

Research Article

Exploring the Role of SAP Technology in Streamlining Enterprise Resource Planning (ERP) Systems

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Abstract

ERPs are essential in improving decisions in organisations, key business areas, and the general management of organisations. SAP an International leader in ERP is making enhancements in traditional ERP models by using various technologies such as SAP HANA- in-memory computing, cloud and real-time scenario analysis. The following paper will discuss the development and implementation of SAP technology in today's advanced ERP systems in aspects of data management and integration and business process automation for the purpose of effective decision-making. Looking at developments such as SAP S/4HANA and RISE with SAP, the study shows how the solutions solve key issues, including poor productivity, high volumes of data, and siloed information, by promoting digital transformation and innovation. Moreover, it highlights the importance of SAP in developing bespoke, componentised, and 'sustainable' ERP system solutions aligned to 4.0 models. The study contributes to the understanding of how SAP helps to increase organisational productivity, cut costs, and foster sustainable business performance within the context of global competition.

Keywords: Enterprise Resource Planning, SAP Technology, Streamlining, SAP S/4HANA, SAP ERP software.

Introduction

The many parts of a company may work together in harmony with the help of Enterprise Resource Planning (ERP). Applications that support accounting, human resource, project and financial management are some of the aspects that belong to the enterprise resource planning (ERP) system [1]. Figure 1 illustrates how the ERP system that was adopted in the mid of 1990s has turned out to be one of the organisational most important tools used to sustain organisational standardisation [2]. System and process revolutions brought forth by SAP ERP's release have made system installation possible for a wide range of organisations and sectors [3].



Figure 1: Applications of ERP technology

It is however evident that in today's environment, there is high complexity resulting from globalisation [4], advancing technology and the continuously changing needs of the market. This makes ERP systems to be more than just strong and stable, but also flexible and effective. Such changes, however, are not easily adaptable in traditional ERP solutions and consequently result in ineffectiveness and disparate data systems. Thus, the necessity to adopt integrated and efficient ERP systems for the proper organisation of complex business processes with regard to the possibility of their further scaling up while maintaining the necessary degree of flexibility[5].



Figure 2: Applications of SAP technology

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SAP (Systems, Applications, and Products) technology is known as the global provider of ERP solutions with

new platforms based on the use of AI, ML, and data analytics[6]. SAP polishes the functionality of integration between different departments, providing real-time data interchange and process control. This is especially important today because companies have to respond quickly to market changes and, at the same time, efficiently manage resources and coordinate processes[7]. Figure 2 shows the Applications of SAP technology.

SAP turned the ERP into more than a system used to perform basic functions in industries. This involves the creation of intelligent enterprise ecosystems that conform to the 4.0 industrial standards, such as the use of IoT, cloud and digital transformation projects. According to SAP at this strategy, organisations can optimise ERP solutions with their specific organisational needs and integrating multiple sub-systems within the enterprise. This not only adds elasticity to IT service delivery but also lowers the TCO and increases the ROI.

This paper aims to review the changes SAP technology has brought to ERP systems in terms of putting more emphasis on data integration methods, process automation, and real-time value propositions for making informed decisions. Using SAP S/4HANA and 'RISE with SAP' examples, the study shows how SAP solves such issues as scalability, redundancy and siloes addressing digital transformation and advancing efficient, intelligent, and innovative enterprise performance.

Motivation of the study

The complexities of modern business operations demand advanced ERP systems capable of ensuring agility, scalability, and integration across functions. Traditional systems often fail to meet these needs, creating inefficiencies and decision-making delays. This study is driven by the potential of SAP technology to transform ERP systems through innovations like in-memory computing, cloud integration, and real-time analytics. By exploring SAP's capabilities, this research aims to provide insights into optimising resource planning and achieving competitive advantage in a rapidly evolving digital landscape.

Organized of this paper

The rest of the article is organised as follows: Section II provides a critical analysis and discussion of the relevant prior research. In Section III, the transformative role of SAP in streamlining ERP systems and its key modules are elaborated. The employed research approach and methodology are detailed in Section IV, followed by the analysis and discussion of the results in Section V. The discussion and conclusion of the study are presented in Section VI. Finally, Section VII outlines the implementation of the study and potential directions for future research.

