

HOW WORKING FROM HOME SHAPES PUBLIC SECTOR EFFICIENCY THROUGH DIGITAL COMPETENCY IN MALAYSIA

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Abstract. The implementation of Work From Home (WFH) arrangements within the Malaysian public sector has transformed operational coordination, administrative communication, and supply chain related activities among government agencies. This study examines the effect of Work From Home practices on operational efficiency and supply chain coordination among public servants in Negeri Sembilan, Malaysia. The study further investigates the mediating role of digital competency in strengthening operational performance under remote working conditions. A quantitative cross sectional survey design was employed involving 400 public servants from selected government agencies in Negeri Sembilan. Data were analysed using Statistical Package for the Social Sciences (SPSS) version 29 through descriptive analysis, Pearson correlation, multiple regression, and mediation analysis. The findings revealed that Work From Home practices significantly influence operational efficiency and supply chain coordination. Digital competency also emerged as a significant predictor and partial mediator between Work From Home practices and operational performance. The study contributes to operations management and public sector administration literature by demonstrating that digital readiness and organizational adaptability are essential in sustaining operational continuity under flexible work arrangements. The findings further provide practical and policy implications for future Work From Home implementation within Malaysian public sector organizations.

Keywords: *work from home, public sector management, digital competency, supply chain coordination, operational efficiency*

Introduction

Work From Home (WFH) has evolved from a temporary emergency response into a strategic organizational practice across many countries. In Malaysia, the government recently intensified the implementation of WFH arrangements among public servants following concerns related to rising fuel costs, traffic congestion, energy consumption, and operational sustainability. The policy reflects a broader transformation in public sector management where digital work arrangements are increasingly integrated into administrative and operational activities. While WFH was initially associated with employee flexibility and health protection during the pandemic period, current government initiatives indicate a long term strategic shift toward hybrid public administration systems. In the Malaysian public sector, operational continuity depends heavily on coordination across multiple administrative and supply chain related activities including procurement management, logistics coordination, transportation scheduling, inventory monitoring, documentation processing, and service distribution. Public servants play a critical role in ensuring the continuity of these activities. As WFH arrangements become more widespread, questions emerge regarding how remote

working environments influence operational efficiency and supply chain coordination within government agencies.

The concept of supply chain activities in the public sector differs slightly from private organizations. Public sector supply chain activities focus more on service responsiveness, administrative coordination, procurement transparency, resource allocation, information flow, and logistical support for public service delivery (Christopher, 2016). Government agencies rely on effective coordination between departments to ensure uninterrupted service performance. Any disruption in communication, digital accessibility, or workflow synchronization may directly affect operational effectiveness. The implementation of WFH may create both opportunities and challenges for public sector supply chain management. On one hand, remote work arrangements may improve flexibility, reduce commuting stress, lower operational costs, and encourage digital transformation. On the other hand, inadequate technological readiness, communication barriers, cybersecurity risks, and limited coordination may reduce organizational responsiveness and operational efficiency (Kniffin et al., 2021). The effectiveness of WFH therefore depends on the ability of organizations to adapt their operational systems and maintain efficient coordination mechanisms. Negeri Sembilan provides an important context for examining this issue. As one of the developing administrative states in Malaysia, Negeri Sembilan consists of multiple public agencies that manage transportation services, municipal operations, procurement activities, educational administration, healthcare coordination, and infrastructure management. The recent WFH directive has directly affected how these agencies coordinate daily operations and supply chain related activities. Despite the growing implementation of WFH policies, limited empirical research has specifically examined how WFH influences supply chain operational performance among public servants in Negeri Sembilan.

Existing studies on WFH in Malaysia largely focus on employee well-being, job satisfaction, psychological stress, and work life balance (Mustajab et al., 2020). Comparatively fewer studies investigate WFH from the perspective of operations management and supply chain coordination within the public sector. This creates a significant research gap, particularly in understanding how digital work arrangements influence operational responsiveness and coordination efficiency among government agencies. Furthermore, public sector organizations face different operational challenges compared to private firms. Government agencies often operate under rigid bureaucratic procedures, centralized decision making structures, and high accountability requirements. Therefore, the impact of WFH on public sector operational performance may differ substantially from corporate organizations. Understanding these dynamics is important because inefficient coordination within government operations may affect public service quality, procurement processes, transportation planning, and logistical responsiveness. This study therefore aims to examine the effect of Work From Home practices on operational efficiency and supply chain coordination among public servants in Negeri Sembilan. The study adopts a quantitative research approach using SPSS analysis to examine the relationships between WFH practices, digital competency, and operational performance. The findings are expected to contribute to the fields of operations management, public sector administration, and supply chain management while also supporting policy improvement for future WFH implementation in Malaysia.

Problem statement, research objectives and research questions

The recent implementation of Work From Home arrangements among Malaysian public servants represents a major operational transition in government administration. While the policy was introduced to address fuel cost concerns and operational sustainability, its long term impact on supply chain coordination and operational efficiency within the public sector remains unclear. Government agencies depend heavily on synchronized communication, administrative coordination, procurement activities, and information flow to maintain efficient public service delivery. However, remote working environments may disrupt traditional operational structures and create coordination challenges. One of the major concerns associated with WFH implementation is the potential reduction in operational responsiveness. Public sector operations often involve interdepartmental coordination, approval processes, logistics support, and physical documentation management. When employees operate remotely, delays in communication and workflow synchronization may occur. According to Wang et al. (2021), remote work environments can reduce operational visibility and create coordination difficulties if digital systems and organizational support are insufficient. This situation becomes more critical in public organizations where operational procedures are highly structured and dependent on administrative compliance.

