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Examining the influence of managerial skills on in-role behavior through role breadth self-efficacy as mediator

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Abstract

This study examines the relationship between managerial skills, role breadth self-efficacy, and in-role behavior through a mediation model grounded in empirical research. A quantitative research design was employed, with hypotheses tested using a self-administered questionnaire distributed to 200 employees of an education-focused agency in Malaysia. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate measurement and structural models. The findings revealed that managerial skills and role breadth self-efficacy significantly and positively influence in-role behavior. This underscores the critical role of managerial skills in shaping employee behavior by enhancing role breadth self-efficacy. Consequently, organizations are encouraged to adopt strategies to improve managerial skills and foster positive employee behavior. The study's results provide valuable insights for practitioners, offering a framework to understand the complexity of role breadth self-efficacy concerning managerial skills.

Keywords In-role behavior, Managerial skills, Role breadth self-efficacy

1 Introduction

Research on the importance of management tasks, roles, and activities was extensively conducted in the 1970s and 1980s [1]. While the skills previously considered important for leaders may have shifted in significance following significant changes in today's workplace, this aligns with the evolving importance of various management skills [1–4]. Managerial skills ensure effective governance and strategic progress in organizations, particularly in Malaysia's educational leadership context. These skills are defined as systematic interaction between managers or leaders and employees. Through discussions and planned learning activities, leaders aim to help employees solve problems and perform tasks more efficiently and effectively [5, 6].

Leaders must clearly understand their roles and responsibilities and possess various skills to execute their tasks effectively [7, 8]. Essential skills include coordinating work systematically, communicating expectations, providing constructive feedback, and

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supporting training and career development initiatives [8, 9]. Additionally, these skills involve understanding the roles and responsibilities of other leaders at various organizational levels and functions, a competency that has become increasingly critical in today's dynamic and ever-changing environment [4, 8]. By strengthening managerial skills at all levels, educational organizations can foster a resilient, innovative, and globally competitive higher education ecosystem. Such efforts enhance operational efficiency and contribute to Malaysia's global higher education reputation and broader socio-economic growth.

The education sector in Malaysia is greatly responsible for improving the effectiveness of managerial skills. Malaysian educational institutions encompassing public universities, private higher education institutions, polytechnics, and community colleges serve as key national education and training ecosystem components. These institutions generate thinkers, scholars, and skilled and semi-skilled workers according to their respective roles [10]. This education-based leadership recognizes the need to build and prepare future leaders who are high-performing, competitive, and excellent [10], capable of efficiently and effectively increasing productivity, contributing to sustainable national economic growth, adding value to career management, improving job performance, nurturing employee talent, and achieving organizational objectives [10].

In the context of educational organizations in Malaysia, the growing focus on managerial skills is critical for enhancing organizational reputation and leadership effectiveness. Research indicates that effective managerial skills contribute to positive in-role behavior and bolster role breadth self-efficacy, both essential for navigating the complex dynamics of educational institutions. Precisely, managerial skills that promote knowledge enhancement and meaningful skills are vital for organizational success in the education sector. Research has shown that in-role behavior involves two main components: knowledge enhancement and meaningful skills. From a cognitive psychology perspective, knowledge enhancement encompasses a deep understanding of tasks, work context, problem-solving processes, and self-awareness in the organization, all of which contribute to strategic competence in task execution [11]. Meanwhile, meaningful skills are defined as the ability to perform activities with expertise through a series of actions that involve the coordination of sequential psychomotor and cognitive skills, thus demonstrating a high level of technical and analytical skills in organizational situations [12]. Role breadth self-efficacy refers to an individual's belief in their ability to successfully perform various tasks or activities across different domains or areas. It represents a person's confidence in their capacity to handle multiple challenges or tasks beyond their specific area of expertise, indicating their general belief in competence across diverse situations. This concept is linked to how individuals perceive their ability to adapt and succeed in varied contexts or environments, often fostering motivation to take on new or unfamiliar tasks [13].

Although the relationship between role breadth self-efficacy and various aspects of leadership is considered necessary, its mediating influence in the leadership context has received insufficient attention in the existing literature on educational organizations [14]. Educational leadership continues to face a significant gap in ensuring that managerial skills consistently enhance role breadth self-efficacy and in-role behavior. This situation creates dissatisfaction as it fails to encourage employees to develop positive and productive organizational behavior.

Several key factors have influenced this research gap. First, most dominant studies are rooted in an objectivist approach, which prioritizes the role of non-human factors, such as organizational policies, operational standards, and work procedures, considering them critical in determining organizational potential and effectiveness [14]. While this approach provides significant insights into how structural elements contribute to organizational success, it tends to overlook human dimensions, particularly aspects of employee motivation and psychology, which are key drivers of performance and innovation in the workplace.

Second, the disproportionate focus of prior literature on the external dimensions of role breadth self-efficacy limits a deeper understanding of this construct [14]. Research often associates role breadth self-efficacy with general meanings such as its importance, benefits, purposes, and challenges in various organizational contexts. However, this focus neglects its internal dimensions, including intrinsic motivation, self-awareness, and adapting to complex work dynamics. Consequently, crucial psychological dimensions that support employee effectiveness are frequently underexplored.

Third, previous research approaches tend to develop hypotheses and research models based on traditional, linear theoretical frameworks. These models often focus on direct relationships between variables, specifically: (a) the relationship between managerial skills and in-role behavior; (b) the relationship between role breadth self-efficacy and in-role behavior; (c) the relationship between role breadth self-efficacy and managerial skills [14]. These relationships are typically tested using basic statistical techniques, such as mean, median, standard deviation, bivariate analysis, and regression. While these methods can measure the strength of relationships between variables and provide a general overview of data patterns, they have significant limitations, particularly in evaluating complex interactions between variables in mediation or more advanced structural models.

