

THE EFFECT OF INFORMATION SYSTEM TECHNOLOGY USE, WORK INVOLVEMENT, AND ORGANIZATIONAL SUPPORT ON EMPLOYEE EFFECTIVENESS WITH WORK MOTIVATION AS AN INTERVENING VARIABLE AT THE TYPE B BATAM CUSTOMS AND EXCISE MAIN SERVICE OFFICE

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Abstract

This study aims to analyze the influence of information system technology utilization, work engagement, and organizational support on employee effectiveness with work motivation as an intervening variable at the Batam Type B Customs and Excise Main Service Office. This study is motivated by the importance of increasing employee effectiveness in facing increasingly complex public service demands and the need to optimize the use of information technology, work engagement, organizational support, and work motivation. This study uses a quantitative approach with a survey method. The study population is all 455 employees of the Batam Type B Customs and Excise Main Service Office. The research sample is 213 respondents determined based on the Slovin formula. Data collection was conducted using a questionnaire with a Likert scale. Data analysis used Structural Equation Modeling (SEM) based on Partial Least Square (SmartPLS). The results of the study indicate that the use of information system technology, work engagement, organizational support, and work motivation have a positive and significant effect on employee effectiveness. In addition, the use of information system technology, work engagement, and organizational support also have a positive and significant effect on work motivation. Testing the indirect effect shows that work motivation is able to positively and significantly mediate the effect of the use of information system technology, work engagement, and organizational support on employee effectiveness. The findings of this study prove that increasing employee effectiveness is not only directly influenced by technology factors, work engagement, and organizational support, but is also strengthened through increased work motivation as a mediating mechanism.

Keywords: Utilization of Information System Technology, Work Involvement, Organizational Support, Work Motivation, Employee Effectiveness.

INTRODUCTION

Advances in information technology have brought significant changes to the administration and public service delivery. The use of information systems plays a role in improving data processing efficiency, service speed, information accuracy, transparency, and supporting decision-making processes. These changes have also been felt by the Batam Type B Main Customs and Excise Service Office, which plays a strategic role in customs services and supervision. The utilization of information systems technology depends not only on the availability of devices and applications, but also on the ability of employees to operate and optimize the technology. Available technology will not deliver optimal results without the support of employee competence, readiness, and motivation. Beyond technology, work engagement is a crucial factor in improving employee effectiveness. Highly engaged employees tend to demonstrate active participation, dedication, commitment, and attention to their work. Work engagement can motivate employees to exert greater effort in completing tasks and achieving organizational goals. Organizational support is also a crucial factor in shaping employee behavior and motivation. Support can be provided through work facilities, leadership attention, competency development, rewards, training, and a conducive work environment. The perception that the organization values employee contributions can lead to increased

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motivation and work effectiveness. Work motivation is positioned as an intervening variable in this study. Motivation serves as a mechanism explaining how technology utilization, work engagement, and organizational support can translate into more effective work behavior. Based on these conditions, this study was conducted to analyze the influence of information system technology utilization, work engagement, and organizational support on employee effectiveness, with work motivation as an intervening variable at the Batam Type B Customs and Excise Main Service Office.

THEORETICAL AND HYPOTHESIS STUDY

Resource-Based View

This study uses **the Resource-Based View (RBV)** as a grand theory. *The Resource-Based View (RBV)* was first introduced by Birger Wernerfelt (1984) and then comprehensively developed by Jay B. Barney (1991). The Resource-Based View views organizations as gaining superiority and effectiveness through optimal management of their resources *and* capabilities. Unlike approaches that emphasize the influence of the external environment, the RBV asserts that organizational success is largely determined by the ability to develop and utilize internal resources that are valuable, rare, inimitable, and non-substitutable, known as the **VRIN concept** (Barney, 1991). In this study, information systems technology is viewed as a technological resource, work engagement and motivation as human resources, while organizational support is an organizational capability that strengthens the management of these resources.

Organizational Support Theory

middle theory used in this study is Organizational Support Theory (OST) developed by Robert Eisenberger, Huntington, Hutchison, and Sowa (1986). Organizational Support Theory explains that employees will form perceptions regarding the extent to which the organization values their contributions and pays attention to their well-being (Perceived Organizational Support). This perception will influence employee attitudes, motivation, commitment, and work behavior in achieving organizational goals. Organizational Support Theory explains that employees form perceptions regarding the extent to which the organization values their contributions and pays attention to their well-being. Organizational support through facilities, competency development, rewards, work environment, and supportive leadership can increase employee motivation, engagement, and effectiveness.

