THE INFLUENCE OF TASK CHARACTERISTICS AND TECHNOLOGY FUNCTIONALITY ON TASKTECHNOLOGY FIT AND SERVICE LEVEL PERFORMANCE IN FULFILLMENT CENTERS: EVIDENCE FROM A STARTUP CONTEXT

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Abstract: *Fulfillment Center is a special facility designed to manage order processing and product fulfillment for e-commerce businesses. The fulfillment center has a service level agreement (SLA) that must be met as a form of prime performance. Analysis of the determinants of Service Level Performance in Fulfillment Centers is conducted within the framework of Task Technology Fit. This study aims to analyze the effect of Characteristics and Technology Functionality on Service Level Performance in Fulfillment Centers with task technology fit as a mediating variable. This study is a quantitative study of 100 employees in the picking and packing division using a questionnaire. The analysis method used is SEM-PLS. The results of the analysis show that Task Characteristics have a positive and significant effect on Task Technology Fit. Technology Functionality has a positive and significant effect on Task Technology Fit. Task Technology Fit mediates the effect of Task Characteristics on the Fulfillment Center Service Level and is proven to be statistically significant. Task Technology Fit mediates the effect of Task Characteristics on the Fulfillment Center Service Level and is proven to be statistically significant.*

Keywords: *Task Technology Fit, Service Level Performance, Fulfillment Center, Task Characteristics, Technology Functionality*

INTRODUCTION

The development of startups in Indonesia in recent years has been quite rapid and dynamic. Indonesia has become one of the largest startup growth centers in Southeast Asia, driven by a large population, increasing internet penetration, and increasing adoption of technology. In 2024, the value of venture capital funding in Indonesia has almost doubled in five years. The increasing number of larger investment transactions reflects the growth of investment in Indonesian startups (Nugrahani, 2024). Most startups are e-commerce businesses, and they often rely on third-party fulfillment centers to handle order processing and delivery. This center is the backbone of the supply chain, taking care of important tasks such as inventory management, order processing, and shipping (Marcomm, 2023).

The fulfillment center has a service level agreement (SLA) that must be met as a form of prime performance. Service Level Agreement (SLA) is a promise to customers that they will receive their orders on time. At the Fulfillment Center (FC) level, SLA is based on the ability to fulfill open orders scheduled for shipment at each departure time. The ability of each center depends on the complex interaction between fluctuating product demand and time-dependent processes (Luna, 2015). Improving the

performance level of the fulfillment center is done in various ways, including the use of technology such as Handheld scanners in the product selection and packing process at the fulfillment center. However, employees in that section must use this technology properly.

Goodhue & Thompson (1995) proposed Task Technology Fit (TTF) as an evaluation construct defined from a theoretical perspective, which assesses certain aspects of technology and seeks to understand how the use of technology can affect a person's performance. The TTF perspective assumes that users can evaluate the level of TTF appropriately when they use technology to perform their job tasks, and ultimately the TTF evaluation can predict performance. TTF is measured through user experience assessments based on different dimensions such as data quality, usability, and technology reliability. However, the assumption is that users evaluate technology functionality and the extent to which the technology helps them in completing tasks and matches their abilities (Vendramin et al., 2021).

According to TTF theory, a higher fit between technology, task characteristics, and individual abilities will contribute to better performance, that is, it will lead to more efficient task completion (Goodhue, 1995). When users recognize that technology improves task execution, it leads to higher adoption and use and, in turn, to improved performance. Improved performance arises from optimal TTF: when technology matches the characteristics of the task it is intended to support and the individual abilities of users, users can perform their tasks more smoothly (Spies et al., 2020).

The interacting elements of TTF. Task requirements represent the physical and cognitive actions that individuals perform to transform inputs into outputs in a given environment (Goodhue, 1995; Goodhue & Thompson, 1995). Tasks may contain varying levels of detail and requirements related to the technology that supports the task. The technology functionality element refers to the tools that individuals use to perform the task or are used to assist them in performing their tasks. Technology can include computer systems (hardware, software, and data) and support services (training, HR policies, and IT support) (Vendramin et al., 2021). TTF also includes a view of task characteristics, which is not included in the TAM perspective. The combination of TTF and TAM can offer a more comprehensive understanding of user attitudes toward a particular technology and the fit between technology functionality and task characteristics. The combined perspective has been widely used in various studies (Pagani, 2006; Shih & Chen, 2013).

