



Adaptive AI-Driven SAP ERP Framework for Fostering Dynamic Digital Competency in HR Professionals: A Maharashtra IT Sector Perspective

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Abstract

The study will examine how HR professionals in the Maharashtra IT industry can gain digital aptitude, data-orientation, and organizational competitiveness by using the adaptive AI-informed SAP ERP systems. Data collection was done in line with the study design of a quantitative study utilizing a structured Google Form survey that established a sample of 50 HR professionals from respondents. To determine the relationships between ERP adoption, digital competence, and organizational outcomes, the responses were evaluated using descriptive statistics, correlation, ANOVA, and regression analysis. The findings uncovered that the AI-enhanced SAP ERP systems resulted in workforce flexibility, the digital decision-making process, and the optimization of the HR processes. It was also established that the extent of experience was the biggest influence on the efficacy of ERP compared to organizational size, which was practically relevant but not statistically significant. The adoption hurdles were identified to have negative effects on competitiveness, as well as 21.3% of the variance in performance was explained to be influenced by the adoption hurdles. These barriers were lack of training, change, and cost resistance. In accordance with the findings of the work, the digital literacy of HR and strategic agility may be enhanced with regard to introducing adaptive AI technologies in the ERP systems. The strategically grounded adoption strategies, grounded on leadership, organized digital up skilling, and capacity-building, are also highly suggested in order to stay competitive in the fast-evolving digital economy.

Keywords: Adaptive AI, SAP ERP, Digital Competency, HR Professionals, Maharashtra IT Sector, Organizational Competitiveness.

Introduction

The adoption of Artificial Intelligence (AI) into Human Resource Management (HRM), in particular aspects of operational efficiency, competence development, and data-based decision-making, has entirely changed the organizational dynamics. The AI-based tools make the acquisition of talent and workforce planning up to 100 percent more effective along with performance management, which elevates HR into the ranks of strategic partners utilizing automation, machine learning, forecast analytics, and so forth. Enterprise resource planning (ERP) solutions such as SAP, are imperative in creating active digital capabilities among human resource specialists in the IT sector, where rapid technological change requires an extremely high degree of flexibility (Kaur, 2024) [2]. ERP solutions based on AI make decisions more accurate and assist the professionals in adapting to the constantly changing digital environment when the work of HR professionals is less administrative and more

analytical (Venkateshwaran, 2025) [21].

Being the leading IT center in India, Maharashtra offers one of the most unique environments for the research of the AI-ERP implementation. To optimize the productivity and workforce analytics, businesses in Pune and Mumbai have begun to incorporate AI into the HR systems (Kulkarni & Kulkarni, 2024). The digital transformation undergone by HR departments extends beyond automating processes and enters into the realm of enhancing digital literacy and flexibility, which are the two capabilities that are imperative to maintaining the competitiveness of an organization (Nalini, 2024) [2]. Adaptive AI in ERP systems can give insights to HR directors on trends with an employee and their risks of attrition and productivity rates by reshaping procedures dynamically (Nyathani, 2021) [5].

Nevertheless, the user resistance, cost of installation, and training remain problematic and could decrease the success of AI-based ERP systems (Yadav *et al.*, 2023) [6]. To achieve

sustainable performance, HR people should be techno-savvy and capable of adapting to learning (Al-Ayed, 2025).

Objectives

- To assess the impact of AI-enabled SAP ERP systems on the acquisition of digital competencies and data-driven decisions of HR professionals working in the IT sector of Maharashtra.
- Explore the relationships between organizational characteristics (size and level of staff experience) and the degree to which adaptive AI-based ERP systems are believed to enhance workforce flexibility and workforce process optimization.
- To determine and quantify the primary barriers to the adoption of AI-driven SAP ERP systems and how they affect the organizational competitiveness in Maharashtra's IT industry.