As a result, the mediating effect of role breadth self-efficacy, which has the potential to offer new insights into understanding organizational dynamics, is often inadequately captured. These limited statistical approaches frequently yield simplistic, generalized, and predictable results. Such findings do not provide comprehensive strategic guidance for employers and practitioners to understand the multidimensional nature of role breadth self-efficacy. This shortcoming restricts the potential of the literature to offer practical solutions in supporting organizational goals, particularly in efforts to maintain competitiveness and enhance organizational adaptability to future challenges.

Given these limitations, there is an urgent need to develop more holistic research methodologies and approaches that can integrate structural elements, human motivation, and dynamic interactions between variables. When relating this gap to current issues, it becomes apparent that the existing literature does not provide comprehensive strategies for addressing the broad challenges of managerial skills, role breadth self-efficacy, and in-role behavior. This highlights the need for a paradigm shift towards a more holistic methodology that integrates structural elements, human motivation, and the interaction of dynamic variables. Such an approach is essential for generating actionable insights that empower leaders to foster positive and productive employee behavior, enhancing organizational adaptability and competitiveness in a rapidly changing environment. This advancement would not only enrich the understanding of role breadth

self-efficacy but also contribute to developing theories and practices that are more relevant in modern leadership and organizational management.

This study examines the relationship between managerial skills, role breadth self-efficacy, and in-role behavior through a mediation model grounded in empirical research. The study makes four significant contributions. First, it demonstrates the importance of examining how managerial skills are essential predictors of enhancing role breadth self-efficacy and in-role behavior. Second, this study extends the literature on employee attitudes and behavior by identifying role breadth self-efficacy as a stronger determinant than personal variables in enhancing in-role behavior. Third, this study demonstrates that role breadth self-efficacy is crucial in mediating the relationship between managerial skills and in-role behavior. Fourth, the findings of this study are particularly significant for understanding leadership challenges in organizations, especially regarding managerial skills and their ability to expand personal potential and behaviors that support organizational performance.

This study provides new insights into more effective approaches to fostering positive and productive employee behaviors by examining these aspects. The results can help organizations design more focused, consistent, and relevant leadership development programs to enhance leaders' ability of leader to play their roles more effectively.

2 Theoretical background and hypothesis development

2.1 Underpinning theory

Leader-Member Exchange (LMX) Theory was introduced by [15]. This theory emphasizes that leadership effectiveness depends mainly on the quality of interpersonal relationships between leaders and individual team members. Effective leaders develop high-quality relationships through dynamic interactions, consistent communication, and active engagement with their team members. According to previous research [15, 16], these relationships do not form automatically but rather develop through a process that requires leaders to practice specific skills such as coaching, which include active listening, providing constructive feedback, and continuously supporting the needs and aspirations of employees. This approach allows leaders to adapt their leadership style to meet individual needs, build trust, and strengthen commitment to organizational goals.

Next, Self-Determination Theory [17] is a motivational theory that emphasizes the critical role of intrinsic motivation in directing human behavior. Intrinsic motivation works within a person, motivating them to act positively and encouraging individuals to achieve their maximum potential, especially in carrying out tasks with full commitment and seriousness. With this drive, individuals can meet external demands and build internal satisfaction through their achievements. Applying these theories in today's organizational context is often referred to as role breadth self-efficacy, and several empirical studies have found a positive correlation between role breadth self-efficacy and in-role behavior.

Bandura's Social Cognitive Theory [18] suggests that individual behavior is influenced by social learning, in which individuals acquire knowledge and skills through observation of others, especially those who are role models. Social learning consists of three main elements: the environment, which includes leaders, other individuals, and peers; cognitive elements, which include language, imagination, and logic; and behavioral elements, which include traits such as cheerfulness, anger, caring, assertiveness, patience,

and positive behavior. The social learning process involves four main steps: first, observation of the behavior that is modeled; second, retention, in which the observed behavior is stored in memory for future reference; third, re-enactment of the behavior based on the observation, which aims to strengthen the behavior; and fourth, reinforcement and motivation, in which the rewards received strengthen and encourage the repetition of the newly learned behavior [18]. This process helps employees improve their efficiency and strengthens their role breadth self-efficacy, defined as the belief in their ability to achieve goals and perform tasks effectively. In today's organizational context, these theories are often associated with role breadth self-efficacy.

2.2 Hypothesis development

Applying these theories in today's organizational context is often referred to as managerial skills. Several empirical studies have found a positive correlation between managerial skills and in-role behavior. Previous studies have shown that managerial skills are essential in improving individual performance [14]. Its effects can be observed in a variety of contexts, including increased ability to perform tasks that fall under in-role behavior [14], task completion [19], and delivery of high-quality services in organizations [20]. Research has shown that managerial skills have a positive relationship with employee performance [21, 22], where good job performance is often associated with closer leader-employee relationships and harmony in the workplace [23, 24].

Furthermore, many studies using various leadership models empirically prove that high-quality leadership can predict excellent employee performance [25, 26]. Although substantial secondary evidence supports the role of managerial skills, empirical evidence that directly links them to in-role behavior is still quite limited. However, existing studies show that managerial skills among leaders can influence employee in-role behavior, thus contributing to achieving individual and organizational goals. Based on these findings, the following hypotheses are formulated:

H1a Managerial skills are positively associated with knowledge enhancement.