This theory is based on Social Exchange Theory, which states that the relationship between organizations and employees is reciprocal. Organizations that provide support through the provision of work facilities, competency development opportunities, rewards, a conducive work environment, and supportive leadership will receive rewards in the form of increased employee loyalty, motivation, work engagement, and effectiveness. Conversely, if employees feel they are not receiving enough support from the organization, their motivation and work commitment tend to decrease, resulting in low task effectiveness. From the Resource-Based View (RBV) perspective, organizational support is an organizational capability, namely the organization's ability to manage human resources effectively. This capability allows organizations to utilize various strategic resources, both technology and human resources, thereby producing sustainable organizational excellence. Therefore, Organizational Support Theory explains the mechanism by which organizational support can increase employee motivation and effectiveness through the management of the organization's internal resources.

Job Demands–Resources Theory

In addition to *Organizational Support Theory*, this study also uses *Job Demands–Resources (JD-R) Theory* developed by Arnold B. Bakker and Evangelia Demerouti as a Middle Theory. JD-R Theory explains that employee behavior and performance are influenced by the balance between job demands *and* job resources. Job resources include organizational support, development opportunities, adequate technology, leadership, and a supportive work environment. Meanwhile, job demands include workload, time pressure, task complexity, and job responsibilities. Job Demands–Resources Theory explains that employee behavior and performance are influenced by the balance between job demands and job resources. Adequate organizational and technological support are job resources that can increase motivation and work engagement, thereby helping employees complete tasks effectively.

Utilization of Information System Technology

According to Thompson et al., (1991) in (Shintia & Riduwan, 2021) the use of technology is the benefit expected by information system users in carrying out their tasks or behavior in using technology while doing work. The

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measurement is based on the intensity of use, frequency of use and the number of applications or software used. The use of information technology, especially information management and electronic transactions, has a very important role to improve the performance of government organizations/agencies in the framework of improving services to the public and accelerating the implementation of e-government (Dewi et al., 2024)). Understanding the relationship between the use of information technology and results is very important to determine how information technology leads to the desired results or performance (Aliefia et al., 2024) .

2.5 Research Hypothesis

H1: The use of information system technology has an impact on employee effectiveness.

H2: Organizational support influences employee effectiveness.

H3: Work engagement influences employee effectiveness.

H4: Work motivation influences employee effectiveness.

H5: The use of information system technology has an impact on work motivation.

H6: Organizational support influences work motivation.

H7: Work involvement influences work motivation.

H8: Work motivation mediates the influence of the use of information system technology on employee effectiveness.

H9: Work motivation mediates the effect of organizational support on employee effectiveness.

H10: Work motivation mediates the influence of work involvement on employee effectiveness.

RESEARCH METHODS

This study used a quantitative approach with **explanatory research methods** to examine causal relationships between variables through hypothesis testing. Data were obtained through questionnaires distributed to employees of the Batam Type B Customs and Excise Main Service Office. The study was conducted from February to July 2026. The research population was employees of the Batam Type B Customs and Excise Main Service Office. Based on calculations using the Slovin formula, a sample of **213 employees was obtained** . The research instrument was a questionnaire with a five-level Likert scale, ranging from Strongly Disagree to Strongly Agree with a score of 1–5. The data used consisted of primary and secondary data. Primary data was obtained directly from respondents through questionnaires and surveys, while secondary data was obtained through literature studies from books, journals, the internet, and other relevant sources. Data analysis was performed using Structural Equation Modeling (SEM) based on Partial Least Squares (PLS) with the help of SmartPLS. Model evaluation included the measurement model or outer model and the structural model or inner model. Convergent validity was evaluated through the outer loading value, discriminant validity through the Fornell-Larcker criterion, and reliability through construct reliability testing. Hypothesis testing was conducted by examining the path coefficient value, t-statistic, and p-value. The hypothesis was declared significant if the p-value <0.05.

RESULTS

Respondent Characteristics

The results of the study indicate that respondents were predominantly young, male, held D4 and S1 degrees, had 6–10 years of service, and most held executive positions. Respondents with 6–10 years of service totaled 113 people or 53.1%, while respondents with 1–5 years of service totaled 57 people or 26.7%. Respondents with more than 20 years of service totaled 27 people or 12.7%, while respondents with 11–20 years of service totaled 16 people or 7.5%. In terms of position, 146 respondents or 68.5% were executives and 67 respondents or 31.5% were functional employees.

