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The DEMATEL Approach in Evaluating the Dynamics of Zakat Payment Factors

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ABSTRACT

This research is designed to investigate and analyse the factors that affect the behaviour towards making zakat contribution from society via the Decision-Making Trial and Evaluation Laboratory (DEMATEL). The quantitative research method was adopted through engaging five experts in the field of zakat and Islamic financing in examining the relationship between seven factors; these include level of understanding and knowledge, religiosity, income and financial capacity, trust in zakat-related institutions, payment ease and accessibility, social influences and norms, as well as government policies and incentives. It was found that the three factors of level of understanding and knowledge, religiosity, and government policies and incentives belong to the cause factors because they drive the process. Meanwhile, the rest of the factors, such as trust in zakat-related institutions, income and financial capacity, payment ease and accessibility, as well as social influences are classified into the effect factors that are affected by other factors. More importantly, the trust in zakat institutions is the most prominent factor among all factors considered in this study. It is recommended that a holistic approach be taken where education and religion play major roles while government policies should be strengthened.

1. Introduction

One of the major pillars of Islam which contributes immensely to the socio-economic balance of the Muslim community is zakat. Besides being a religious requirement, zakat can be referred to as a wealth redistribution system capable of bridging the poverty gap and improving the welfare of the Muslim society [1]. Today, there have been many changes in the administration and distribution of zakat, involving even technological methods such as digital technology for paying zakat. However, the extent to which zakat has been paid in society still falls short of expectations, creating concerns as regards what determines the said behaviour.

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A number of factors affecting the payment of zakat include internal factors like religiosity, attitudes, and knowledge, and external factors like trust towards zakat organisations, social influence, and ease of payment. Religiosity and attitudes have a significant bearing on zakat payment behaviour [2,3]. These factors support the assertions of Ajzen's (1991) Theory of Planned Behaviour, which suggests that behaviour is determined by attitudes, subjective norms, and perceived behavioural control.

The knowledge and accessibility of digital platforms for making payments have also been identified as other essential determinants of paying zakat through online platforms in today's digital age [3]. In a systematic review of the determinants of zakat compliance [4,5], the determinants were classified based on three categories: psychological factors, environmental factors, and organisational factors. Financial literacy and zakat knowledge have also been recognised as key drivers in facilitating zakat compliance. According to Kharisma *et al.*, [6] and Shukor [7], increased financial literacy leads to better decisions about financial matters, including zakat.

Also, trust in zakat institutions has been noted to be another important determinant of paying zakat. The efficiency, transparency, and accountability of zakat institutions influence people's level of trust when making zakat contributions through the relevant channels [9,8]. Nonetheless, previous research on the determinants of zakat payment has considered such factors in isolation.

Consequently, in this research, the DEMATEL approach will be used to investigate the interaction among different factors affecting the payment of zakat. This approach facilitates the analysis of cause and effect relationships among different variables within a complex system.

2. Methodology

The decision-making trial and evaluation laboratory method (DEMATEL) has been used to undertake this study. DEMATEL can be described as an advanced approach to structural modelling that was initially developed in the Science and Human Affairs Program by Battelle Memorial Institute in Geneva during the period between 1972 and 1976 for analysing complex global problems [10]. With time, DEMATEL has developed from its initial use as a tool for solving complex problems to becoming a useful multi-criteria decision-making tool that allows researchers to develop structural models of a problem as well as impact-relation maps to understand the cause–effect relationship between factors.

The principle behind using DEMATEL in making decisions and analysing problems is the fact that it transforms qualitative judgments made about a problem into quantitative indices for the purpose of bringing out the interdependence and feedback relations among variables [11]. The reason why DEMATEL is preferred by researchers is that unlike traditional analytic approaches which tend to ignore the relationships among criteria, it acknowledges such relationships and therefore becomes very important in finding critical factors and understanding the relationship of each factor to other factors.

2.1 DEMATEL Method Procedure

The process of implementing the DEMATEL technique is a five-stage process which transforms the judgments provided by experts into a structural causal model. As such, this process identifies the relations and dependencies which exist between variables, as illustrated in Table 1.

The first step involves creating a direct relation matrix, based upon expert judgments, with respondents rating the intensity of direct influence between pairs of factors in accordance with an established ordinal scale, varying from 0 (no influence) to 4 (very high influence) [12].