This study offers something new in exploring the influence of Technology Characteristics (TC) and Technology Functionality (TF) on Service Level Performance in Fulfillment Centers (SL) with task technology fit (TTF) as a

mediating variable. The uniqueness of this study is that it uses TTF to improve service level performance in fulfillment centers. By focusing on 3D scanner technology in the picking and packing section, this study provides valuable insights into how employees view and evaluate the implementation of advanced logistics technology in fulfilling their daily Service Level. In addition, this study contributes to the development of a conceptual model that describes the relationship between TC, TF, TTF, and SL based on employee perspectives in the context of Fulfillment Centers. This approach allows for a deeper understanding of how TC and TF directly affect SL in the Fulfillment center logistics process.

METHODOLOGY

The current research is explanatory research that aims to identify causes, determine causality, and predict changes in social phenomena related to other variables. This explains the relationship between variables and tests whether existing theories or hypotheses can be accepted or not Strydom (2014).

The research instrument used as the basis for the questionnaire for the Task Characteristics variables was adopted from Wijayanti et al. (2024), Technology Functionality was adopted from Jalali et al. (2020), and Task-Technology Fit was adopted from Wijayanti et al. (2024), and Fulfillment Center Service Level was adopted from (Cheng, 2020). The research instrument will be distributed in the form of a G-Form.

The population of this study consists of fulfillment center employees of startup companies. The indicators used in this study are 20 so the minimum number of samples needed is 20 x 5 = 100 respondents. This study uses partial regression analysis (PLS-SEM) to test the goodness of fit model and test whether the research hypothesis is accepted or not.

RESULT AND DISCUSSION

Convergent and discriminant validity are two fundamental aspects of construct validity. Convergent validity refers to how closely the new scale relates to other variables and other measures of the same construct. The construct must not only correlate with related variables but also must not correlate with different and unrelated variables. This latter determination is called discriminant validity. According to Hair et al. (2019), a loading value of 0.7 is a good cut-off value.

Tabel 2 Outer Loadings (Measurement Model)

	Fulfillment Center Service Level	Task Characteristics	Task-Technology Fit	Technology Functionality
SL1	0.932			
SL2	0.982			
SL3	0.954			
TC1		0.747		
TC10		0.771		
TC2		0.836		
TC3		0.836		
TC4		0.732		
TC5		0.786		
TC6		0.836		
TC7		0.842		
TC8		0.860		
TC9		0.812		

	Fulfillment Center Service Level	Task Characteristics	Task-Technology Fit	Technology Functionality
TF1				0.900
TF2				0.928
TF3				0.776
TTF1			0.896	
TTF2			0.924	
TTF3			0.862	
TTF4			0.816	

The results of processing using SmartPLS can be seen in Table 1. The outer model value or correlation between constructs and variables has all met convergent validity because all indicators have loading factor values above 0.70.

The results of the discriminant validity test are obtained as follows:

Table 2. Discriminant Validity Value (Cross Loading)

	Fulfillment Center Service Level	Task Characteristics	Task-Technology Fit	Technology Functionality
SL1	0.932	0.643	0.614	0.584
SL2	0.982	0.755	0.675	0.650
SL3	0.954	0.695	0.618	0.560
TC1	0.541	0.747	0.439	0.393
TC10	0.541	0.771	0.363	0.281
TC2	0.628	0.836	0.469	0.502
TC3	0.598	0.836	0.500	0.397
TC4	0.659	0.732	0.412	0.356
TC5	0.480	0.786	0.296	0.282
TC6	0.659	0.836	0.548	0.371
TC7	0.596	0.842	0.507	0.372
TC8	0.613	0.860	0.530	0.429
TC9	0.542	0.812	0.473	0.236
TF1	0.519	0.328	0.416	0.900
TF2	0.612	0.472	0.447	0.928
TF3	0.499	0.375	0.424	0.776
TTF1	0.540	0.415	0.896	0.524
TTF2	0.538	0.433	0.924	0.505
TTF3	0.475	0.518	0.862	0.329
TTF4	0.726	0.602	0.816	0.368

From Table 2 it can be seen that all loading factor values for the research variable indicators have the highest values on the variables they represent compared to the loading factor values for other variables. This means that the indicators used are truly appropriate for measuring the variables they represent. Therefore, the analysis can be continued to the next stage.

Hair (2019) proposed the use of (AVE to represent the average amount of variance explained by a construct in its indicators relative to the overall variance of its indicators.

