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A Model of Performance Improvement from Training and Competence Moderated by Ict Capability (Empirical Study at Semarang Medium Tax Office)

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Abstract. *This study is an explanatory research aimed at examining and analyzing the effects of training and competence on human resource (HR) performance, as well as evaluating the role of information and communication technology (ICT) capabilities as a moderating variable in these relationships. The research was conducted on all HR personnel at the KPP Madya Semarang Office, with a total sample of 117 respondents determined using the census method. Primary data were collected through questionnaires using a Likert scale ranging from 1 to 5 to measure the variables of training, competence, ICT, and HR performance. The findings reveal that training has a positive and significant effect on HR performance, and competence also contributes to improving the quality of HR performance. Furthermore, ICT capabilities are proven to positively moderate the effects of both training and competence on HR performance, indicating that optimal utilization of ICT can strengthen the impact of training and competence in enhancing HR performance. These findings highlight the importance of synergy between competence development, training programs, and the utilization of information technology to optimize organizational performance.*

Keywords: *Competence; Development; Performance; Training.*

1. Introduction

The ever-evolving world signifies the occurrence of globalization, where countries remain interconnected (Pankaj Ghemawat 2020). Globalization today has a significant impact on our lifestyles, marked by changes in communication methods, faster access to technology, and the birth of many innovations.(Zhang et al., 2022)Revolutionary digital technology is transforming society and the global economy into a dynamic, seemingly seamless, and inseparable relationship. This revolutionary change is triggering companies to compete with each other to increase their business competitiveness by balancing human resource competencies with technology within the company.(Vellycia et al., 2024). Moreover, improving human resource performance is a crucial aspect in facing globalization.(Liu et al., 2021).

The challenges facing organizations in responding to rapid globalization due to the interconnected world and interactions without national boundaries require a proactive approach.(Mollik & Ananna, 2024). The rapid development of technology is not balanced by other factors in an organizational environment in achieving organizational goals.(Zhang et al., 2022)In this case, individual readiness is needed to face the inequality that arises.(Vrchota et al., 2020).

Nowadays, technology is completely digital and has become a priority and main need for businesses and institutions.(Oviawe & Uwameiye, 2020). Do not forget that human resources must always be developed and required to be able to keep up with the increasingly rapid development of technology, so that they are able (competent) to respond to the rapid changes presented by organizations or institutions.(Alvarez-Aros & Bernal-Torres, 2021).

Performance is a term that expresses the final effort of completing an individual's work.(Bakirova Oynura, 2022). According to(Vrchota et al., 2020)Performance is often defined as quantified output. Human resource performance is a description of the level of achievement of an activity/program/policy in realizing the goals, objectives, vision, and mission of an organization in formulating an organization's strategic planning scheme.(Saks, 2022). According to(Sulaeman et al., 2019)Performance is the result of a process based on specific measurements and periods compared to previous agreements. In other words, human resource performance is the work achievement that should be achieved according to predetermined standards to achieve organizational goals.

Human resource performance is influenced by many factors. One factor that influences human resource performance is training.(Onyeador et al., 2021; Rivaldo & Nabella, 2023; Sloan & Paoline, 2021). According to(Korpi & Tåhlin, 2021)Training helps human resources to understand the organization's mission, strategy and goals which are implemented in the form of work behavior.

Training increases the level of competitiveness of human resources through knowledge, skills, abilities and social values.(Napitupulu, 2020; Subari & Raidy, 2015). By conducting several trainings, human resources will become accustomed to carrying out assigned work perfectly and minimizing errors due to human error.

Previous research on the relationship between competency and performance has been highly controversial. The discrepancy between competency and performance leaves ample scope for further research. The results indicate that competency significantly predicts performance.(Adeoti et al., 2018)The results of the study indicate that there is a positive but insignificant relationship between competence and financial performance in Bahraini companies.(Alhashimi, M., Reyad, S., Hamdan, A., Badawi, S., Al-Sartawi, A., & Razzaque, 2019). Then the research results showed that training had a positive and significant effect on improving performance.(Risdiantoro, 2021) This result differs from the research results which stated that training had no effect on job satisfaction and performance.(Putra & Wulandari, 2019).Basyri and Priono (2021) explained that training has a positive effect on human

resource performance. However, a study by Mawarni et al. (2023) concluded that training had no effect on human resource performance.