The second stage is normalization, during which the elements of a direct relation matrix are divided by its maximum row sum [13], ensuring that the elements are constrained to one uniform range. Then, the total relation matrix is generated for the purpose of capturing direct and indirect effects between factors in the system through the following formula $T = X(I - X)^{-1}$, where X is a normalized direct relation matrix and I refers to the identity matrix [14].

In the fourth step, prominence and relation indexes are computed using the summation of D (rows) and R (columns) of the total relation matrix. The sum of index $(D + R)$ denotes the prominence level or importance of the factors in the system, whereas the subtraction index $(D - R)$ represents the net direction of the factor; whether the factor is causal or effect. It is important to distinguish between both types of factors, since they enable us to detect driving factors and dependent factors in the system.

Finally, the fifth step involves the construction of a causal diagram by mapping the prominence and relation indices onto a two-dimensional Cartesian plane. The horizontal axis represents prominence, while the vertical axis represents relation. This visual representation facilitates a comprehensive understanding of the structural relationships among factors and supports strategic decision-making by highlighting the most influential drivers within the system.

Table 1
DEMATEL evaluation steps

Step	Process	Description
Step 1	Construction of Direct-Relation Matrix	To identify the structural relationships among n criteria, an $n \times n$ matrix is first established. In this matrix, the influence of each element (row) on every other element (column) is evaluated. When multiple experts are involved, each expert completes the matrix, and the arithmetic mean of all responses is computed to produce the initial direct-relation matrix (X). $X = [0 \cdots x_{n1}, \vdots, \vdots, x_{1n} \cdots 0]$
Step 2	Computation of Normalized Direct-Relation Matrix	To normalise the matrix, the sum of each row and column is calculated. The maximum value among these sums is denoted as k . Each element of the direct-relation matrix is then divided by k to obtain the normalized matrix (N). $k = \max \{ \max \sum_j x_{ij}, \max \sum_i x_{ij} \}$ $N = (1/k) X$
Step 3	Computation of Total-Relation Matrix	Once the normalized matrix is obtained, the total-relation matrix (T) is calculated. This involves constructing an identity matrix (I) of size $n \times n$, subtracting N from I , and computing its inverse. The total-relation matrix captures both direct and indirect influences: $T = \lim_{k \rightarrow \infty} (N^1 + N^2 + \cdots + N^k)$ $T = N(I - N)^{-1}$
Step 4	Determination of Threshold Value	A threshold value is established to construct the Network Relationship Map (NRM). Weak relationships are filtered out, and only significant interactions are retained. The threshold is typically determined as the average value of the elements in matrix T . In this study, the threshold value is 1.4641. Values below the threshold are set to zero, as they are considered insignificant.
Step 5	Final Output and Causal Diagram Construction	The final step involves calculating the sum of rows (D) and columns (R) of the total-relation matrix (T): $D = \sum_j T_{ij}$ (row sum) $R = \sum_i T_{ij}$ (column sum) The values $(D + R)$ and $(D - R)$ are then derived. $(D + R)$ indicates the overall importance (prominence) of each factor, while $(D - R)$ represents the net effect, distinguishing between cause (positive) and effect (negative) factors. These values are subsequently used to construct the DEMATEL causal diagram.

1.1.1 DEMATEL sampling technique

Choice of the right sampling technique forms one of the key stages in conducting the DEMATEL methodology since the correctness and validity of expert opinions determine the credibility of the generated structural model. Purposive or judgmental and expert sampling is the most prevalent way used when conducting DEMATEL research. In this case, experts are purposefully chosen based on

their specialized knowledge and experiences, as well as deep understanding of the problem area being investigated [15,16].

It is debatable in the literature as to how many experts should be sampled in any DEMATEL application since there is no clear-cut answer. Normally, the number of experts used ranges between five and fifteen since such a number can be seen as sufficient [17].

Criteria that are usually used by researchers in selecting experts include more than five years of work experience in the relevant area, having a master's degree in the particular area of focus, being actively involved in making decisions on the issues under investigation, and demonstrating expertise through academic research publications or practical performance [18,19]. However, only five experts participated in this study as respondents.