H1b Managerial skills are positively associated with meaningful skills.

Next, previous studies have shown that role breadth self-efficacy consistently predicts in-role behavior positively [14] and plays a vital role as a predictor in the relationship between managerial skills and in-role behavior. For example, a study by [18] emphasized the cognitive and affective dimensions of role breadth self-efficacy in influencing in-role behavior. Specifically, this study empirically shows that role breadth self-efficacy practiced by employee's functions as an effective predictive mechanism for in-role behavior. This finding emphasizes the strategic importance of role breadth self-efficacy in improving employee performance, thus making it a critical component in organizational development. Based on the theory and empirical evidence presented, the following hypotheses are formulated:

H2a Role breadth self-efficacy is positively associated with knowledge enhancement.

H2b Role breadth self-efficacy is positively associated with meaningful skills.

Recent findings empirically demonstrate that self-efficacy and in-role behavior mediate leaders' managerial skills. These findings provide a clearer picture of the dynamic

process through which managerial skills influence employee performance, thus explaining the critical role of self-efficacy in enhancing productive work behavior [18, 27]. Furthermore, these findings offer valuable insights into specific aspects that organizational leaders should emphasize, particularly in the context of managerial coaching. This includes developing leadership skills to enhance employee self-efficacy, which can directly strengthen in-role behavior and contribute to achieving organizational goals more effectively. The research empirically shows that managerial skills demonstrated by leader's function as a mechanism mediated through role breadth self-efficacy, linking to in-role behavior. Based on the theory and empirical evidence presented, the following hypotheses are formulated:

H3a Role breadth self-efficacy acts as a mediating variable between managerial skills and knowledge enhancement.

H3b Role breadth self-efficacy acts as a mediating variable between managerial skills and meaningful skills.

The empirical studies and theoretical evidence were used to build this study's framework. The conceptual framework illustrates the hypothesized relationships between the key variables. The direct effects (H1a, H1b, H2a, and H2b) and indirect effects (H3a and H3b) demonstrate the complex interplay between managerial skills, role breadth self-efficacy, and in-role behavior components. Figure 1 shows that managerial skills serve as the independent variable, role breadth self-efficacy as the mediating variable, and in-role behavior as the dependent variable. Figure 1 demonstrates that the effect of managerial skills on in-role behavior is indirectly influenced by role breadth self-efficacy.

3 Research methodology

3.1 Participants and procedures

This study was conducted at an organization that plays a key role in shaping Malaysia's education ecosystem to be progressive and responsive to global change. As the government agency responsible for planning, implementing, and monitoring education policies, it recognizes that managerial skills are essential to ensure organizational effectiveness. The organization strives to develop a resilient workforce through effective and strategic leadership while fostering an innovative and collaborative work culture. In addition, its leadership guidelines emphasize effective communication, emotional intelligence, and employee motivation to empower leaders to navigate the rapidly evolving digital era. This approach not only enhances individual competence but also ensures

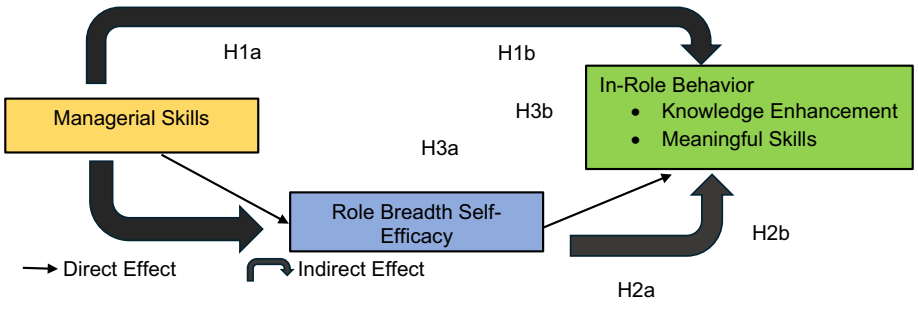


Fig. 1 Proposed conceptual framework

graduates are prepared to meet industry needs, ultimately contributing to the sustainable and inclusive progress of the nation.

Sample size determination was a crucial step in designing this cross-sectional study. The Raosoft Calculator was used to determine the appropriate sample size [28]. With an employee population of 200 individuals input into the calculator, the results indicated a minimum requirement of 200 employees for sufficient accuracy. Furthermore, Harman's single-factor test was employed to assess response bias in the sample [29]. The results showed a single factor variance of 32.177%, which, being below 50%, confirmed that response bias was not present in the study sample. The pilot study was conducted from 17 May 2024 to 20 May 2024, involving 60 samples. According to Chua [30] an effective pilot study should be tested on 25 to 100 respondents. The researchers prepared a questionnaire that included important information such as demographic data, questions related to managerial skills, role breadth self-efficacy, and in-role behavior. Only items that achieved an outer loading criterion of 0.708 using SmartPLS software would be considered for use in the actual study.

The unit of analysis involved in this study comprised employees currently serving in the study organization. They were selected because they are directly involved in the organization's operations, policies, and culture, making them the most relevant and reliable data source to achieve the research objectives. Data were collected from 27 August 2024 to 27 September 2024. A purposive sampling technique was used to distribute 200 questionnaires to employees of various levels and job categories across different divisions or departments in an education-based organization in Malaysia. This study employed the purposive sampling technique to select respondents who had served in the organization for at least five years. This sampling approach focuses on selecting participants with specific attributes or experiences highly relevant to the research objectives. To ensure the generalizability and representativeness of the sample in this study, the authors selected respondents based on criteria that reflect the target population as a whole.