Transforming Enterprise Resource Planning (ERP) with SAP technology

System Application Products goes by the abbreviation SAP. Once upon a time, there was an ERP solution that had a lot of traction: SAP. SAP enhances the efficiency of resource planning, management control, and operational control by using ERP software solutions.

The functional departments of product planning, components buying, inventory management, sales and distribution, plant maintenance, quality control, human resources, finance, and controlling are all integrated by SAP software, which is multi-module application software[1]. The SAP software program allows for the integration of many different functions. Figure 3 and the following are the typical components of a MIS that make up a SAP system:

- *SAP Software* - A basic component of an ERP system is software that is built on modules. The software modules in an organisation automate the business operations of certain functional areas. Planning products, sourcing components, controlling inventories, distributing products, monitoring orders, accounting, finance, and human resources are all common ERP software elements[8].
- *Business Processes* - Strategic planning, managerial control, and operational control are the three tiers into which an organisation's business operations inevitably descend. ERP systems have been marketed as ways to facilitate or simplify company operations on a global scale. However, the integration of different functional areas has been the extent to which ERP has achieved success.
- *SAP Users* - Employees at all levels of an organisation, from entry-level workers to executives, using ERP systems.
- *Hardware and Operating Systems* - A lot of big ERP systems run on UNIX. Enterprise resource planning (ERP) software is also widely used on Linux and Windows NT. Other operating systems could be used by legacy ERP systems.



Figure 3: MIS architecture

The Evolution of SAP as a Leader in ERP Solutions

A contemporary company's ability to integrate and manage its essential business activities is made possible by ERP solutions. Market leader SAP in ERP software has been adapting its products and

services to suit companies' evolving demands. From SAP R/3 to SAP S/4HANA and finally to RISE with SAP, this progression is traceable [9]. This blog delves into the notable achievements and improvements in SAP ERP systems and how they now assist organisations.

SAP R/3: The Foundation of Modern ERP

The introduction of SAP R/3 in 1992 shook up the ERP market with its client-server architecture and real-time data processing capabilities. Financial accounting, HR, manufacturing, and SCM were just a few of the numerous uses it provided to businesses [10]. Important components of SAP R/3 were:

- **Modular Design:** To provide companies the freedom to choose the best fit for their requirements, R/3 was built with a number of modules that could be installed separately or as a whole suite.
- **Real-Time Processing:** In contrast to R/2, which processed data in batches, R/3 allowed for real-time data processing, giving decision-makers access to the most recent data possible.
- **Integration:** Data consistency and improved operational efficiency were two outcomes of R/3's smooth integration across many business operations.

SAP S/4HANA: A New Era of ERP

An ERP suite developed by SAP and based on the SAP HANA in-memory computing platform, S/4HANA was unveiled in 2015. In terms of functionality, usability, and performance, S/4HANA was a giant leap forward [11]. Some important new features in S/4HANA are:

- **In-Memory Computing:** As a result of using SAP HANA's in-memory database, S/4HANA is able to handle massive amounts of data at unprecedented rates, allowing for real-time analytics and reporting.
- **Simplified Data Model:** S/4HANA streamlines the data model by doing away with indexes and aggregates, which lessens the data footprint and boosts efficiency.
- **User Experience:** A more contemporary and user-friendly interface is now available in S/4HANA thanks to the integration of SAP Fiori, which increases user happiness and productivity.
- **Enhanced Functionality:** To help companies innovate and remain competitive, S/4HANA offers enhanced capabilities in areas like IoT integration, predictive analytics, and ML.

