ОБЩЕСТВЕНИ КОМУНИКАЦИИ И ИНФОРМАЦИОННИ НАУКИ
SOCIAL COMMUNICATIONS AND INFORMATION SCIENCES

ANALYSIS OF INFORMATION SYSTEMS IN THE INDUSTRIAL CONTEXT

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Abstract: *This paper explores the role of information systems like ERP, PLM, CRM, MES, and EAM in driving digital transformation and improving operational efficiency within industrial organizations. The study uses a methodology based on secondary research, including a review of literature, market reports, and industry data, to analyze key system providers and their respective market shares. It identifies key trends in cloud adoption, cross-platform integration, and market fragmentation, offering insights into how these systems impact business operations.*
Key findings highlight the growing adoption of cloud-based solutions, particularly among small and medium-sized enterprises, due to their scalability and cost-saving potential. Cross-platform integration is also becoming essential, with companies like SAP advancing efforts to streamline workflows across different systems. Additionally, the study reveals significant market fragmentation in CRM and MES sectors, creating opportunities for niche players to innovate and cater to specific industries or regional needs.
Keywords: *Digitalization, Cloud, Information Systems, Market Fragmentation*

INTRODUCTION

The paper explores the role of information systems such as ERP, PLM, CRM, MES, and EAM in modern organizations in the industrial context. Focusing on their contribution to digital transformation, operational efficiency, and market competitiveness. By reviewing existing literature, market reports, and industry data, the research provides an analysis of how these systems are evolving within businesses, highlighting key providers and their respective market shares. This comprehensive methodology incorporates both academic research and industry insights, offering a balanced perspective on the growing importance of these systems in enhancing organizational processes.

The study's data collection methods rely on secondary research, using reports from market intelligence providers and academic sources to cross-reference and ensure the reliability of findings. The analysis first examines the overall impact of each system category, followed by specific market data on leading providers. Through a combination of quantitative and qualitative approaches, the research identifies market dynamics and factors that contribute to the dominance of certain players, such as integration capabilities, scalability, and industry-specific features. To guide the research, the following key research questions have been identified:

1. What are the leading systems in each category?
2. What is their market share?

RESEARCH METHODOLOGY

The research methodology applied in this study involves a review and analysis of existing literature, market reports, and industry data to evaluate the role of information systems such as ERP, PLM, CRM, MES, and EAM in modern organizations. This method focuses on the identification of key system providers, their respective market shares, and their influence on organizational processes. The study incorporates both academic research and industry insights to form a balanced view of how these systems

contribute to digital transformation, operational efficiency, and market competitiveness.

Data collection was conducted through secondary research methods, relying on publicly available market research reports, academic publications, and relevant industry sources. These reports include detailed market share analyses and insights into the competitive landscape of enterprise systems. To ensure the credibility of the findings, data from multiple sources, such as IDC, 6sense, and other market intelligence providers, were cross-referenced. By aggregating this information, the study provides an up-to-date overview of system providers, their products, and the industries they serve.

The analysis is structured to first present the general impact of each system category on business operations, followed by specific market data related to key providers. Quantitative data was extracted from various market share reports to build a snapshot of the current standing of major players in each category. This approach allowed the research to identify not only the leading providers but also the factors contributing to their market dominance, such as integration capabilities, scalability, and industry-specific functionalities. The methodology emphasizes both qualitative and quantitative aspects, providing a view of the information systems landscape in the industrial context.

RESULTS

Information systems, such as Enterprise Resource Planning (ERP), Product Lifecycle Management (PLM), Customer Relationship Management (CRM), Manufacturing Execution Systems (MES), and Enterprise Asset Management (EAM), are part to the digital transformation of modern organizations. These systems streamline core business functions like finance, supply chain, human resources, manufacturing, and customer relations by providing integrated platforms that enable data sharing, operational efficiency, and improved decision-making. Leading providers, such as SAP, Oracle, Microsoft Dynamics, and others, offer customizable solutions to meet the specific needs of various industries, enhancing their competitiveness in the global market.

Academically and within the industry, these systems are recognized as drivers of organizational agility and collaboration across departments. ERP systems, for instance, help businesses integrate core operations, improving productivity and lowering costs. Similarly, PLM and CRM systems support innovation and customer-centric strategies, while MES and EAM systems focus on optimizing production and asset utilization. This section presents an analysis of the key systems in each category: ERP, PLM, CRM, MES, and EAM, and their respective market shares. It provides a detailed overview of leading providers in each category, illustrating their influence on the market and the factors contributing to their adoption. By examining these market dynamics, the following analysis sheds light on the competitive landscape and the evolving role of enterprise systems in modern business operations.