The researchers used the purposive sampling technique by following a systematic process to select respondents for the survey. First, they defined the inclusion criteria, which required employees to complete at least five years of service in the organization. These criteria were established to ensure that respondents deeply understood the organization's long-term practices and dynamics. Second, the authors worked with the Human Resources department to access records and identify individuals who met these criteria. This systematic approach minimized bias and ensured the accuracy of the selection process. To further enhance representativeness, respondents were selected from a variety of departments, roles, and hierarchical levels while also considering demographic factors such as gender, age, and job function to reflect the diversity of the organization. Finally, identified respondents were invited to participate in the survey. This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Universiti Sains Malaysia (protocol code USM/JEPeM/PP/23090675) for research involving humans. Accordingly, written informed consent was obtained from the respondents. The purposive technique in this study was chosen because the organization's management faced constraints in providing a complete list of employees due to the need to maintain confidentiality and protect the organization's reputation and corporate image. Therefore, this situation prevented the researchers from using random sampling methods to select respondents, thus requiring

a more controlled and selective approach. The researchers prepared the printed questionnaire and handed it to the human resources officers, who facilitated distributing the forms to employees willing to participate in the study.

The researchers provided printed questionnaires to the human resource officers, who played a key role in the data collection process. The officers assisted by distributing the questionnaires to the targeted employees participating in the study. Once the participants completed the questionnaires, the human resource officers collected them and returned them to the researchers. In total, 200 questionnaires were answered entirely and returned to the researchers. Furthermore, all respondents participated voluntarily without coercion, ensuring full compliance with research ethics throughout the study process. Respondents were free to participate in this study, and there was no coercion or pressure from management. This collaborative approach facilitated efficient data distribution and collection, ensuring a smooth process. The collected data were analyzed using Harman's Single Factor test, as suggested by [29], to reduce the risk of response bias. This test measures the variance of the data to determine the extent to which bias affects the study findings. The test results showed that the variance value was 49%, below the critical level of 50%. This indicates that bias is not vital, and the data collected were reliable and suitable for analysis.

This study used a cross-sectional approach combining a literature review, pilot study, and questionnaires to collect data from respondents in the organizations studied. This approach allowed the researchers to systematically obtain quantitative data, ensuring that the data collected were accurate, relevant, and of high quality while minimizing the risk of bias or sampling error. As stated by [31] and [32], objective data collection methods are the basis for producing reliable and valid findings. In the first stage, the survey questionnaire was developed based on the existing literature on managerial coaching. The questionnaire items were then translated into English and Malay using a back-to-back translation method by a bilingual faculty member with expertise in human resource management. Subsequently, another bilingual faculty member from the same field translated the English version into Malay. Both faculty members examined the English and Malay versions for the consistency of item meanings and instrument quality [32, 33]. By ensuring the accuracy and reliability of the instrument, the questionnaire could improve the respondents' understanding and reduce confusion, especially for those from different language and cultural backgrounds.

3.2 Research instruments

The survey questionnaire consisted of three main parts: managerial skills, role breadth self-efficacy, and in-role behavior. All items were rated using a seven-point Likert scale, with responses ranging from "Strongly Disagree/Dissatisfied" (1) to "Strongly Agree/Satisfied" (7). The demographic characteristics of the respondents in this study were used as a control variable, as the study exclusively focused on employee attitudes. The study data were first reviewed using the Statistical Package for the Social Sciences (SPSS) software to assess the data quality. The study was evaluated using the SmartPLS software package in the second stage to determine the measurement and structural models and test the research hypotheses developed [34].

3.2.1 Managerial skills

Managerial skills are the structured interaction between managers or leaders and their employees. Through purposeful discussions and organized learning activities, leaders strive to assist employees in solving problems and completing tasks with greater efficiency and effectiveness [5, 6]. Managerial skills were measured using eight items adapted from the management coaching literature [35, 36].

3.2.2 Role breadth self-efficacy

Role breadth self-efficacy refers to an individual's belief in their ability to successfully perform various tasks or activities across domains or areas [13]. Role breadth self-efficacy was measured using four items adapted from the self-efficacy literature [37].

3.2.3 In-role behavior

Extensive research on managerial skills has revealed that in-role behavior consists of two primary elements: knowledge enhancement and meaningful skills. From a cognitive psychology standpoint, knowledge enhancement refers to a comprehensive understanding of tasks, the work environment, problem-solving methods, and self-awareness within the organization, all of which contribute to strategic competence in task performance [11]. On the other hand, meaningful skills are defined as the capacity to execute tasks proficiently, involving a sequence of actions that require coordination between psychomotor and cognitive skills, showcasing advanced technical and analytical abilities in organizational settings [12]. Both elements were assessed using five items adapted from the knowledge literature [38, 39] and adapted from the organizational commitment scale developed by [40].

3.3 Analysis of tools and techniques

The research data were initially analyzed using the Statistical Package for the Social Sciences (SPSS) software. This initial step was crucial to ensure that the data collected met quality standards and could be used for further analysis more accurately [34]. This process involved several critical procedures, including outlier detection, to avoid inaccurate results due to extreme values that might not represent the population. In addition, the analysis also focused on identifying missing data, which may occur due to collection errors or incomplete responses from respondents. This analysis provided a solid foundation and ensured that the data metal.l the statistical prerequisites required for subsequent analysis to be carried out accurately.

In the second stage, the study continued using SmartPLS software to evaluate the structural model developed in this research. SmartPLS was chosen because it is suitable for handling more complex models and can assess the relationship between latent variables. Through the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, SmartPLS allows this study to analyze the direct relationship between variables and the indirect effects and interactions between elements in the model. Compared to traditional analytical approaches, this gives researchers the advantage of testing hypotheses in greater depth and comprehensiveness.