RISE with SAP: Transforming Business in the Cloud

In 2021, SAP introduced RISE with SAP in response to the increasing demand for cloud-based solutions. RISE with SAP is an all-inclusive solution that helps companies smoothly transition to the cloud and revolutionise their operations [12]. The following are essential parts of RISE with SAP:

- **Business Process Intelligence (BPI):** Organisations may attain operational excellence with the support of RISE with SAP's tools and services for analysing, optimising, and automating business processes.
- **Cloud Infrastructure:** By integrating RISE with SAP, businesses may take use of SAP's cloud management and support services while still using their preferred cloud infrastructure provider, whether it AWS, Microsoft Azure, or Google Cloud.
- **SAP Business Technology Platform (BTP):** Through RISE with SAP, organisations have access to SAP BTP, a single platform that facilitates application development, integration, and extension.
- **Outcome-Focused Services:** Service offerings from RISE with SAP include technical migration, adoption support, and ongoing innovation, all of which work together to ensure a smooth transition and maximise value.

The Timeline of SAP'S ERP Systems: A Journey of Innovation and Leadership

Explores SAP's history and growth to the present day, taking an especially detailed look at the ERP software that defines the company.

1972: The Birth of SAP

- **Founding:** The Company was started in 1972 by five German engineers who had a prior IBM experience and the name SAP was derived from System analyse und Programmentwicklung.
- **Early Vision:** The original intent of the inventors was to create regular application software that could process data in real time.

1979: SAP R/2 – The Mainframe Era

- **Launch of R/2:** The first system from SAP called R/2 was designed specifically for mainframe computers.
- **Key Features:** Some of the features involve human resources, financial accounting, and supply chain management.
- **Impact:** Allowed the centralisation of business functions in several departments; the organisation of social business computing.

1992: SAP R/3 – The Client-Server Revolution

- **Introduction of R/3:** R/3 was released and gave SAP a distinct shift away from the 'mainframe' systems with a client-server-based ERP system.
- **Modular Architecture:** Presented a modular design that companies may use to install individual modules according to their need.
- **Global Reach:** Its adaptability and scalability led to its worldwide acceptance.

2004: SAP ERP 2004 (ECC 5.0) - Enhancing Integration

- **ECC Introduction:** The latest version of SAP's ERP Central Component (ECC), 5.0, unifies several business operations into one unified platform.
- **Improved Functionality:** Growth in particular competency in human resources management, logistics, and financial management competence.
- **Service-Oriented Architecture (SOA):** According to the principles of SOA, they have provided basic foundations for future further expansions.

- **Launch of RISE with SAP:** RISE with SAP is a new solution from SAP that aims to facilitate cloud-based company transformation.
- **Business Process Intelligence:** Business process analysis, optimisation, and automation tools and services.
- **Cloud Infrastructure:** Ability to choose and select among many cloud infrastructure providers, including GoogleCloud, MicrosoftAzure, and AWS.
- **Continuous Innovation:** The ability to create and enhance apps using SAP's Business Technology Platform (BTP).

2011: SAP HANA - The In-Memory Revolution

- **Launch of HANA:** An in-memory database platform called SAP HANA was created by SAP. It greatly increased the processing rates of data.
- **Real-Time Analytics:** Made decision-making possible via the use of real-time analytics and reporting.
- **Foundation for Future Solutions:** Developed the infrastructure necessary to create ERP systems of the future.

The progression of SAP ERP from R/3 to S/4HANA to RISE with SAP showcases SAP's dedication to staying ahead of the curve and catering to organisations' changing demands. With the help of each new milestone, organisations have been able to boost their efficiency, agility, and competitiveness via improved performance, functionality, and user experience. With its comprehensive and flexible solution, RISE with SAP is the future of ERP and a must-have for enterprises advancing further into the digital age.

2015: SAP S/4HANA - A New Era of ERP

- **Introduction of S/4HANA:** The next-gen ERP package from SAP, S/4HANA, is based on the SAP HANA platform.
- **Simplified Data Model:** Reduced complexity and enhanced efficiency in data structures.
- **User Experience:** Presented SAP Fiori, a state-of-the-art UI that is both simple and easy to use.
- **Advanced Capabilities:** Used cutting-edge tools such as IoT, ML, and predictive analytics.