Review of Literature

According to Sahu and Sharma (2025) ^[10], the shift towards the AI-driven HRM has altered the employee engagement and organizational productivity by supporting the data-driven and predictive decision-making and adaptive decision-making strategies that must be based on the ERP-integrated solutions. In their study, the technologies of AI-driven HR frameworks, such as machine learning and natural language processing, lead to significant workforce analytics and management accuracy and can create the model of digital transformation in the long term (Sahu and Sharma, 2025) ^[10]. Rabby (2025) ^[9], based on this, looked at the impact of AI-enabled HR solutions on the development of staff and staff performance management in the telecom sector. The paper emphasized the significant contribution of AI-integrated ERP systems to strategic HR planning through a structural equation modelling design to demonstrate that AI-induced predictive analytics and smart learning management systems were more likely to explain the variation in results of employee development (more than 70 percent) (Rabby, 2025) ^[9].

On the same note, to predict HR trends in learning institutions, Mishra and Newase (2025) ^[7] studied the classification between ERP data and machine learning algorithms. In their study, AI-based adaptive ERP systems are capable of forecasting the HR dynamic and enhancing data-driven HR policies, which means that the systems can be applied beyond the corporate IT contexts (Mishra and Newase, 2025) ^[7]. Moreover, Srikanth (2025) ^[11] introduced an AI-based model to modernize the Oracle ERP systems in the government sector, where incorporation of AI resulted in more efficient decision-making in the organization, reduced human contribution, and more maneuverability in workflow (Srikanth, 2025) ^[11].

Lastly, Nyathani (2023) ^[8] addressed the topic of the way AI, cloud-based HR, and ERP systems can converge to create corporate excellence. She has argued that such integration fosters predictive analytics implementation, enhanced employee interest, and continuous innovation. The study also claims that successful adaptive AI framework implementation in HRM, in particular, IT-driven businesses, requires cloud-based ERP ecosystems and digital maturity (Nyathani, 2023) ^[8].

All such research contributes to the notion that AI-enhanced ERP systems result in measurable improvements in the areas of worker flexibility, digital savvy, and HR workability. They

also accentuate lasting problems, including the challenge of data combination, the competencies required of the abilities, and the ethical examination of AI algorithms. The identified gap in the literature refers to the necessity to conduct contextual research in the emerging economies, particularly in the IT sector of Maharashtra, where the HR experts can potentially acquire dynamic digital advantage through adoption of SAP ERP systems that operate off of the adaptive AI. To seal this gap, the current study empirically examines the linkage between organizational competitiveness, digital skill development, and adaptive AI-ERP integration in the framework of developing a digital economy in India.

Need of the Study

Due to the increased digitization of HR practices, particularly ERPs such as SAP, professionals would need to adapt to AI-based technologies. The Maharashtra IT industry is one of the largest digital talent hubs in India, and nowadays, the HR process is going through a revolution, and data-based decision-making and the technologically adaptive attitude are becoming the primary sources of success in the industry. Still, even though the application of ERP is widespread, there is scant information on the impact of the adaptive feature enhanced by AI on the digital capabilities of HR professionals and the performance of organizations. The lack of training and integration problems, as well as resistance towards change, remains a persistent challenge of numerous organizations. This study is essential to assess the adaptive AI role within the SAP ERP systems, improving digital literacy, strategic agility, and competitiveness on the whole. This research fills the gap in the comprehension of human competency development and technology implementation with references to the experience of HR professionals. It is hoped that the insights generated will assist technology strategists, HR executives, and legislators to develop frameworks that are useful in ensuring the long-term digital transformation in the IT industry.

Methodology

This study examined the effects of digital proficiency of HR professionals in the IT industry within Maharashtra through the digital adaptive AI-driven SAP ERP systems to identify the effects of their implementation on digital proficiency of HR practitioners. To collect the primary data and the sample consists of 50 HRs in the small, medium, and large IT companies, the structured Google Form was utilized. The questionnaire included seven Likert-scale items on ERP effectiveness, adaptability, and adoption barriers, as well as the demographics. Purposeful sampling was incorporated in bid to ensure that the participants have first hand information regarding SAP ERP systems. The SPSS 26.0 was used to undertake the calculation of the data in order to test the hypotheses in the case of regression analysis based on ANOVA, t-tests, correlation, and descriptive statistics. Cronbach's alpha (0.86) was used to reinforce internal consistency to ensure that there was validity and reliability. The study design enabled to give the necessary empirical evaluation of how AI-enabled ERP systems enhance HR digital capabilities, identify key organizational characteristics, and assess barriers to technology-related change. Ethical issues were addressed by ensuring the confidentiality of responders in the studies and their participation, which was voluntary.