According to [34], PLS-SEM is a flexible method for data with small sample sizes and complex model structures, making it a handy tool in the context of this study. SmartPLS allows the proposed theoretical model to be tested more effectively while reducing the

risk of bias due to data constraints or violations of statistical assumptions. The combination of these two stages of analysis namely, data cleaning and quality assessment using SPSS and model evaluation and hypotheses testing with SmartPLS ensures that the research achieves a high level of reliability and accuracy.

4 Findings

4.1 Sample characteristics

The majority of respondents were aged 40 to 45 years old (32.0%), were Malay (94.0%), female (72.6%), married (69.5%), and in the support service group (69.5%). Their highest education levels were Malaysian Higher School Certificate (STPM) and Bachelor's Degree (38.0% each). Most respondents were in job grades 1 to 18 (47.5%), had up to 5 years of service (34.5%), were permanent (76.5%), and earned between RM2000 to RM2999 (34.0%) (Table 1).

4.2 Assessment for measurement model

The measurement model analysis confirms strong construct validity and reliability (Table 2). All constructs demonstrate external loading values exceeding 0.708 [34, 41]. This indicates strong relationships between items and their respective constructs, demonstrating good convergent validity. The average variance extracted (AVE) values exceed 0.5 [34], confirming that more than 50% of each construct's variance is explained by its related items, meeting the minimum requirements for convergent validity. The composite reliability values exceed 0.8 across all constructs, demonstrating strong internal consistency [34]. These results establish that the items in each construct consistently and reliably measure their intended concepts. The measurement model thus provides a solid foundation for analyzing the relationships between constructs in the structural model.

The Heterotrait-Monotrait Correlation Ratio (HTMT) analysis was conducted to assess discriminant validity (Table 3). Discriminant validity indicates the extent to which constructs in the model are distinct from each other and do not conceptually overlap. All HTMT values were less than 0.85 [34], confirming that each construct uniquely measures different dimensions and meets the established criteria for discriminant validity.

The Fornell-Larcker analysis provided additional support for discriminant validity (Table 4). The square root of AVE values along the diagonal exceeded the correlations with other constructs in the corresponding rows and columns. These results confirm that all constructs demonstrate acceptable discriminant validity [41].

Model fit was assessed using the Standardized Root Mean Square Residual (SRMR), which measures the difference between observed and model-implied correlation matrices. This metric evaluates the average magnitude of discrepancies between observed and expected correlations as an absolute measure of model fit. Values below 0.08 indicate a good fit [42]. The study's SRMR value of 0.054 demonstrates an appropriate model fit (Table 5).

Table 6 presents the variance inflation factor (VIF) analysis and descriptive statistics. Mean values ranged from 5.795 to 5.909, indicating high levels (on a scale where 4.0 = high, 7.0 = very high) of perceived managerial skills, role breadth self-efficacy, knowledge enhancement, and meaningful skills. These elevated ratings reflect respondents' positive perceptions of the organizational leadership environment and its influence on role breadth self-efficacy and workplace competency development.

Table 1 Sample characteristics ($N = 200$)

Profile	Sub-profile	Frequency	Percentage
Age	Less than 27 years	38	19.0
	28 to 33 years old	38	19.0
	34 to 39 years old	41	20.5
	40 to 45 years old	64	32.0
	46 years old and above	19	9.5
Race	Malay	188	94.0
	Chinese	2	1.0
	Indian	5	2.5
	Others	5	2.5
Gender	Male	55	27.5
	Female	145	72.6
Status	Single	58	29.0
	Married	139	69.5
	Others	3	1.5
Services Group	Top Management	1	0.5
	Management and Professional	50	25.0
	Support	139	69.5
	Others	10	5
Highest education	Malaysian Certificate of Education (SPM)	36	18.0
	Malaysian Higher School Certificate (STPM)	76	38.0
	Bachelor's Degree	76	38.0
	Master's Degree	0	0
	PhD	11	5.5
	Others	1	0.5
Grade	54/56	2	1.0
	48/51/52	10	5.0
	29 to 40	41	20.5
	19 to 26	52	26.0
	1 to18	95	47.5
Length of services	5 years	69	34.5
	6 to10 years	26	13.0
	11 to 15 years	52	26.0
	16 years and above	53	26.5
Employment status	Temporary/Part-time	6	3.0
	Contract	41	20.5
	Permanent	153	76.5
Salary	RM1,000 to RM1,999	26	13.0
	RM2,000 to RM2,999	68	34.0
	RM3,000 to RM3,999	54	27.0
	RM4,000 to RM4,999	18	9.0
	RM5,000 to RM6,999	15	7.5
	RM7,000 and above	19	9.5

The VIF assessed multicollinearity among constructs. All VIF values were below 5.0, indicating the absence of serious collinearity issues that could affect the results [34]. These findings support the data's reliability and accuracy for structural model evaluation and hypothesis testing.