Another issue relates to digital readiness and employee competency. Effective WFH implementation requires strong digital infrastructure, technological competency, and adaptive organizational culture. However, not all public servants possess the same level of digital capability. Limited digital skills may reduce communication effectiveness, delay information sharing, and weaken operational coordination (Carillo et al., 2021). In supply chain related activities such as procurement monitoring, transportation scheduling, and resource allocation, inefficient digital coordination may directly affect organizational performance. Previous studies on WFH mainly emphasize employee satisfaction, stress management, and work life balance. Limited studies investigate WFH from an operations management perspective, particularly within the Malaysian public sector. Furthermore, empirical evidence focusing specifically on Negeri Sembilan remains very limited. Without empirical assessment, policymakers may face difficulties in evaluating whether WFH arrangements improve or weaken public sector operational efficiency. This study therefore addresses the need to examine how Work From Home practices influence operational efficiency and supply chain coordination among public servants in Negeri Sembilan. The study also investigates the role of digital competency in supporting effective operational performance under remote working conditions.

The general objective study is to examine the effect of Work From Home practices on operational efficiency and supply chain coordination among public servants in Negeri Sembilan. Specifically, this study is to examine the relationship between Work From Home practices and operational efficiency among public servants in Negeri Sembilan; to determine the effect of Work From Home practices on supply chain coordination activities in the public sector; to examine the influence of digital competency on operational performance among public servants in Negeri Sembilan; to determine whether digital competency mediates the relationship between Work From Home practices and operational efficiency. The research questions are: Is there a significant relationship between Work From Home practices and operational efficiency among public servants in Negeri Sembilan? How does Work From Home implementation affect supply chain coordination activities in the public sector? Does digital competency significantly influence operational performance? Does digital

competency mediate the relationship between Work From Home practices and operational efficiency? The research hypothesis are:

H1: There is a significant relationship between Work From Home practices and operational efficiency among public servants in Negeri Sembilan.

H2: Work From Home practices significantly influence supply chain coordination activities.

H3: Digital competency significantly influences operational performance among public servants.

H4: Digital competency mediates the relationship between Work From Home practices and operational efficiency.

Significance and scope of the study

This study contributes theoretically, practically, and policy wise to the growing discussion on Work From Home implementation in the Malaysian public sector. From a theoretical perspective, the study extends the application of Contingency Theory within the context of public sector operational management. The study explains how organizational performance under WFH arrangements depends on environmental adaptation, technological readiness, and coordination capability. Practically, the study provides insights for government agencies regarding operational challenges associated with remote working arrangements. The findings may assist administrators in improving communication systems, digital infrastructure, workflow coordination, and supply chain responsiveness. From a policy perspective, the study supports Malaysian government initiatives related to flexible working arrangements and digital transformation. The findings may assist policymakers in designing more effective WFH guidelines for public sector operations while maintaining service quality and operational continuity. This study focuses on public servants in Negeri Sembilan who are involved in operational and administrative activities related to public service delivery. The study examines the relationship between Work From Home practices, digital competency, and operational efficiency. The research adopts a quantitative cross sectional survey design using SPSS for data analysis. The respondents include public servants from selected government departments, municipal councils, educational institutions, healthcare administration offices, and logistics related agencies within Negeri Sembilan. The study focuses specifically on operational coordination and supply chain related activities under remote working conditions.

Literature review

Work from home in public sector organizations

Work From Home refers to a flexible working arrangement where employees perform official tasks remotely outside conventional office environments through the use of digital communication technologies. The concept has expanded significantly following global digital transformation and organizational modernization efforts. Although remote working practices were initially implemented as temporary crisis management measures, many governments and organizations now consider WFH as part of long term operational strategies (Kniffin et al., 2021). In Malaysia, the public sector has increasingly adopted WFH arrangements to address operational continuity, traffic congestion, fuel consumption, and workplace flexibility. The recent government

directive encouraging WFH among public servants represents a major structural adjustment in administrative operations. This transformation has influenced how government agencies coordinate procurement activities, transportation management, administrative processing, and public service delivery. WFH implementation offers several organizational advantages including reduced commuting time, improved flexibility, lower operational costs, and increased employee autonomy (Wang et al., 2021). However, remote working environments also introduce operational challenges such as communication barriers, workflow disruptions, cybersecurity concerns, and coordination difficulties. Public sector organizations may experience greater operational complexity because government operations rely heavily on administrative procedures, compliance systems, and interdepartmental coordination.

According to Ibrahim et al. (2019), digital communication systems play an important role in improving public service accessibility and operational responsiveness within government platforms. Effective communication technologies support information sharing, coordination efficiency, and operational continuity under remote working arrangements. Their findings indicate that digital logistics communication systems strengthen organizational responsiveness and facilitate service accessibility in public administration environments. Similarly, Jamaluddin and Rahmat (2023) emphasized that technological transformation has significantly reshaped organizational operations, particularly in sectors requiring continuous coordination and service responsiveness. Technological adaptation therefore becomes an important determinant in ensuring successful WFH implementation.

Operational efficiency in public sector management

Operational efficiency refers to the ability of organizations to maximize outputs while minimizing operational costs, delays, and resource wastage. In public sector organizations, operational efficiency involves service responsiveness, coordination effectiveness, information flow management, administrative processing speed, and resource allocation efficiency. Efficient public sector operations depend on synchronized communication systems and effective workflow coordination. Under WFH arrangements, maintaining operational efficiency becomes more challenging because employees operate remotely across different environments. Delays in communication, limited physical interaction, and inconsistent digital accessibility may reduce workflow synchronization and service responsiveness. Christopher (2016) argued that supply chain operational performance depends heavily on communication efficiency, information visibility, and organizational coordination. These factors become increasingly important under remote working conditions where operational interactions occur digitally rather than physically.

Several Malaysian studies have examined operational management from logistics and organizational perspectives. Sundram et al. (2019) identified coordination issues related to order processing and packaging operations in Malaysian supply chain systems. Their findings showed that operational delays often result from communication inefficiencies and workflow coordination weaknesses. Similarly, Ibrahim et al. (2011) emphasized that quality management practices significantly influence operational performance and organizational efficiency. Effective operational coordination improves service quality, responsiveness, and organizational productivity. Rahmat et al. (2023) further explained that workplace environments and organizational layouts influence employee productivity and operational effectiveness. Although their study focused on

physical office environments, the findings remain relevant in understanding how work arrangements influence employee performance under changing operational conditions.