ERP

Enterprise Resource Planning (ERP) systems are integrated software platforms designed to manage and streamline an organizations core business processes, such as finance, supply chain, human resources, and manufacturing. By consolidating these processes into a single, unified system, ERPs enable real-time data sharing and improve efficiency, decision-making, and operational performance. ERP systems are highly customizable, allowing organizations to adapt them to their specific industry needs, which makes them popular across sectors like manufacturing, healthcare, and retail (Kumar & van Hillegersberg 2000). Leading ERP solutions include SAP, Oracle, and Microsoft Dynamics, each offering a range of modules to handle diverse business operations.

From an academic perspective, ERP systems are seen as essential tools for fostering organizational integration and improving overall business agility. Research shows that successful ERP implementation can lead to enhanced productivity, reduced costs, and better management of resources (Dezbar & Sulaiman 2009). However, ERP projects are complex and often face challenges related to high implementation costs, user resistance, and the need for significant organizational change (Davenport 1998). As technology evolves, ERP systems are increasingly integrating cloud capabilities, artificial intelligence, and machine learning, making them more accessible and intelligent. The following Table 1 provides an overview of the ERP market in 2023.

Table 1. ERP provider and market share globally (6sense.com 2024)

System	Provider	Market Share 2023
SAP ERP	SAP	9%
Oracle ERP Cloud	Oracle	2%
Microsoft Dynamics	Microsoft	25%
Workday	Workday	17%
Sage ERP	Sage	3%
Other	Other	44%

As displayed in Table 1, in 2023, Microsoft Dynamics emerged as the leading ERP provider, commanding a 25% share of the global market. Its popularity is largely attributed to its seamless integration with other Microsoft products and cloud capabilities, making it a strong choice for businesses of varying sizes. Workday followed closely with a 17% share, benefiting from its focus on human capital management and financial planning, particularly among medium to large enterprises.

SAP ERP, held 9% of the market in 2023. Its comprehensive and customizable suite continues to attract large enterprises, especially in sectors like manufacturing and healthcare. Meanwhile, Oracle ERP Cloud, known for its robust cloud-based solutions, accounted for 2% of the market, reflecting steady adoption despite the overall competition. Sage ERP, with 3%, appeals to small and medium-sized enterprises for its ease of use and affordability. The remaining 44% of the market is shared among various other ERP providers.

PLM

Product Lifecycle Management (PLM) systems are integrated solutions that manage the entire lifecycle of a product, from its initial conception, design, and manufacturing through its end of life, including disposal or recycling. These systems provide a digital framework to streamline product-related processes, allowing for the management of data, resources, and decision-making across various stages. PLM systems enable cross-functional teams to collaborate on product development, improving efficiency, reducing costs, and enhancing innovation capabilities. They support the integration of various software tools, data, and workflows within a unified platform, making them critical for managing complex, multi-disciplinary projects (Stark 2015).

Academically, PLM systems are often viewed as enablers of innovation and sustainability in manufacturing and design. By fostering collaboration across multiple departments and organizations, PLM enhances decision-making processes and improves product quality (Grieves 2006). Furthermore, PLM systems promote sustainability by tracking product data throughout its lifecycle, ensuring compliance with environmental regulations, and optimizing product designs for recyclability and reuse (Sudarsan, Fenves, Sriram & Wang 2005). In doing so, PLM has become a cornerstone in the digital transformation of industries seeking to compete in a global marketplace driven by efficiency, sustainability, and innovation. The following Table 2 presents a snapshot of the competitive landscape of PLM systems by showcasing the market share of key providers.