Another factor that influences human resource performance is competence.(Mulang, 2021). A person's competence can improve the performance of human resources individually, thereby triggering overall human resource performance and being reflected in improved performance.(Gita Friolina et al., 2017; Salman et al., 2020)If human resources are capable enough to carry out their main tasks and functions, then these human resources will be willing to give maximum performance to the company.(Nyoman et al., 2023).

Competence is defined as a source of competitive advantage that an organization has to achieve its goals.(Hartati et al., 2020). Competence includes knowledge, skills and attitudes that are relevant to achieving better performance.(Hanum et al., 2020)So, competence is the knowledge and skills needed to achieve better performance. Previous research has shown that competence has a positive effect on human resource performance, as found in Mahmudah et al. (2021). However, a different finding was obtained from Ratnasari's (2021) study, which stated that competence had no significant effect on human resource performance.

Another effort to improve human resource performance is mastering ICT (Information, Communication, and Technology). According to Stephen Haag and Maeve Cummings, ICT, or better known as Information and Communication Technology (ICT), is a combination of information technology (IT) and communication technology (CT) used to collect, store, manage, and convey information. According to Wendell Odom, ICT is everything related to computers and their software for transmitting information.(Cueva-Ortiz & Cruz-Cárdenas, 2021). Amelia Paramma et al (2025) study concluded that ICT variables play an important role in improving human resource performance.(Nicolás-Agustín et al., 2025).

Nurcahyono's study (2022) concluded that at the end of December 2020, tax revenue reached 96.10% of the 2020 APBN target in Presidential Decree 72. Based on the Ministry of Finance Data Portal, the tax target for the last 10 years has only been achieved 3 (three) times, namely 2021, 2022, and 2023. According to Prianto Budi Saptono (2023), the failure to achieve the tax target was due to the suboptimal performance of government officials, in this case human resources for taxation in Indonesia.

Human resource performance measurement within the Directorate General of Taxes, as the state revenue collector, is regulated by the Minister of Finance Decree No. KMK-300/KMK.01/2022 concerning Performance Management within the Ministry of Finance and the Minister of Finance Circular No. SE-17/MK.1/2022 concerning Guidelines for the Implementation of Performance Management within the Ministry of Finance. Human resource performance assessment within the institution is expressed as Employee Performance Values (NKP) and Organizational Performance Values (NKO), as the outcome of the institutional assessment, in this case the Semarang Medium Tax Office (KPP Madya). The

NKP determination consists of several Key Performance Indicators (KPI) with a maximum achievement calculation of 120% and a minimum achievement index of 0%.

2. Research Methods

The type of research used in this study is explanatory research. According to(Widodo, 2010)Explanatory research is research that is explanatory in nature, meaning that this research emphasizes the relationship between variables by testing hypotheses, the description contains descriptions but the focus lies on the relationship between variables includingTraining, Competence, ICT and Human Resource Performance.The researcher chose this method with the aim that the results of this research could be applied directly to the organization where the researcher works. The data used in this study is primary data, which is data taken directly from data sources collected in relation to the problem being studied. The primary data consists of a questionnaire administered to employees of the Semarang Medium Tax Office (KPP Madya). The questionnaire contains a list of questions based on the applied indicators and the research variables, namely:training, competency, ICT capabilities and human resource performance. Data was collected by distributing questionnaires to taxpayer respondents. Questionnaires were distributed using two methods: in-person and online via Google Forms. Additionally, researchers used documentation methods in the form of notes, books, newspapers, magazines, and other relevant materials relevant to the variables studied.Training, Competence, ICT capabilities and Human Resource Performance.

3. Results and Discussion

The respondents of this study were employeesSemarang Medium Tax Office has 117 employeesRespondent data were obtained from questionnaire distribution. The research was conducted by distributing research questionnaires on July 19-28, 2025. Respondent description analysis consisted of information related to respondent characteristics seen from gender, age, education, and length of service. The results of questionnaire data processing related to respondent descriptions are presented in Table.