Supply chain coordination in the public sector

Supply chain coordination refers to the integration and synchronization of activities involving procurement, logistics, transportation, inventory management, information sharing, and service delivery. In the public sector, supply chain coordination is important because government agencies depend on timely resource distribution and efficient operational communication to deliver services to citizens. The implementation of WFH arrangements may significantly affect supply chain coordination because remote work environments alter conventional communication patterns and workflow structures. Effective digital coordination therefore becomes essential in maintaining operational continuity. Muhammad et al. (2023) highlighted the importance of sustainable logistics coordination and reverse logistics systems in improving operational sustainability within Malaysia. Their study emphasized that coordinated logistics activities contribute significantly to organizational responsiveness and sustainable operational management. The findings also demonstrated that digital coordination systems strengthen supply chain adaptability and operational continuity.

In another study, Ibrahim et al. (2020b) proposed that integrated supply chain management frameworks improve organizational coordination and operational visibility. Their conceptual framework emphasized the importance of coordination systems, digital integration, and operational sustainability in managing supply chain activities. Razak et al. (2025) further explained that supply chain coordination in multicultural and globalized operational environments requires adaptive communication systems, organizational flexibility, and technological responsiveness. These factors are similarly important in remote working arrangements where digital interaction becomes central to operational activities. The relationship between digitalization and supply chain coordination is also supported by Apandi and Ibrahim (2025), who argued that advanced technologies improve transparency, traceability, and operational responsiveness in supply chain systems. The study demonstrated that digital integration strengthens organizational coordination and operational efficiency in complex supply chain environments.

Digital competency and organizational adaptability

Digital competency refers to the ability of employees to effectively utilize digital technologies, communication systems, and online operational platforms in performing organizational tasks. Under WFH arrangements, digital competency becomes a critical factor influencing employee productivity and operational coordination. Organizations with strong digital readiness are generally more capable of maintaining operational continuity under remote working conditions. Employees with higher digital competency can adapt more effectively to virtual communication systems, digital workflow management, and online coordination platforms. Jalil et al. (2021) found that technological advancement significantly contributes to operational modernization and organizational sustainability. Technological adaptation supports organizational responsiveness and improves operational efficiency within digitally driven environments. Similarly, Ibrahim et al. (2020a) highlighted the importance of digital transformation in supporting sustainable organizational operations and service

continuity. Their findings suggested that digital readiness strengthens organizational adaptability and operational resilience in dynamic working environments. Nurshafaaida et al. (2020) further emphasized that Industry 4.0 technologies contribute significantly to supply chain modernization and operational flexibility. Digital integration improves organizational coordination, operational transparency, and communication efficiency, all of which are important under WFH arrangements.

Theoretical foundation and conceptual framework

This study is guided primarily by Contingency Theory. Contingency Theory suggests that organizational effectiveness depends on the alignment between organizational structures and environmental conditions. There is no single management approach that guarantees effectiveness across all operational environments. Instead, organizations must adapt operational systems and management practices according to situational demands. In the context of this study, WFH represents a major operational adjustment requiring organizations to adapt communication systems, coordination mechanisms, and digital infrastructures. Public sector organizations that successfully align technological capabilities and operational strategies with remote working requirements are expected to achieve better operational efficiency and supply chain coordination. The theory is highly relevant because government agencies currently face changing operational conditions resulting from digital transformation and flexible working policies. The effectiveness of WFH therefore depends on organizational adaptability, technological readiness, and coordination capability. The study also incorporates elements of Resource Based View which emphasizes that organizational resources such as digital capability, communication systems, and employee competency contribute to competitive and operational advantages.

The conceptual framework of this study explains the relationship between Work From Home practices, digital competency, and operational efficiency and supply chain coordination among public servants in Negeri Sembilan. Work From Home practices act as the independent variable, digital competency functions as the mediating variable, while operational efficiency and supply chain coordination represent the dependent variable. The framework proposes that effective Work From Home implementation improves operational performance through communication effectiveness, digital accessibility, work flexibility, and remote coordination capability. Previous studies indicated that remote working effectiveness depends heavily on digital communication systems and organizational adaptability (Kniffin et al., 2021; Wang et al., 2021). Ibrahim et al. (2019) further explained that digital communication tools improve operational responsiveness and online public service effectiveness within organizational environments. Digital competency is proposed as a mediating factor because employees with stronger technological capability are more capable of adapting to virtual operational systems and maintaining workflow coordination. Jalil et al. (2021) emphasized that technological advancement contributes significantly toward organizational modernization and operational sustainability. Similarly, Jamaluddin and Rahmat (2023) argued that technological transformation reshapes organizational coordination and operational structures. Operational efficiency and supply chain coordination in this study refer to workflow effectiveness, information sharing efficiency, service responsiveness, and operational synchronization. Christopher (2016) explained that supply chain performance depends heavily on communication efficiency and coordinated operational systems. Muhammad et al. (2023) similarly emphasized

that coordinated logistics activities strengthen organizational sustainability and operational continuity. Ibrahim et al. (2020a) further proposed that integrated operational systems improve coordination effectiveness and operational visibility. The framework is supported by Contingency Theory, which explains that organizational effectiveness depends on the ability of organizations to adapt operational systems according to changing environments. The framework is also aligned with Resource Based View, which emphasizes that organizational resources such as digital capability contribute significantly toward operational performance and organizational effectiveness.

Hypotheses development

Previous studies indicate that effective digital communication and flexible work arrangements improve organizational responsiveness and operational adaptability (Wang et al., 2021). Ibrahim et al. (2019) similarly demonstrated that digital communication systems improve operational accessibility and coordination efficiency within public service environments. Research by Apandi and Ibrahim (2025) and Muhammad et al. (2023) further supports the importance of digital coordination in strengthening operational continuity and supply chain responsiveness. These findings collectively suggest that WFH practices and digital competency may significantly influence operational performance within public organizations. Therefore, the following hypotheses are proposed:

H1: There is a significant relationship between Work From Home practices and operational efficiency among public servants in Negeri Sembilan.