4.2.1 Structural model analysis

The coefficient of determination (R^2) is used to measure the model's overall predictive accuracy, indicating how much variance in the endogenous variables can be explained by the exogenous variables in the model. According to [43], R^2 values can be classified as

Table 2 Convergent validity analysis

Constructs	Outer loading	Composite reliability (CR)	Average variance extracted (AVE)	Cronbach's Alpha
Managerial skill				
MGLS1:	0.846	0.961	0.781	0.960
MGLS2:	0.847			
MGLS3:	0.871			
MGLS4:	0.909			
MGLS5:	0.900			
MGLS6:	0.906			
MGLS7:	0.901			
MGLS8:	0.890			
Role breadth self-efficacy				
SLFY1:	0.910	0.921	0.807	0.920
SLFY2:	0.896			
SLFY3:	0.905			
SLFY4:	0.882			
Knowledge enhancement				
KDET1:	0.931	0.961	0.866	0.961
KDET2:	0.941			
KDET3:	0.927			
KDET4:	0.937			
KDET5:	0.906			
Meaningful skills				
MGFL1:	0.901	0.960	0.862	0.960
MGFL2:	0.933			
MGFL3:	0.942			
MGFL4:	0.942			

All values exceed threshold criteria (Loading > 0.708, CR > 0.8, AVE > 0.5)

Table 3 Discriminant validity using HTMT analysis

Constructs	Managerial skills	Knowledge enhancement	Meaningful skills
Managerial skills			
Role breadth self-efficacy	0.597		
Knowledge enhancement	0.881	0.680	
Meaningful skills	0.869	0.714	0.893

Values < 0.85 thresholds indicate adequate discriminant validity

Table 4 Discriminant validity using Fornell-Larcker analysis

Constructs	Managerial skills	Role breadth self-efficacy	Knowledge enhancement	Meaningful skills
Managerial skills	**0.884**			
Role breadth self-efficacy	0.562	**0.898**		
Knowledge enhancement	0.848	0.640	**0.930**	
Meaningful skills	0.834	0.672	0.877	**0.928**

Diagonal values (bold) represent the square root of AVE; off-diagonal values represent construct correlations

Table 5 Model fit analysis

Model fit	Saturated model	Estimated model
SRMR	0.043	0.054
d_ULS	0.469	0.744
d_G	0.859	0.932
Chi-square	923.659	971.560
NFI	0.845	0.837

SRMR values < 0.08 indicate good model fit

Table 6 VIF and descriptive constructs analysis

Constructs	VIF values			Mean	SD*
	Role breadth self-efficacy	Knowledge enhancement	Meaningful skills		
Managerial skills	1.000	1.461	1.461	5.795	0.9201
Role breadth self-efficacy		1.461	1.461	5.909	0.6791
Knowledge enhancement				5.841	0.8776
Meaningful skills				5.885	0.8123

VIF values < 5.0 indicate no serious collinearity issues; *SD* standard deviation

Table 7 Effect size (f^2) analysis

Constructs	Managerial skills	Role breadth self-efficacy	Knowledge enhancement	Meaningful skills
Managerial skills		0.461	1.435	1.251
Role breadth self-efficacy			0.162	0.248
Knowledge enhancement				
Meaningful skills				

large (0.26), medium (0.13), or small (0.02). The R^2 assessment obtained from this model was crucial in evaluating the overall effect of the tested model. In the structural model test, the R^2 values were 0.31 for role breadth self-efficacy, 0.75 for knowledge enhancement, and 0.75 for meaningful skills. These values exceed 0.26, indicating that this study's model had a large effect in explaining the variance of the studied variables.

The effect size (f^2) was used to assess the change in R^2 that occurs when exogenous constructs are removed from the model, allowing researchers to understand how much a particular construct affects other endogenous variables. Following classification, f^2 values are categorized as small effect (0.02), medium effect (0.15), or large effect (0.35). Table 7 presents the f^2 analysis results for the various constructs in this study. The findings revealed that managerial skills had f^2 of 0.461 on role breadth self-efficacy, indicating a large effect. For knowledge enhancement, managerial skills showed an f^2 value of 1.435, indicating a large effect. For role breadth self-efficacy's effect on knowledge enhancement, the f^2 value was 0.162, indicating a moderate effect. Managerial skills demonstrated an f^2 value of 1.252 on meaningful skills, suggesting a large effect. Lastly, role breadth self-efficacy showed an f^2 value of 0.248 on meaningful skills, indicating a moderate effect. These findings demonstrate that managerial skills consistently showed large effects across multiple variables. In contrast, role breadth self-efficacy demonstrated moderate effects on both knowledge enhancement and meaningful skills, suggesting the relative importance of these factors in our model.

The model's predictive relevance was assessed using blindfolding (Q^2). This procedure systematically omits data points in the endogenous construct indicators to evaluate the

Table 8 Cross-validated redundancy analysis

Construct	SSO	SSE	Q^2 (= 1-SSE/SSO)
Managerial skills	1600.000	1600.000	0.001
Role breadth self-efficacy	800.000	597.686	0.253
Knowledge enhancement	1000.000	351.894	0.648
Meaningful skills	1000.000	355.233	0.645

Table 9 Direct effects analysis

Direct relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P* values
H1a: Managerial skill → knowledge enhance	0.667	0.665	0.064	10.426	0.000
H1b: Managerial skill → meaningful skill	0.715	0.713	0.051	14.118	0.000
H2a: Role breath self-efficacy → knowledge enhance	0.297	0.299	0.068	4.364	0.000
H2b: Role breath self-efficacy → meaningful skill	0.240	0.244	0.058	4.144	0.000

model's predictive accuracy. According to Q^2 values should exceed zero to demonstrate predictive relevance. Table 8 shows that Q^2 values for all constructs managerial skills (0.001), role breadth self-efficacy (0.253), knowledge enhancement (0.648), and meaningful skills (0.645) exceed zero, confirming the model's predictive relevance.