Table Description of Respondent Characteristics

No	Characteristics	Sample n= 117	
		Amount	Percentage (%)
1.	Gender		
	Man	85	72.6
	Woman	32	27.4
2.	Age		
	25 - 35 years old	34	29.1
	36 - 45 years old	41	35.0
	46 - 55 years old	27	23.1
	> 55 years	15	12.8
3.	Education		
	S1	86	73.5
	S2	31	26.5
4.	Length of work		

5 - 10 years	57	48.7
10 - 20 years	32	27.4
20 - 30 years	17	14.5
> 30 years	11	9.4

Source: Processed research data (2025)

The composition of employees is dominated by men (72.6%) compared to women (27.4%). This indicates a gender imbalance in the staffing structure at the research site; this condition needs to be taken into account in human resource planning and organizational policies. For example, in recruitment, career development, and work flexibility and welfare policies, to achieve more proportional representation and ensure that services and operational decisions reflect diverse perspectives.

The employee age distribution across the productive range—including the 25–35 years (29.1%), 36–45 years (35.0%), 46–55 years (23.1%), and >55 years (12.8%) groups—indicates demographic diversity that influences the dynamics of experience, career mobility, and development needs; organizations should develop workforce management policies that include succession planning, intergenerational knowledge transfer, differentiated career development programs based on career stage, and retention strategies for key groups and retirement planning for the age group approaching retirement.

The majority of employees have a bachelor's degree (73.5%), with some holding a postgraduate degree (26.5%). This reflects a relatively high level of formal literacy and analytical capabilities in the workplace; this opens up opportunities for employee involvement in more complex tasks, the use of technology-based work methods, and the development of advanced competency improvement programs (certification or continuing education) that can improve the productivity and quality of institutional services.

The majority of employees are in the 5–10 years of service category (48.7%). This indicates the presence of employees who already have substantial operational experience but are still in the career development phase; organizations are advised to focus efforts on career development, middle leadership programs, and reward and retention mechanisms to ensure optimal utilization of this experience while providing a pathway to professional advancement.

In this section, a descriptive analysis is conducted to obtain an overview of respondents' responses to the research variables. This analysis is conducted to obtain perceptions about respondents' tendencies to respond to the indicator items used to measure these variables and to determine the status of the variables studied at the research site.

PLS analysis is a variance-based SEM analysis aimed at testing model theory, emphasizing predictive studies. Several measures of model acceptance are used, including R-square and Q-square (Hair et al., 2019).

1) R square

R square indicates the extent to which the variation of an endogenous variable can be explained by other exogenous or endogenous variables in the model. The interpretation of R square according to Chin (1998) as quoted (Abdillah, W., & Hartono, 2015) is 0.19 (low influence), 0.33 (moderate influence), and 0.67 (high influence). The following table presents the coefficient of determination (R2) of the endogenous variables:

Table R-Square Value

	R-square
HR Performance	0.481

The coefficient of determination (R-square) obtained from the model was 0.481. This means that 48.1% of the HR Performance variable can be explained by the Competence, Training, and ICT variables. The remaining 51.9% is influenced by other variables outside the study. The R-square value (0.481) is in the range of 0.33 - 0.67, meaning that the Competence, Training, and ICT variables have a significant influence on the HR Performance variable.

2) Q square

Q-Square (Q2) describes the measure of predictive accuracy, namely how well each change in exogenous/endogenous variables is able to predict endogenous variables. Q-Square predictive relevance for structural models is a measure of how well the observation values are generated by the model and also its parameter estimates. Size. Q square above 0 indicates the model has good predictive relevance or model prediction suitability. The criteria for the strength of the model is measured based on Q-Square Predictive Relevance (Q2) according to Ghozali & Latan (2015, p. 80) are as follows: 0.35 (strong model), 0.15 (moderate model), and 0.02 (weak model).

The results of the Q-Square value calculation for the structural model of this study are as follows:

Table Q-square value

	SSO	SSE	Q^2 (=1-SSE/SSO)
HR Performance	351,000	215,376	0.386

The Q-square (Q2) value for the HR Performance variable is 0.386 andCompetenceof 0.386, indicating a Q-square value > 0.35, indicating the model has high predictive relevance. This means that the estimated parameter values generated by the model correspond to the observed values, indicating that the structural model fits the data well.