A construct is said to have high reliability if its value is 0.70 and AVE is above 0.50. Table 4.3. presents the Composite Reliability and AVE values for all variables.

Table 3. Composite Reliability and Average Variance Extracted

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Fulfillment Center Service Level	0.953	0.958	0.970	0.914
Task Characteristics	0.940	0.944	0.949	0.651
Task-Technology Fit	0.898	0.905	0.929	0.766
Technology Functionality	0.837	0.846	0.903	0.758

Based on Table 3. it can be concluded that all constructs of Fulfillment Center Service Level, Task Characteristics, Task-Technology Fit, and Technology Functionality meet the reliable criteria for both Cronbach's

Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE) criteria.

Structural Model Testing (Inner Model) The inner model or structural model consists of two types of variables, namely exogenous and endogenous. Latent variables are called exogenous if they are not influenced by other latent variables in the model (no arrows are entering from other latent variables). In addition, the inner model in PLS also analyzes the magnitude of the structural path coefficient to determine the relationship between latent variables.

Goodness Of Fit Model Testing Model assessment with PLS involves examining the R-square for each dependent latent variable. Table 4. shows the results of the R-square estimation obtained from SmartPLS.

Table 4 R-Square Value

	R Square	R Square Adjusted
Fulfillment Center Service Level	0.688	0.678
Task-Technology Fit	0.395	0.382

This study involves two main variables: Fulfillment Center Service Level (Y), which is influenced by Task Characteristics (X1), and Technology Functionality (X2). In addition, Task Technology Fit (Z) is also influenced by Task Characteristics (X1), and Technology Functionality (X2). Table 4. presents the R-square value for the Fulfillment Center Service Level variable of 0.688. This means that 68.8% of the variable is influenced by Task Characteristics (X1), Technology Functionality (X2), and Task Technology Fit (Z). The R- square value for the Task Technology Fit (Z) variable is 0.395. This means that 39.5% of the Task Technology Fit variable is influenced simultaneously by Task Characteristics (X1), and Technology Functionality (X2).

The partial effect hypothesis testing directly on the independent variables and intermediate and dependent variables using PLS is found in the output result for inner weight which can be seen in the following figure and table:

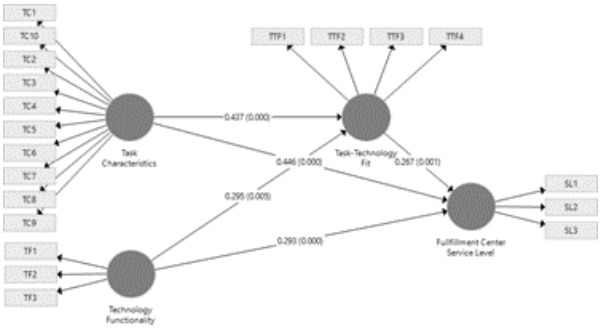

Fig 2. Estimation output for structural model testing

The detailed bootstrapping estimation results using Smart-PLS are presented in the following table:

Table 5. Result For Inner Weights (Direct Effect)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Task Characteristics -> Fulfillment Center Service Level	0.446	0.448	0.076	5.837	**0.000**
Task Characteristics -> Task Technology Fit	0.437	0.426	0.107	4.065	**0.000**
Task-Technology Fit > Fulfillme	0.267	0.259	0.081	3.273	**0.001**

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
nt Center Service Level					
Technology Functionality-> Fulfillment Center Service Level	0.293	0.295	0.079	3.723	0.000
Technology Functionality-> Task-Technology Fit	0.295	0.291	0.104	2.831	0.005

The results of the hypothesis test show that the influence of the Task Characteristics variable on Task Technology Fit shows a path coefficient value of 0.437 with a t value of 4.065 and p values = 0.000. The p-value is smaller than 0.05. This result means that Task Characteristics have a positive and significant influence on Task Technology Fit, which means that H1 which states that Task Characteristics have a significant positive influence on Task Technology Fit is supported. The results of the hypothesis test show that the influence of the Technology Functionality variable on Task Technology Fit shows a path coefficient value of 0.295 with a t value of 2.831 and p values = 0.005. The p-value is smaller than 0.05. This result means that Technology Functionality has a significant influence on Task Technology Fit, which means that H2 which states that Technology Functionality has a significant positive influence on Task Technology Fit is supported. The results of the hypothesis test show that the influence of the Task Technology Fit variable on the Fulfillment Center Service Level shows a path coefficient value of 0.267 with a t value of 3.273 and p values = 0.000. The p-value is greater than 0.05. This result means that Task Technology Fit has a positive and significant influence on the Fulfillment Center Service Level, which means that H3 which states that Task Technology Fit has a significant positive influence on the Fulfillment Center Service Level is supported.