Respondent Characteristics

Profile	Category	Frequency	Percentage (%)
Age	20-30 Years	144	67.6%
	31-40 Years	36	16.9%
	41-50 Years	33	15.5%
	> 51 Years	0	0%
Gender	Man	163	76.5%
	Woman	50	23.5%

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last education	D4 S1 S2	107 85 21	50.2% 40% 9.8%
Length of work	1-5 Years 6-10 Years 11-20 Years >20 Years	57 113 16 27	26.7% 53.1% 7.5% 12.7%
Position	Executor Functional Head of Division/Section	146 67	68.5% 31.5%

Convergent Validity Results (*Outer Loading*)

	Organization al Support	Employee Effectiveness	Job Engagement	Work motivation	Utilization of Information System Technology
X1.1					0.784
X1.10					0.762
X1.11					0.719
X1.12					0.805
X1.13					0.727
X1.14					0.722
X1.2					0.519
X1.3					0.615
X1.4					0.854
X1.5					0.835
X1.6					0.843
X1.7					0.833
X1.8					0.845
X1.9					0.835
X2.1			0.594		
X2.10			-0.581		
X2.11			-0.615		
X2.2			0.555		
X2.3			0.559		
X2.4			0.539		
X2.5			0.364		
X2.6			0.311		
X2.7			0.356		
X2.8			-0.610		
X2.9			-0.653		
X3.1	-0.566				
X3.10	0.782				
X3.11	0.731				
X3.12	0.758				
X3.2	-0.540				

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X3.3	-0.588				
X3.4	-0.604				
X3.5	0.771				
X3.6	0.779				
X3.7	0.765				
X3.8	0.762				
X3.9	0.754				
Y.1		0.295			
Y.10		-0.763			
Y.11		0.571			
Y.12		0.596			
Y.2		0.266			
Y.3		0.339			
Y.4		0.271			
Y.5		0.282			
Y.6		-0.725			
Y.7		-0.789			
Y.8		-0.814			
Y.9		-0.763			
Z.1				0.849	
Z.10				0.730	
Z.11				0.759	
Z.12				0.726	
Z.2				0.884	
Z.3				0.859	
Z.4				0.852	
Z.5				0.851	
Z.6				0.848	
Z.7				0.857	
Z.8				0.736	
Z.9				0.718	

Discriminant Validity Test (*Fornell-Larcker Criterion*)

	Organizational Support	Employee Effectiveness	Job Engagement	Work motivation	Utilization of Information System Technology
Organizational Support	0.786				
Employee Effectiveness	0.786	0.883			
Job Engagement	0.826	0.799	0.934		
Work motivation	0.764	0.393	0.711	0.808	

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Utilization of Information System Technology	0.761	0.380	0.712	0.975	0.760
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HTML Test

	Organization al Support	Employee Effectiveness	Job Engagement	Work motivation	Utilization of Information System Technology
Organizational Support					
Employee Effectiveness	0.832				
Job Engagement	0.289	0.816			
Work motivation	0.781	0.463	0.859		
Utilization of Information System Technology	0.783	0.498	0.885	0.660	

Reliability

	<i>Cronbach's alpha</i>	<i>Composite reliability (rho a)</i>	<i>Composite reliability (rho c)</i>	<i>Average variance extracted (AVE)</i>
Organizational Support	0.750	0.911	0.706	0.801
Employee Effectiveness	0.819	0.861	0.713	0.773
Job Engagement	0.760	0.756	0.807	0.810
Work motivation	0.951	0.956	0.957	0.653
Utilization of Information System Technology	0.938	0.954	0.948	0.577

Coefficient of Determination (*R Square*)

R-square value for employee effectiveness was **0.855** , with an adjusted R-square of **0.852** . Meanwhile, the R-square value for work motivation was **0.951** , with an adjusted R-square of **0.950** . These results indicate that the model has high explanatory power for the endogenous constructs studied.

***R-Square* Determination Test**

	R-square	R-square adjusted
Employee Effectiveness	0.855	0.852
Work motivation	0.951	0.950

Direct Effect Testing

Direct Effect Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 → Y	0.270	0.269	0.055	4,933	0.000
X2 → Y	0.286	0.288	0.049	5,879	0.000
X3 → Y	0.295	0.297	0.047	6,316	0.000
Z → Y	0.377	0.376	0.061	6,179	0.000
X1 → Z	0.515	0.515	0.043	12.102	0.000
X2 → Z	0.387	0.386	0.047	8,274	0.000
X3 → Z	0.339	0.339	0.045	7,588	0.000

All direct relationships show a p-value of 0.000 or less than 0.05 so that all direct effect hypotheses are declared accepted. The use of information system technology has a positive and significant effect on employee effectiveness with a coefficient of 0.270. This means that increasing the use of information system technology is followed by an increase in employee effectiveness. Organizational support has a positive and significant effect on employee effectiveness with a coefficient of 0.286. Work engagement also has a positive and significant effect on employee effectiveness with a coefficient of 0.295. Meanwhile, work motivation has a positive and significant effect on employee effectiveness with a coefficient of 0.377. In the relationship to work motivation, the use of information system technology has an influence coefficient of 0.515, organizational support of 0.387, and work engagement of 0.339. All are significant with a p-value of 0.000.

