviews the efficacy of the ROM and ICS. When necessary, suggestions for improvement are prepared and implemented. This is monitored centrally. Corporate Finance and Corporate Controlling regularly conduct internal reviews of accounting-relevant control processes and modifies them for new developments.

KEY INDIVIDUAL RISKS AND OPPORTUNITIES

Software AG presents key risk and opportunity areas and individual risks and opportunities discerned from the totality of risks and opportunities identified through the risk and opportunity management system in the Risk and Opportunity Report.

Environment and sector risks/opportunities

Market risks

Market risks are related, among other things, to the varying economic developments in individual countries or regions. The technological evolution of the individual sectors of the IT industry can impact the business potential of the individual business lines positively or negatively. Software AG's balanced revenue mix reduces dependence on a single geographical or professional IT submarket. Software AG markets technologies that are not specific to certain industries, ruling out a dependence on individual industries or customers. Thanks to its technological innovations, ongoing R&D investments and procurement of new technologies as part of technology-driven acquisitions, the Company significantly expanded its product portfolio and will continue to do so in the future. That enables greater flexibility for customers' existing IT infrastructures and significant cost savings. And, it ensures a long-term broad customer base for Software AG. The ROI is relatively fast for Software AG customers. Hence, new products are a logical way to cope with market-related cost pressures even in weak economic periods. An overwhelming majority of Software AG customers use their software for business-critical applications for years, or often decades, when running satisfactorily. This results in a largely stable flow of returning revenue in this business line.

Market opportunities

Software AG sees itself as a technology leader in enterprise digitalization software. The clear trend toward the Internet of Things (IoT) signifies a major opportunity for Software AG's future development. Considerable dynamic growth is therefore expected in this market over the next few years. According to external market analysts, the Software AG's IoT platform total addressable market is expected to grow at 26 percent (CAGR) and reach $9.8 billion by the year 2024. Software AG's new strategic focus, which incorporates the results of a comprehensive strategy project, will enable the Company to further intensify its focus on technological and regional growth markets. Furthermore, Software AG will continue its Adabas & Natural 2050+ program. And, because of the significance of its ecosystems in successful software sales, it will also enhance its partner model. These measures could lead to better-than-average opportunities for Software AG to grow and claim market share in core markets.

Brexit

In light of the United Kingdom's exit from the European Union (EU) and the end of the interim period on December 31, 2020, uncertainties arose with respect to not only the future of Britain's economy but of Europe's as well. After concluding negotiations on the terms of their future economic relationship at the end of 2020, the EU and the U.K. ultimately signed a trade and cooperation agreement on December 24, 2020, which determined the details of future cooperation. This agreement on exact departure terms will have a major impact on economic relations and the future development of both economic areas.

One year after the trade and cooperation agreement went into force, no material impact could be identified on Software AG's business in the U.K. Based on this experience, Software AG continues to anticipate no material impact on its future business growth in the U.K from Brexit. Furthermore, the fact that Software AG operates in all key financial centers of the EU should have a risk-mitigating effect. Any financial companies that leave the U.K. to resettle in another EU country such as Germany, France or Ireland can be served by Software AG subsidiaries in the relevant region.

USA

The USA is Software AG's most important market in the world. Software AG operates its own sales organization in the USA. It also runs significant portions of corporate departments like Marketing and R&D there, with key local intellectual property rights, which result in considerable royalties for the Company in the USA. A large percentage of Group profits is generated and taxed in the USA. Because Software AG's business volume with China and Russia is relatively low, no substantial risks to its global business resulting from U.S. foreign trade policies with regard to China and Russia are expected. The extent of the negative impact of ongoing trade conflicts between the USA and China, Russia and the EU on the Software AG Group's global development is not clear. As a mid-sized company based in the EU, Software AG is not dependent on large American software platform providers as other companies are. Software AG products can also be deployed on the China-based Alibaba and Tencent platforms. Growth of the U.S. economy depends on a variety of factors. Nevertheless, future market opportunities should outweigh risks.

Russia-Ukraine conflict

It is not yet possible to predict the overall economic impact of Russia's invasion of the Ukraine and the ensuing sanctions imposed by western nations on Russia.

From a business point of view, the sanctions against Russia represent a challenge for Software AG, just as for all companies with global operations and transnational projects in Eastern Europe.The situation also raises the probability of cyberattacks and cyberwarfare because our products are employed worldwide by organizations with critical infrastructures.

Coronavirus pandemic

The COVID-19 pandemic has been affecting the global economy for two years. Multiple lockdowns in most countries of the world initially had a negative impact on the global economy. Many companies froze, postponed or extended investment activities. In addition, nearly all organizations placed extensive restrictions on business travel. These circumstances make contract negotiations with customers difficult because nearly all meetings can only be conducted online. The absence of customer events and meetings places a burden on generating new project opportunities. Product training for Software AG customers is only possible online, which can result in delayed installation and rollout thereby hindering new business for Software AG. Travel and investment freezes at a portion of Software AG customers could have a negative effect Software AG's revenue in 2022. The effects on business operations were minor in 2021. Generally speaking, though, employees of the Software AG Group and of customer organizations have gotten used to working online. The positive effect of this is that the initially feared risk of a pandemic-related decline in business did not manifest. Software AG is generally not affected by disruptions in supply chains thanks to its business model. Software AG's business could, however, be negatively affected by a prolonged global economic recession, which has not yet occurred. However, the pandemic could have a potentially negative impact on product development if it impedes collaboration in local R&D teams and their creativity.

The pandemic has forced a large share of companies' and government agencies' administrative work to be carried out in employees' homes. The crisis has shed light on the lack of digitalization in business processes, which has had and continues to have an accelerating effect on digitalization. This is resulting in new business opportunities for Software AG, particularly in the Digital Business segment, which could compensate, or even overcompensate, for the negative effects of a global economic recession.

Corporate strategy risks and opportunities

Product innovation and portfolio

The software sector is subject to very fast innovation cycles with respect to new products as well as go-to-market models, such as usage-based models (pay per use) in the IoT and cloud markets. These are based on constantly changing customer, market and integration requirements. Software AG is rapidly shifting all sales agreements with customers to subscriptions and an increasing share to the Software as a Service (SaaS) model. New innovation trends are very difficult to predict and are sometimes identified too late. The risk of not being able to identify new innovation trends or identifying them too late exists due to the uncertain nature of future developments in the software market. A key challenge, typical of this industry, associated with the innovation risk is allocating Company resources such as R&D, Product Marketing, Marketing, Sales and M&A to those products with future revenue potential. This can lead to an insufficient focus on growth-relevant products. Software AG's product portfolio consists primarily of software tools and platforms whose value for customers is maximized through customized solutions. This translation of platform technology to customized solutions is the Company's key success factor. It is therefore essential to develop and deliver the right, ideally repeatable, customized solutions punctually. If the product portfolio does not address customer needs, revenue potential will decrease. Large competitors have greater financial resources for innovation and ongoing development of their product portfolios. Software AG's business development is thus susceptible to being negatively affected by new competitor products. Furthermore, the focus on Software AG's existing markets can also not be impaired. To better address customer needs in product development, R&D in the Digital Business line was segmented based on a matrix structure into the product lines: IoT & Analytics (Cumulocity IoT & TrendMiner), API Management, Integration & Microservices (webMethods) and Business Transformation (ARIS & Alfabet) Since 2021, the focus of the Professional Services segment has also been sharpened to reflect these product lines.