Using 200 bootstrap samples ($N = 200$), the researchers tested the direct relationships between the variables. A bootstrapping method was used to determine the statistical significance (sig. level 1.96) of the parameters. Table 9 presents the results of direct hypothesis testing, which yielded four main findings. First, managerial skills positively and significantly influenced knowledge enhancement (H1a, $\beta = 0.667$; $t = 10.426$; $p = 0.000$). Second, managerial skills positively and significantly affected meaningful skills (H1b, $\beta = 0.715$; $t = 14.118$; $p = 0.000$). Third, role breadth self-efficacy positively and significantly impacted knowledge enhancement (H2a, $\beta = 0.297$; $t = 4.364$; $p = 0.000$). Fourth, role breadth self-efficacy positively and significantly influenced meaningful skills (H2b, $\beta = 0.240$; $t = 4.144$; $p = 0.000$). Based on these results, H1a, H1b, H2a, and H2b were supported (Fig. 2).

Table 10 presents the results of indirect hypothesis testing, which revealed two main findings. First, managerial skills positively and significantly influenced knowledge enhancement through role breadth self-efficacy (H3a, $\beta = 0.167$; $t = 3.797$; $p = 0.000$). Second, managerial skills positively and significantly affected meaningful skills through role breadth self-efficacy (H3b, $\beta = 0.135$; $t = 3.695$; $p = 0.000$). Based on these results, H3a and H3b were supported. These indirect effects, while smaller in magnitude than the direct effects, suggest that role breadth self-efficacy is a significant mediating mechanism between managerial skills and knowledge enhancement and meaningful skills outcomes.

5 Discussion

This study demonstrates that role breadth self-efficacy effectively mediates the relationship between managerial skills and in-role behavior. The findings reveal that employees' role breadth self-efficacy increased when leaders consistently demonstrated effective managerial skills in their daily activities. This effectiveness manifested through emotional and professional support mechanisms, including continuous feedback and

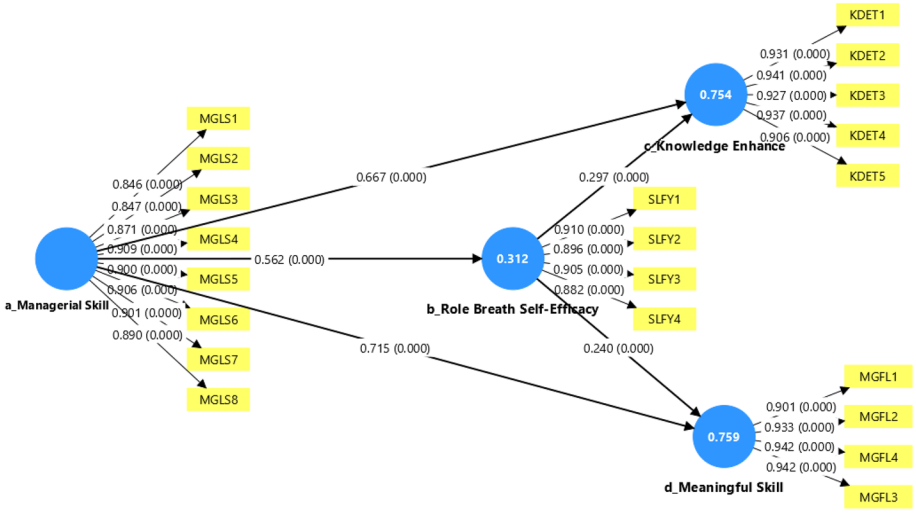


Fig. 2 Graphical output of bootstrapping figure

Table 10 Indirect effect analysis

Indirect relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	t-Statistics (|O/STDEV|)	*p*-values
H3a: Managerial skills → role breadth self-efficacy → knowledge enhancement	0.167	0.169	0.044	3.797	0.000
H3b: Managerial skills → role breadth self-efficacy → meaningful skills	0.135	0.138	0.037	3.695	0.000

achievement recognition. Such cumulative support enhances employees' confidence in proactively addressing job challenges.

Employees with high self-efficacy demonstrate greater initiative in knowledge acquisition, complex problem-solving, and professional skill development, leading to more effective in-role behavior. These findings align with previous research by [26] and [27], which established positive and significant relationships between managerial skills, role breadth self-efficacy, and in-role behavior. In dynamic organizational cultures, role-breadth self-efficacy is a crucial mediating variable that strengthens the relationship between management skills and employee performance and facilitates more effective and competitive achievement of organizational goals.

These results extend the existing literature on managerial coaching and leadership, mainly supporting studies by [26, 27] highlighting how leaders' managerial skills influence employees' in-role behavior through self-efficacy. The literature consistently identifies self-efficacy as a critical factor enabling employees to build confidence, improve performance, and enhance problem-solving capabilities. Studies by [14, 26] specifically demonstrate that leaders who employ effective management skills including clear communication, strategic decision-making, and consistent employee support directly contribute to increased self-efficacy, resulting in improved work behaviors such as initiative-taking, responsibility assumption, and enhanced teamwork.