1.1.2 DEMATEL questionnaire scale explanation

The DEMATEL technique will be applied for the evaluation of causal relationships among the selected factors. For this purpose, respondents should assess the impact of each factor on the others by means of a five-level scale. It includes the following meanings [20]:

- 0 – no influence (the factor does not affect the other one),
- 1 – low influence (low impact),
- 2 – moderate influence (moderate impact),
- 3 – high influence (high impact), and
- 4 – very high influence (very strong causality).

This quantitative scale allows quantifying the views of experts on the interdependence among the variables. The obtained answers are summarised to create the matrix of direct relations, which is further normalised and subjected to mathematical operations to obtain the total relation matrix. From this matrix, critical measures like prominence ($R + C$) and relation ($R - C$) can be obtained to classify causes from effects. The prominence measure represents the general importance of the particular factor to the whole system, while the relation measure will define the particular factor either as a cause or an effect.

This kind of analysis helps to understand the interrelationships between the different variables and aids in making decisions based on evidence.

3. Research Findings

Table 1

TOTAL RELATION MATRIX (T)

$T = X(I - X)^{-1}$ captures both direct and indirect influences between factors

	Tahap kefahaman dan pengetahuan Factor 1	Keagamaan	pendapatan dan keupayaan kewangan	Kepercayaan terhadap institusi zakat	Kemudahan dan Akses pembayaran	Pengaruh sosial dan norma masyarakat	Insentif dan polisi kerajaan
Tahap kefahaman dan pengetahuan Factor 1	0.9756	1.1000	1.1711	1.2554	1.0673	1.1260	1.0674
Keagamaan	1.0556	0.9062	1.0981	1.2114	1.0228	1.0879	1.0154

pendapatan dan kemampuan keuangan	0.8633	0.8262	0.7835	0.9817	0.8522	0.8849	0.8153
Kepercayaan terhadap institusi zakat	1.0902	1.0422	1.0938	1.0493	1.0495	1.0826	1.0104
Kemudahan dan Akses pembayaran	0.9482	0.9096	0.9878	1.0758	0.8102	0.9794	0.9048
Pengaruh sosial dan norma masyarakat	0.9328	0.9296	0.9559	1.0264	0.8945	0.8231	0.8667
Insentif dan polisi kerajaan	0.9494	0.9271	0.9898	1.0704	0.9454	0.9560	0.7905

$T = X(I - X)^{-1}$ captures both direct and indirect influences between factors.

The results obtained based on T reveal that the entire factors considered in the zakat payment model demonstrate both indirect and direct relations, and there is medium to a high influence among them. The range from 0.78 up to 1.25 shows that none of the considered factors acts independently but rather interacts as part of a complicated system impacting the decision to pay zakat.

The analysis further shows that the level of knowledge represents one of the key driving factors and exerts significant influence on some other variables, especially trust in zakat institutions (1.2554) and income and financial capability (1.1711). Therefore, efforts aimed at improving the knowledge of the target population will result in positive changes in other aspects of the system.

Moreover, religion also proves a substantial influence on the variable "trust in zakat institutions" (1.2114), meaning that the spiritual dimension is also very influential when trying to establish trust between the population and the organizations that manage zakat payments. Thus, trust in zakat institutions can be viewed as an influential factor receiving influence from various variables. In contrast, the level of influence for income and financial ability is relatively low, implying that economic variables are not the main factors in determining the behaviour of people in paying zakat. Instead, they become secondary variables in the system.

Payment convenience, social influence, and governmental incentive are considered to have moderate influences. Therefore, these variables become facilitating factors that enhance the process of paying zakat. In other words, they do not act independently but work together in reinforcing the system of paying zakat.

It can be concluded that the use of a holistic perspective that encompasses the knowledge, religiosity, and trust aspects of people will be highly beneficial for improving the compliance of paying zakat in society.