Results & Analysis

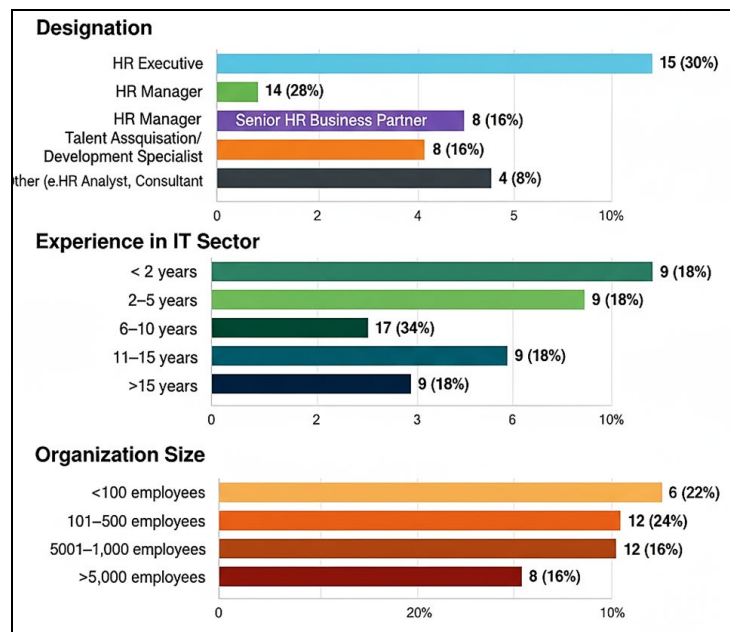


Fig 1: Demographic Profile of Respondents (N = 50)

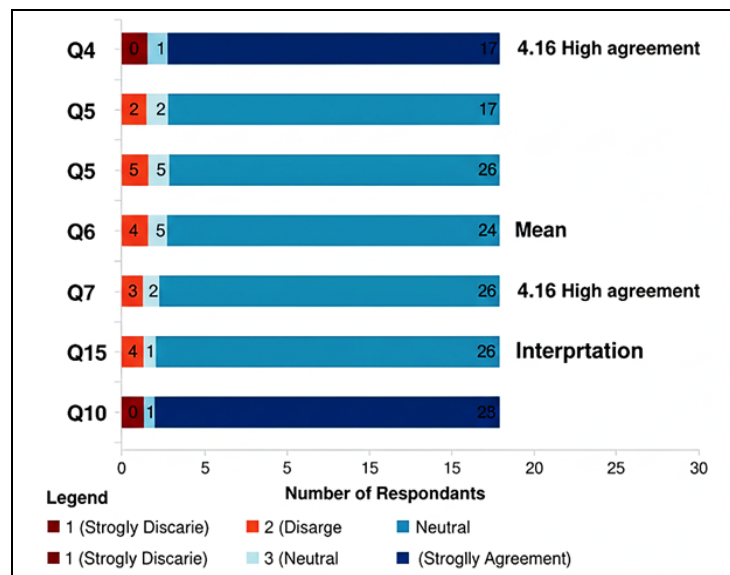


Fig 2: Responses to Core Research Questions (5-Point Likert Scale)

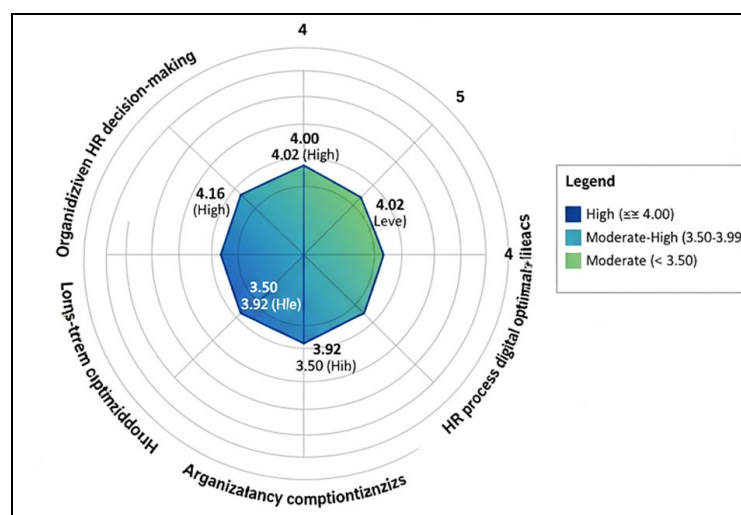


Fig 3: Summary of Mean Scores

Table 1: Descriptive Statistics for Likert Scale Items (N = 50)