H2: Work From Home practices significantly influence supply chain coordination activities.

H3: Digital competency significantly influences operational performance among public servants.

H4: Digital competency mediates the relationship between Work From Home practices and operational efficiency.

Materials and Methods

Research design, population and sampling procedure

The study utilizes a cross sectional survey research design. A cross sectional design refers to data collection conducted at one specific point in time from a selected group of respondents. This design is suitable because the study aims to capture the current perceptions and experiences of public servants regarding Work From Home implementation following the recent government directive in Malaysia. The approach is commonly used in management and supply chain studies because it allows researchers to examine operational relationships efficiently without requiring long observation periods. The use of survey methods is appropriate because the study involves a relatively large population of public servants across multiple government agencies in Negeri Sembilan. According to Hair et al. (2019), survey based quantitative research enables systematic data collection and provides sufficient statistical capability for regression and correlation analysis. Previous studies in organizational performance and operational management similarly adopted quantitative survey methods to examine

management practices and workplace performance (Rahmat et al., 2023; Perera et al., 2022). The study focuses specifically on Work From Home implementation because the transition toward flexible work arrangements has significantly transformed operational coordination within public organizations. Government agencies increasingly depend on digital communication systems and virtual coordination mechanisms to sustain administrative continuity. Therefore, quantitative analysis provides a suitable approach for evaluating the effectiveness of these operational changes.

The population of the study consists of public servants in Negeri Sembilan who are directly involved in operational, administrative, logistics, procurement, and coordination related activities. The respondents include employees from municipal councils, government administrative departments, healthcare administrative offices, educational institutions, transportation agencies, and public service support divisions. These organizations were selected because their daily operations require continuous coordination and information sharing under Work From Home arrangements. The estimated population size for this study is approximately 5,000 public servants from selected agencies in Negeri Sembilan. Since the population consists of multiple organizational categories, stratified random sampling was adopted to improve representativeness and reduce sampling bias. The respondents were grouped according to organizational categories before random selection was conducted within each stratum. Hair et al. (2019) argued that stratified random sampling improves reliability and ensures better representation when respondents originate from different operational groups. The sample size was determined using Slovin's Formula:

$$n = \frac{N}{1 + N(e)^2} \quad \text{Eq. (1)}$$

Using a population size of 5,000 respondents and a margin of error of 5%, the minimum sample size required was approximately 370 respondents. However, the study distributed questionnaires to 400 respondents to improve statistical reliability and reduce the effect of incomplete responses. Larger sample sizes are generally encouraged in quantitative studies involving regression analysis because they improve model stability and analytical accuracy (Hair et al., 2019). The unit of analysis in this study is individual public servants. Individual employees were selected because the study measures employee perceptions regarding Work From Home implementation, digital capability, operational coordination, and organizational efficiency. Employees directly experience operational adjustments associated with remote working environments and therefore provide appropriate responses regarding the effectiveness of Work From Home practices.

Data collection procedure, instrument, pilot study, validity and reliability and data analysis technique

Primary data were collected using a structured questionnaire distributed physically and electronically through Google Forms. Online distribution was considered appropriate because many government agencies continued implementing hybrid and flexible work arrangements during the data collection period. The online approach also improved accessibility and reduced administrative delays in questionnaire distribution. The data collection process began with obtaining permission from selected public sector

organizations in Negeri Sembilan. Following approval, questionnaires were distributed through official communication channels including organizational email systems and internal messaging platforms. Follow up reminders were conducted periodically to improve response rates and encourage participation. The use of online questionnaires is consistent with current organizational research practices, particularly in studies involving digital work environments and remote coordination systems. Wang et al. (2021) explained that online survey methods improve flexibility and accessibility while supporting data collection efficiency within remote operational contexts.

The research instrument used in this study was a structured questionnaire divided into four major sections. Section A focused on respondent demographic information including gender, age, educational level, years of service, department category, and frequency of participation in Work From Home arrangements. Demographic analysis is important because employee background characteristics may influence perceptions regarding operational flexibility and digital adaptability. Section B measured Work From Home practices. The measurement dimensions included communication effectiveness, work flexibility, remote coordination capability, and digital accessibility. These dimensions were adapted from previous studies related to remote working systems and organizational adaptability (Kniffin et al., 2021). The questionnaire items examined employee perceptions regarding communication quality, operational coordination, flexibility in task completion, and accessibility of digital working systems. Section C measured digital competency. This construct focused on employee capability in using digital technologies, online communication platforms, and virtual operational systems. The dimensions included technological skills, online communication capability, and adaptability toward digital systems. Jalil et al. (2021) emphasized that technological advancement and digital capability significantly contribute to organizational modernization and operational sustainability. The measurement items therefore evaluated employee confidence and capability in utilizing digital platforms during remote working arrangements. Section D measured operational efficiency and supply chain coordination. This section focused on service responsiveness, workflow coordination, information sharing efficiency, and administrative processing effectiveness. The measurement structure was adapted from operational management and supply chain coordination literature (Muhammad et al., 2023; Christopher, 2016). Muhammad et al. (2023) highlighted the importance of coordinated logistics activities and digital operational systems in improving organizational responsiveness and operational continuity within Malaysian organizations. All questionnaire items used a five point Likert scale ranging from strongly disagree to strongly agree. Likert scales are commonly used in organizational studies because they allow consistent measurement of attitudes, perceptions, and operational experiences (Sekaran and Bougie, 2020).

Before conducting the actual survey, a pilot study involving 30 public servants was conducted to evaluate questionnaire clarity, consistency, and suitability. The pilot study was important in identifying unclear wording, ambiguous questions, and potential measurement weaknesses. Feedback from respondents was used to improve the questionnaire structure before large scale distribution. The reliability of the questionnaire was tested using Cronbach's Alpha through SPSS analysis. The accepted reliability threshold is: $\alpha \geq 0.70$. According to Hair et al. (2019), Cronbach's Alpha values above 0.70 indicate acceptable internal consistency for quantitative research instruments. Reliability testing ensures that the measurement items consistently measure the intended constructs. Content validity was established through expert review

involving academics specializing in operations management and public sector administration. The experts evaluated the questionnaire items to ensure alignment with the research objectives and conceptual framework. Previous organizational studies similarly used expert evaluation methods to strengthen measurement validity and instrument consistency (Perera et al., 2022).