Table 2

Analysis results

Threshold Value: 1.0029 | Total Experts: 5 | Total Factors: 7

Factor	R (Influence)	C (Influenced)	R+C (Prominence)	R-C (Relation)
Tahap kefahaman dan pengetahuan Factor 1	7.7627	6.8151	14.5778	0.9476
Keagamaan	7.3974	6.6408	14.0382	0.7566
pendapatan dan keupayaan kewangan	6.0071	7.0800	13.0871	- 1.0730
Kepercayaan terhadap institusi zakat	7.4180	7.6704	15.0884	- 0.2524
Kemudahan dan Akses pembayaran	6.6158	6.6419	13.2577	- 0.0261
Pengaruh sosial dan norma masyarakat	6.4290	6.9399	13.3689	- 0.5109
Insentif dan polisi kerajaan	6.6286	6.4705	13.0991	0.1581

DEMATEL Results Analysis: Based on the values of R, C, (R + C), and (R – C), one gains better insights into the role of each factor in the decision-making process about the payment of zakat. In terms of prominence (R + C), the variable for trust in zakat institutions is ranked first since it achieves the highest value (15.0884). This is mainly because it is highly involved in the system as both influencer and receiver of influence, thus making it the most important factor of the entire system. Then, understanding and knowledge (14.5778) and religiosity (14.0382) are also considered as very influential in determining the success of the zakat payment process in Malaysia.

As per the relation (R – C), understanding and knowledge (0.9476), religiosity (0.7566), and government incentives/policies (0.1581) belong to the cause category since their values are positive. It means that these three factors have great impacts on the rest of the variables of the system because they can be seen as the main driving forces of the system.

On the contrary, the income and financial capability (-1.0730), trust in the zakat organizations (-0.2524), payment convenience and accessibility (-0.0261), as well as the social influence and societal norms (-0.5109) fall under the category of effect variables due to their negative values. These variables seem to be influenced more by some other factors, and not vice versa.

Surprisingly, even though the trust in the zakat organizations represents the most prominent variable among all, it belongs to the group of effects. This shows that the trust is not a constructively formed aspect, but rather the result of another aspect that has some influence on its development, primarily education and religiosity. This is quite an important finding which implies that improving people's trust towards zakat institutions should start with introducing some educational aspects.

Also, income and financial capability that present the most negative relation, can be regarded as the most dependent variables among others. In general, it can be concluded from the analysis that internal variables like comprehension and religiosity play as the core driving forces in shaping the decision making on zakat payments, while the external variables like ease, social norm, and trust are outcomes of the interaction processes. It is important then that for any sustainable increment in zakat adherence, one should take a strategic focus in developing knowledge and religiousness.

Table 3

Cause and effect relationship

Criteria	ri	ci	ri + ci	ri – ci	Cause / Effect
Tahap kefahaman dan pengetahuan Factor 1	7.76	6.82	14.58	0.95	Cause
Keagamaan	7.40	6.64	14.04	0.76	Cause
pendapatan dan keupayaan kewangan	6.01	7.08	13.09	-1.07	Effect
Kepercayaan terhadap institusi zakat	7.42	7.67	15.09	-0.25	Effect
Kemudahan dan Akses pembayaran	6.62	6.64	13.26	-0.03	Effect
Pengaruh sosial dan norma masyarakat	6.43	6.94	13.37	-0.51	Effect
Insentif dan polisi kerajaan	6.63	6.47	13.10	0.16	Cause

The cause and effect relationship analysis of the DEMATEL model results reveals that the zakat payment factors are classified into two categories, which include the cause (driver) factors and the effect (receiver) factors. From the R-C values, the understanding and knowledge level (0.95), religious factors (0.76), and government encouragement and policies (0.16) fall under the cause category, meaning that these factors are the major drivers that influence other factors in the system. Notably, the understanding and knowledge level was rated highest among the factors in the cause category, suggesting that education and awareness on zakat contribute greatly to zakat payment.

On the other hand, the income and financial capacity (-1.07), trust in zakat institutions (-0.25), ease of payment and accessibility (-0.03), as well as social and community influence (-0.51), are among the effect factors. It means that these factors are less autonomous and likely to be affected by other factors in the system. Despite having the highest value for prominence, the trust in zakat institutions factor still falls under the effect category. This implies that the trust developed by the general public regarding zakat institution is a result of the influence from the factors such as knowledge and religion. It is clear that for any attempt to improve the trustworthiness of the zakat institution must include attempts to develop the awareness and religiousness of people.