The indirect effect between variables in PLS is done manually by multiplying the coefficient of the direct effect path between the independent variable and the dependent variable through the intermediary variable. This analysis helps evaluate how the research variables interact indirectly. The results of the indirect influence analysis between variables are shown as follows:

Table 6. Indirect Influence

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Task Characteristics -> Task-Technology Fit -> Fulfillment Center Service Level	0.117	0.109	0.041	2.815	0.005

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Technology Functionality -> Task-Technology Fit -> Fulfillment Center Service Level	0.079	0.077	0.038	2.063	0.040

The indirect influence of Task Characteristics on Fulfillment Center Service Level through Task Technology Fit has p values = 0.005 or so it can be concluded that the Task Technology Fit variable mediates the influence of Task Characteristics on Fulfillment Center Service Level. This means that H4 which states that Task Technology Fit acts as a mediating variable on the influence of Task Characteristics on the Behavior of Using Islamic Banking is supported. The indirect effect of Technology Functionality on the Fulfillment Center Service Level through Task Technology Fit has p values = 0.040 or <0.05 so it can be said that the Task Technology Fit variable mediates the effect of Technology Functionality on the Fulfillment Center Service Level. This means that H5 which states that Task Technology Fit acts as a mediating variable on the effect of Technology Functionality on the Fulfillment Center Service Level is supported.

The results of the discussion analysis show that Task Characteristics have a positive and significant effect on Task Technology Fit. Task characteristics that can be carried out by individuals can be explained by the dimensions of task clarity and task dependence on others (Goodhue & Thompson, 1995). The results of this study are in line with Fu et al. (2019) that the task characteristic dimension, namely task dependence on others, has a significant effect on task technology fit.

The second study showed that Technology Functionality had a significant effect on Task Technology Fit. Murphy et al. (2019) define Technology Functionality as the positive impact of technology-supported interaction interfaces on the transmission of electronic services. High Technology Functionality provides strong assurance to customers to be able to control technology more smoothly and the results are more reliable in other words, the technology will be more efficient and effective in providing its services. The results of this study are in line with the findings of Ruan et al. (2024) which show that Technology Functionality has a positive and significant impact on task technology fit.

SEM analysis also shows that increasing Task technology fit will increase the Fulfillment Center Service Level as the performance of employees in the picking and packing division. The TTF model has been widely tested, and it has been shown that TTF affects individual performance as well as organizational outcomes (Mikalef et al., 2019). The results of this study are in line with Abelsen et al. (2023) who found that TTF for collaborative work and focused

work has a positive and significant effect on individual performance. Research shows that Task Technology Fit functions as a significant mediator between Task Characteristics and Fulfillment Center Service Level.

The results of this study are in line with Khan et al. (2022) that task technology fit mediates the effect of Task Characteristics on performance, which in this case is the Fulfillment Center Service Level. The findings of the study on the mediation role of Task Technology Fit showed significant results. This means that Task Technology Fit mediates the effect of Technology Functionality on the Fulfillment Center Service Level. Task Technology Fit theory is widely used to align tasks and technology in the workplace, understanding their impact on user performance and satisfaction. The findings of the current study are in line with Ruan et al. (2024) which shows that Task Technology Fit plays a mediating role in the impact of Technology Functionality on satisfaction with technology use and performance.

CONCLUSION

The conclusion that can be drawn from the results of this study is that Task Characteristics have a positive and significant effect on Task Technology Fit. Technology Functionality has a positive and significant effect on Task Technology Fit. Task Technology Fit has a positive and significant effect on the Fulfillment Center Service Level. Task Technology Fit acts as a mediating variable on the effect of Task Characteristics on Fulfillment Center Service Level. Task Technology Fit acts as a mediating variable on the effect of Technology Functionality on the Fulfillment Center Service Level.

For management, increasing Task Technology Fit can be done by adjusting Task Characteristics with Technology Functionality so that employees have a high Task Technology Fit. Management must also improve Task Technology Fit through the implementation of new technology while providing training to employee users periodically. For further research, other variables that affect the Fulfillment Center Service Level can be added, such as knowledge-sharing behavior. Developing research in companies with different characteristics.

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