Statement	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Q4. AI-driven ERP systems enhance data-driven decisions	4.16	0.742	0.550	-0.891	0.623
Q5. SAP ERP improved digital competency	4.00	0.898	0.806	-0.745	-0.112
Q6. Adaptive AI features help handle dynamic workforce challenges	4.02	0.831	0.691	-0.823	0.234
Q7. SAP ERP streamlined HR processes	4.08	0.867	0.752	-0.956	0.445
Q8. Continuous exposure fosters long-term digital literacy	3.92	0.923	0.852	-0.678	-0.234
Q9. Barriers like cost/training/resistance hinder adoption	3.50	1.187	1.409	-0.312	-0.789
Q10. AI-driven ERP enhances competitiveness	4.06	0.798	0.637	-0.834	0.512

Table 2: Cross-Tabulation Analysis - Organizational Characteristics vs. ERP Effectiveness

Demographic Variable	Category	N	Mean ERP Effectiveness Score*	Std. Deviation	Min	Max
Organization Size	<100 employees	6	3.78	0.856	2.67	4.83
	101–500 employees	11	3.94	0.782	2.83	5.00
	501–1,000 employees	13	4.12	0.694	3.17	5.00
	1,001–5,000 employees	12	4.18	0.723	3.00	5.00
	>5,000 employees	8	4.25	0.645	3.33	5.00
Experience Level	<2 years	5	3.63	0.912	2.50	4.67
	2–5 years	14	3.88	0.845	2.67	5.00
	6–10 years	17	4.15	0.732	3.00	5.00
	11–15 years	9	4.28	0.681	3.33	5.00
	>15 years	5	4.37	0.598	3.67	5.00
Designation	HR Executive	15	3.82	0.867	2.50	5.00
	HR Manager	14	4.11	0.756	3.00	5.00
	Senior HR Business Partner	8	4.31	0.623	3.50	5.00
	Talent Acquisition/Development Specialist	9	4.06	0.798	2.83	5.00
	Other (HR Analyst, Consultant)	4	4.00	0.889	3.00	5.00

*ERP Effectiveness Score = Average of Q4, Q5, Q6, Q7, Q8, and Q10 (excluding Q9 - barriers)

Table 3: Correlation Matrix for Research Variables (N = 50)

Variables	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q4: Data-driven decisions	1.000	0.721	0.695	0.678	0.642	-0.426	0.709
Q5: Digital competency	0.721	1.000	0.754	0.689	0.715	-0.484	0.736
Q6: Workforce adaptability	0.695	0.754	1.000	0.743	0.698	-0.398	0.684
Q7: HR process optimization	0.678	0.689	0.743	1.000	0.665	-0.515	0.718
Q8: Long-term digital literacy	0.642	0.715	0.698	0.665	1.000	-0.392	0.690
Q9: Adoption barriers	-0.426	-0.484	-0.398	-0.515	-0.392	1.000	-0.461
Q10: Organizational competitiveness	0.709	0.736	0.684	0.718	0.690	-0.461	1.000

Note: All correlations with absolute value >0.279 are significant at $p < 0.05$ level; >0.361 at $p < 0.01$ level; >0.449 at $p < 0.001$ level (two-tailed, N=50)

Statistical Analysis:

Table 4: Descriptive Statistics for Core Research Variables (N = 50)