In addition, the factor of income and financial resources, with the lowest R-C index, proves that this factor is most influenced by other factors. This indirectly debunks the widespread idea that economic capability is the key to making the decision to pay zakat. Rather, it is proven here that non-economic factors such as knowledge, religiosity, and institutional trust play a greater role in this process. At the same time, the two supporting factors of the accessibility of payment methods and social influence remain almost neutral, which proves their ability to assist in developing the system but not to be the primary factor in its development.

Thus, it becomes clear that a strategy focused on the cause factors, which will allow improving the level of understanding, instilling religiousness, and developing proper governmental policies, is essential in creating a strategy aimed at increasing zakat payment. At the same time, the factors belonging to the effect group must be seen as results that can be improved through measures aimed at driving factors.

4. Analysis and Discussion

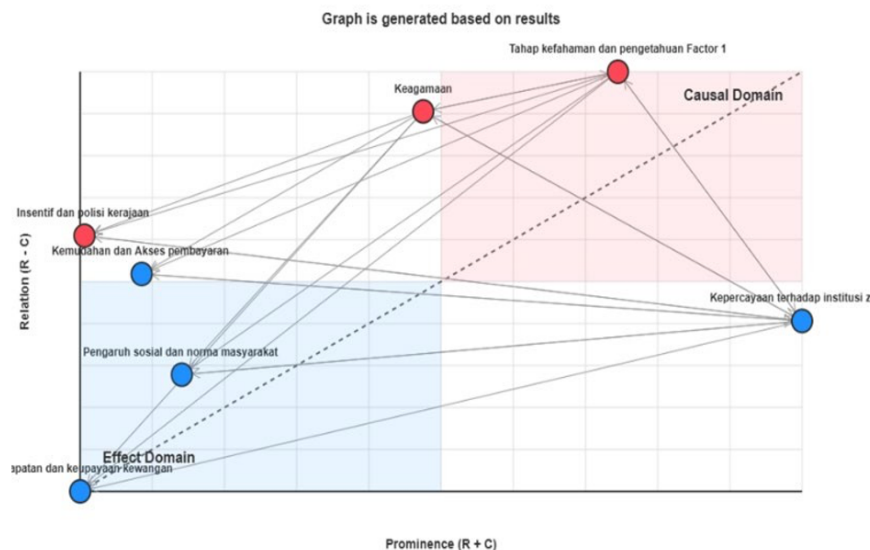


Fig. 1. Network diagram (Prominence vs Relation)

Figure 1, which presents the Network Diagram (Prominence vs. Relation), is a useful illustration for showing the positions of factors depending on their prominence ($R+C$) and cause-and-effect relations ($R-C$). According to Figure 1, all factors that are above the horizontal line in the graph have positive $R-C$ values, meaning that they should be grouped as cause factors. Conversely, all factors that fall below the horizontal line should be grouped as effect factors because they have negative $R-C$ values. In the current case, the level of understanding and knowledge, religiosity, and incentives from the government are classified as causes because they determine the functioning of the entire process of zakat payments.

Finally, according to prominence ($R+C$), the trust towards zakat institution factor is the furthest right point in Figure 1. It implies that even though the trust towards zakat institution is the least important element among all factors (as per cause-and-effect relation), it is still the most crucial one among all factors in the network. Other factors, including factors such as income and financial capability, social and community pressure, and accessibility and availability for payment, are arranged at the bottom of the diagram, which further proves that these factors are much more likely to be affected by the driving factors.

On the whole, this diagram supports the results obtained in the DEMATEL analysis that internal and spiritual factors form the main basis affecting the decision-making concerning zakat payments, while external factors can be seen as an additional tool for making the process more powerful. Thus, actions aimed at enhancing the understanding and spiritual background of individuals should be used to affect the issue in question.