Indirect Effect Testing

Indirect Effect Test Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 → Z → Y	0.194	0.194	0.035	5,520	0.000
X2 → Z → Y	0.128	0.127	0.026	4,968	0.000
X3 → Z → Y	0.146	0.145	0.029	5,074	0.000

The results of the indirect effect test indicate that the use of information system technology has a positive and significant effect on employee effectiveness through work motivation with a coefficient of 0.194 and a t-statistic of 5.520. Thus, work motivation is able to mediate this relationship.

Furthermore, organizational support has an indirect effect of 0.146 on employee effectiveness through work motivation, while work engagement has an indirect effect of 0.128. Both relationships are significant with a p-value of 0.000.

DISCUSSION

1. The Influence of Information System Technology Utilization on Employee Effectiveness

The results of the study indicate that the use of information systems technology has a positive and significant impact on employee effectiveness. A coefficient value of 0.270 indicates that the more optimally employees utilize information systems technology in carrying out their work, the higher the resulting effectiveness.

These findings demonstrate that technology serves as a strategic resource that helps employees process information, perform work, increase efficiency, and support decision-making. Therefore, the provision of information systems must be accompanied by employee capacity to utilize them optimally.

2. The Influence of Organizational Support on Employee Effectiveness

Organizational support has been shown to have a positive and significant impact on employee effectiveness. Support in the form of work facilities, leadership attention, competency development, rewards, and a conducive work environment can help employees perform their tasks more effectively.

These results strengthen the perspective of Organizational Support Theory that positive perceptions of organizational support can encourage work attitudes and behaviors that support the achievement of organizational goals.

3. The Influence of Work Engagement on Employee Effectiveness

Job engagement has a positive and significant effect on employee effectiveness with a coefficient of 0.295. Employees who actively participate, are dedicated, pay attention to their work, and consider their work important tend to demonstrate better work effectiveness.

Research findings also show that increasing work engagement can be achieved through employee empowerment, effective communication, employee involvement in decision-making, competency development opportunities, and a collaborative work culture.

4. The Influence of Work Motivation on Employee Effectiveness

Work motivation is the variable with the highest direct influence coefficient on employee effectiveness, at 0.377. This result indicates that motivation is a crucial factor in encouraging employees to complete their work effectively. The higher the employee motivation, the greater the drive to carry out tasks, achieve targets, and contribute to the organization.

5. The Influence of Information System Technology Utilization, Organizational Support, and Work Involvement on Work Motivation

All three independent variables were shown to have a positive and significant effect on work motivation. The largest influence came from the use of information systems technology with a coefficient of 0.515, followed by organizational support at 0.387 and work engagement at 0.339.

These findings suggest that well-utilized technology, adequate organizational support, and employee engagement in work can create conditions that encourage work motivation.

6. The Role of Work Motivation as an Intervening Variable

Work motivation has been shown to mediate the relationship between information system technology utilization, organizational support, and work engagement on employee effectiveness. These results demonstrate that these three factors not only have a direct influence but can also increase effectiveness by enhancing work motivation.

Thus, improving employee effectiveness requires an integrated approach. Organizations need to provide more than just technology or work facilities; they also need to ensure that these resources enhance employee motivation and engagement.

CONCLUSION AND SUGGESTIONS

1. CONCLUSION

Based on the research results, it can be concluded that:

1. The use of information system technology has a positive and significant impact on employee effectiveness.
2. Organizational support has a positive and significant effect on employee effectiveness.
3. Work engagement has a positive and significant impact on employee effectiveness.
4. Work motivation has a positive and significant effect on employee effectiveness.
5. The use of information system technology has a positive and significant effect on work motivation.
6. Organizational support has a positive and significant effect on work motivation.
7. Work involvement has a positive and significant effect on work motivation.
8. Work motivation positively and significantly mediates the influence of the use of information system technology on employee effectiveness.
9. Work motivation positively and significantly mediates the influence of organizational support on employee effectiveness.
10. Work motivation positively and significantly mediates the influence of work involvement on employee effectiveness.

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Overall, the research results show that employee effectiveness at the Batam Type B Main Customs and Excise Service Office is influenced by a combination of technological factors, human resources, organizational support, and work motivation.

2. SUGGESTION

Practically, agencies need to continuously improve the quality of their information systems to ensure they are user-friendly, integrated, and aligned with job requirements. Regular training is also necessary to enable employees to utilize technology optimally.

Organizational support needs to be strengthened through the provision of work facilities, recognition of achievement, competency development, and good communication between management and employees. Work engagement can also be enhanced by providing employees with opportunities to participate in decision-making and problem-solving.

For further research, research can be developed by adding other variables such as transformational leadership, organizational culture, competence, job satisfaction, work discipline, or work environment, as well as using different objects and number of respondents.

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