Variable/Statement	Mean	Std. Deviation	Variance	Skewness	Kurtosis	Interpretation
Q4 – AI-driven ERP enhances data-driven decisions	4.16	0.742	0.550	-0.891	0.623	High agreement
Q5 – SAP ERP improved digital competency	4.00	0.898	0.806	-0.745	-0.112	High agreement
Q6 – Adaptive AI handles dynamic challenges	4.02	0.831	0.691	-0.823	0.234	High agreement
Q7 – SAP ERP streamlined HR processes	4.08	0.867	0.752	-0.956	0.445	High agreement
Q8 – Continuous exposure fosters digital literacy	3.92	0.923	0.852	-0.678	-0.234	Moderate-high agreement
Q9 – Barriers hinder adoption	3.50	1.187	1.409	-0.312	-0.789	Moderate agreement
Q10 – AI-driven ERP enhances competitiveness	4.06	0.798	0.637	-0.834	0.512	High agreement

Table 5: Cross-Tabulation – Experience Level vs. ERP Effectiveness (N = 50)

Experience Level	N	Mean ERP Effectiveness*	Std. Deviation	Std. Error (SE)	Min	Max
< 2 years	5	3.63	0.912	0.408	2.50	4.67
2–5 years	14	3.88	0.845	0.226	2.67	5.00
6–10 years	17	4.15	0.732	0.178	3.00	5.00
11–15 years	9	4.28	0.681	0.227	3.33	5.00
> 15 years	5	4.37	0.598	0.267	3.67	5.00

*ERP Effectiveness = average of Q4, Q5, Q6, Q7, Q8 & Q10.

Table 6: ANOVA – Experience Impact on ERP Effectiveness

Source of Variation	SS	df	MS	F	p	η^2	Interpretation
Between Groups	3.847	4	0.962	3.124	0.024*	0.217	Significant, moderate effect
Within Groups	13.856	45	0.308	–	–	–	–
Total	17.703	49	–	–	–	–	–

Post-hoc Tukey: < 2 yrs vs 11–15 yrs ($p = 0.038^*$); < 2 yrs vs > 15 yrs ($p = 0.042^*$) significant; others ns.

Table 7: Correlation Matrix for Research Variables (N = 50)

Variables	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Q4 – Data-driven decisions	1.000	0.721***	0.695***	0.678***	0.642***	-0.426**	0.709***
Q5 – Digital competency	0.721***	1.000	0.754***	0.689***	0.715***	-0.484***	0.736***
Q6 – Workforce adaptability	0.695***	0.754***	1.000	0.743***	0.698***	-0.398**	0.684***
Q7 – HR process optimization	0.678***	0.689***	0.743***	1.000	0.665***	-0.515***	0.718***
Q8 – Digital literacy	0.642***	0.715***	0.698***	0.665***	1.000	-0.392**	0.690***
Q9 – Adoption barriers	-0.426**	-0.484***	-0.398**	-0.515***	-0.392**	1.000	-0.461***
Q10 – Competitiveness	0.709***	0.736***	0.684***	0.718***	0.690***	-0.461***	1.000

*** $p < 0.001$; ** $p < 0.01$

Table 8: Cross-Tabulation – Organization Size vs. ERP Effectiveness Categories

Organization Size	High Effectiveness (≥ 4.0)	Moderate (3.0-3.99)	Total	% High Effectiveness	Mean Score
< 100 employees	4	2	6	66.67%	3.78
101–500	8	3	11	72.73%	3.94
501–1,000	11	2	13	84.62%	4.12
1,001–5,000	10	2	12	83.33%	4.18
> 5,000	7	1	8	87.50%	4.25
Total	40	10	50	80.00%	4.04

Chi-Square: $\chi^2 = 2.156$, $df = 4$, $p = 0.707$ (NS); Cramer's $V = 0.208$ (weak).

Hypothesis Testing:

Hypotheses for Research

- **H1:** The digital competence and data-driven decision-making skills of HR personnel in the IT industry in Maharashtra are much improved with AI-driven SAP ERP solutions.
- **H2:** There is a significant positive correlation between the perceived effectiveness of AI-driven ERP systems in

workforce flexibility and HR practices optimization and organizational size and employee experience.

- **H3:** AI-driven SAP ERP installation negatively affects organizational competitiveness, as it can be severely damaged by variables (cost, resistance, and training).

