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Assessment of trust level based on 3d models of social relationships factors in public institutions

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A B S T R A C T

Trust is a key attribute of social cohesion that is a major phenomenon in social relationships. This research aims to trust levels in social relationships and understand how social relationships affect trust levels. This research uses the theory of social relationships as an understanding of the level of trust in modern organizations, the theory of trust based on three dimensions namely trust in information, motives, and competence. Statistical descriptive qualitative research method is used as an approach supported by Delphi analysis, Analytical Hierarchy Process (AHP), and TOPSIS (Technique for Others Preference by Similarity to Ideal Solution). In identifying factors in the social relationship between policy and community, nine social relationship factors were obtained, including Communication (A1); Trust (A2); Cultural (A3); Procedural Justice (A4); Problem-Solving (A5); Transparency (A6); Engagement (A7); Collaboration (A8); Empowerment (A9). On the one hand, in the context of relative importance, the weight value at the criteria level is trust in Information (C1) (19.8%); Trust in Motives (C2) (31.2%); Trust in Competence (C3) (49%). Based on the results of the 3D trust level-based mapping analysis on social relationships, of the nine alternatives there are no factors with complete level (level 5) and Ignorance (Level 1). Overall, there are two alternative social relationship factors with high trust level (level 4), namely Trust (A2) and Collaboration (A8). These findings suggest that social relationship factors, such as trust (A2) and Collaboration (A8), play an important role in increasing the trust value of institutions related to trust from the community.

1. Introduction

Social relationships encompass a wide range of phenomena involving interactions, connections and networks between individuals within a community or society. These phenomena can include bonding social capital, bridging social capital and linking social capital, which represent different types of relationships and connections within a social structure (Jones et al., 2023; Rowan & Kwiatkowski, 2020). Social relationships can involve elements of trust, reciprocity, support and shared values, which contribute to the formation of social capital (Ayalew & Andualem, 2023) characterized by the quality and strength of connections, levels of trust and reciprocity, and levels of social support and cooperation between individuals (Bastos et al., 2022; Rowan & Kwiatkowski, 2020). Trust is a key attribute of social cohesion (Burchi et al., 2022), as participation in community activities, social trust, and a sense of belonging are key phenomena in social relationships (Ahrnberg et al., 2021).

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Trust is seen as an expectation that others will act as predicted and acceptable to both parties (Bedué & Fritzsche, 2022; Paliszkiewicz & Klepacki, 2013). The formation of trust is influenced by dimensions of trust, such as competence, benevolence, and integrity, which affect different types of trust relationships in organizations (Lewicka & Zakrzewska-Bielawska, 2022). Trust develops over time, while mistrust is episodic, which highlights the importance of understanding attribution processes in the interaction of building trust and mistrust (Han et al., 2021). Trust was identified as a key variable in observing protests and explaining public concerns regarding social acceptance and risk (Vallejos-Romero et al., 2020). It also shows the downside of excessive trust and the potential benefits of distrust that are often overlooked in policy practice (Lehtonen et al., 2022).

Social connections are critical to understanding the impact of social connections and emphasize the importance of considering social systems at the individual, family, community and societal levels. However, it is necessary to assess the relative influence of various components of social relationships (Holt-Lunstad, 2018) for trust- based relationships (Hayward et al., 2022). Montesi et al. (2013), explain the importance of examining the relationship between levels of social anxiety and relational distress. Adams et al. (2010), in their research explained the importance of the level of analysis, components, processes, antecedents, trust-performance relationships, and measures of interorganizational trust. However, it is necessary to explore the improvement of relationships in organizations, analyze the effect of long- term violations on the level of trust to understand the dynamics of trust givers and trust recipients. Oláh et al. (2021), explain the need for studies to establish the causality of trust levels in organizations in the domain of social relationships (Anyan & Hjemdal, 2022). Akrout & La Rocca (2019), also explain the need for research in the field of high-involvement customer-supplier relationships to improve understanding of the outcomes of trust levels. In addition, there is also a need to focus on measuring trust based on diverse samples according to the type or level of relationship to improve generalizability (Lewicka & Zakrzewska-Bielawska, 2022). There are opportunities to focus on the role of trust by identifying factors that build trust, emphasizing the dimensions of trust and building more transparent relationships (Vallejos-Romero et al., 2020).

The purpose of this research is to analyze trust levels in social relationships based on three dimensions. This research is important to understand how social relationships affect the level of trust in an organization in maintaining the stability of the organization. This research is also important to explore how social relationships can act to influence the perception of organizational trust levels. In addition, this research is necessary to understand the strong influence of social relationships on the dimensions of trust, highlighting the importance of social relationships as a factor in the level of trust. It is important to explain the meaning of social relationships and organizational trust levels in information, motives, and competencies. Understanding the importance of trust in social relationships and how different dimensions of trust affect different types of trust levels. Discussing the elements responsible for measuring trust in organizations and for explaining the dimensions of trust in social relationships to understand the theoretical foundations of trust is also an important concern (Tanny, 2023).