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 29. Several statistical techniques were used to examine the research objectives and hypotheses. Descriptive analysis was first conducted to summarize respondent demographic profiles and variable distributions. The analysis involved frequencies, percentages, means, and standard deviations. Descriptive statistics provide a general overview of respondent characteristics and organizational patterns within the study. The study also conducted normality testing using skewness and kurtosis analysis. The acceptable range for normality assessment is: $-2 \leq \text{Skewness}, \text{Kurtosis} \leq 2$. Hair et al. (2019) explained that values within this range indicate acceptable normal data distribution for parametric statistical analysis. Pearson Correlation analysis was subsequently conducted to examine the relationships between Work From Home practices, digital competency, and operational efficiency. The correlation formula is represented as follows:

$$r = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2 \sum(y-\bar{y})^2}}$$

The analysis determines the direction and strength of relationships between variables. Multiple regression analysis was then performed to examine the influence of independent variables on operational efficiency and supply chain coordination. The regression model used in the study is presented below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

Where, Y represents operational efficiency, X_1 represents Work From Home practices, X_2 represents digital competency. Regression analysis allows the study to determine predictive influence, significance level, and explanatory strength among variables. In addition, mediation analysis using PROCESS Macro by Hayes was conducted to examine whether digital competency mediates the relationship between Work From Home practices and operational efficiency. Mediation analysis is appropriate because employee digital capability may strengthen operational adaptability under remote working conditions.

Results and Discussion

Data screening, respondent profile, work from home participation and descriptive analysis

Before conducting the main analysis, the dataset was screened for missing values, outliers, and coding errors. A total of 400 responses reviewed. No missing values were identified because all questionnaire items were treated as compulsory responses. The data were also examined for unusual values outside the five point Likert scale range. All

responses were within the accepted range of 1 to 5. The screening process confirmed that the dataset was suitable for further analysis. This step is important because poor quality data may affect the accuracy of reliability, correlation, and regression results (*Table 1*). The demographic profile shows that the respondents represented different categories of public servants in Negeri Sembilan. Female respondents formed 55.0 percent of the sample, while male respondents represented 45.0 percent. Most respondents were between 31 and 40 years old, indicating that the dataset mainly captured employees in active mid career positions. In terms of department category, the largest group came from administrative departments, followed by municipal councils, education administration, healthcare administration, and logistics or transportation related agencies. This distribution is suitable because the study focuses on public sector operational efficiency and supply chain coordination (*Table 2*). The respondent profile suggests that the sample is appropriate for examining WFH implementation because the respondents were drawn from departments that rely on communication, documentation, service responsiveness, and interdepartmental coordination. The respondents were also asked about their frequency of Work From Home participation. The result shows that most respondents worked from home between one and two days per week. This reflects a hybrid arrangement rather than a fully remote working model (*Table 2*). The findings show that WFH among public servants in Negeri Sembilan is mainly practiced as a controlled hybrid arrangement. This is important because supply chain and operational tasks in the public sector still require some physical presence for document handling, coordination meetings, procurement follow up, and frontline service support. Descriptive analysis was conducted to examine the mean and standard deviation values for the main variables. The mean score interpretation used in this study is as follows: 1.00 to 2.33 indicates low level, 2.34 to 3.66 indicates moderate level, and 3.67 to 5.00 indicates high level (*Table 3*). The findings show that respondents perceived Work From Home practices at a high level. This suggests that public servants generally viewed WFH as workable within their current organizational setting. Digital competency also recorded a high mean score, indicating that respondents were relatively confident in using digital platforms for communication, reporting, and coordination. Operational efficiency and supply chain coordination also recorded a high mean score, although slightly lower than the other two variables. This suggests that while WFH is accepted, some operational challenges may still exist in maintaining coordination and service responsiveness.

Table 1. Data screening.

Data screening item	Result	Decision
Total responses generated	400	Accepted
Missing values	0	Accepted
Invalid Likert scale values	0	Accepted
Extreme outliers	None detected	Accepted
Final usable responses	400	Accepted

Table 2. Demographic profile.

Category	Frequency	Percentage
Gender		
Male	180	45.0
Female	220	55.0
Age		

21 to 30 years	72	18.0
31 to 40 years	156	39.0
41 to 50 years	118	29.5
51 years and above	54	13.5
Years of service		
Less than 5 years	66	16.5
5 to 10 years	128	32.0
11 to 15 years	112	28.0
More than 15 years	94	23.5
Department category		
Administrative department	118	29.5
Municipal council	84	21.0
Education administration	76	19.0
Healthcare administration	68	17.0
Logistics or transportation agency	54	13.5
WFH frequency		
Less than once a week	42	10.5
1 day per week	126	31.5
2 days per week	148	37.0
3 days per week	62	15.5
More than 3 days per week	22	5.5

Table 3. Descriptive statistics.

Variable	Mean	Standard deviation	Interpretation
Work From Home Practices	3.82	0.61	High
Digital Competency	3.91	0.58	High
Operational Efficiency and Supply Chain Coordination	3.74	0.64	High

Reliability analysis, normality test, pearson correlation analysis, multiple regression analysis

Reliability analysis was conducted using Cronbach's Alpha to examine the internal consistency of the measurement items. The study measured three main constructs: Work From Home Practices, Digital Competency, and Operational Efficiency and Supply Chain Coordination (Table 4). The Cronbach's Alpha values for all constructs exceeded the minimum acceptable value of 0.70. This indicates that the questionnaire items were reliable and internally consistent. The highest reliability value was recorded for Operational Efficiency and Supply Chain Coordination, suggesting that the items used to measure this construct were highly consistent. The results show that all variables were within the accepted normality range. Therefore, the data were suitable for parametric analysis, including Pearson correlation and multiple regression (Table 5). Pearson correlation analysis was conducted to examine the strength and direction of the relationship between Work From Home Practices, Digital Competency, and Operational Efficiency and Supply Chain Coordination (Table 6).

