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The Effect of Artificial Intelligence Adoption on Human Resource Function Roles at the Organizational Level among SMEs in Johor Bahru

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Abstract

The purpose of this study is to identify the effect of artificial intelligence (AI) adoption on human resource (HR) function roles at the organizational level among SMEs in Johor Bahru. HR function roles are treated as the dependent variable, encompassing practices such as teamwork, skill development, communication, performance evaluation, rewards and recognition, and empowerment. AI adoption is regarded as the independent variable, represented by dimensions that consist of technology openness, technology affordances, and technology generativity. A structured questionnaire with 37 closed-ended questions was used to gather data from 381 respondents from SMEs in Johor Bahru. The data was collected using Google Forms. The data were analysed using the Statistical Package for Social Science (SPSS) version 29 to conduct descriptive analysis and determine the levels of AI adoption and HR function roles. The effect of AI adoption on HR function roles was examined using Structural Equation Modelling (SEM) AMOS. The findings indicated that both HR function roles and AI adoption in SMEs were at a high level. The results also indicated that AI adoption has a positive and significant effect on HR function roles suggesting that the integration of AI technologies improves the effectiveness of HR practices. This study provides valuable insights for SMEs in utilising AI to enhance HR functions.

Keywords: Artificial Intelligence Adoption, Human Resource Function Roles, SMEs

Introduction

Artificial intelligence (AI) is changing the way in which businesses, especially small and medium-sized enterprises (SMEs), handle their operations and human resources. In recent years, AI has emerged as one of the most transformative technologies influencing

organisational effectiveness, enabling businesses to improve operational efficiency, reduce repetitive tasks and enhance decision-making processes. The increasing adoption of AI reflects the growing need for organisations to remain competitive in rapidly evolving digital environments. In the context of human resource management, AI is increasingly viewed as a valuable tool for enhancing workforce management, employee development and strategic HR decision-making. Therefore, the effectiveness of AI adoption in improving HR function roles have become increasingly important for organisational sustainability and competitiveness.

AI technologies are being used in human resource management for important HR tasks like hiring, performance management, and employee development. This helps businesses make better decisions, increase productivity, and improve workforce planning (Tambe et al., 2019; Pandey, 2020; Minbaeva, 2021). The use of AI in HR practices is particularly important because effective HR function roles contribute significantly to employee productivity, organisational performance and long-term business success. Through automation and data-driven insights, AI can reduce administrative burdens and enable HR professionals to focus more on strategic initiatives such as talent development, employee engagement, and workforce planning. This demonstrates the practical usefulness and effectiveness of AI in transforming traditional HR operations into more strategic and value-adding functions.

According to Poorkaveh and Hooi (2014), HR function roles refer to the key responsibilities of the Human Resource function in managing and developing employees through effective policies and practices to ensure alignment with organisational objectives and enhance organisational performance. SMEs are crucial to Malaysia's economic growth and job generation, especially in developing industrial areas like Johor Bahru. Given the important contribution of SMEs to economic growth, strengthening HR effectiveness through technological innovation has become increasingly necessary to ensure business sustainability and competitiveness. The adoption of AI may provide SMEs with opportunities to improve operational efficiency and strengthen HR capabilities despite resource limitations.

However, despite the increasing accessibility of AI technologies, many SMEs still struggle to incorporate these tools into HR operations because of a lack of technological skill and employee digital expertise (Yusuf et al., 2024). Although SMEs are rapidly adopting AI, putting it into practice is still difficult. Due to a lack of willingness to implement cutting-edge digital solutions, many SMEs find it difficult to completely incorporate AI into HR function roles. AI tools are frequently implemented at the operational level but are not completely integrated into HR decision-making procedures, leading to a partial use of technology. This suggests that the existence of AI technology by itself does not ensure that HR function roles will be effectively transformed.

SMEs encounter a significant challenge in the limited ability of their HR functions to adapt to technological developments. SMEs frequently rely on small HR teams, where employees must handle several tasks at once, in contrast to large organisations that have specialised HR departments. The inability of HR function roles to fully leverage advanced technologies is often associated with limitations in key HR function roles, particularly in areas such as teamwork and skill development. In SMEs, constrained resources and less structured HR practices reduce opportunities for collaboration, continuous learning and capability building

among employees, which are essential for adapting to technological advancements (Cardon and Stevens, 2004). As a result, HR functions remain focused on routine operational activities rather than effectively enhancing employee competencies and fostering collaborative practices that support organisational development. Furthermore, these structural and capability limitations also contribute to implementation-related difficulties in integrating AI into HR roles. Effective adoption is further slowed by problems including a lack of knowledge and skills related to AI applications (Bettoni et al., 2023). These limitations suggest that further investigation is required to identify whether AI adoption can effect HR function roles in SME settings.