Structural model testing (inner model) examines the relationship between latent constructs by estimating the path parameter coefficients and their significance levels (Ghozali, 2011). This procedure is carried out as a step in testing the proposed research hypothesis. The test produces output from the structural model of the construct loading factor, which will explain the influence of the Training construct on HR Performance through Competence and ICT moderation.

In this case, data processing was performed using the Smart PLS v4.1.0 software tool. The results of this data processing are shown in the following image:

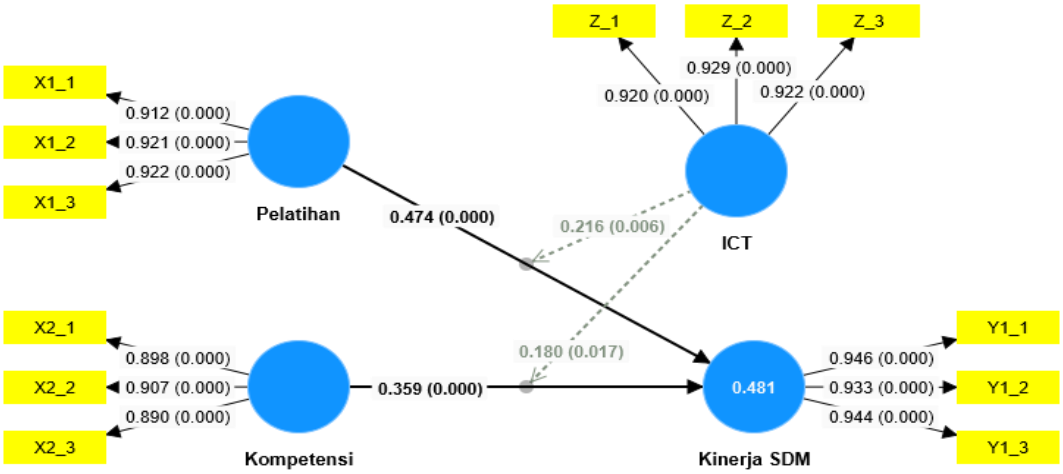

Figure Full Model SEM-PLS Moderation

Source: Results of research data processing with Smart PLS 4.1.0 (2024)

Research hypothesis testing is conducted to determine whether a hypothesis is accepted or not by comparing the calculated t with the t table with the condition that if the calculated t > t table, then the hypothesis is accepted. The critical value used when the sample size is greater than 30 and the two-tailed test is 1.65 for a significance level of 10%, 1.96 for a significance level of 5% and 2.57 for a significance level of 1% (Marliana, 2019). In this case, to test the hypothesis used a significance level of 5% where the t table value is 1.96 (Ghozali & Latan, 2015). The results of testing the influence of each variable in this study can be presented in the following table:

Table Hypothesis Test Results

	Influence	Original sample	T statistics	P values	Information
H1	Training -> HR Performance	0.474	6,423	0.000	Accepted
H2	Competence -> HR Performance	0.359	5,216	0.000	Accepted
H3	ICT x Training -> HR Performance	0.216	2,736	0.006	Accepted
H4	ICT x Competence -> HR Performance	0.180	2,388	0.017	Accepted

Source: Primary data processing with Smart PLS 4.1.0 (2024)

Decisions are made based on the calculated statistical test values and predetermined significance levels. Hypothesis testing is performed by comparing the predetermined t-table with the calculated t-value generated from the PLS calculation. Based on the data processing results table above, the results of each proposed hypothesis test can be identified as follows:

1) Hypothesis Testing 1:

H1: If training increases, human resource performance will increase. Good

In testing hypothesis 1, the original sample estimate value was obtained at 0.474. This value proves that training has a positive effect on the quality of HR performance, the results of which are also strengthened by the results of the t-test which obtained a calculated t value (6.423) > t table (1.96) and p (0.000) < 0.05, so it can be said that there is a positive and significant influence of training on the quality of HR performance. Thus, the first hypothesis which states that 'If training increases, human resource performance will improve' can be accepted.

2) Hypothesis Testing 2

H2: If competence increases, human resource performance will increase. Good

In testing hypothesis 2, the original sample estimate value was obtained at 0.359. This value proves that competence has a positive effect on HR Performance, the results of which are also strengthened by the results of the t-test which obtained a calculated t value (5.216) > t table (1.96) and p (0.000) < 0.05, so it can be said that there is a positive and significant influence of competence on HR Performance. Thus, the second hypothesis which states that 'If competence increases, human resource performance will improve' can be accepted.