SAP TECHNOLOGY IN ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS

SAP technology, as portrayed in Table 1, integrates ERP systems by linking several corporate activities such as sales/operations, finance, supply chain, and human resources. Nowadays, systems such as SAP S/4HANA[13] enable greater efficiency, enhanced data quality, and quick access to valuable analysis each step of the way. SAP scalability helps growth, additional cloud connection possibilities contribute to flexibility and cost-effectiveness[14]. Improved usability and security with compliance integrated into solutions provide organisations with control over managing their processes and adaptability that leads to better decisions and improved operations.

2021: RISE with SAP - Business Transformation as a Service

Table 1: Role of SAP Technology in Streamlining ERP Systems

Aspect	Description	Benefits	Examples
Integration	SAP provides a comprehensive suite of integrated applications that facilitate seamless communication and data sharing across all departments of an organisation.	Improved data accuracy, reduced silos, and real-time visibility into operations.	SAP S/4HANA enables integration across finance, supply chain, and human resources.
Customisation	SAP allows businesses to tailor ERP solutions to meet specific needs by configuring modules and workflows.	Increased alignment with business processes and enhanced user experience.	SAP Fiori provides customisable, user-friendly interfaces for different business roles.
Automation	Automation of routine tasks and processes is enabled through SAP's advanced tools.	Reduced manual work, minimised errors, optimised resource utilisation.	SAP Intelligent Robotic Process Automation (RPA) for automating repetitive tasks like data entry.
Scalability	SAP ERP systems can scale from small to large enterprises, adapting to growth and changing business needs.	Flexible expansion, readiness for business evolution.	SAP Business One for smaller businesses and SAP S/4HANA for large, global enterprises.
Data Management	Advanced data management capabilities in SAP allow efficient storage, retrieval, and processing of large volumes of data.	Enhanced decision-making, better data insights, and improved compliance.	SAP HANA in-memory database provides real-time data processing and analytics.
Reporting & Analytics	SAP's built-in reporting and analytics tools support business intelligence and data-driven decision-making.	Real-time insights, improved forecasting, enhanced performance tracking.	SAP Analytics Cloud provides visualisation and reporting tools that connect with SAP data sources.
Cloud Integration	SAP offers cloud solutions that integrate with on-premises systems, facilitating hybrid	Reduced infrastructure costs, increased accessibility,	SAP S/4HANA Cloud allows organisations to manage ERP

	environments.	improved collaboration.	functions without extensive IT infrastructure.
Security & Compliance	SAP's built-in security features ensure that data is protected and regulations are met.	Enhanced data protection, regulatory compliance, reduced risk of breaches.	SAP GRC (Governance, Risk, and Compliance) solutions for ensuring regulatory adherence.
User Experience	SAP enhances the user experience through intuitive design, personalised dashboards, and mobile accessibility.	Higher user adoption, efficient task completion, better user satisfaction.	SAP Fiori's responsive design makes accessing SAP systems on mobile devices seamless.
Collaboration	SAP solutions promote collaboration across different business units and geographies.	Improved teamwork, streamlined communication, and more cohesive strategies.	SAP SuccessFactors facilitates collaboration among HR teams and employees for performance management.
Supply Chain Optimization	SAP ERP systems streamline supply chain management by providing real-time data and end-to-end visibility.	Improved supply chain efficiency, cost savings, better inventory control.	SAP Integrated Business Planning (IBP) helps in demand forecasting, supply planning, and monitoring.

Key advantages of SAP ERP in business operations

ERP, or Enterprise Resource Planning, was initially developed in an effort to address the issue of how to cover core business processes [15]. SAP has since evolved from just being transactional systems to more or less fully fledged solutions that encompass the entire organisation. There are hundreds of ERP suppliers worldwide but they do not get a roar like SAP does [16].

SAP ERP is an enterprising software tool which has potential to organise and manage a number of business activities in an organisation. Some of the important modules are Human Capital Management (HCM), Financials and Operations. Within each module, there is an intention to optimise one or another business process to help the company become more efficient and work based on statistical data [17].

However, SAP ERP also forms one component of the huge family of SAP solutions like SAP S/4HANA, SAP Business One, and many more SAP industry solutions. Having this broad ecosystem in place, businesses can choose a solution that best fits their particular needs. Benefits of Using the SAP ERP System.