Adoption of AI has the ability to change HR function roles despite these obstacles by moving HR practices away from manual and transactional duties and toward more automated and data-driven procedures. Artificial intelligence (AI) can support HR departments by improving the accuracy of performance evaluation processes (Hmoud, 2021). This change enables HR professionals to concentrate more on strategic HR initiatives that support organisational growth and competitiveness while reducing administrative workload (Tuffaha and Perello, 2023; Ahmed, 2024). The study of AI adoption in HR is therefore important because it highlights the potential of digital transformation in enhancing HR effectiveness and employee outcomes, particularly within SMEs. Furthermore, the findings may benefit HR practitioners, SME owners, and policymakers by facilitating the effective integration of AI technologies into HR functions and supporting organisational performance.

However, there is still a lack of research on how AI adoption affects HR function roles, especially when it comes to SMEs. The majority of earlier research has been on big businesses, which have more advanced HR and technology infrastructure. Because of this, there is not enough empirical data to determine how AI adoption affects HR function roles in settings with limited resources, like SMEs. This leads to a knowledge gap about how HR departments adjust to technology development in the face of organisational, technical and financial constraints. The effect of AI adoption on HR function roles in such circumstances is crucial, given the growing significance of digital transformation for SMEs. Thus, the purpose of this study is to examine the effect of AI adoption on HR function roles in SMEs, with a particular focus on SMEs in Johor Bahru. The results are anticipated to contribute to the body of knowledge on AI adoption in HR management and provide valuable insights for SMEs aiming to enhance HR function roles through AI adoption.

Research Questions

To guide the direction of this study, the following research questions were formulated:

- What is the level of Artificial Intelligence (AI) adoption at the organizational level among SMEs in Johor Bahru?
- What is the level of Human Resource (HR) function roles at the organizational level among SMEs in Johor Bahru?
- Is there any significant effect of Artificial Intelligence (AI) adoption on Human Resource (HR) function roles at the organizational level among SMEs in Johor Bahru?

Research Objectives

In conducting this research, the researcher aimed to achieve these three objectives:

- To identify the level of Artificial Intelligence (AI) adoption at the organizational level among SMEs in Johor Bahru.
- To identify the level of Human Resource (HR) function roles at the organizational level among SMEs in Johor Bahru.
- To identify the effect of Artificial Intelligence (AI) adoption on Human Resource (HR) function roles at the organizational level among SMEs in Johor Bahru.

Literature Review

Artificial Intelligence Adoption

Adoption of artificial intelligence (AI) has emerged as a key component of modern organisational transformation, especially when it comes to improving productivity, creativity and decision-making. Due to developments in data processing power, machine learning and digital infrastructures, artificial intelligence (AI), which was first conceived in the middle of the 20th century as an attempt to replicate human intellect in computers, has undergone substantial change (Wang et al., 2019; Venkatesh, 2022). According to DeStefano et al. (2022) and Prasad (2023), these advancements have made it possible for artificial intelligence (AI) to go from being a theoretical notion to a useful tool that is extensively used across industries, enhancing organisational competitiveness and operational performance.

Despite its growing relevance, AI does not have a single universally accepted definition. Different viewpoints highlight different elements, such as autonomous decision-making, intelligent behaviour, or logical problem-solving (European Commission, 2019). The interdisciplinary nature of AI and its ongoing progress are reflected in this lack of agreement (Csaszar and Steinberger, 2022). According to Russell and Norvig (2020), artificial intelligence (AI) can be defined as systems that are intended to evaluate data, learn from patterns and carry out activities that normally require human intelligence.

Adoption of AI at the organisational level is the process by which businesses incorporate AI technologies into their strategic and operational endeavours. According to Booyse and Scheepers (2024), this process entails going from initial awareness and interest to actual deployment and usage of AI tools. Adoption of AI in commercial settings is linked to increases in creativity, productivity and data-driven decision-making (McElheran et al., 2024; Tuffaha and Perello-Marin, 2023). AI applications in human resource management, including as performance analytics, recruitment automation and customised employee development, collectively transform conventional HR procedures (Hmoud, 2021).