Assessment of future market development is conducted in continuous cooperation with leading technology analysts such as Gartner and Forrester.

Rapid product innovation is critical. But striking a balance between fast product innovation on one hand and product quality on the other is of utmost importance. Considerable reputation risks will arise if the delivered quality of products does not live up to the quality Software AG promises its customers. Due to the newness of the IoT products, a considerable volume of resources was and continues to be utilized for quality assurance, which leads to challenges when allocating resources between product enhancement and innovation. Software AG's competitors have grasped the differentiation with respect to their product portfolios and are constantly augmenting competitive pressure in this market segment. Product quality investments were also increased significantly in webMethods.io (integration Platform as a Service solution). These investments allow product defects to be corrected as early as possible. Software AG also ensures product quality through implementation of product standards, the Chief Quality Officer and the ISO 9001: 2015 certified quality management system. Product quality and user-friendliness as well as customer support are monitored using these mechanisms on an ongoing basis.

To minimize the innovation risk, substantial investments in the product product portfolio enhancement remain necessary.

Growing the SaaS business (cloud business) is extremely challenging and cost-intensive. Despite significant revenue growth, scalability in this business area is clearly not optimal, making it impossible to improve the continued insufficient margin situation. Technological and legal risks are notably higher in the cloud business than in the still prevalent on-premises business due to data protection and security. Startups, without a long history in on-premises business, can employ the cloud business model from the beginning, which gives them a headstart in developing and implementing this model. Software AG accounts for the increased risk associated with the cloud business with a dedicated externally ISO 27001-certified information security management monitoring system and cross-departmental response teams for arising data protection and information security failures. It also expanded its work with contracted IT forensic specialists.

With the intent of shortening time-to-market, Software AG's products are also augmented by acquisitions when it comes to newer development trends.

Expansion of the IoT business and the Digital Business business line's technology leadership—confirmed repeatedly by distinguished technology analysts like

Gartner and Forrester—are generating major market opportunities for Software AG. As digitalization continues to advance—fueled by the COVID-19 pandemic—in companies' administrative units and production (IoT) activities as well as in government agencies, as an innovation leader, Software AG can influence the development of markets and drive its own growth.

The product portfolio and innovation risks described here were rated at risk signal green (2020: yellow) at the end of 2021.

Market risks and opportunities for the Digital Business segment

The comprehensive Digital Business segment is streamlined by product offerings based on the IoT & Analytics, API Management, Integration & Microservices, and Business Transformation product lines. This structure ensures the right roadmap prioritization of customer and market requirements for product development. It improves opportunities for further expanding the competitive advantages of Software AG products and receiving outstanding ratings by the relevant technology studies. A stronger R&D focus will also improve customer satisfaction and business success. It also reduces the product development-related risk of not adequately addressing customer requirements. In addition, product line general managers monitor individual product revenue so as to identify negative developments early and trigger and execute management activities accordingly. Because Digital Business is Software AG's largest segment, the Company can only grow if this segment grows. This is the primary risk associated with this segment.

Additional risks exist due to Software AG's low visibility in the USA, its largest single market. Significant marketing investments were made to generate pipeline and market visibility in order to reduce this risk. Furthermore, the allocation of R&D spending toward this segment's product cloud availability was and continues to be increased. Revenue performance is also still too dependent on single large-scale deals. To reduce this dependency, there will also be a major push in the transition to the subscription model in this business line, which will lead to consolidation of revenue streams in the medium term. To ensure the necessary rate of contract renewals, Customer Success managers provide ongoing customer service for the term of a cloud agreement to improve customer satisfaction and minimize the risk of termination. This relatively new time-to-value model was developed and introduced in connection with the sustainable subscription and SaaS sales models. With this model, customer benefits, and in turn customer satisfaction, grow over time.

These efforts are intended to reduce sales complexities and shift the focus to the strength of the individual product offerings. The Management Board sees opportunities in raising the visibility of products with existing and target customers, sharpening Software AG's identity and significantly improving customer satisfaction and success. In the Management Board's estimation, this will all contribute to significantly increasing the Company's share in the high-growth IoT & Analytics, API Management, Integration & Microservices and Business Transformation markets. The complete Digital Business line holds major opportunities for Software AG's future business development. This is especially due to the Company's technology lead, the fast pace of the IoT market's growth, as well as the ever clearer enterprise digitalization trend, which drives growth in the API Management, Integration & Microservices product line.

Growth in API Management, Integration and Web Services

The API Management, Integration & Microservices product line in the Digital Business segment generates the largest volume of business of all Software AG product lines. Software AG's growth depends on the growth of this product line. In 2021, this product line posted revenue growth of 7 percent at constant currency and bookings growth of 19 percent at constant currency. The intensity level of competition is very high in this business. Due to the necessity of fast innovation cycles, there is a high risk associated with correctly balancing the speed of development and the required product quality. Any quality issues that arise must be resolved quickly.

The following measures were taken to manage the strategic risks in this product line:

- Market observation and trend tracking, including collaboration with leading tech analysts, Gartner and Forrester
- Proactive marketing campaigns to grow the pipeline and generate new business as well as improve Software AG's visibility in key markets

- Intensified cross-sell activities for products in the API Management, Integration & Microservices product line with customers in the IoT & Analytics and Business Transformation product lines to grow new business
- Allocated more R&D resources to cloud products, especially webMethods.io
- Training and staff development in the R&D and Cloud Operation teams for the continued successful management of customers' software environments and fulfillment of service level agreements (SLAs)
- Closer collaboration with the first customers of new products for early recognition and resolution of quality issues
- Increased cloud availability of source codes and software environments to mitigate risks associated with ongoing business operations
- Cloud-first developer training
- Ongoing improvement of product quality monitoring
- Additional investment in cloud solutions

It is anticipated that, due to the COVID-19 pandemic, digitalization of enterprise processes and administration—including the public sector—will drive development of the API Management, Integration & Microservices product line. This product line holds major opportunities for Software AG's future business development.

Thanks to the measures described above, including the intensified digitalization trend in connection with the COVID-19 pandemic, the risk rating further improved to green as of the the end of 2021 (2020: yellow).