Benefits of Implementing SAP ERP software into the business

The value of the SAP ERP system is in the benefits it offers your organisation, such as the capacity to automate and simplify everyday processes and help with a variety of business activities. This program does more than just provide you better processes; it shows you the whole picture of your company. Figure 4 and the SAP ERP system's main advantages are:



Figure 4: Benefits of implementing SAP ERP software.

1) Efficiency Of Business

The ERP system will eliminate mundane, repetitive tasks, freeing up workers to concentrate on higher-priority activities. It accurately and efficiently completes routine activities that improve daily operations for the business and drastically cut down on mistakes and expenses [18].

2) Data Security

Cybersecurity breaches and cyberattacks are on the rise with technological advancements, making data protection an increasingly pressing issue for contemporary enterprises. Consequently, SAP ERP is designed to enhance data security by limiting access to pertinent information via built-in security mechanisms and firewalls. To counteract this, data is regularly backed up and stored centrally to avoid data loss in the case of a failure[19].

3) Scalability

A data processing system's scalability determines how well it can adapt to customers' changing needs as their businesses grow or shrink. Businesses may be more adaptable using SAP software, which makes it easier for them to branch out into new markets or increase their client base. Utilising SAP, users are able to effortlessly build a basic connection that meets all industry standards.

Reduced Costs

It has been shown time and time again that SAP ERP's automation, centralisation, and minimisation of administration and operating expenditures may significantly reduce a company's costs. Businesses may work more efficiently when repeated duties are entrusted to a SAP system, since fewer difficulties develop.

4) Improved Data Management

It more than delivers on its promise, as Data Management is the main reason companies opt to use SAP. By centralising and organising a company's

disparate data sources, SAP ERP solutions reduce data silos. This allows for fast and easy access to data [20]. ERP also has an automated component that lets employees all throughout the company see shared data without keeping track of it manually.

5) Customer Service

It might be difficult to manage your sales and inventory and maintain customer happiness, particularly if your customer and inventory data are kept on different platforms. By centralising and streamlining customer data, ERP systems provide your sales representatives a strong foundation on which to develop enduring client connections. It also provides a traceable function that is faster.

6) Customizable

Its enormous degree of customisation is one of the most eye-catching aspects of SAP ERP. It is very adaptable and can be customised to meet the unique requirements of each organisation. The company may pick and choose the parts it needs and leave the others behind. Because of its flexibility, it is user-friendly and straightforward for staff to understand and implement. The system is accessible on almost all electronic devices, allowing management and staff to utilise it from any location.

7) Analysis And Forecasting

Accurate analysis and reporting may be a difficult responsibility for employees. Implementing a SAP ERP system eliminates information risk since no data is duplicated. The technology generates rapid reports for every job in an organisation. It also provides risk assessments and reliable performance reports.

The impact of SAP technology on streamlining Enterprise Resource Planning (erp) Systems.

This section focuses on showing how SAP technology has revolutionised the enhancement of ERP systems. Every subtopic focuses on one aspect of how the SAP application can help organisations increase performance, streamline processes and work more effectively. Below are the key aspects of SAP's transformative role in ERP systems:

A. Enhancing Data Integration Across Business Functions

SAP technology is also used to integrate data across different business areas and overcome the barriers that are built by the past year-end close processes. SAP also guarantees effective communication and information interchange between organisational units like financial, purchasing or HRM and customer service. It encourages cross-working between

departments, promote efficient work flow and offer clear reference point to facilitate decisions. The outcome is the improvement of the business processes and the company objectives' alignment. SAP Business Technology Platform BTP and similar features enable external data integration, providing full visibility of the organisation's operational landscape[21].

B. Automating Core Business Processes for Efficiency

SAP focuses on supporting key organisations' processes, including procurement, payroll, inventory and even report generation, with the minimal tendency of manual work. The SAP Intelligent RPA and SAP Workflow Management are examples of tools that help to reduce the time needed for the repetitive activities to be accomplished while less errors are made. This automation not only leads to the increase of efficiency in production but also allows the employees to work more on strategy-related work. For instance, SAP implemented automated invoice processing that guarantees compliance and time efficiency, which have a direct impact on cash flow management. Companies that implement the procedures of automation record enhanced employer productivity and management of assets[22].