However, not all businesses have adopted AI in the same way. Compared to larger businesses, small and medium-sized enterprises (SMEs) in particular face unique obstacles. The successful application of AI technology is frequently hampered by organisational resistance, a lack of technical know-how and limited financial resources (Auer et al., 2023; Ulrich and Frank, 2021). Even if SMEs are aware of the potential advantages of AI, like improved productivity and competitiveness, many find it difficult to put this knowledge into practice (Bettoni et al., 2021; Pingali et al., 2023). This gap emphasises how crucial it is to look at the enabling factors that facilitate effective AI integration in settings with limited resources.

The Artificial Intelligence Acceptance and Digital Entrepreneurship (AIADE) model offers a helpful framework for comprehending AI adoption in SMEs (Upadhyay et al., 2022). Three

crucial dimensions are identified by this model such as generativity, affordances and openness (Nambisan et al., 2019). The degree to which digital technologies enable wider engagement and collaboration outside of organisational boundaries is referred to as openness (Chesbrough, 2003). According to Majchrzak and Markus (2013), affordances are opportunities made possible by AI technology that give businesses access to new markets or resources. The capacity of digital technologies to promote creativity by reusing preexisting resources is reflected in generativity (Zittrain, 2006). When considered collectively, these factors explain the role of AI adoption in fostering innovation and organisational growth, especially in SMEs with constrained internal resources. In conclusion, the adoption of AI is a transformative organisational process that encompasses strategic integration and capability development in addition to technology deployment. The effectiveness of AI adoption depends on organisational preparedness, resource availability and the capacity to take advantage of technology advances within certain contexts, such as SMEs, even though its benefits are widely recognised.

Human Resource Function Roles

Over the years, jobs in the human resource function have changed significantly, moving from administrative duties to more strategic contributions inside businesses. In the past, regular tasks like personnel record keeping, payroll management and compliance were the main focus of HR responsibilities. Despite their continued importance, these duties have little bearing on the long-term functioning of the organization (Ulrich, 1997; Mukkelli, 2015). HR departments are anticipated to take on a more strategic role as businesses realise how crucial human capital is to gaining a competitive edge. According to Beatty and Schneier (1997) and Yusuf et al. (2017), this entails improving employee engagement, fostering talent development and coordinating HR procedures with organisational goals. HR is now seen as a strategic partner that contributes to the sustainability and efficacy of the organization rather than just as a support function.

Beyond operational outputs, HR roles have an impact on more general organisational outcomes like financial success, productivity and innovation (Beatty and Schneier, 1997). However, the research now in publication shows that many businesses, especially SMEs, struggle to fully realise this strategic function. HR roles are frequently limited to operational chores rather than strategic initiatives due to resource constraints, a lack of formal HR structures and inadequate knowledge (Cardon and Stevens, 2004; Inyang, 2010).

HR function roles are being increasingly reshaped by advances in technology, particularly AI. HR managers can concentrate on higher-value duties like workforce planning, talent management and strategic decision-making by using AI technologies to automate repetitive processes (Fenwick et al., 2024). Furthermore, AI-driven analytics enhance the efficacy of hiring, performance management and employee engagement by offering insights that complement evidence-based HR strategies (Tambe et al., 2019; Minbaeva, 2021).

However, incorporating AI into HR operations is not without its difficulties. The efficacy of HR function roles may be limited, employee trust may be diminished and ethical issues may arise from poorly implemented AI systems (DeStefano et al., 2022). This highlights the importance of balancing technological innovation with human considerations when transforming HR function roles.

The evolution of HR function roles is especially complicated in SMEs. SMEs frequently function with small teams where HR duties are divided across several positions, in contrast to large businesses with dedicated HR departments (Cardon and Stevens, 2004). Because of this structure, HR departments are unable to participate in strategic operations, which makes it more challenging to adjust to technological advancements like the adoption of AI. But by automating administrative procedures and facilitating more strategic decision-making, AI also offers SMEs a chance to improve HR efficacy (Agrawal et al., 2017; Arslan et al., 2022).

The High-Involvement Work Practices (HIWP) model offers a thorough approach for operationalising HR function roles (Poorkaveh and Hooi, 2014). Teamwork, skill development, communication, performance evaluation, rewards and recognition, as well as empowerment are among the important elements identified by this framework. The strategic role of HR in promoting organisational performance is reflected in these practices, which place a strong emphasis on employee participation, ongoing learning and organisational collaboration. In summary, HR function roles have developed into strategic and dynamic elements of an organization's success. The influence of technology innovations like artificial intelligence (AI) on HR efficiency depends on how businesses, especially small and medium-sized enterprises (SMEs), incorporate new technologies into HR procedures while resolving resource and capability limitations.