Development of Business Transformation

The Business Transformation product line in the Digital Business segment consists primarily of the ARIS and Alfabet products. This market is characterized by intense innovative competition. To keep up with this level of competition, Software AG introduced new functionality for its process mining products in 2021. This resulted in top ratings from leading software analysts Everest and Nelson. As most other Software AG products by now, the products in this product line are cloud-native. But competitors have a significantly higher share of cloud revenue than Software AG in the field of process mining software. To accelerate growth and the shift to cloud business in this product line, entry consultant teams are necessary and are currently being set up, especially for the new ARIS Elements cloud-entry solution. The task of these teams is to strengthen customer relationships and drive the relevant business volumes as well as to support the Sales organization in growing this business. Furthermore, Customer Success managers provide customer care for the duration of a cloud agreement to improve customer satisfaction and minimize the risk of termination. The relevant Customer Success Management organization was established and further developed last year. Within the Digital Business segment, the Business Transformation product line has the second-highest bookings growth rate after the API Management, Integration & Webservices product line. The Business Transformation products are particularly well suited as entry products for Software AG technology. But because the average deal size for these products is second-lowest of all product lines, the sales efficiency of direct sales channels is lower. Software AG's sales focus for these products is directed more toward other channels such as partner and online sales. Expansion of the partner ecosystem is necessary to boost the success of this product line. A higher number of implementation parters is needed to support customers in the implementation of these software products. These were not and are not yet available to Software AG to the extent necessary and are currently being increased. Competition for human resources has also intensified considerably in this product line. Software AG enhanced its recruitment and staff development programs to address potential fluctuation in this area. The COVID-19 pandemic has caused an increase in demand for this product line's ARIS and Alfabet products and is therefore having a more positive impact on this business.

These risks were given a green risk signal (2020: green) at the end of 2021.

Ongoing development of IoT & Analytics

Software AG's strategy foresees business in the IoT & Analytics product line in the Digital Business (Cloud & IoT business) segment as a key future growth driver. IoT is a fast-growing market subject to intense competition. The market is being driven by hyperscalers (computing networks to achieve major scaling in cloud computing and big data), system integrators as well as industrial companies that are developing their own IoT system landscapes. Software AG's competition includes large IT corporations such as Microsoft and PTC. Because IoT products are based on new software that is enhanced at a rapid pace, there are still inherent differences in product quality. Large R&D investments are necessary to resolve open technical issues and ensure the enhancements required by customers. These challenges grow in proportion with the number of customers and the increasing economic significance of this software for customers. The resulting challenge is allocating limited R&D resources correctly to product enhancement and to the development of new products. Software AG offers an IoT platform and implementation services. But more and more customers want an end-to-end IoT solution which Software AG cannot consistently deliver.

The COVID-19 pandemic also impeded the generation of new projects in this product line because face-to-face communication with new customers was not possible. Due to the intense level of competition and highly qualified employees in this product line, there is the risk of competitors attempting to solicit away employees, which can result in an increased risk of employee attrition. There is room for expansion in the availability of qualified sales and technology consultants in many smaller national subsidiaries. The complexity of projects with customers requires additional incentives in the Sales organization. These were not adequate in 2021. Because these products are increasingly sold as part of SaaS offerings, there is a growing risk that service level agreements will not consistently be met. Software AG's overall brand strength still has the potential to improve.

Growth in this product line was hindered in 2021 by the risks described above.

To lead this product line back to dynamic growth, the following measures were taken:

- Ongoing monitoring of IoT markets and focused innovative development of products to ensure technological USPs and product leadership
- Dedicated investments in R&D support and operations to ensure the IoT platform's quality, stability and availability
- Further expansion of innovation capacities in R&D, Product Management and Marketing, co-innovation with customers to complete the product portfolio
- Improvement of Sales employee compensation for generating IoT projects
- Measures to enhance positive employer image ("Great Place to Work")
- Training activities to expand human resources in IoT, both in R&D and Sales
- Reduction of COVID-19 risks through thorough remote work concept, free COVID-19 testing and vaccinations, as well as expanded collaboration platforms
- Expanded customer-centric teams to boost collaboration with customers and better understand customer needs
- Harmonization of teams, processes, tools and contracts for greater synergy in the Cloud Operations and Managed Services teams
- Prioritized limited IoT resources in countries with larger Software AG Sales resources such as USA, U.K., France and Germany as well as individual sectors
- Grew the IoT partner business for non-focus countries with increased investment in specific IoT partner teams to develop the IoT partner ecosystem
- Further expansion of marketing activities to raise awareness of Software AG's IoT offering in the market, grow the sales pipeline and convert more opportunities to real business

The risks associated with the IoT business were rated at risk signal yellow (2020: yellow).

Market risks and opportunities: Adabas & Natural (A&N)

Software AG's traditional Adabas & Natural (A&N) products is currently in an advanced stage of the product life cycle. The age structure of A&N employees poses a challenge for Software AG—in R&D, Presales, Sales and Professional Service—and its customers. The necessary generational shift across all customer-oriented functions must be well organized. Otherwise, there is a risk of losing customer contacts and expertise with the corresponding negative effects on sales opportunities. There is hardly any new customer business in this segment. The product portfolio is based on existing customers. Growing cost pressure on customers has the effect of more migration of mainframes to open system platforms. But resources are tight when it comes to supporting customers with this migration. There is also the risk of customers changing to new competitor products, which would have negative effects on revenue and profit margin. It would also reduce the cross-sell potential of other Software AG products. Software AG's strategy is based in part on extending customers' existing A&N license rights and/or selling add-on products. The potential offered by renewing licenses continued to drop compared to past years. Software AG's A&N customers nevertheless remain very loyal. This is because A&N products are highly valued for their:

- High availability
- Low operating costs
- Strategic relevance for operation of customer applications running on A&N
- Future guarantee

This presents the opportunity to attract customers with positive Software AG experiences to long-term maintenance and modernization of their IT infrastructure while keeping A&N technology. Software AG is the best partner for that. Retaining and acquiring product expertise make this possible. Ongoing innovation and R&D activities lead to significantly better prospects for the A&N business line. Software AG began communicating its Adabas & Natural 2050+ program in 2015 and is fundamentally willing to continue developing A&N and providing A&N customers installation support through the year 2050 and beyond. This initiative resonated extremely well with customers and increased the level of loyalty among the customers base. The transition to subscriptions in the A&N segment also opens up additional revenue potential.

Software AG is countering the described risks with the following measures:

- The Adabas & Natural 2050+ program can significantly delay the anticipated long-term revenue decline
- Ongoing development of hosting and private cloud availability for A&N products generates new business
- Through the sales of new products, the "Freedom for Legacy" initiative generates incremental revenue and enables existing A&N customers to integrate their legacy applications with modern software environments
- Customer support for migration of mainframes to Linux platforms with the help of A&N technology (re-hosting) to cut hardware costs for customers and prolong maintenance periods
- Expansion of A&N service capacities to support local partners and their re-hosting activities
- Generation change training programs for young A&N staff in R&D and Pre-sales working at Software AG and at customers
- Extended application support to serve customers with current A&N staff
- Expansion of offshore R&D and support centers
- Focus on key operating system platforms like z /OS®, Linux® and Windows®
- A&N modernization to extend the product life cycle, e.g. enhancement and sale of Adabas encryption and auditing products as well as zIIP™ functionality for online transactions and Adabas for zIIP
- Regular customer satisfaction surveys
- Increased marketing budget

These measures can significantly slow the downward trend of A&N sales while providing opportunities for generating additional sources of revenue. For these reasons, A&N revenue decreased by only 4 percent in 2021, or 2 percent at constant currency. Bookings declined by 13 percent (11 percent at constant currency). This performance was within the range of guidance for bookings that had been raised during the year from between -30 and -20 percent to between -12 and -8 percent.