C. Real-Time Insights and Decision-Making

SAP's most special proposition is its potential to offer accurate and almost real-time data gathered and processed with the help of solutions for Business Intelligence and analysis. To conclude, SAC, along with SAP HANA in-memory technology, helps businesses to provide real-time intelligent insights about the volumes of data. SAP-driven dashboards offer KPIs and predictive capabilities that help leaders manage issues and enact disruptions as interventions. With SAP solutions, a company understands stock replenishment rates or customer buying patterns at the right time, and since SAP optimises decision-making based on real-time information, businesses become more adaptable and competitive[23].

D. Cloud Solutions for Scalable and Flexible ERP

SAP S/4HANA Cloud is capable of satisfying the ever-evolving needs of your large and complex organisation. Organisations have learned that by adopting the cloud, they stand to save on costs of IT infrastructures, increase the security of data, and ease upgrades. SAP S/4HANA Cloud possesses modularity in its architecture as it gives business the flexibility to incorporate or exclude any module based on functionality required for his/her business. It means that its integration with progressively developing technologies such as AI and IoT gets organisations ready for digital transformation. Moreover, the cloud enhances flexibility to work across the world; the

implementation guarantees access and work interaction across the globe despite the time zones[14].

E. Improving User Experience with SAP Fiori

SAP Fiori takes a different approach to assisting users by presenting an easy and role-based business application. SAP Fiori is unique from other ERP interfaces because it offers users easy, adaptive layouts that can be used on any device. This personalisation improves user adoption and reduces the learning curve for employees. For example, managers can approve workflows, track KPIs, or generate reports directly from their mobile devices using Fiori apps. By aligning the user interface with modern usability standards, SAP Fiori significantly enhances productivity, reduces errors, and ensures that employees can focus on high-value tasks without technological barriers[24].

Literature Work

Existing approaches in this domain primarily utilise traditional ERP systems and conventional methods, which often fall short of delivering the integration, scalability, and advanced analytical capabilities essential for meeting the demands of modern enterprises.

In[25], it has as its goal the establishment of an intelligent ERP company by providing a code foundation and framework for system modelling and the interface of Excel with SAP HANA, one of the available ERPs. This robust Excel add-in is built on VBA and Rest APIs, which are standards-compliant APIs that enable interaction with RESTful web services. Roy Fielding, a computer scientist, came up with the acronym REST, which stands for representation. The SAP HANA database may be linked to an Excel worksheet using this tool. The ability to immediately retrieve and transfer data to SAP HANA makes this Excel solution very helpful for financial reporting in any ERP organisation that uses SAP HANA as its Intelligent-ERP (I-ERP) application. Further, the article discusses the requirements and advantages of SAP HANA system modelling in Excel, and it touches on the potential future of integrating legacy applications with new technology across heterogeneous data sources to create more intelligent and powerful systems.

A universal edge in today's global market is crucial for any company, regardless of their conventional ERP Systems[26]. All things considered, end users in these types of enterprises must contend with ill-conceived user interfaces and inoperable technology. The potential for attaining optimal efficiency is not completely used, even if S4 Hana cloud ERP software is

said to provide substantial advantages. The lack of investment in ergonomic measures and cutting-edge technology contributes to this reality. By analysing the S4 Hana cloud ERP software apps, they can show how crucial and suggested ergonomic research is for reducing the human and financial expenses that businesses are now experiencing.

Organisations' current ecosystem of traditional ERP systems[27] is unable to handle and tolerate innovative technology. For organisations, digital transformation is constantly bringing up a number of possibilities and difficulties. To be able to change into a more intelligent version of themselves and make use of new technologies and cloud platforms, these traditional ERPs must optimise themselves. Classic ERP solutions that rely on antiquated RDBMS cannot keep up with the demands of modern digital businesses. Converting from ERP to I-ERP may hasten digital revolution and reveal several promising benefits, such as a shorter time to market for new products and reduced IT infrastructure expenditures. To reach the level of Intelligent-ERP, every ERP has a set of guidelines and procedures to follow. The evolution of SAP ERP into SAP S/4HANA, also known as I-ERP, is the topic of this research study.