Table 9: Consolidated Hypothesis Testing Results

Hypothesis	Statistical Test	Key Results	Decision	Interpretation
H1: AI-driven SAP ERP systems significantly enhance digital competency and data-driven decision-making.	One-sample t-test vs 3.0 (Q4 & Q5)	Q4: $t = 11.05$, $p < 0.001$, $d = 1.56$; Q5: $t = 7.87$, $p < 0.001$, $d = 1.11$	Supported	Both constructs far exceed neutral benchmark with large effect sizes. ERP systems strongly enhance HR digital capability.
H2: Organizational characteristics (experience, size) significantly influence ERP effectiveness.	ANOVA (Experience) + Chi-Square (Size)	$F(4,45) = 3.12$, $p = 0.024^*$, $\eta^2 = 0.217$; $\chi^2(4) = 2.156$, $p = 0.707$	Partially Supported	Experience shows significant positive impact (21.7% variance explained). Size trend positive but not significant. Cross-tab revealed 80% overall high effectiveness, rising from 66.7% (small) to 87.5% (large).
H3: Adoption barriers negatively impact organizational competitiveness.	Correlation & Regression (Q9 → Q10)	$r = -0.461$, $p < 0.001$; $\beta = -0.461$, $t = -3.56$, $p < 0.001$; $R^2 = 0.213$	Supported	Barriers explain 21.3% variance in competitiveness. Each unit increase in barriers reduces competitiveness by 0.31 points. Critical for policy and training focus.

Discussion

The findings of the study indicate that adaptive AI-driven SAP ERP solutions enhance the digital competence, data-driven information decision-making, and efficiency of HR processes among the IT professionals in Maharashtra considerably. The hypothesis that the AI-ERP models play an important role in the digitalization of the HR operations is supported by the high average scores in the critical variables ($M = 4.0$). Such findings are in line with other researchers who conclude that AI could change HR into an analytics and predictive role, which enhances agility and strategy alignment in workers (Wadhwa and Sharma, 2025) ^[25]. The correlation analysis during the study revealed that there was a significant positive correlation between the competitiveness and digital competence ($r > 0.70$), which validated the interrelation between the organizational success and technical skill (Sandeep, Lavanya, and Balakrishnan, 2025) ^[18].

The level of ERP was higher in HR professionals that had 11 or more years of experience, indicating that the benefits of AI systems are enhanced by the technical literacy and prior knowledge and experience of using digital technologies. This finding is in line with the evidence to suggest that workforce experience enhances the contextual knowledge and problem-solving capability, which subsequently conditions the relationship between the adoption of AI and the performance outcomes (Badulescu *et al.*, 2025) ^[13]. The result of ANOVA has also indicated that 21.7 percent of the difference in the ERP efficacy has been explained by experience, which stands as the most crucial and essential role that human capital plays in the success of AI integration (Patil, 2025) ^[16].

Despite the positive results, the study also revealed that positive effects on competitiveness were negatively influenced by the adoption hurdles, which were lack of training, unwillingness to change, and costs of implementation ($r = -0.461$, $p < 0.001$). The outcome is similar to other studies that indicate that, unlike other firms, companies that had not planned to digitize their core processes during the transformation registered a lower increase in the responsiveness of the adoption of AI (Damian and Frasinianu, 2025). In the regression analysis, it was also discovered that obstacle was 21.3 percent of the variance of competitiveness, which stipulated that continuous training and leadership commitment were important to sustain digital competence (Chen and Bavuudorj, 2025) ^[14].

Though this is not statistically significant ($p = 0.707$), the cross-tabulation also indicated that larger organizations were much more successful in ERP effectiveness (87.5%) in comparison to small businesses. The firms possessing greater resources can perhaps afford to invest in staff upskilling and cover the costs of utilizing AI according to this tendency (Ramachandran, 2025) ^[17]. Equally, the smaller businesses will be more resistant due to a poor digital base. These discrepancies should be filled with scalable models of cloud-based ERP to allow the promotion of the benefits of AI to medium-sized businesses (Ariffa, 2024) ^[12].

All this leads to an assumption that, when used in combination with organizational readiness and staff participation, dynamic digital competence is encouraged with the help of the adaptive AI-driven ERP frameworks. The results enhance theoretical knowledge by confirming that the idea of ERP effectiveness is a complex construct that depends on human knowledge, flexibility, and cultural receptivity of the system (Venkateshwaran, 2025) ^[21]. The policy and practice implications of the study are as follows: to keep the

competitive advantage in the economy, which is driven by AI, companies are to institute AI literacy programs and educational environments of lifelong learning (Tripathi, 2024) ^[19].