The number of large-scale deals was lower in the 2021 fiscal year than in the previous year. Slightly more large-scale deals are expected for 2022. For this reason, Software AG raised its bookings growth guidance at constant currency in the A&N segment to between 0 and 5 percent for 2022. Software AG foresees a stabilization of A&N bookings in the years thereafter. Customer evaluations show that the majority of all A&N installations are business-critical for customers. This means that many customers' economic livelihood depends on the performance and availability of their A&N installations. After having invested heavily over the past decades, these customers cannot and will not forgo this technology. There is thus an opportunity that this business line will continue generating high revenues in the future.

There are significant opportunities associated with product innovation and A&N modernization/digitalization packages; this type of offering can make the need for large, cost-intensive projects to replace A&N technology superfluous. In this way, A&N remains a future-proof technology, which can make a positive impact on A&N customers' investment decisions. The COVID-19 pandemic also had barely any negative effects on business performance in this segment. In times of crisis, customers rely on proven technology and do not undertake activities to try out new technologies.

These risks were given risk signal green at the end of 2021 (2020: yellow).

Acquisitions

Software AG expands its technology offering and its global presence through targeted acquisitions. Acquisitions present the opportunity to participate in waves of innovation, to expand the product portfolio and increase relevance in the market and with prospective customers. Acquisitions can help shorten time-to-market significantly for new products that address the latest trends. The uncertainty of future market and technology trends poses a risk associated with determining the right target companies that are well matched to the Company’s future strategic focus. The selection of an unsuitable target company leads to management resources and investment funds being tied up without sufficient return on investment. This can result in risks associated with possible impairment losses, the unnecessary use of Software AG’s cash and a decrease of its growth potential.

The long-lasting period of low interest rates caused prices of potential target companies to rise and the profitability to drop. Potential target companies are therefore rare, highly priced or not yet the right size. Companies already successful in the market with groundbreaking technology are rarely put up for sale and have a high price. This market situation can poses a considerable obstacle in Software AG’s acquisition of new technologies and limit its non-organic growth. A risk therefore exists of acquiring unsuccessful business models or suboptimal products. There is always a residual risk inherent to due diligence processes of not having correctly assessed strategic risks.

The following risk-mitigating processes were defined for the time prior to and after acquisitions:

Pre-acquisition phase

To mitigate the selection risk, the Mergers & Acquisitions (M&A) department is continuously observing and evaluating the market for technology developments. Software AG expanded and optimized its process for identifying investment areas, target companies and potential divestitures. In this context, potential companies are identified using a sophisticated screening process. To reduce risks associated with due diligence processes, Software AG conducts a critical business model analysis of all potential target companies. Its current due diligence process identifies problems, rejection criteria and uncontrollable risks early. In-depth due diligence is carried out with respect to technological, strategic and operational integration. Prior to a takeover, an intensive review is conducted to ascertain whether the technologies of the target company in question effectively supplement Software AG's product portfolio, how market access and market penetration will change, and what synergy potential can be realized. Every acquisition is preceded by a precise analysis of the financial fitness of the target company by experienced due diligence teams. These teams consist of a core team and experienced specialists from the relevant business units. They assess whether the target company's corporate culture can be harmonized with that of Software AG. In order to ensure consistent integration planning, staff members who will be responsible for integration later are included in due-diligence processes at an early point in time.

The risks associated with the pre-acquisition phase were given a green risk signal at the end of 2021.

Post-acquisition phase

Furthermore, there is a risk that the companies acquired will not be integrated successfully.

Insufficient integration could result in growth and profitability issues as well as failure to achieve combined business plan targets. It would become difficult to quickly exploit revenue and cost synergies. There is an additional potential risk associated with the loss of key specialists when not enough attractive positions are created quickly. Especially smaller-scale acquisitions pose the challenge that managers who have worked as generalists must transition to the role of specialist in a larger organization following an acquisition. The main challenges include the integration of the product portfolio, the processes, the organization, the people, and the different corporate cultures. The risk of insufficient integration also has a negative effect on the integration of future acquisitions.

Due to these risks, a unit under the CFO, known as Corporate Development, was established as of January 1, 2021, to drive the Company's strategic development, including acquisitions. The existing M&A department was incorporated into the new unit to create the maximum M&A value possible. Within this organization, a new Post-Merger Integration (PMI) team was also established including a dedicated PMI manager to lead the team, which is responsible for integration of past and future acquisitions. This new team operates as part of the unit responsible for Software AG's corporate development; it created an integration concept with a stronger focus on cultural integration.

Through established control mechanisms, any possible integration risks or opportunities are identified during the due-diligence stage. The established integration processes clearly define roles for centrally managed sales, development and administrative tasks. This ensures integration across all departments and enables quick generation of revenue and cost synergies. Possible areas of employment for future employees are assessed at the beginning as well as ways for ensuring knowledge transfer. The acquired company's budget is detailed for the post-acquisition period in order to guarantee continued business operations. Specific KPIs are identified and monitored for each integration. A key component of these activities is the integration of sales. It entails dovetailing the new sales models and product offerings with the Software AG sales organization and leveraging revenue synergies. This enables the sale of newly acquired products to customers (upsell) and sales of existing products to new customers (cross sell). The acquired sales organization can act as an overlay function for the existing sales organization.

Opportunities and risks associated with integration in the post-acquisition phase were rather low at the end of 2021 due to two small-scale acquisitions in fiscal year 2016, one small-scale acquisition in fiscal year 2017, two small-scale acquisitions in fiscal year 2018 and none in 2019, 2020 or 2021.

Because an intensification of acquisition activities is planned in the near term, the integration risk was assigned a yellow risk signal (2020: yellow).