The Effect of Artificial Intelligence Adoption and Human Resource Function Roles

The way human resource (HR) functions are carried out has been significantly changed by the increasing use of artificial intelligence (AI) in businesses. By automating routine and administrative chores, AI technologies free up HR experts to concentrate on more strategic and valuable work. In the end, this change improves organisational effectiveness by strengthening key HR functions like hiring, employee engagement, retention and decision-making (Hmoud, 2021; Tambe et al., 2019). HR function roles are changing from operational support roles to strategic contributors to organisational performance as businesses depend more and more on data-driven platforms.

Talent management and recruitment procedures are two areas where AI use is most noticeable. Large amounts of applicant data may be effectively analysed by AI-powered systems, which can also find qualified applicants and shorten the time needed to make recruiting decisions. According to empirical research, companies who use AI in hiring report increased productivity, lower operating expenses and better candidate selection accuracy (Arora and Siradhana, 2024; Minbaeva, 2021). These enhancements free up HR departments to concentrate on workforce planning and strategic talent acquisition instead of standard screening procedures.

Adoption of AI improves personnel development and performance management in addition to recruitment. AI-driven analytics give businesses real-time insights into worker performance, allowing them to pinpoint skill shortages and create focused training initiatives. This helps improve HR procedures in areas like performance evaluation and skill development (Tambe et al., 2019; Jarrahi, 2019). Additionally, AI facilitates more objective and knowledgeable decision-making, enabling HR managers to match organisational objectives with workforce initiatives.

Additionally, AI technologies contribute to improved communication and staff engagement. Chatbots and digital HR platforms are examples of tools that speed up communication, offer individualised employee support and enhance the general employee experience (Hmoud, 2021). According to research, these skills enhance HR's ability to promote organisational culture and employee engagement (Minbaeva, 2021). The success of AI adoption, however, depends on how it is applied within businesses, according to certain studies that point out possible obstacles include less human engagement and issues with trust and transparency (DeStefano et al., 2022).

From a broader perspective, HR function roles is facilitated by the adoption of AI. HR professionals can concentrate on higher-level duties including organisational development, talent management and strategic decision-making by lowering their administrative workload (Fenwick et al., 2024). This change increases HR's total contribution to business success. However, the impact of AI adoption may be restricted in small and medium-sized businesses (SMEs) due to a lack of resources, experience and technological maturity (Bettoni et al., 2021; Auer et al., 2023). The degree to which AI adoption can successfully change HR function responsibilities inside SMEs may be influenced by these limitations.

In the context of this study, human resource function roles are represented through six key dimensions such ad teamwork, skill development, communication, performance evaluation, rewards and recognition as well as empowerment. The adoption of AI has the potential to positively effects each of these dimensions. AI-supported communication platforms facilitate information sharing and collaboration among employees, thereby enhancing teamwork and communication. AI-driven learning systems can identify employee skill gaps and recommend personalised training programmes, contributing to skill development. Furthermore, AI-based performance management tools provide objective and real-time performance data that improve the accuracy and fairness of performance evaluation processes. These insights can also support more transparent rewards and recognition practices based on employee achievements. In addition, AI-enabled self-service systems and decision-support tools can empower employees by providing greater access to information, increasing autonomy and encouraging active participation in organisational activities. Therefore, AI adoption is expected to strengthen these dimensions and enhance the overall effectiveness of HR function roles within SMEs.

Overall, previous research repeatedly shows that the implementation of AI improves efficiency, makes data-driven practices possible and supports strategic HR transformation, all of which have a beneficial impact on HR function roles. Despite these conclusions, there is still limited empirical evidence in SME settings, where organisational characteristics may affect the adoption of AI. Therefore, more research is needed to comprehend this interaction within SMEs.

Hypothesis 1
AI adoption has a significant and positive effect on human resource function roles at the organisational level in SMEs.

Socio-Technical Systems (STS) Theory

According to Socio-Technical Systems (STS) Theory, an organization's ability to function depends on how well its technology systems and human components operate together. The theory, which was created by Trist and Bamforth (1951), highlights that organisations are made up of two interconnected parts such as the social system (people, skills, and organisational structures) and the technical system (tools, technologies, and processes). When these two systems are optimised together, effective results are obtained (Trist and Bamforth, 1951; Pasmore et al., 2019). According to STS Theory, integrating AI technology into HR functions is a technical shift that needs to be backed by human capacities. AI makes it possible to automate repetitive operations and improve data-driven decision-making, which makes HR functions more strategic (Hmoud, 2021). However, how successfully employees comprehend, adjust to, and use these technologies will determine how AI adoption affects HR function roles (Haenlein et al., 2019). Thus, STS Theory offers a useful paradigm for explaining the effect of AI adoption on HR function roles.