3) Hypothesis Testing 3:

H3: ICT capability moderates the relationship between training and performance. human Resources

In testing hypothesis 3, the original sample estimate value was obtained at 0.216. This value proves that the implementation of ICT capabilities positively moderates the effect of training on the quality of HR Performance, the results of which are also strengthened by the results of the t-test which obtained a calculated t value (2.736) > t table (1.96) and p (0.014) < 0.05, so it can be said that there is a positive and significant moderating effect of the implementation of ICT capabilities on the relationship between training and HR Performance. Thus, the third hypothesis which states that 'ICT capabilities moderate the relationship between training and human resource performance' can be accepted.

4) Hypothesis Testing 4

H4: ICT capability moderates the relationship between competence and performance. human Resources.

In testing hypothesis 4, the original sample estimate value was obtained at 0.180. This value proves that the implementation of ICT capabilities positively moderates the influence of competence on the quality of HR Performance, the results of which are also strengthened by the results of the t-test obtained with a calculated t value (2.388) > t table (1.96) and p (0.017)

< 0.05, so it can be said that there is a positive and significant moderating influence of the implementation of ICT capabilities on the relationship between competence and the quality of HR Performance. Thus, the fourth hypothesis which states that 'ICT capabilities moderate the relationship between competence and human resource performance' can be accepted.

Discussion:

1) The influence of training on human resource performance

Training has been shown to have a positive and significant impact on the quality of human resource performance. This suggests that the clearer the training objectives, the more effective the methods used, and the more optimal the amount of training provided, the greater the improvement in work quality, quantity, and time efficiency.These results are supported by research which states that the higher the success of implementing job training programs for employees, the higher the increase in employee competence.(Karyono et al., 2020).

The training variable with the highest outer loading value is the qualifications suitability indicator, while the HR performance variable has the highest outer loading value, namely work quality. This finding indicates that the higher the level of match between an individual's qualifications and job requirements, the more optimal the quality of work produced. This reflects that relevant and appropriate training that aligns with competency needs will significantly support improved HR performance, both in terms of effectiveness, accuracy, and work results.

The training variable with the lowest outer loading value is the training objective indicator, while for the HR performance variable, the indicator with the lowest outer loading value is work quantity. This finding indicates that clarity and accuracy of training objectives play a crucial role in increasing work quantity. In other words, the clearer and more focused the training objectives, the more optimal the amount or volume of work that HR can produce, as they have a better understanding of the competency targets to be achieved through the training program.

2) The influence of competence on human resource performance

This research shows that competency has a positive and significant influence on the quality of human resource performance. This means that the higher the level of motivation, knowledge, skills, and attitudes and behavior of human resources, the more optimal the quality, quantity, and timeliness of the resulting performance.These results are supported by research which states that work experience and human resource competency have a significant influence on employee performance.(Ratu et al., 2020).

The competency variable showed the highest outer loading value for the knowledge and skills indicator, while the HR performance variable had the highest outer loading value for the work quality indicator. This finding indicates that increasing the knowledge and skills possessed by

HR directly contributes to improving work quality. In other words, the higher the level of knowledge and skills mastery, the more optimal the quality of performance achieved in carrying out their duties and responsibilities.

The competency variable with the lowest outer loading value is the motivation indicator, while the HR performance variable has the lowest outer loading value in the work quantity indicator. This finding indicates that increasing individual motivation is directly proportional to increasing work quantity. In other words, the higher the level of motivation of HR, the greater their drive to complete more work, which ultimately has a positive impact on overall organizational productivity and performance.

3) Moderation of ICT Capability in the relationship between training and human resource performance

The discussion of this research shows that the implementation of ICT (Information and Communication Technology) capabilities acts as a positive moderator that strengthens the influence of training on the quality of Human Resources (HR) performance. The ICT capability variable in this study is measured through three main indicators: information technology infrastructure, information technology knowledge, and information technology operational capabilities. Adequate technological infrastructure support, competent knowledge, and good operational skills enable HR to manage tasks more quickly, accurately, and innovatively.(Okafor, OU & Obikwelu, 2019).