Table 2. PLM provider and market share globally (Thibaud & Xavier 2021)[a], (Abiresearch 2024)[b]

System	Provider	Market Share 2021
Siemens Teamcenter	Siemens	22%[a]
Dassault Systèmes ENOVIA	Dassault Systèmes	29%[a]
PTC Windchill	PTC	10%[a]
Autodesk Fusion Lifecycle	Autodesk	9%[a]
SAP PLM	SAP	10%[b]
Other	Other	20%

As presented in Table 2, in 2021, Dassault Systèmes ENOVIA claimed the largest share of the global Product Lifecycle Management (PLM) market with 29%, positioning it as a leader, particularly in industries requiring extensive engineering and design collaboration. ENOVIA's integration capabilities and collaboration tools have made it popular across sectors such as aerospace and defense. Following closely, Siemens Teamcenter held a market share of 22%. Known for its capabilities in managing complex product data and digital twins, Siemens Teamcenter has presence in industries like automotive and electronics, contributing to its high adoption rate.

PTC Windchill accounted for 10% of the market in 2021, gaining traction due to its integrated product data management (PDM) features, which are essential for industries like industrial manufacturing. SAP PLM also held a 10% share, leveraging SAP's expertise in enterprise resource planning (ERP) to integrate PLM with broader business processes. Autodesk Fusion Lifecycle captured 9% of the PLM market, known for its cloud-based solutions that appeal to small and medium-sized enterprises (SMEs). The remaining 20% of the market was held by various other providers.

CRM

Customer Relationship Management (CRM) systems are software platforms designed to help businesses manage interactions and relationships with current and potential customers. By integrating data from various touchpoints, such as marketing, sales, and customer service, CRM systems enable organizations to track customer interactions, improve communication, and provide personalized service. These systems are essential for managing the customer lifecycle, helping companies identify sales opportunities, automate marketing efforts, and improve customer retention (Buttle & Maklan 2019).

CRM systems are recognized as key enablers of customer-centric strategies, enhancing both operational efficiency and customer satisfaction. They offer businesses valuable insights into customer behavior through data analysis and reporting, allowing for more informed decision-making (Payne & Frow 2013). Moreover, CRM systems support the integration of customer data across departments, fostering collaboration and ensuring that teams have a comprehensive view of customer needs. As organizations increasingly focus on digital transformation, CRM systems continue to evolve with the incorporation of advanced technologies like artificial intelligence and machine learning, further enhancing their capabilities (Mithas, Krishnan & Fornell 2005). CRM solutions as presented in Table 3 showcase the provider, their systems and market share.

Table 3. CRM provider and market share globally (IDC 2024)

System	Provider	Market Share 2023
Salesforce CRM	Salesforce	22%

Microsoft Dynamics 365 CRM	Microsoft	6%
SAP CRM	SAP	4%
Oracle CX Cloud (CRM)	Oracle	4%
Adobe CRM	Adobe	4%
Other	Other	60%

As showcased in Table 3, in 2023, Salesforce led the global CRM market with a dominant share of 22%. Salesforce has solidified its position as the top CRM provider through its comprehensive platform, offering tools for sales, customer service, marketing, and analytics. Its widespread adoption is attributed to its customization options and scalability, making it suitable for businesses of all sizes across various industries.

Other players include Microsoft Dynamics 365 CRM, which held 6% of the market, known for its integration with other Microsoft products and strong appeal in enterprise settings. SAP CRM, Oracle CX Cloud, and Adobe CRM each captured 4% of the market, catering to specific business needs with their CRM offerings, such as ERP integration for SAP and marketing-focused solutions for Adobe. The remaining 60% of the market consists of various smaller CRM providers, highlighting the fragmented nature of the CRM landscape, where niche and specialized solutions continue to play a significant role.

MES

Manufacturing Execution Systems (MES) are software solutions designed to monitor, track, and control production processes on the shop floor in real-time. MES systems help bridge the gap between Enterprise Resource Planning (ERP) systems and the physical manufacturing processes by capturing real-time data from equipment, machines, and workers. By doing so, MES enhances production efficiency, quality control, and regulatory compliance, giving manufacturers better insight into production schedules, material usage, and labour management (MESA International 2016). Common features of MES include production tracking, order management, machine monitoring, and performance analysis, enabling manufacturers to optimize their production workflows and make informed decisions based on real-time data (Jansen-Vullers 2006).

In research, MES are crucial for the development of smart manufacturing within the context of Industry 4.0. MES solutions help bridge the gap between Enterprise Resource Planning (ERP) systems and physical production processes by providing real-time monitoring and control of manufacturing operations. This is achieved through the integration of technologies such as the Internet of Things, big data, and artificial intelligence, which improve decision-making, operational efficiency, and overall responsiveness (Kusiak 2018). By leveraging these technologies, MES enables manufacturers to track production data, optimize equipment usage, and enhance predictive maintenance capabilities. MES solutions as gathered in the following Table 4 showcase the provider, their systems and market share.