Conceptual Model

This study develops a conceptual model, as shown below, to examine the effect of AI adoption on HR function roles based on the literature review conducted.

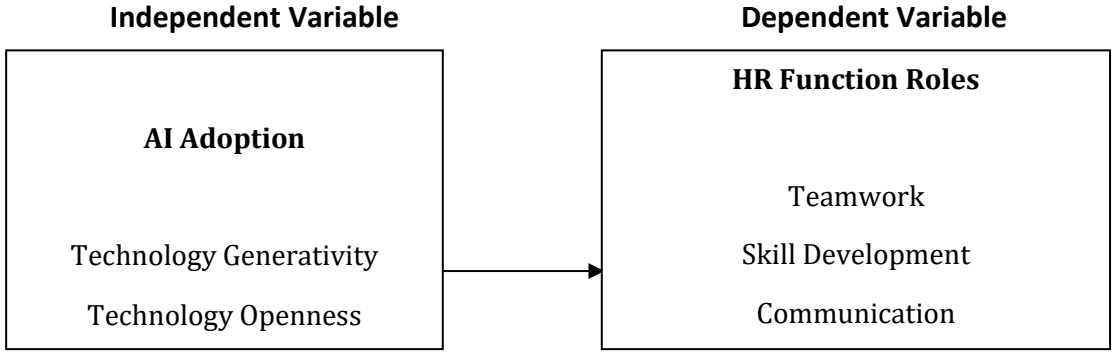

Figure 1. Conceptual Model

Methods

The purpose of this study is to identify the effect of Artificial Intelligence (AI) adoption on human resource (HR) function roles at the organisational level in SMEs. A quantitative correlational research design was adopted. Data were collected through a structured questionnaire distributed via the Google Forms platform and analysed using SPSS for preliminary analysis and Structural Equation Modelling (SEM) AMOS for hypothesis testing. The target population of this study consists of 41,332 SMEs located in Johor Bahru. According to Krejcie and Morgan (1970) sample size determination table, 381 respondents were needed to ensure accurate population representation. Due to accessibility and time constraints, a non-probability sampling technique, specifically convenience sampling was used, and a total of 381 respondents were successfully obtained for this study.

The research instrument was adapted from established sources to ensure validity. The measurement items for AI adoption was measured using the AIADE model by Upadhyay (2022), while the questionnaire items were adopted from Jalil et al. (2024). HR function roles were measured based on the High-Involvement Work Practices (HIWP) model developed by

Poorkaveh and Hooi (2014). The questionnaire was divided into three sections such as demographic information, AI adoption and HR function roles. Age, gender and educational level were among the demographic factors. There were sixteen items in the AI adoption construct and twenty-one in the HR function roles. A five-point Likert scale, with 1 representing "strongly disagree" and 5 representing "strongly agree," was used to rate each item. Before the primary data collection, a pilot study was carried out to evaluate the instrument's clarity and dependability. Using both face validity and internal consistency analysis, the pilot test made sure the questionnaire was stable and internally consistent. Cronbach's alpha reliability analysis revealed good internal consistency for both constructs, with HR function roles (dependent variable) obtaining a value of 0.927 and AI adoption (independent variable) recording a value of 0.855. These findings show that the measurement scales are trustworthy and appropriate for more study.

To ascertain the degree of AI adoption and HR function roles, descriptive analysis was carried out. As shown in Table 1, the mean scores were interpreted using predetermined classification ranges.

Table 1
The Level Mean Score for Tested Variables

Ratio	Level
1.00-2.33	Low
2.34-3.66	Moderate
3.67-5.00	High

Source: Landell (1997)

The proposed association between AI adoption and HR function roles was tested using Structural Equation Modelling (SEM) with AMOS. The effect between variables was evaluated through structural model analysis. Several goodness-of-fit indices were used to assess model fit, and Table 2 presents the suggested criteria.