These results confirm that training provided to human resources will yield more optimal results when supported by strong ICT capabilities. With adequate infrastructure, robust technological knowledge, and strong operational skills, human resources are able to apply training materials more effectively in daily work activities. This not only increases productivity but also drives superior performance quality, enabling organizations to adapt more quickly to the changes and demands of the dynamic digital era.

The ICT variable shows the highest outer loading value for the information technology knowledge indicator, followed by the training variable, with the qualification suitability indicator as the most dominant, and the HR performance variable, with the work quality indicator as the main determinant. This finding indicates that the higher the level of information technology knowledge possessed by HR, the stronger the influence of qualification suitability on improving work quality. This means that good technological mastery enables HR to more effectively utilize their skills and competencies, thereby encouraging the creation of more optimal performance and high competitiveness.

The ICT variable shows that the indicator with the lowest outer loading value is information technology infrastructure. For the training variable, the indicator with the lowest outer loading value is training objectives, while for the HR performance variable, the indicator with the lowest outer loading value is work quantity. These findings indicate that improving and strengthening information technology infrastructure can significantly strengthen the

influence of clarity and accuracy of training objectives on increasing the work quantity of HR. In other words, the more optimal the support of information technology infrastructure, the greater the impact of training programs on increasing workforce productivity.

4) Moderation of ICT capabilities in the relationship between competence and human resource performance.

The results of this study indicate that ICT capabilities act as a positive moderator in strengthening the influence of competency on improving the quality of Human Resources (HR) performance. This means that the ICT variables in this study, as measured by three main indicators: information technology infrastructure, information technology knowledge, and information technology operations, are able to strengthen the relationship between HR competencies and resulting performance. In other words, HR with high competency will demonstrate more optimal performance when supported by adequate ICT capabilities. This support enables HR to access information more quickly, operate systems efficiently, and adapt to dynamic technological changes, thereby significantly increasing productivity and work effectiveness. Adequate technological infrastructure support, adequate knowledge, and good operational skills enable HR to manage tasks more quickly, accurately, and innovatively.(Okafor, OU & Obikwelu, 2019)

The ICT variable showed the highest outer loading value for the information technology knowledge indicator, while the competency variable had the highest outer loading value for the knowledge and skills indicator. Conversely, the HR performance variable recorded the highest outer loading value for the work quality indicator. These findings indicate that improving information technology knowledge plays a significant role in strengthening the influence of knowledge and skills on improving work quality. In other words, the better the understanding and mastery of information technology possessed by HR, the more optimal the utilization of existing competencies in driving overall performance improvement.

The ICT variable showed the lowest outer loading value for the information technology infrastructure indicator, while for the competency variable, the motivation indicator had the lowest outer loading value. Meanwhile, for the HR performance variable, the work quantity indicator recorded the lowest outer loading value. These findings indicate that improving the quality of information technology infrastructure can strengthen the influence of motivation on increasing work quantity. In other words, adequate technological infrastructure support can encourage motivated individuals to work more productively and produce more optimal output.

4. Conclusion

This study proves that training and competence have a positive and significant influence on the quality of HR performance, and this influence is further strengthened by the implementation of ICT capabilities which act as a positive moderator in the relationship between training and competence with increased HR performance. Training has a positive

and significant impact on the quality of human resource performance.This means that the more frequent or better training provided to human resources, the more their performance will significantly improve. Training helps employees acquire greater knowledge, skills, and understanding, enabling them to work more effectively and efficiently. Competence has a positive and significant influence on the quality of HR performanceThis means that the higher the competency of human resources, whether in terms of knowledge, skills, or attitudes, the better their performance will be. Strong competencies enable human resources to carry out their duties and responsibilities optimally and professionally. The implementation of ICT capabilities positively moderates the influence of training on the quality of HR performance..This means that the ability to manage and utilize information and communication technology (ICT) can strengthen the impact of training on human resource performance. With the support of strong ICT capabilities, training outcomes can be applied more quickly to the workplace, resulting in significantly improved human resource performance. The implementation of ICT capabilities positively moderates the influence of competence on the quality of HR performance..This means that mastery of information and communication technology (ICT) also strengthens the influence of competency on human resource performance. Competent human resources will deliver maximum work results when supported by adequate technological capabilities, as ICT enables efficiency, accuracy, and innovation in work execution.

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