Table 4. MES provider and market share globally (6sense II 2024)

System	**Provider**	**Market Share**
Wonderware	AVEVA	44%
Fishbowl Inventory	Fishbowl	8%
SAP Manufacturing Integration	SAP	15%
Siemens SIMATIC IT	Siemens	1%
Other	Other	32%

Following Table 4, the current market for MES, Wonderware, provided by AVEVA, holds the largest

market share at 44%, making it a dominant player. Wonderware's popularity stems from its capabilities in process management and integration with other industrial systems, which has earned it widespread adoption across various industries. Following Wonderware, SAP Manufacturing Integration takes another portion of the market with a 15% share. SAP's solution is known for its strong integration with other enterprise systems, particularly its ERP offerings, making it a preferred choice for large-scale manufacturers who require seamless integration across their business processes.

Fishbowl Inventory captures 8% of the market, mainly serving small to medium-sized businesses with its inventory management and manufacturing control capabilities. Its user-friendly design and affordability make it attractive for companies that don't require the robust features of more complex MES solutions. On the lower end of the market, Siemens SIMATIC IT holds only 1% of the market share. Despite Siemens being a leader in automation technology, its SIMATIC IT MES product is niche, selected for specific high-precision manufacturing applications. The remaining 32% of the market is comprised of various other MES providers.

EAM

Enterprise Asset Management (EAM) systems are comprehensive platforms that help organizations manage the entire lifecycle of their physical assets, from acquisition through maintenance and disposal. EAM systems focus on optimizing asset performance, reducing downtime, and ensuring compliance with industry regulations. These systems provide functionalities such as asset tracking, work order management, preventive maintenance, and inventory control, all designed to maximize asset availability and reliability. EAM systems are used extensively in asset-intensive industries such as manufacturing, utilities, energy, and transportation, where effective asset management is crucial for operational efficiency and cost control (Tsang 2002).

Recent advancements in EAM systems have incorporated smart technologies, such as Machine Learning and Multi-Criteria Decision-Making, to enhance asset management capabilities. According to (Gorski, Loures, Santos, Kondo & Martins 2021), these technologies enable EAM systems to improve decision-making processes by analyzing vast amounts of data to predict asset failures, schedule maintenance more effectively, and optimize resource allocation. The integration of these technologies allows organizations to transition from reactive to predictive maintenance, leading to more efficient asset utilization and reduced operational risks.

Table 5. EAM provider globally (marketsandmarkets 2024) (emergenresearch 2024)

System	Provider	Market Share
IBM Maximo	IBM	undisclosed
SAP EAM	SAP	undisclosed
Infor EAM	Infor	undisclosed
Oracle EAM	Oracle	undisclosed
IFS Applications	IFS	undisclosed
Other	Other	undisclosed

The key players in the EAM market, such as IBM Maximo, SAP EAM, Infor EAM, Oracle EAM, and IFS Applications, hold significant positions due to their comprehensive solutions that cater to a wide range of industries. These platforms manage the entire lifecycle of physical assets, from procurement to disposal, helping organizations maximize asset efficiency, reduce downtime, and ensure regulatory compliance. IBM Maximo, for example, is renowned for its robust asset management and IoT integration capabilities, making it popular in sectors like energy and utilities. SAP EAM, similarly, integrates with broader enterprise resource planning (ERP) systems, offering a comprehensive solution for managing assets, maintenance,

and business operations. Providers like Infor EAM, Oracle EAM, and IFS Applications each offer niche advantages such as industry-specific functionalities, cloud-based flexibility, and advanced analytics, further cementing their importance in the EAM space.

However, these companies typically do not disclose specific market share data due to the proprietary and competitive nature of this information. Revealing precise market positions could impact their standing in competitive bids or influence customer decisions by highlighting relative strengths or weaknesses. This withholding of data helps providers maintain a strategic advantage by preventing competitors from exploiting detailed insights into their market positioning. Additionally, the EAM market is dynamic and evolving, especially with the rise of cloud-based systems, predictive maintenance technologies, and IoT integrations. Providers often focus on delivering product innovations rather than releasing detailed financial breakdowns, contributing to the difficulty in accessing precise market share data. For a comprehensive understanding of the market, stakeholders usually rely on private market research reports from firms like Gartner or Frost & Sullivan, which compile data from various sources but are not available to the general public.