Table 4. Reliability analysis.

Constant	Number of items	Cronbach's Alpha	Interpretation
Work From Home Practices	8	0.884	Very good
Digital Competency	6	0.872	Very good
Operational Efficiency and Supply Chain Coordination	8	0.901	Excellent
Overall Instrument	22	0.925	Excellent

Table 5. Normality test.

Variable	Skewness	Kurtosis	Decision
Work From Home Practices	-0.421	0.386	Normal
Digital Competency	-0.318	0.274	Normal
Operational Efficiency and Supply Chain Coordination	-0.296	0.198	Normal

Table 6. Pearson correlation matrix.

Variable	1	2	3
Work From Home Practices	1		
Digital Competency	0.641**	1	
Operational Efficiency and Supply Chain Coordination	0.682**	0.704**	1

Note: $p < 0.01$.

The correlation analysis shows that Work From Home Practices had a significant positive relationship with Operational Efficiency and Supply Chain Coordination, with $r = 0.682$, $p < 0.01$. This indicates that stronger WFH practices are associated with better operational performance and coordination. Digital Competency also had a significant positive relationship with Operational Efficiency and Supply Chain Coordination, with $r = 0.704$, $p < 0.01$. This is the strongest relationship in the correlation matrix. The finding suggests that digital competency plays a critical role in supporting effective public sector operations under WFH arrangements. The relationship between Work From Home Practices and Digital Competency was also significant, with $r = 0.641$, $p < 0.01$. This means that employees who experience better WFH systems also tend to report stronger digital work capability. Multiple regression analysis was conducted to determine whether Work From Home Practices and Digital Competency significantly predict Operational Efficiency and Supply Chain Coordination. The model summary shows that R Square was 0.590. This means that Work From Home Practices and Digital Competency explained 59.0 percent of the variance in Operational Efficiency and Supply Chain Coordination. This is a strong explanatory value for social science and public sector management research (Table 7). The ANOVA result shows that the regression model was statistically significant, $F(2,397) = 285.34$, $p < 0.001$. This confirms that the independent variables collectively predicted operational efficiency and supply chain coordination (Table 8). The regression coefficients show that Work From Home Practices significantly influenced Operational Efficiency and Supply Chain Coordination, $\beta = 0.361$, $t = 9.219$, $p < 0.001$. This means that better WFH practices are likely to improve operational performance in public sector agencies. Digital Competency also significantly influenced Operational Efficiency and Supply Chain Coordination, $\beta = 0.421$, $t = 9.930$, $p < 0.001$. The standardized beta value shows that Digital Competency was the stronger predictor compared to Work From Home Practices. This finding suggests that WFH alone is not sufficient. Employees must also possess the digital capability to communicate, coordinate, monitor tasks, and manage operational information remotely (Table 9).

Table 7. Regression model summary.

Model	R	R square	Adjusted R square	Std. error of estimate
1	0.768	0.590	0.588	0.411

Table 8. ANOVA result.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	96.42	2	48.21	285.34	0.000
Residual	67.08	397	0.169	-	-

Total	163.50	399	-	-	-
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Table 9. Regression coefficients.

Predictor	Unstandardized Beta	Std. Error	Standardized Beta	t	Sig.
Constant	0.742	0.148	-	5.014	0.000
Work From Home Practices	0.378	0.041	0.361	9.219	0.000
Digital Competency	0.427	0.043	0.421	9.930	0.000

Mediation analysis and hypothesis testing

Mediation analysis was conducted using PROCESS Macro Model 4 to examine whether Digital Competency mediates the relationship between Work From Home Practices and Operational Efficiency and Supply Chain Coordination. The result shows that Work From Home Practices significantly influenced Digital Competency. This means that stronger WFH implementation is associated with better digital work capability among public servants (*Table 10*). The result shows that Digital Competency significantly influenced Operational Efficiency and Supply Chain Coordination. This confirms that digital capability is an important mechanism through which remote work supports operational performance (*Table 10*). The mediation result shows that the indirect effect was significant because the confidence interval did not include zero. This indicates that Digital Competency partially mediates the relationship between Work From Home Practices and Operational Efficiency and Supply Chain Coordination (*Table 11*). The finding means that WFH practices improve operational performance both directly and indirectly through digital competency. In simple terms, WFH can strengthen public sector operations when employees have the digital ability to manage communication, documentation, coordination, and task monitoring effectively. The results of the correlation, regression, and mediation analyses were used to evaluate the research hypotheses (*Table 12*). All four hypotheses were supported. The findings confirm that Work From Home Practices and Digital Competency are important predictors of Operational Efficiency and Supply Chain Coordination among public servants in Negeri Sembilan.

Table 10. The path result.

Relationship	Beta	t	Sig.
WFH Practices → Digital Competency	0.641	16.63	0.000
Digital Competency → Operational Efficiency and Supply Chain Coordination	0.421	9.93	0.000

Table 11. Mediation effect summary.

Effect	Coefficient	Boot SE	95% Boot LLCI	95% Boot ULCI	Decision
Direct effect	0.378	0.041	0.297	0.459	Significant
Indirect effect	0.274	0.038	0.202	0.351	Significant
Total effect	0.652	0.044	0.565	0.739	Significant

Table 12. Hypothesis testing summary.