Risks and opportunities associated with the strategic transformation (Helix)

While the opportunities associated with the strategic transformation were already discussed in the relevant sections, Software AG's Management Board is also aware that it represents a substantial multi-year change project for the Company. Such a change/transformation process can lead to considerable risks when guidance and management of the process is not clearly structured. The greatest risk is that the organization could become structurally overwhelmed by too many simultaneous initiatives and the existing governance structures hamper change and/or become ineffective due to imprecise or uncoordinated change. The Management Board is combating the considerable risk inherent to any such major change project with the following measures:

- A central Transformation Office, under the leadership of an experienced Senior Vice President for Strategy and Transformation, was established and appointed eight employees. Four change managers design and support concrete initiatives based on the defined strategic priorities. Three program managers coordinate operational project inquiries; provide transparency on interdependencies; and ensure the use of standard tools for project management and application/process documentation. The Transformation Office reports to the Chief Human Resources Officer.
- A detailed execution plan with all change workstreams was created to coordinate scheduling of initiatives and measures, monitor progress of the transformation, provide complete transparency of the change/transformation program and manage dependencies.
- Responsibility for transformation initiatives was largely handed over to the relevant departments. Workstream leads in the relevant departments ensure execution of their respective parts of the overall execution plan. Organizational and content-related coordination between workstreams is managed by the Transformation Office as well as in regularly scheduled result-to-action (RTA) meetings. Here all workstreams present their progress, KPIs and any points in need of clarification. Because intense collaboration is vital to the change process, this forum provides a way to manage all change processes holistically across departments.
- Quarterly business reviews were established to assess and drive regional adaptation to the transformation process. They provide a comprehensive summary of the regions and units with respect to business performance and transformation. Measures are defined based on results to counter potential deviations.
- The existing governance structures incorporate transformation/change components ensuring that all deviations from the execution plan are identified early and escalated to the right people if necessary. A change/impact analysis, for example, is generated on a regular basis to identify the main risks and define measures to counter them.
- In addition, a Change Network was introduced in which managers from different departments execute concrete changes and improvements regarding specific topics in the context of relevant projects.
- External consulting and guidance of the change and transformation process, primarily in the areas of people and culture, implementation of the subscription sales model and customer success focus, will ensure that change/transformation management and plan execution meet Software AG's high level of quality standards.
- A review of market development assumptions will also be conducted at regular intervals as these parameters provide a key basis for the initial alignment of strategy and the transformation program.

The success of Software AG's transformation depends on its corporate culture and its adaptation to the new strategy. For that reason, particular attention is given to the following measures:

- Employees are actively included and trained in the change process.
- Communication is geared to the specific target audience.
- Talent is fostered, feedback sessions and round tables are held.
- Employee surveys are conducted. And, behaviors that may hinder the change process are identified and addressed.

This is driven through a company-wide simplification initiative which adapts processes to be able to present the transformation to employees quickly, directly and tangibly.

This risk was rated at red in the first years of implementation. But the opportunities associated with the strategic realignment far outweigh the risk. Because these risks are included in the other strategic risks, they were not separately rated in the 2020 or 2021 fiscal years.

Product distribution risks and opportunities

Sales efficiency and sales risks and opportunities

The complexity of Software AG's products together with the complexity of the requirements of its customers alike require a well trained and highly specialized Sales force. This leads to relatively long sales cycles. Product-related sales and marketing expenses decreased in 2021. At 111 percent of license revenue they were lower than in the previous year (2020: 116 percent). Another meaningful metric is the ratio of product-related sales and marketing expenses relative to bookings, which was 52 percent (2020: 51 percent) in fiscal 2021. This reflects a slight increase in sales efficiency in 2021 year-on-year when considering these two metrics. An ineffective sales organization can be an indication of an inadequate sales approach; uncompetitive products regarding capability, price or possible applications; or unscalable product solutions. A sales model has to improve efficiency and remove inefficiency. Repeatable product solutions and sales approaches are necessary to achieve this. A result can also be shortened sales cycles. Software AG's land-and-expand sales strategy must be refined and expanded.

The Sales organization must be more clearly structured into one unit that generates new deals with annual recurring revenue and another unit that carries out efficient renewal of existing recurring customer contracts. If Software AG does not decisively optimize its sales efficiency and sales approach in key markets, its growth and profitability targets will be difficult to meet. Software AG's shift to the subscription model from the previous sales model based predominantly on perpetual licenses could mean that customers terminate agreements more quickly when products do not fully address their wishes. Higher average deal size and better scalability can improve sales efficiency. A sales focus on the expansion of relationships with strategic customers as well as signing new logos is essential. Business with large customers increases the dependence of license revenue on a smaller number of large customers though.

Insufficient average deal sizes closed by the direct sales organization with full administrative support from Legal and Finance and insufficient use of standard agreements and processes lead to a reduction in sales efficiency and profitability. Some of the smaller country subsidiaries have too few technology consultants (Pre-Sales staff) and skills to provide customers with technical consulting on the entire Digital Business product portfolio. Not enough standard contracts are used—even for small-scale deals—due to the "customer first" approach in place. The COVID-19 pandemic is causing slower procurement cycles when customers lack adequate digital collaboration infrastructure.

Software AG intends to continually increase sales efficiency and thereby further accelerate deal size growth in the Digital Business segment through the following measures:

- Accelerate the transition to recurring license models such as subscriptions, usage-based licenses and SaaS in all product lines with better scalability and forecast accuracy.
- Further development of the Customer Success Manager organization, created last year to provide ongoing care and consulting to customers in areas such as the renewal of existing contracts. Already in 2021, the Customer Success Manager organization was able to increase the net retention rate (NRR) to 106 percent.
- Renewals of customer contracts based on subscription and SaaS will increasingly be carried out by efficient maintenance renewal teams. This will be driven with the aim of increasing efficiency.
- A sharpened focus on key markets and customers also drives the improvement of sales efficiency.

- Concentration of the direct Sales organization on generating new recurring customer contracts
- Further expansion of the contract renewal team to relieve the direct Sales organization
- Further reduce complexity of product offerings and pricing with simpler product bundles
- Further simplify administrative processes to increase sales efficiency

Due to improved sales efficiency achieved in the 2021 fiscal year as compared to 2020, the risk rating in terms of risk signal stabilized at green in 2020 and 2021.

Partnership risks and opportunities

Software AG's growth strategy is anchored in the expansion of its partner ecosystem to broaden vertical and regional market reach. The partner ecosystem must be further expanded to generate additional revenue growth in markets that have not yet been addressed. Global systems integrators play a key role in the majority of transformation projects in Software AG's customer base. Software AG's collaboration with global system integrators like Wipro, Tata Consulting Services, Capgemini, etc. used to be heavily geared to sales collaboration and only played a minor role in transformation projects. Their assessment of Software AG products is highly important to Software AG's sales success. Sales channel conflicts between direct and indirect sales in combination with insufficient compensation for partners often stood in the way of success in the partner business. A successful partner business is only possible if the right goals are defined internally for Software AG Sales, for technology consultants (Pre-Sales) and for the Professional Services organization. Furthermore, collaboration with partners must be compensated adequately to minimize sales channel conflicts. The implementation of a global partner strategy, standardized partner business processes, collaboration between direct and indirect Sales as well as the necessary compensation structures with a focus on incremental rather than existing business is not yet complete. Software AG products are not yet sufficiently ready for business with Original Equipment Manufacturers (OEMs). Therefore, too many inefficient adjustments still need to be made to products and specific product support provided when it comes to OEM partner contracts. Partner business with leading cloud providers such as Amazon Web Services (AWS) and Microsoft Azure is essential to stabilizing and broadening Software AG's installed customer basis since customers are increasingly moving their applications to the cloud and recommendations from these huge organizations have a substantial impact on Software AG's sales success.