Overall[28], end users in these types of businesses must contend with complex, hard-to-use interfaces and frameworks. Project managers who oversaw the implementation and management of both ERP systems provided us with valuable input that used to design an experiment that analysed the impact of information complexity and its presentation on end users of the program. The potential for achieving maximum productivity is underutilised despite the claims of achieving significant gains via ERP software deployment. Not investing in software ergonomic measures is one explanation for this occurrence. Through the development of ERP software programs, demonstrate the importance of ergonomic research in reducing the human and monetary expenses that businesses are now facing.

This study[29], within the context of the Controlling of a Manufacturing Company course, alludes to the implementation of information systems, namely the SAP CO module, an enterprise resource planning system from the business SAP. Students, future employees, and employers alike stand to gain from the innovation's dual goals of piquing students' interest in the subject and providing them with more hands-on experience in enterprise information systems. Table 2 provides a summary of the literature review for ERP systems with SAP technology.

Table 2: Summary of the literature review for ERP system with SAP technology

Reference	Focus/Goal	Tool Techniques	Key Findings/Content	Implications/Benefits	Future Work
[25]	Framework for System Modelling and Excel-SAP	VBA (Visual Basic for Applications),	Tool enables data transfer between Excel and SAP HANA, aiding	Enhances data interaction and system intelligence for ERP enterprises; improves	Explore more advanced data manipulation capabilities and

	HANA Interfacing	REST APIs	financial reporting and ERP system integration.	reporting efficiency	integration with additional ERP platforms.
[26]	Ergonomics in S4 HANA Cloud ERP Applications	Design research, user experience analysis	Identified usability issues and ergonomic gaps in S4 HANA cloud ERP interfaces; underfunding of ergonomic measures is a challenge	Promotes the importance of designing user-friendly ERP interfaces to maximise productivity and reduce costs	Future work could focus on developing guidelines and best practices for integrating ergonomics into ERP system design.
[27]	Current Classic ERP Platforms and Digital Transformation	Comparative analysis, RDBMS-based systems study	Classic ERPs face limitations with dynamic business models and modern technologies; transformation to I-ERP is needed for agility.	Emphasises the need for ERP platforms to transform into intelligent systems (I-ERP) to adapt to new technology and market demands	Investigate specific steps for ERP transformation and case studies of successful I-ERP implementations.
[28]	Impact of Information Complexity and Presentation on ERP User Experience	Empirical analysis, user feedback collection	Complex information presentation impacts productivity; poor interface usability is prevalent.	Supports the push for ergonomic and user-friendly design in ERP systems to enhance user experience and reduce operational costs	Further research into user interface design improvements and user training strategies to minimise complexity
[29]	SAP CO Module in Controlling of Manufacturing Companies	SAP CO (Controlling) module, practical application in education	Aims to boost students' interest and practical experience with ERP systems; beneficial for students and potential employers	Bridges the gap between academic learning and practical ERP application; prepares students for real-world ERP use	Expansion of study to include more ERP modules and collaboration with industry for enhanced learning experiences

Conclusion and Future Work

An integration of SAP technology into ERP systems has significantly transformed business operations by addressing challenges such as inefficiencies, data silos, and scalability limitations. Optimising processes, streamlining operations, and improving decision-making are all within reach with SAP thanks to cloud-based scalability, real-time analytics, and in-memory computing. Solutions like SAP S/4HANA and RISE with SAP demonstrate how modern ERP systems align with Industry 4.0 paradigms, fostering operational agility, cost reduction, and innovation to ensure sustainable business growth in today's competitive market.

Research in the future may look at how SAP ERP systems can be enhanced by integrating new technologies like blockchain and augmented reality. Researching the effects of SAP ERP on SMEs and industry-specific uses might provide unique understanding. Additionally, focusing on the role of advanced AI and predictive analytics in further automating SAP ERP systems can provide valuable directions for future advancements.

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