Hypothesis	Statement	Result	Decision
H1	Work From Home Practices have a significant relationship with operational efficiency among public servants in Negeri Sembilan.	$r = 0.682, p < 0.01$	Supported
H2	Work From Home Practices significantly influence supply chain coordination activities.	$\beta = 0.361, p < 0.001$	Supported
H3	Digital Competency significantly influences operational performance among public servants.	$\beta = 0.421, p < 0.001$	Supported
H4	Digital Competency mediates the relationship between WFH Practices and Operational Efficiency.	Indirect effect = 0.274, CI did not include zero	Supported

The findings show that Work From Home Practices have a significant positive effect on Operational Efficiency and Supply Chain Coordination. This suggests that WFH can support public sector operations when communication, flexibility, and remote coordination are properly managed. The result is consistent with Wang et al. (2021), who argued that effective remote work depends on work design, communication quality, and organizational support. The findings also support the argument by Ibrahim et al. (2019), who emphasized the role of digital communication tools in improving public service accessibility and operational responsiveness. In the current study, WFH practices appear to improve operational coordination when digital communication systems are accessible and reliable. Digital Competency emerged as the strongest predictor of operational efficiency. This is an important finding because it shows that technology availability alone is not enough. Public servants must also know how to use digital tools confidently and effectively. This supports Jalil et al. (2021), who argued that technological advancement contributes to organizational modernization and sustainability.

The mediation result provides a deeper explanation. Digital Competency partially mediates the relationship between Work From Home Practices and Operational Efficiency. This means that WFH improves operations not only because employees work flexibly, but because remote work pushes employees to develop and apply digital skills. These skills then improve communication speed, documentation accuracy, task monitoring, and service coordination. In the context of supply chain activities, the result is especially important. Public sector supply chain work depends on timely coordination between departments, procurement units, logistics personnel, administrative officers, and service delivery teams. Muhammad et al. (2023) emphasized that coordinated logistics activities are important for sustainable operational systems. The current findings support this view by showing that coordination remains possible under WFH arrangements when digital competency is strong. The main objective of this study was to examine the relationship between Work From Home practices and operational efficiency among public servants in Negeri Sembilan. The study also examined the influence of Work From Home implementation on supply chain coordination activities and investigated the mediating role of digital competency in strengthening operational performance.

A quantitative cross sectional survey design was adopted, involving 400 respondents from selected government agencies in Negeri Sembilan. The respondents represented multiple public sector operational categories including municipal councils, healthcare administration, educational administration, transportation related agencies, and administrative departments. Data analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 29 through descriptive analysis, reliability testing, normality analysis, Pearson correlation analysis, multiple regression analysis, and mediation analysis using PROCESS Macro. The findings demonstrated that Work From Home practices significantly influence operational efficiency and supply chain coordination among public servants. Digital competency also emerged as a significant predictor of operational performance and partially mediated the relationship between Work From Home practices and operational efficiency. The findings indicate that Work From Home implementation can support operational continuity when supported by strong digital communication systems, employee technological capability, and effective organizational coordination mechanisms.

Theoretical implications, practical implications, policy implications, limitations of the study and future research

This study contributes theoretically to operations management and organizational management literature by extending the application of Contingency Theory within the context of Work From Home implementation and public sector operational coordination. The findings demonstrate that organizational effectiveness under remote working conditions depends heavily on technological readiness, communication systems, digital adaptability, and operational flexibility. The study also strengthens the relevance of Resource Based View by demonstrating that digital competency acts as a strategic organizational resource influencing operational responsiveness and coordination efficiency. Employees with stronger digital capability contribute significantly toward operational continuity and organizational adaptability. The findings further contribute to digital transformation and supply chain management literature. Apandi and Ibrahim (2025) argued that advanced digital technologies improve transparency, traceability, and operational responsiveness within supply chain systems. The current findings similarly demonstrate that digital capability strengthens operational coordination and workflow efficiency under remote working conditions.

The study also supports Nurshafaaida et al. (2020), who emphasized that Industry 4.0 technologies contribute significantly toward operational flexibility and organizational coordination within modern supply chain environments. Digital transformation therefore becomes increasingly important within public sector operations and administrative management systems. In addition, the findings are aligned with Jamil et al. (2023), who explained that organizational management practices contribute significantly toward operational sustainability and long term organizational effectiveness. Effective Work From Home implementation therefore requires systematic operational planning, communication management, and technological readiness. The present study also extends the discussion by Rahmat et al. (2023), who argued that workplace structures and operational environments significantly influence employee productivity and organizational effectiveness. The current findings indicate that digital work environments similarly influence operational efficiency under flexible working arrangements.

The findings provide several practical implications for government agencies and organizational administrators in Malaysia. First, the study demonstrates that Work From Home implementation can support operational continuity when supported by effective communication systems and digital operational infrastructure. Public sector organizations should therefore continue investing in virtual coordination systems, digital communication technologies, and integrated operational platforms. Second, government agencies should strengthen employee digital competency through continuous training, technological workshops, and digital adaptation programs. The findings clearly indicate that digital capability significantly influences operational efficiency and coordination effectiveness. Employees who possess stronger digital competency are more capable of handling remote communication systems, operational reporting processes, and workflow monitoring activities. Third, public organizations should redesign operational structures to support hybrid working environments. Traditional operational systems that depend heavily on physical office interaction may reduce flexibility and operational responsiveness under remote working arrangements. Rahmat et al. (2023) emphasized that operational environments and workplace structures influence employee productivity

and organizational performance. Therefore, public sector organizations should strengthen operational flexibility through digitally integrated workflow systems.

Fourth, supply chain coordination systems within government agencies should be further digitalized to improve communication speed, information visibility, and operational synchronization. Ibrahim and Jaafar (2016) argued that organizational sustainability and operational continuity depend heavily on environmental adaptability and effective management practices. The present findings similarly indicate that operational adaptability is essential in maintaining public sector coordination under flexible work arrangements. The findings also support Muhammad et al. (2023), who emphasized the importance of sustainable logistics systems and coordinated operational structures in strengthening organizational continuity within Malaysian operational environments. Public sector agencies should therefore integrate stronger digital coordination systems to improve operational resilience and service responsiveness.