Potentially insufficient partner governance could result in legal and reputational risks, including damage claims against Software AG, and jeopardize the success of Software AG's partner business. The longer the COVID-19 pandemic lasts, the more the partner business will be impeded through an increased coordination effort.

To grow the success of its partner business, Software AG introduced the following measures:

- Expansion of a global partner management team to grow the partner strategy, expand partner relationships and establish networks on all levels to increase incremental partner business
- Ensure sales skills at Software AG and with partners through a scalable self-driving training approach
- Revise the sales compensation model to increase incentive for collaboration between direct sales organizations and distribution, cloud and OEM partners
- Define objectives for partner-related revenue at regional and national levels
- Obligate software sales organizations to incorporate global system integrators into strategic key account relationships
- Clear definition of new account business (white space) to be managed by partners
- Offer more attractive, foreseeable margins to win value-added resellers
- Expand the partner program to fuel partner recruitment
- Simplify Software AG'S pricing and create more flexible price structures in the OEM partner business
- Simplify partner-related processes and systems on all levels
- Set up a marketing fund for partners to accelerate the generation of partner business
- OEM-enable products and introduce standard processes for certification of OEM solutions by R&D
- Install a global team focused on commercial cloud alliances
- Improve partner business reporting
- Introduce standardized rules for working working with cloud providers
- Sharper focus on signing new customers

- Systematically develop and expand an effective and scalable partner-enablement and qualification program to improve service capacity and quality
- Partner support in coping with challenges of the COVID-19 pandemic

Part of the Company's strategic transformation is to maximize the considerable opportunities presented in the partner business by pursuing a consistent and comprehensive concept to build a global partner ecosystem. It can be assumed that establishing a new performance matrix and focusing on high-potential partnership models in the different product groups can generate mid-term revenue growth through the partner ecosystem.

The risks associated with partnerships were given the green risk signal (2020: yellow) at the end of 2021.

Personnel risks and opportunities

Employer appeal

Software AG's most valuable asset is its people, their knowledge and their personal skills. An an increasingly competitive environment in which every organization is trying to attract the best talent for itself, one of Software AG's main challenges is to attract, promote and retain the best people. The goal is to ensure having a sufficient number of highly qualified and motivated employees at all relevant sites at all times. Uncertainty about Software AG's future success in new markets could have a negative impact on its image as an employer both among highly qualified applicants and existing specialists. This can increase attrition risks. Risks arise when succession is not adequately planned and the Company is not attractive to internal or external talents. Attracting and managing talent are therefore decisive success-driving factors and key to ensuring Software AG's operational and financial performance.

Another essential factor is that the Company continues surmounting the challenges of the COVID-19 pandemic while accelerating its own transformation. In the past two years, Software AG very successfully contained the impact of the pandemic and was able to significantly improve employee satisfaction and engagement, as confirmed by the latest customer survey from October 2021. The COVID-19 pandemic and its effects are expected to lessen continuously in the future. The demographic trend in some countries and markets could also result in a reduction in potential growth due to a shortage of qualified young talent. Succession management and well organized knowledge transfer are key success factors in minimizing the impact of this risk.

The advancing age structure in the A&N business line could lead to a loss in expertise.

Software AG is taking the following measures to counter these risks:

- Monitor, track and assess internal and external key indicators such as external rating platforms, attrition rates, employee satisfaction, etc.
- Ongoing evaluation of market-oriented remuneration and target salaries based on global benchmarks
- Foster an education culture through comprehensive learning and growth programs, courses and workshops for employees and leaders
- Support leaders to deepen and strengthen their capabilities and competencies

- Globally optimize employee development reviews and establish options for personal and professional advancement
- Invest in employee and cultural initiatives
- Promote physical and mental health
- Improve employee engagement and satisfaction with annual employee surveys and apply improvement where weaknesses are identified
- Specific offerings to foster and educate high school and college students early in their development
- Strengthen Software AG's presence externally in the labor market and social media as well as promote the Software AG image as an attractive employer
- Improve talent acquisition with better team structures
- Continue activities for direct recruitment of new employees and training of existing staff

Overall, Software AG assumes that these measures provide a sound basis for ensuring its long-term success.

Due to the implemented measures to address the intense competition among employers for talent, personnel-related topics were given a green risk signal (2020: green) at the end of 2021.

Legal risks

Intellectual property (IP) right protection

This strategic risk mainly consists of of the two subcategories described below.

Patent litigation

Patent law, especially in the U.S. due to the large number of software patents granted combined with the peculiarities of U.S. procedural law, favors the bringing of patent lawsuits. Aside from potential lawsuits from other software companies, patent holders are also exploited by non-practicing entities (patent trolls), which are often financed by hedge funds to file patent lawsuits against software companies. This also affects Software AG. Patent litigation in the U.S. entails the risk of higher procedural costs to defend against claims without provision for reimbursement in American procedural law. The risk associated with patent trolls has lessened in recent years due to a new legal ruling by U.S. courts. According to the decision, non-practicing entities are required to own a relevant business in order to sue for infringements against their own patents. Furthermore, large U.S.-based software companies have joined forces to form the License-on-Transfer (LOT) Network. The LOT Network is a non-profit community established to enable patent licensing among members and combat patent trolling. To strengthen its own position, Software AG joined the network in 2020. Members of the LOT Network commit to not sue each other for patent infringements. The last patent troll lawsuit ended in a settlement in fiscal 2019. Since this case, spanning multiple years, there have been no further attacks by patent trolls in recent years. There is also a risk of being sued for patent infringements by competitor software companies provided they are not members of the LOT Network. Software AG has an IP Rights team to counter patent law suits. In addition to tasks associated with patent law protection, the team handles Software AG's own patent applications and coordinates its defense against patent suits. The Company's portfolio of patents is the best protection against claims from other market participants, because it offers opportunities for cross-licensing agreements. There was room for improvement regarding Software AG's patenting activities in recent years. IP Management therefore launched an initiative whereby workshops were held at all relevant R&D locations to examine the option of new patent registrations.

But entering patenting processes also leads to risks. For example, IP rights can be lost in such processes due to conditions by the patent issuing organization. These rights can also be lost when built into open-source software. Software AG owns a significant number of patents, which can be used to protect its business and defend it against patent suits.

To defend itself against future patent-related lawsuits, all relevant technical and marketing documentation was systematically stored in a central location, which makes the necessary documents available quickly in the event of a legal suit. This documentation process is employed for newly acquired companies as well. All new products are evaluated internally for potential patent infringements before public publication. R&D and Product Marketing employees receive training on the subject of patent protection laws. Training on trademark name research is currently in development. Implemented measures and processes reduce this risk considerably for Software AG. No new patent suits have been filed against Software AG since 2012. It is currently unforeseeable to what extent future patent suits will be fueled by the increasingly nationalistic tendencies worldwide.