Table 2
Model Fit Indices

Fit Index	Recommended Value
χ^2/df (CMIN/DF)	< 5.0
CFI	≥ 0.90
GFI	≥ 0.90
IFI	≥ 0.90
NFI	≥ 0.90
RMSEA	≤ 0.10

Source: Hair et al. (2010)

By applying this methodological framework, the study aims to provide robust empirical evidence on the effect of AI adoption on HR function roles within SMEs.

Research Findings

The research reveals that respondents from SME in Johor Bahru demonstrate a high level of AI adoption and engagement in HR function roles. Moreover, AI adoption is found to have a positive and significant effect on HR function roles.

Demographic of The Respondents

It can be seen that most of the respondents are aged between 31 and 40 years old (33.6%), followed by those aged 21 to 30 years old (23.6%) and 41 to 50 years old (23.1%). The smallest proportion of respondents are aged 60 years old and above (2.9%). In terms of gender, the majority of respondents are female (66.4%), while 33.6% are male. Regarding education level, most respondents hold a diploma qualification (33.3%), followed by high school (29.7%), degree (26.8%), master (8.1%), and doctoral level (2.1%). For job tenure, the highest proportion of respondents have worked for 1 to 5 years (28.1%), followed by 15 years and above (22.3%), 6 to 10 years (21.0%), below 1 year (14.7%), and 11 to 15 years (13.9%).

Table 3
Demographics of the Respondents

		Frequency (*f*)	**Percentage (%)**
Gender	Male	128	33.6
	Female	253	66.4
Age	21 - 30 years old	90	23.6
	31 - 40 years old	128	33.6
	41 - 50 years old	88	23.1
	51 - 60 years old	64	16.8
	60 years old and above	11	2.9
Education Level	High School	113	29.7
	Diploma	127	33.3
	Degree	102	26.8
	Master	31	8.1
	Doctoral	8	2.1
Job Tenure	Below 1 year	56	14.7
	1 - 5 years	107	28.1
	6 - 10 years	80	21.0
	11 – 15 years	53	13.9
	16 years and above	85	22.3

Mean Level of Artificial Intelligence Adoption

The first objective of this study is to identify the level of Artificial Intelligence (AI) adoption among employees in SMEs. The overall mean score for each AI adoption dimension and the overall mean score for the AI adoption variable are presented in Table 4.

Table 4
Level of Artificial Intelligence Adoption

Dimension	N	Mean	Level
Openness	381	4.15	High
Affordance	381	4.08	High
Generativity	381	3.99	High
Total	**381**	**4.07**	High

The descriptive analysis shows that openness recorded the highest mean score (M = 4.15), followed by affordance (M = 4.08), and generativity (M = 3.99). Overall, the total mean score (M = 4.07) indicates that the level of AI adoption among SMEs is high across all dimensions.

Mean Level of HR Function Roles
The second objective of this study is to identify the level of human resource (HR) function roles in SMEs. The overall mean score for each HR function role dimension and the overall mean score for the HR function roles variable are presented in Table 5.

Table 5
Level of HR Function Roles

Dimension	N	Mean	Level
Dimension	**N**	**Mean**	**Level**
Teamwork	381	3.99	High
Skill Development	381	3.95	High
Communication	381	3.98	High
Performance Evaluation	381	3.92	High
Rewards and Recognition	381	3.93	High
Empowerment	381	3.91	High
Total	381	**3.95**	**High**

The descriptive analysis shows that teamwork recorded the highest mean score (M = 3.99), followed closely by communication (M = 3.98) and skill development (M = 3.95). This is followed by rewards and recognition (M = 3.93), performance evaluation (M = 3.92), and empowerment (M = 3.91). Overall, the total mean score (M = 3.95) indicates that HR function roles in SMEs are at a high level across all dimensions.

Direct Effect of Artificial Intelligence (AI) Adoption on HR Function Roles
This section examines the direct effect of Artificial Intelligence (AI) adoption on HR function roles in SMEs. The findings are based on the view that AI integration improves HR efficiency by streamlining processes, enhancing decision quality, and enabling a shift towards more strategic HR responsibilities. Previous studies also indicate that AI reduces routine administrative tasks while supporting data-informed decisions in key HR areas such as recruitment, performance management, and employee development (Bersin, 2018; Marler & Boudreau, 2017). Before testing the hypothesis, the structural model was assessed to ensure its suitability. The results indicate that most fit indices meet the recommended criteria, demonstrating that the model has an acceptable fit with the observed data and is appropriate for further structural analysis. Although the GFI value for HR function roles was slightly below the recommended threshold, model fit assessment should be evaluated using multiple fit indices collectively rather than relying on a single criterion (Hair et al., 2010; 2014). Therefore, the overall findings suggest that the measurement models are acceptable

and provide a sufficient basis for further confirmatory factor analysis (CFA) to assess construct validity at the item level.