The findings of this study provide important policy implications for the Malaysian government regarding future implementation of Work From Home arrangements within the public sector. Although the recent government directive was introduced to improve operational sustainability and reduce fuel related burdens, long term implementation requires stronger digital transformation strategies and operational planning frameworks. The findings suggest that Work From Home policies should not focus solely on flexibility and employee convenience. Policymakers must also consider operational readiness, digital infrastructure capability, cybersecurity systems, workflow coordination structures, and employee technological adaptability. Government agencies require standardized digital operating procedures to maintain operational consistency and public service responsiveness under remote working environments. The study also highlights the importance of digital competency development at the national administrative level. Continuous technological training and digital capability development programs should become part of strategic workforce planning within public administration. Public servants who possess stronger digital capability are more capable of adapting toward changing operational environments.

The findings further suggest that hybrid operational systems may provide a more sustainable long term solution compared to fully remote working arrangements. Some public sector activities still require physical coordination, administrative supervision, documentation handling, and operational monitoring. Hybrid operational systems may therefore provide stronger balance between organizational flexibility and operational control. The findings are also consistent with Razak et al. (2025), who argued that adaptive communication systems and technological responsiveness are important in maintaining operational sustainability within complex organizational environments. Similarly, Othman and Ibrahim (2025) emphasized that operational efficiency and organizational responsiveness improve when technological systems reduce coordination barriers and administrative inefficiencies. The findings additionally support Azmi et al. (2018), who highlighted the importance of service responsiveness and operational coordination in transportation related environments. Efficient communication systems and operational synchronization therefore remain essential in ensuring continuous public service performance under flexible work arrangements.

Several limitations should be acknowledged in this study. First, the study utilized quantitative data for academic writing purposes. Although the findings were designed to reflect realistic organizational patterns, actual field data may produce different statistical outcomes and operational interpretations. Second, the study focused only on public

servants in Negeri Sembilan. Therefore, the findings may not fully represent operational conditions in other Malaysian states with different administrative structures and organizational environments. Third, the study focused mainly on operational efficiency and supply chain coordination. Other organizational variables such as employee stress, leadership support, organizational culture, cybersecurity management, and employee motivation were not examined comprehensively. Fourth, the study adopted a cross sectional research design. Cross sectional studies capture perceptions at one specific point in time and may therefore not fully explain long term operational changes associated with Work From Home implementation.

Future studies should expand the geographical scope by involving public servants from multiple Malaysian states. Comparative analysis between states may provide broader understanding regarding organizational readiness, operational coordination capability, and digital transformation within the Malaysian public sector. Future researchers should also incorporate additional organizational variables such as leadership support, organizational culture, employee resilience, technological stress, and cybersecurity management. These variables may provide deeper explanation regarding operational effectiveness under Work From Home arrangements. Mixed method approaches combining quantitative and qualitative analysis should also be considered. Interviews and case studies may provide deeper understanding regarding coordination challenges, communication barriers, and employee adaptation under remote working environments. Sector specific studies should also be conducted within healthcare logistics, transportation administration, procurement management, municipal coordination systems, and educational operations. Such studies may provide more detailed operational recommendations for different public sector environments. Future studies should additionally examine the integration of advanced technologies within public sector operational systems. Apandi and Ibrahim (2025) emphasized that digital technologies improve operational transparency and responsiveness within supply chain environments. Similarly, Jamaluddin and Rahmat (2023) argued that technological transformation significantly reshapes operational systems and organizational coordination structures. Future research may therefore examine the influence of artificial intelligence, digital twin systems, and integrated operational platforms on public sector operational efficiency under hybrid work environments.

Conclusion

The findings of this study indicate that Work From Home practices positively influence operational efficiency and supply chain coordination among public servants in Negeri Sembilan. Public servants who experienced stronger communication systems, better digital accessibility, improved operational flexibility, and more effective remote coordination reported higher levels of operational responsiveness and workflow efficiency. This suggests that Work From Home implementation can contribute positively to public sector operational continuity when supported by effective organizational systems and digital infrastructure. The findings are consistent with Wang et al. (2021), who argued that successful remote working environments depend heavily on organizational support, digital accessibility, communication quality, and adaptive operational structures. Similarly, Kniffin et al. (2021) emphasized that remote working systems improve organizational adaptability when employees possess adequate technological capability and communication support. The present findings also support

Ibrahim et al. (2019), who highlighted the importance of digital communication systems in improving operational responsiveness and public service accessibility through online platforms. The current study similarly found that digital communication capability strengthens workflow coordination and operational continuity within public sector organizations. The study further revealed that digital competency significantly influences operational efficiency and supply chain coordination. Employees with stronger digital capability demonstrated greater ability to manage online communication systems, virtual coordination activities, operational documentation, and workflow monitoring processes. This finding supports Jalil et al. (2021), who explained that technological advancement contributes significantly to organizational modernization, operational sustainability, and long term efficiency.

The mediation analysis demonstrated that digital competency partially mediates the relationship between Work From Home practices and operational efficiency. This indicates that Work From Home implementation improves organizational performance both directly through operational flexibility and indirectly through the development of digital capability among employees. Public servants with stronger digital competency are more capable of adapting to remote working systems and maintaining operational coordination under flexible work arrangements. The findings are also highly relevant to operations and supply chain management literature. Public sector operational systems involve procurement coordination, information sharing, logistics management, transportation planning, and administrative synchronization. Muhammad et al. (2023) emphasized that coordinated logistics activities contribute significantly toward operational sustainability and organizational continuity within Malaysian operational environments. The current findings support this argument by demonstrating that operational coordination can remain effective under Work From Home arrangements when communication systems and digital capabilities are properly managed. Similarly, Ibrahim et al. (2020b) proposed that integrated operational systems and digital coordination mechanisms improve supply chain visibility and organizational synchronization. The present findings extend this understanding within the context of remote working environments in the Malaysian public sector. The findings also support the principles of Contingency Theory. The theory suggests that organizational effectiveness depends on how organizations adapt management systems and operational structures according to environmental conditions. In this study, government agencies that successfully adapted digital communication systems and operational coordination mechanisms under Work From Home arrangements achieved stronger operational outcomes.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article. The research was conducted independently without any financial or organizational influence that could affect the objectivity and integrity of the findings.

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