6 Theoretical implications

This study yields six key findings that strengthen the theoretical framework in organizational leadership and development: First, the research confirms a significant relationship between managerial skills and knowledge enhancement. Second, it establishes that managerial skills significantly relate to meaningful skills. Both findings align with the Leader-Member Exchange (LMX) Theory [15], emphasizing how effective leadership cultivates high-quality, dynamic, mutually beneficial relationships between leaders and team members. These results support previous findings by [14, 17], and [18] regarding leadership relationships' impact on organizational performance. Third, the study demonstrates that role breadth self-efficacy significantly relates to knowledge enhancement. Fourth, role breadth of self-efficacy shows significant links to meaningful skills. These findings align with the Self-Determination Theory [25], which emphasizes intrinsic motivation's role in helping individuals reach their full potential. This theoretical framework explains how self-efficacy motivates optimal performance, supporting previous research by [14] and [26]. Fifth, the research establishes that managerial skills significantly influence role breadth self-efficacy and knowledge enhancement. Sixth, managerial skills demonstrate significant association with role breadth self-efficacy and meaningful skills. These findings support Social Cognitive Theory [38], which posits that individual behavior develops through social learning and role model observation. This aligns with studies by [26] and [27] on social learning's role in developing professional competence and positive work behavior. These theoretical implications, supported by multiple findings, highlight the dynamic relationships between managerial skills, self-efficacy, and competence enhancement, contributing significantly to the literature on organizational leadership and individual motivation.

7 Practical implications

This research provides practical guidance for employers and employees seeking to enhance managerial skills, particularly within government administrative offices. Top management should consider the following key aspects: First, leaders should develop clear and effective verbal and written communication skills. Professional development in interpersonal communication can enhance leaders' ability to convey expectations, provide feedback, and understand employee needs effectively [44]. Second, leaders should adopt leadership approaches that inspire and support employee potential. This involves continuous learning opportunities and guidance while fostering a collaborative culture [45]. Third, leaders should strengthen time management skills to ensure timely completion of tasks and projects. Specialized time management and prioritization training can reduce stress and increase productivity [44]. Fourth, leaders should develop rapid decision-making and problem-solving skills, especially in complex situations. Implementing analytical and data-driven approaches can lead to more effective decisions [46]. Fifth, leaders must master relevant technology for management tasks in the digital era. This encompasses project management tools, data analysis software, and communication applications that enhance work efficiency and streamline daily operations [46].

8 Limitations and future research recommendations

8.1 Study limitations

This study presents several limitations that warrant consideration for future research. While effectively identifying relationships between managerial skills, role breadth self-efficacy, and in-role behavior, the cross-sectional design precludes the causality determination. Specifically, the study cannot definitively establish whether certain factors directly cause weak in-role behavior or if other underlying issues influence the findings. The scope of examined relationships is also limited, focusing solely on managerial skills, role breadth self-efficacy, and in-role behavior without exploring other crucial elements such as leadership skills, work quality, and productivity. These additional aspects are significant as effective management shapes internal leadership, improves work quality, and enhances organizational productivity. The pathway analysis using SmartPLS, while useful in explaining relationships between variables, only assessed variance explained by selected variables without accounting for external factors or organizational influences. This limitation may restrict the holistic understanding of factors influencing study outcomes. The sample size and composition 200 staff members from educational agencies in Peninsular Malaysia also limit result generalizability. The findings apply to government agencies and cannot be extended to other organizational contexts or sectors.

8.2 Future research recommendations

This research highlights several important recommendations that should be considered in future studies to broaden the understanding of managerial skills in Malaysia's public sector and enhance the robustness of research findings. First, future studies should incorporate respondent characteristics, such as service type and organizational diversity. Including these demographic variables would enable researchers to identify variations in participants' attitudes toward managerial skills, providing deeper insights into the impact of coaching across various employee categories. Second, future studies should use a longitudinal research design to examine the cause-and-effect relationship between variables. This design is particularly relevant when assessing changes in employee attitudes or behaviors over time. A longitudinal approach would provide a more comprehensive and dynamic perspective on the development and change of the variables studied, helping researchers understand how coaching affects employees over time. Third, future research should focus on more detailed elements of managerial coaching, including communication skills, change management, and employee motivation, as an in-depth exploration of these characteristics is important in understanding their direct impact on employee self-efficacy and competency development. Fourth, future studies should involve more diverse populations from different sectors, including both private and industrial sectors, to increase the generalizability of the findings and make them more relevant to various types of organizations. Implementation of these recommendations would not only enhance our understanding of managerial coaching effectiveness and provide practical insights for developing more targeted and effective coaching interventions across various organizational contexts.

9 Conclusion

This study confirms role breadth self-efficacy's significant mediating role in the relationship between managerial skills and in-role behavior within Malaysian educational agencies. The research developed a conceptual framework grounded in managerial coaching literature and theories, focusing on how managerial skills influence employee in-role behavior. Confirmatory factor analysis validates the measurement scales' high standards of validity and reliability, ensuring data accuracy and result validity. The findings demonstrate impacts beyond individual efficiency, contributing significantly to organizational effectiveness and success. This research underscores the importance of strengthening managerial coaching as a strategic approach to employee empowerment and organizational performance enhancement. The evidence supports investing in managerial skill development as a key driver of organizational success through improved employee self-efficacy and behavior.

Author contributions

Authors' Contributions: For articles with several authors should be used "conceptualization, N.I.M, I.A.R, and S.O.; methodology, N.I.M; software, N.I.M; validation, N.I.M, N.A.; formal analysis, N.I.M; investigation, M.J.A; writing—original draft preparation, N.I.M; writing—review and editing, I.A.R, S.O and M.J.A; visualization, N.A.; supervision, N.I.M; project administration, N.I.M; funding acquisition, N.I.M; I.A.R,;S.O; N.A; M.J.A. All authors have read and agreed to the published version of the manuscript."

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Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Universiti Sains Malaysia (protocol code USM/JEPeM/PP/23090675) for studies involving humans. All participants were informed about the purpose of the study, and their participation was entirely voluntary. Informed consent was obtained prior to data collection.

Consent for publication

The authors affirm that the participants provided consent for anonymized data to be published in this manuscript.

Competing interests

The authors declare no competing interests.

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