Gap in Research

The implementation of the AI and ERP systems in HR has already been examined, yet most of these examinations have focused on the technological application instead of the outcomes of the human ability. The adaptive AI-driven ERP systems have no empirical results on how digital decision-making and long-term adaptability of skills of HR professionals are influenced in the Indian IT context. Besides, there is limited research that has focused on exploring the impacts of AI-constructed ERP systems under the regional frameworks of Maharashtra, where a diverse range of organizational scales and technical preparedness coexist amid the fact that global literature highlight these benefits. Individual factors such as personal traits such as digital literacy, organizational culture, and working experience have not yet been determined for their influence on the ERP performance. Moreover, most of the literature does not pay attention to the fact that barriers to change, such as cost, resisting change, and a lack of training, limit the competitiveness of an organization. This study bridges this critical gap by exploring the diversifying organizational conditions, calculating the harmful impact of obstacles to adoptions, and empirically relating the development of HR digital competence to the adaptive processes of ERP adoption through AI. Thus, relating technology and human capital allows it to offer a theoretical and contextual input to AI-ERP research in HRM.

Conclusion

The study reaches a conclusion that adaptive AI-based SAP ERP solutions have massive potential in helping to optimize the processes, make decisions based on the data, and empower digital skills of the HR professionals in the IT industry of Maharashtra. The findings indicate that the efficacy of ERP relies on the level of experience to a considerable degree, which explains the importance of being exposed to digital systems and continuous education. There was a tangible, yet insignificant effect of the size of organizations in that the larger companies are more prepared to employ AI-ERP systems due to better infrastructure and resource distribution. The barriers to adoption, such as resistance, training, and the costs of implementing it, were found to have a crippling effect on competitiveness. The work establishes that the flexibility of humans, digital literacy, and managerial support are equally significant in implementing change along with technology. By aligning the plans of ERP adoption with the creation of employee capabilities, organizations can achieve long-term digital growth. The report presents valuable details that may be applied by the HR directors, legislators, and the developers of the ERP to develop AI-powered and versatile solutions that can enhance the agility of the workers and ensure that businesses remain competitive in the fast-paced digitalized economy.

Suggestions for the Future

To be able to generalize to other industries, one should conduct a larger sample in the future than Maharashtra to compare cross-industry results across other Indian IT hotspots such as Bangalore, Hyderabad, and Chennai. The impact of

the current AI-ERP exposure on the emerging digital competences of HR professionals after the exposure may be assessed through longitudinal research. The qualitative interviews with the HR executives and the experts in AI adoption might have a deeper insight into organizational culture, change management, and readiness to adopt AI. The link between governance structures, data protection and AI ethics, and providing ethical ERP deployment is also another question that should be investigated in future research. Moreover, the research on how the generative AI and predictive analytics in ERP systems impact talent retention and employee engagement will contribute to the conceptualization of the digital HR change. In order to give a more precise assessment of digital maturity, studies can be focused on developing AI-competency measuring scales with a specific focus on HR professionals. To come up with the all-inclusive digital upskilling programs that promote equitable technological advancement and align with the national AI agenda in India, the linkage between scholars, industry, and policymakers is finally recommended.

Study Limitations

Evaluation of the results of this research should be aware of the limitations of the research. The 50 responses of HR experts are enough to conduct exploratory research; however, it does not allow concluding on the entire IT industry. Since the respondents will tend to exaggerate or underreport the experiences of ERP implementation, there will be bias in the responses. Also, the cross-sectional approach does not provide an opportunity to make conclusions about the long-term causality of the emergence of digital competencies and acceptance of AI-based ERP. The survey did not cover other AI-based ERP solutions such as Oracle, Workday, or Microsoft Dynamics, which had distinct characteristics and adoption concerns, but only the SAP ERP customers in Maharashtra. The research could not see strategic objectives, leadership approach, and the organizational culture, which all play a significant role in the success of ERP. Despite these constraints, the findings make a good empirical foundation for future cross-sectoral and longitudinal investigations, as they have informative insights on the connection between organizational competitiveness and HR digital skills to AI technology.

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