Protection of Software AG partners' IP rights

Because Software AG licenses third-party products, it is required to defend rights granted to customers such as rights of use for specific resources. Unauthorized undetected use by customers can result in liability risks relating to past license fees owed to software distributors. To mitigate this risk, audit rights have been included in all customer contracts which entitle Software AG to monitor customers' use of products in accordance with contractual stipulations. All third-party software sales agreements are reviewed for unfavorable terms and modified as needed by a central department. In addition, Software AG continued developing and optimizing its procurement process.

Like last year, the risk associated with the protection of IP rights was rated at a green risk signal as of December 31, 2021.

Risks from cloud contracts

The overall buying behavior of enterprise customers in the software market has changed radically. Customers increasingly request time-limited, self-installable software products and hosted cloud products. Unlimited self-installable software products are less and less in demand. The demand for subscription and SaaS offerings is therefore rising continuously. Software AG's Management Board therefore defined a "subscription-first" approach as part of the new strategy, whereby all Software AG products have been offered primarily as subscriptions since 2020. Software AG is also continuously expanding its cloud offering. Nearly all Software AG products are now available as cloud solutions. This satisfies the increasing customer demand for pay per use and subscription options and, regardless of the deployment model, provides access to the advantages of this form of consumption.

The risk associated with information security and data protection is significantly higher in the cloud business than in on-premises business because Software AG acts as a data processing company. This transfers the risk to Software AG as the cloud provider. This change results in an increased legal risk associated with cloud agreements. To minimize this increased risk, an information security management system (ISMS) in accordance with ISO 27001 was implemented and externally certified.

The assessment of risks associated with cloud contracts is included in the two following risks regarding data protection and information security and was therefore not conducted separately.

Data protection

As a provider of maintenance, cloud and consulting services, Software AG works with personal customer data and thus acts as a data processor. Software AG also processes personal data about its employees, customers, prospective customers, partners and suppliers and is responsible for that data in its role as data controller. The Company is legally required to treat this data in accordance with the applicable data protection laws and protect it against unauthorized access, alteration or deletion. Software AG must ensure personal data is treated confidentially, but available at all times for the required application without loss of integrity. Due to the increasing number of cyberattacks, guaranteeing compliance with data protection is becoming more challenging. Data processing agreements (DPAs) with customers stipulate that Software AG must comply with data protection laws, particularly with the EU's General Data Protection Regulation (GDPR). From August 2020 to July 2021, total cyber incidents worldwide increased year-on-year by 64 percent, according to a study by Barracuda Networks Inc. According to Bitdefender GmbH, they increased by 715 percent year-on-year in the first half of 2020. Software AG did not report any level 1 incidents with high threat potential in 2021, whereas one material attack had been reported in 2020. At the same time, growing IT complexity increases the attack surface for data attackers. Under the GDPR, penalties of up to 4 percent of Software AG's total annual revenue can be issued in the event of infringement of data protection laws. It can also lead to additional costs for external consultants, reduced process productivity and considerable revenue-diminishing reputation damage. Sizable investments are necessary on an ongoing basis to take these security measures and comply with regulations.

Software AG counteracts these risks by improving its data protection management system (DPMS) on an ongoing basis. This DPMS defines processes that help ensure data protection such as internal data protection policies and standardized processes that are constantly being adapted accordingly.

In addition, the following measures were taken to reduce the risks associated with data protection:

- When Software AG enters DPAs with customers, the risks it assumes are minimized to the legally admissible extent
- Implementation of a data protection policy that is binding for the whole Group as well as binding corporate rules (BCRs) for international data transfer to ensure a uniform level of data protection throughout the Software AG Group (current project)
- The DPMS is being monitored and optimized on an ongoing basis
- Mandatory data protection training for all employees to raise awareness for the requirements of data protection
- As a result of the malware attack in October 2020, Software AG acquired a great deal of experience in processing personal (including sensitive) data and drew the necessary security-related conclusions. With the help of investments and measures now concluded, Software AG significantly improved its level of data protection; however, 100 percent security cannot be guaranteed as attacks are getting ever more intelligent

The Schrems II ruling (Judgment of the European Court of Justice on Transfers of Personal Data to Third-Party Countries) strengthens data protection for EU citizens. The ruling also creates compliance issues that can, however, be mitigated through the use of EU standard contractual clauses (SCCs). The ruling stipulates, among other things, that necessary data transfer to an "unsafe third country" can be legally safeguarded through the use of EU SCCs. Under certain circumstances, using an SCC can help provide the legal security necessary to transfer personal data to a data processor based in an unsafe third country. The main prerequisite for using an SCC is that a data processor can guarantee an equivalent level of data protection as that in the EU. To minimize the risk of unauthorized data processing in an unsafe third country, Software AG concludes SCCs with the relevant data processors. In addition, supplementary and technical measures were taken, e.g. encryption, to ensure compliance with the rules associated with the Schrems II ruling.

Software AG's data protection risks were evaluated separately from information security for the first time in 2021 and were given risk signal yellow. There is therefore no comparable rating indicator from the previous year.

Information security

All data and IT service functions for internal purposes and customers globally are subject to a sharp upward threat potential curve because of the fact that malware attacks are getting smarter every year. Furthermore, government regulations on data protection and IT security are getting ever stricter. The growing complexity of IT increases the vulnerable attack surface of Software AG's sensitive data and IT systems to hackers and poses a constant threat to its tangible and intangible assets. This risk, however, is not specific to Software AG. It affects nearly every company worldwide. The security level 1 attack in October 2020 that posed a high threat potential to Software AG's business, was followed by a security level 2 attack in 2021 that posed a medium threat potential, and seven security level 3 attacks with low threat potential to Software AG's business.

To mitigate the risks described above, Software AG introduced and implemented the following measures:

- The SecureBiz program was introduced at the beginning of 2021. This program primarily comprises improvement of the following points:
  - Continuous surveillance of the IT landscape for weak spots and security monitoring
  - Information protection and management
  - Network redesign including network segmentation, real-time data flow and irregularity monitoring
  - Hardened active directory and Azure active directory
  - Admin rights only issued upon request
  - End-device management
- An ISO 27001 certified information security management system (ISMS) was instituted for cloud business customers. The roadmap for customer services outside the certified customer cloud services includes the implementation of an ISMS and ISO 27001 certification for dedicated business areas of customer service to be instituted in 2022.
- Information security employee training was introduced and will be expanded continuously.
- To increase transparency of IT security, internal control mechanisms are monitored and optimized to reach a state-of-the-art level.
- Management and monitoring of overall information security was restructured in 2021 and separated from IT security operations.