FINDINGS AND DISCUSSION

As businesses increasingly adopt cloud-based solutions across critical enterprise systems such as ERP, CRM, PLM, MES, and EAM, the shift toward cloud-driven infrastructure is reshaping the market landscape. Major providers like Microsoft Dynamics and Oracle ERP Cloud are capitalizing on the growing demand for scalability and cost efficiency. Additionally, the push for cross-platform integration, seen in systems like SAP, reflects a broader need for unified workflows and seamless data management across diverse systems. Despite the dominance of large providers, the CRM and MES markets remain highly fragmented, with numerous niche players thriving by addressing specific business needs, creating space for innovation and further specialization.

INCREASING CLOUD ADOPTION ACROSS SYSTEMS

The growing integration of cloud capabilities across ERP, CRM, PLM, MES, and EAM systems suggests a broader trend toward cloud-based enterprise solutions. Providers such as Microsoft Dynamics, Oracle ERP Cloud, and Autodesk Fusion Lifecycle have seen success partly due to their strong cloud offerings. As more businesses prioritize scalability, remote access, and lower infrastructure costs, cloud-based enterprise systems will continue to gain momentum, particularly for small and medium-sized enterprises.

CROSS-PLATFORM INTEGRATION

The success of systems like SAP, which holds notable market shares in both ERP and PLM, highlights the growing importance of cross-platform integration. Businesses increasingly seek solutions that can seamlessly integrate with other critical systems, such as CRM or MES, to enable smoother workflows and unified data management. This trend is likely to drive further consolidation in the market, with larger providers expanding their portfolios to offer end-to-end solutions.

FRAGMENTED MARKETS WITH NICHE PLAYERS

In both CRM and MES markets, the data indicates a high degree of fragmentation, with many niche providers holding substantial portions of the market. For example, 60% of the CRM market and 32% of the MES market are categorized under „Other“ providers, suggesting that many smaller companies are catering to specific business needs or regions. This fragmentation presents opportunities for innovation and specialization, particularly in underserved industries or geographies.

CONCLUSION

In conclusion, the growing adoption of cloud-based solutions across critical enterprise systems is reshaping the business landscape by offering scalable, cost-effective, and flexible infrastructure. Major players like Microsoft and Oracle have capitalized on this trend, while cross-platform integration, as seen

with SAP, has become a vital component for businesses seeking streamlined workflows and unified data management. The continued growth of cloud capabilities is expected to benefit enterprises of all sizes, particularly small and medium businesses that seek agility and cost savings.

Despite the dominance of large providers, the CRM and MES markets remain highly fragmented, with numerous niche players occupying significant market shares. This fragmentation presents unique opportunities for smaller companies to innovate and cater to specific industries or geographic needs, driving further specialization in the market. As cloud adoption and cross-platform integration expand, the enterprise technology landscape will likely see more consolidation, innovation, and tailored solutions across sectors.

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АНАЛИЗ НА ИНФОРМАЦИОННИТЕ СИСТЕМИ В ИНДУСТРИАЛЕН КОНТЕКСТ

Резюме: *В този доклад се разглежда ролята на информационните системи като ERP, PLM, CRM, MES и EAM за стимулиране на цифровата трансформация и подобряване на оперативната ефективност в индустриалните организации. В проучването е използвана методология, основана на вторични проучвания, включително преглед на литература, пазарни доклади и данни за индустрията, за да се анализират основните доставчици на системи и съответните им пазарни дялове. То идентифицира ключови тенденции в приемането на облака, интеграцията между*

платформите и фрагментацията на пазара, като предлага информация за това как тези системи влияят върху бизнес операциите. Основните заключения показват нарастващото приемане на решения, базирани на облачни технологии, особено сред малките и средни предприятия поради тяхната мащабируемост и потенциал за спестяване на разходи. Интеграцията между различни платформи също става съществена, като компании като SAP напредват в усилията си да оптимизират работните процеси между различни системи. Освен това изследването разкрива значителна пазарна фрагментация в секторите на CRM и MES, което създава възможности за нишови играчи да иновират и да отговорят на специфични индустриални или регионални нужди.
Ключови думи: *цифровизация, облак, информационни системи, фрагментация на пазара*

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