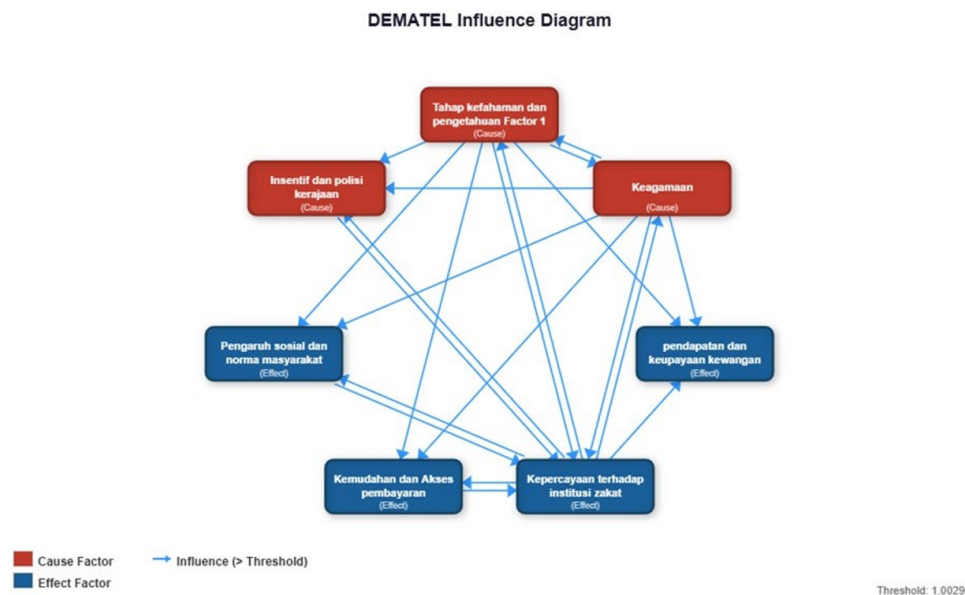


Fig. 2. Influence diagram

As shown in the above Influence Diagram, the direction and degree of interaction of the factors affecting the payment of zakat in light of the threshold of 1.0029 have been further elaborated. Here, the arrows represent the direction of influence of the factors, whereas those factors whose relationships exceed the threshold value have been shown. This helps in focusing more on the truly meaningful relationship within the system.

From the above diagram, it is evident that understanding and knowledge, religiosity, and governmental encouragement and policy are all cause factors which impact other factors in the system. Amongst these three factors, the level of understanding and knowledge is considered to be the most dominating node due to the fact that there are many arrows emerging from this node which show its relationship with other factors such as institutional trust, income/financial capability, and social influence.

Moreover, the religiosity factor proves to be another important determinant of various effect factors, such as trust towards zakat institutions and income and financial capability. The significance of this determinant enhances the importance of spiritual values as a base for building attitudes and behavior toward zakat payment. However, even though the factor of governmental incentives and policies exhibits less influence, it is still quite influential concerning its impact on other factors, especially when serving as a catalyst for optimizing the support structure.

Finally, the factor of trust towards zakat institutions represents the most influential effect factor, receiving influences from different cause factors. The above position confirms the assumption that public trust results from a complex interaction between education, religiosity, and governmental policies. The same applies to the factors of convenience and ease of payment and social influence and community norms, both of which exhibit influences from different sides. In turn, the factors in question play the role of support factors, contributing to the development of the zakat payment environment. The factor of income and financial capacity represents the last effect factor, implying that it cannot serve as a primary driver.

In conclusion, it is evident from the diagram that the pattern of interaction among the factors follows a hierarchical interdependence where the cause factors serve as the base that induces a change in the effect factors. Consequently, in order to enhance zakat donation, emphasis should be

placed on enhancing the driving factors like knowledge, religiosity, and government policy. This is because any enhancement made to these factors would result in a domino effect on the other factors within the system.

5. Conclusion

In summary, the study has succeeded in establishing the structural relationship between the variables affecting zakat payment through the use of the DEMATEL technique. It was established from the results of the analysis that the factors responsible for zakat payment include understanding/knowledge, religiosity, government incentive/policies, all of which are the causes having a great influence on other factors. However, trust in zakat institutions, financial capability, accessibility, and social pressure belong to the effect category, meaning that this group is more likely to accept influences from other variables.

It is noteworthy that despite being the key variable in terms of its overall prominence/impact, trust in zakat institutions appears to depend on other variables such as understanding and religiosity. Therefore, it can be suggested that building trust in the institutions responsible for collecting zakat requires addressing educational issues and fostering a sense of religiosity. Moreover, contrary to popular belief, it was also established that non-economic factors are predominant rather than economic ones when determining zakat payment.

The implications of this study suggest that zakat authorities need to emphasize zakat educational programs, the strengthening of religious values, as well as the improvement of government policies and incentives to increase the level of zakat payment compliance. This study also paves the way for further research using different methodological approaches to validate the findings obtained.

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