Table 6
Model Fit Indices for AI Adoption

Fit Index	Obtained Value	Recommended Value
χ^2/df (CMIN/DF)	4.164	< 5.0
CFI	0.943	≥ 0.90
GFI	0.90	≥ 0.90
IFI	0.943	≥ 0.90
NFI	0.926	≥ 0.90
RMSEA	0.091	≤ 0.10

Table 7
Model Fit Indices for HR Function Roles

Fit Index	Obtained Value	Recommended Value
χ^2/df (CMIN/DF)	4.866	< 5.0
CFI	0.922	≥ 0.90
GFI	0.822	≥ 0.90
IFI	0.922	≥ 0.90
NFI	0.903	≥ 0.90
RMSEA	0.10	≤ 0.10

Table 8
Results of Hypothesis Testing

Hypothesis	Relationship	Estimate (β)	C.R.	P-value
H1	AI adoption → HR function roles	0.625	6.427	< 0.001

The hypothesis testing results are presented in Table 8. The analysis shows that AI adoption has a significant positive effect on HR function roles (β = 0.625, C.R. = 6.427, p < 0.001). This indicates that higher levels of AI adoption are associated with improved HR function roles in SMEs. The findings suggest that AI adoption contributes significantly to enhancing HR function roles by increasing operational efficiency and supporting the transition towards more strategic HR practices. Therefore, the hypothesis is supported.

Discussions and Recommendation

This section discusses the findings of the study in relation to the research objectives. It provides an in-depth interpretation of the results, highlighting their implications for theory and practice. Additionally, this section offers practical recommendations to assist SME owners and human resource practitioners in implementing effective strategies, particularly in enhancing AI adoption and improving AI literacy within their organizations.

Level of Artificial Intelligence (AI) Adoption at the Organizational Level among Small and Medium-sized Enterprises (SMEs) in Johor Bahru

Based on the descriptive analysis, the overall level of AI adoption among SMEs is high, indicating that organizations have extensively integrated AI technologies into their operations and are now using them to support business processes and decision-making beyond early digital transformation stages. This reflects the growing recognition of AI's strategic importance in enhancing efficiency, innovation, and competitiveness, consistent with prior studies on AI adoption in SMEs (Bettoni et al., 2021; Tuffaha & Perello-Marin, 2023). Among the dimensions, technology openness recorded the highest level, suggesting strong willingness among SMEs to engage with external technologies and ecosystems to access knowledge and innovation opportunities (Chesbrough, 2003; Kallinikos et al., 2013). Technology affordances also showed a high level, indicating effective use of AI capabilities to improve operations and decision-making, while technology generativity reflects strong capacity for innovation and idea creation through AI use (Majchrzak & Markus, 2013; Nambisan et al., 2019; Zittrain, 2006). Overall, the findings suggest that SMEs are not only adopting AI but also leveraging it effectively for innovation and operational improvement, indicating a relatively mature stage of AI adoption aligned with the Socio-Technical Systems theory (Trist & Bamforth, 1951; Pasmore et al., 2019).

Level of Human Resource (HR) Function Roles at the Organizational Level among Small and Medium-sized Enterprises (SMEs) in Johor Bahru

The findings indicate that the level of Human Resource (HR) function roles in small and medium-sized enterprises (SMEs) is generally high across all dimensions, suggesting that HR practices are actively implemented to support organizational processes and employee outcomes (Poorkaveh and Hooi, 2014) . This suggests that SMEs are actively implementing HR practices that support employee involvement, development, and organizational effectiveness, which are key characteristics of high-involvement work systems (Boxall and Macky, 2007; Gollan et al., 2005). The consistent high level across teamwork, skill development, communication, performance evaluation, rewards and recognition, as well as empowerment reflects the presence of structured HR practices aligned with high-involvement work practices (HIWP) model, which emphasize employee participation, skill enhancement, and shared decision-making (Appelbaum et al., 2000; Lawler III, 1986). In particular, teamwork and communication appear to be the most strongly emphasized aspects of HR function roles, which is consistent with prior research highlighting teamwork and open communication as core elements of effective HIWP model (Gollan et al., 2005; Wilkinson et al., 1998). This implies that SMEs place significant importance on collaboration and effective information sharing, which are essential for coordinating tasks and achieving organizational goals (Boxall & Macky, 2007). Strong communication practices also indicate that employees are well-informed and engaged, supporting smoother organizational processes and better decision-making, as effective communication is a key driver of employee involvement and performance (Sun, 2000b; Soltani, 2006). At the same time, dimensions such as empowerment and performance evaluation, although still at a high level, show relatively lower emphasis compared to others. This may suggest that while SMEs are encouraging employee participation, there is still some limitation in fully delegating authority and enhancing decision-making autonomy, which are critical elements of empowerment in high-involvement systems (Bowen & Lawler III, 1992) . Similarly, performance evaluation practices may still be developing in terms of consistency and alignment with strategic organizational