- The IT Security department (e.g. Security Operation Center, SOC) was reorganized and strengthened with additional human resources in 2021.
- A new Chief Information Security Officer (CISO) was appointed and the position's responsibilities expanded. This position reports directly to the CEO.
- The newly created position of Chief Security Officer (CSO) reports to the Chief Information Officer.
- Software AG's IT security strategy and the corresponding management program are aligned with the global corporate and IT strategies.
- The IT Security department will be responsible for ongoing development of processes, workflows and tools and will monitor the extent to which they are correctly installed and employed so as to prevent potential malware attacks.
- Risk evaluations are being optimized and rolled out on all security-relevant IT systems.
- In the interest of ongoing improvement of the SOC's identification and response processes, the option of using simulated attacks ("Red Team") to evaluate these processes is being reviewed.

All these measures, however, cannot and will not provide a 100 percent guarantee of IT security. The systems have become too complex, and potential attackers too well trained and equipped, sometimes by foreign governments with extensive resources. Software AG therefore can and must do everything in its power to achieve the maximum level of security.

Like last year, the risk associated with information security was rated at a red risk signal.

Other legal risks

Regulatory, compliance and litigation risks

Regulatory and political changes, such as embargoes, can influence Software AG's business operations in difference national markets. That could have a negative impact on the Group's future business and financial performance. Uncertainties regarding regional legal systems could hinder or prevent the assertion of Software AG's rights (e.g. commercial property rights).

A multinational software company like the Software AG Group is subject to global risks associated with legal disputes and government and official processes. Software AG cannot rule out that litigation and proceedings will have negative effects on the earnings of the Company; as a rule, the Group's financial position can even be negatively affected when law suits are won, given the high cost of defense attorneys and other defense services needed to thwart accusations, for example in the United States. Despite detailed risk assessment and forward-looking risk provisions, there is a risk that the actual cost of litigation is higher than the assumed risk value.

For information on specific legal disputes, please refer to Note [36] in the Notes to the Consolidated Financial Statements and Other Provisions in the Separate Annual Financial Statements of Software AG (Parent Company).

Financial operating risks

Exchange rate risks

Software AG is exposed to exchange rate risks through its global business activities. Software AG's sales organizations operate in the currency of the country in which a sale is transacted. This can result in currency risks and opportunities for Group revenue. For more information on Currency Split, please refer to the graphic in the section Financial Performance of the Group in the Economic Report.

Exchange rate fluctuation impact on Group revenue in 2021:

Currency fluctuation in 2021	Change in exchange rates volume-weighted 2021 vs. 2020	Impact on revenue in 2021 in € millions
U.S. dollar 31.1% of revenue	−3.1%	−8.4
Israeli shekel 6.7% of revenue	+2.3 %	+1.3
Pound sterling 5.4% of revenue	+3.9 %	+1.7
Australian dollar 3.9% of revenue	+4.6 %	+1.4
South African rand 2.6% of revenue	+8.0 %	+1.6
Brazilian real 2.5% of revenue	−8.6%	−2.0
Canadian dollar 2.1% of revenue	+3.2 %	+0.5
Other currencies 14.6% of revenue	−2.2%	−2.7
Currency effects on total revenue	**−0.8%**	**−6.6**

The sales-related expenses are in the same currency as the sales themselves, however. This natural hedging relationship is stronger in the USA due to the fact that components of Software AG's R&D and global Marketing are based there. Software AG further utilizes derivative financial instruments for hedging. This mitigates the effects of exchange rate fluctuations on Group results. Furthermore, portions of the Company's liquid assets are held in the USA. Its hedging instruments are used to cover existing foreign currency receivables and payables and anticipated cash flows. All exchange rate risks are monitored centrally.

Risks from financial instruments

Liquidity and cash-flow risks concerning derivative financial instruments are eliminated by the fact that Software AG secures only existing balance sheet items or highly likely cash flows. Based on the financial instruments open on the balance sheet date, an increase in the market interest rate level by 100 basis points would have increased Group net income in 2021 by €2.9 million (2020: €2.1 million). Provided conditions such as revenue structure and balance sheet relationships remained constant and no further hedging transactions took place, this approximate correlation could be applied to future fiscal years as well. Under these conditions, a 10 percent decrease in the euro's value against the U.S. dollar as of December 31, 2021 would have caused Group net income in 2021 to increase by €1.7 million (2020: €2.1 million). Constant monitoring of the relevant banks' creditworthiness helps Software AG minimize the risk of losing business partners with whom derivative financial instruments are concluded.

Other financial risks

Other financial risks include predominantly the risk of bad debt losses. No cluster risks exist due to Software AG's diversified markets and customer structure. Default risks in the long-term average are quite marginal as a result of the generally high level of creditworthiness on the part of its customers. As in the previous year, financial provisions were set up in 2021 due to the increased default risk associated with the COVID-19 pandemic. To reduce the impact of this risk, Software AG uses an automated approval process for customer contracts, known as the Global Deal Desk (GDD), based on its own technology. To protect cash holdings, Software AG constantly monitors partner banks' creditworthiness and adjusts investment decisions accordingly.

GENERAL STATEMENT ON THE GROUP'S RISK SITUATION

The Software AG Group's overall consolidated risk situation is lower than in the previous year. In 2021, 69.2 percent (2020: 41.7 percent) of Software AG's strategic risks were categorized as risk signal green, 23.1 percent (2020: 50.0 percent) as yellow, and 7.7 percent (2020: 8.3 percent) as red.

The Management Board assumes that the strategic risks are limited and manageable. No individual or consolidated risks can be identified that, due to the extent of their impact or their likelihood of occurring, are likely to jeopardize the going concern of the Company now or in the future.

SOFTWARE AG'S RATING

The necessity for an external rating did not arise because of Software AG's solid financial structure and employed financing instruments. There is currently no official external rating of Software AG. Nevertheless, there are some facts that shed light on Software AG's external rating.

Based on the financial statements from December 31, 2020, as in previous years, Software AG was given central bank eligibility by the German Central Bank (Deutsche Bundesbank). This means that lending banks can use credit claims with Software AG as collateral for refinancing with the Deutsche Bundesbank.

Software AG's own banks were unified in their classification of its creditworthiness as investment-grade at the end of 2021.

Risk Summary

	Impact on EBIT in the next 3 years	Probability	Risk signal	Trend
Corporate strategy risks and opportunities				
Product innovation and portfolio	medium	unlikely	green	declining
Growth in API Management, Integration and Web Services	medium	unlikely	green	constant
Development of Business Transformation	low	unlikely	green	constant
Ongoing development of IoT & Analytics	medium	likely	yellow	declining
Market risks and opportunities: Adabas & Natural	medium	unlikely	green	constant
Acquisitions: pre-acquisition phase (selection)	medium	unlikely	green	constant
Acquisitions: post-acquisition phase (integration)	medium	likely	yellow	increasing
Product distribution risks and opportunities				
Sales efficiency and sales risks and opportunities	medium	unlikely	green	constant
Partnership risks and opportunities	medium	unlikely	green	increasing
Personnel risks and opportunities				
Employer appeal	low	likely	green	increasing
Legal risks				
Intellectual property (IP) right protection	low	unlikely	green	constant
Data protection	low	highly likely	yellow	declining
Information security	medium	highly likely	red	increasing