objectives, as effective appraisal systems must be integrated with organizational goals and continuous improvement efforts (Soltani, 2006). Overall, these findings highlight that HR function roles in SMEs have evolved beyond basic administrative functions toward more strategic and developmental roles, consistent with the transformation of HR into a strategic partner in organizational performance (Ulrich, 1997; Murphy, 2003). This supports the view that HR practices play a critical role in enhancing employee capabilities and organizational performance (Ulrich, 1997; Poorkaveh & Hooi, 2014) . Furthermore, in the context of this study, the strong implementation of HR function roles provides a solid foundation for integrating advanced technologies such as artificial intelligence, as effective HR practices are essential for maximizing the benefits of digital transformation in SMEs (Wickramasinghe & Gamage, 2011).

The Effect of Artificial Intelligence (AI) Adoption on Human Resource (HR) Function Roles at the Organizational Level among Small and Medium-sized Enterprises (SMEs) in Johor Bahru

The findings of this study indicate that Artificial Intelligence (AI) adoption has a significant positive effect on Human Resource (HR) function roles in small and medium-sized enterprises (SMEs). This suggests that the integration of AI into organizational processes enhances and transforms HR functions, shifting them from primarily administrative tasks toward more strategic and value-adding roles. The positive effect shows that AI adoption enables SMEs to streamline routine HR activities such as data management, recruitment screening, and performance monitoring. By automating these repetitive tasks, HR professionals can focus more on strategic functions, including talent development, employee engagement, and organizational planning. This supports the view that AI plays an important role in modernizing HR practices and improving organizational efficiency (Hmoud, 2021; Tambe et al., 2019). In addition, AI adoption improves decision-making in HR by providing data-driven insights. With access to real-time data and predictive analytics, HR professionals are better equipped to make informed decisions related to workforce planning, performance evaluation, and employee development. This reinforces the idea that AI strengthens the strategic role of HR and enhances the quality of HR outcomes (Minbaeva, 2021). However, these findings should be considered within the SME context, where organizations often face resource constraints. Although AI adoption positively effects HR function roles, its effectiveness depends on the organization's ability to integrate these technologies into existing processes and ensure that employees have the necessary skills to use them effectively. Without sufficient capability and understanding, the benefits of AI may not be fully realized. Overall, the results confirm that AI adoption plays an important role in enhancing HR function roles in SMEs by improving efficiency, supporting better decision-making, and enabling HR to become more strategic and impactful.

Recommendation and Conclusion

Based on the findings, SMEs are encouraged to further strengthen the strategic integration of Artificial Intelligence (AI) within human resource (HR) function roles by embedding AI into key HR processes such as recruitment, performance management, training, and employee development rather than limiting its use to routine administrative tasks. Organizations should also invest in continuous and structured training and development programs that enhance not only technical proficiency but also digital literacy, analytical thinking, and the ability to interpret AI driven insights for informed HR decision making. In addition, reinforcing structured HR practices such as transparent performance evaluation systems, effective

communication mechanisms, and employee empowerment initiatives is essential to ensure that AI adoption is aligned with organizational objectives and applied consistently and ethically. Collectively, these efforts can enable SMEs to optimize the benefits of AI, thereby developing more efficient, strategic, and adaptive HR function roles that support long term organizational competitiveness and growth.

In conclusion, Artificial Intelligence (AI) adoption has a significant positive effect on human resource (HR) function roles in small and medium-sized enterprises (SMEs). The findings indicate that the integration of AI transforms HR functions from primarily administrative responsibilities into more strategic and value-adding roles. AI adoption enhances efficiency, supports data-driven decision-making, and strengthens key HR practices such as talent development, employee engagement, and performance management (Hmoud, 2021; Tambe et al., 2019; Minbaeva, 2021). Therefore, AI adoption is an important driver in improving HR effectiveness and overall organizational performance within SMEs.

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