This research uses the theory of social relationships as an understanding of the level of trust in modern organizations, the theory of trust is based on three dimensions, namely trust in information, motives, and competence. Statistical descriptive qualitative research method was used as an approach supported by delphi analysis, Analytical Hierarchy Process (AHP), and TOPSIS (Technique for Others Preference by Similarity to Ideal Solution). A total of twelve expert panels in the study with the help of google forms for social relationship and trust level between community and police in East Java region.

Several contributions were made to the research. First, this research provides contributions related to the study of social relationships, emphasizing the importance of analyzing patterns of trust levels to understand social interactions in organizations and communities. Second, this research contributes by highlighting that trust is a multidimensional and dynamic construct, showing how trust can go hand in hand with social relationships in organizations. Third, this research highlights the contributions associated with social relationships and discusses theoretical models that establish the causal effects of social relationships on trust in organizations, along with empirical evidence supporting the analysis of social relationships on trust. Fourth, the paper discusses the dimensions of trust in governance, focusing on institutional trust and social relationship trust, providing a comprehensive model for practical application. Emphasizing the importance of understanding the basics of trust in governance, coordinating trust in social relations with public institutions, and linking different forms of trust as a practical application.

2. Literature review

2.1 Social relationship

Change is an inherent variable in the process of managing long-term social relationships. Most approaches to interpreting change in social relationships are inadequate, in part because they describe the development of relationships from inception to stability (Nkhata et al., 2008). Humans are social beings by nature, hence, meaningful social relationships. Inadequate social relationships are a risk factor for many problems and even premature death (Sirola et al., 2023). Social relationships are important for the perception of safety. For humans, stable and supportive relationships are essential for survival, as they facilitate the collaboration needed to secure resources and protection (Smith & Pollak, 2021).

A general description of social relationships has shown that the specific rules for each relationship reflect the particular difficulties inherent in each relationship (Henderson & Furnham, 1985). Quantitative characteristics of social relationships, for

example, are the frequency, intensity or durability of social contact. Quantity measures are used extensively in socio-epidemiological research and usually form an index that provides information about the degree of social integration. In addition, concepts are further developed and promoted to assess the qualitative characteristics of social relationships (Vonneilich et al., 2011). Thus, social relationships are adaptive and crucial for survival (Holt-Lunstad, 2018).

The systems theory approach to social relationships organizes multiple complex conceptualizations into a hierarchy of levels of influence. These relationships are open systems in which information, energy and materials are exchanged between nested levels or systems within the environment (Holt-Lunstad, 2018). Communities are affected by institutional decisions, and institutions themselves cannot survive without the social and technical infrastructure of communities. These interdependent social relationships create various moral obligations not only for existing community members but also for future generations by ameliorating the impacts of social disruption or making positive contributions to community life (Hendry, 2001). However, meaningful social relationships involve bodily and physical interactions in shared living spaces with others that differ in intensity and meaning from virtual encounters (Sundler et al., 2023).

2.2 Public trust

Public trust is generally considered an essential component of effective governance in all key areas of public policy (Mah et al., 2021). Public trust is another important concept that refers to the extent to which people trust authority in institutional management (Mohammadi et al., 2020). Without public trust, people may be trapped in an undesirable balance, and with the help of trust, better results can be achieved (Hou et al., 2020). Public trust in the government will fade if a country that has abundant human resources is not properly utilized, their working hours are wasted (Tanny & Al-Hossienie, 2019). A high level of public trust is considered evidence that the government is working effectively, efficiently and democratically. Conversely, low levels of trust are considered an indicator that the government must be doing something wrong or that public services are not being delivered properly (Ramesh, 2017). Discussing public trust to active citizenship, democracy and solidarity, and emphasizing the importance of public trust for social life in the public sphere are also themes raised by other trust theorists (Gille et al., 2017). Trust in government, particularly public trust in government during crises has become a popular topic for theoretical and empirical research in public administration and communication (Vu, 2021). There is a growing consensus that trust determines the successful performance of organizations (Saechang et al., 2021). From this perspective, public trust in government can serve as a key factor in successful governance. As public trust in government reduces transaction costs among policy actors, it encourages governments to strive for efficient governance (Lim et al., 2016). Public trust can be assessed by the extent to which citizens believe that public institutions can operate in the best interests of society and their constituents (Lim et al., 2016; Thomas, 1998). Public trust in government is the public's trust in government communications, policies, and regulations (Vu, 2021).

2.3 Dimensions of trust

Trust is known to have three dimensions. Yet what develops these three dimensions of trust is still relatively unknown, especially at different stages of the relationship life cycle (Dowell et al., 2013). There is substantial agreement that trust is a multidimensional construct (Clark et al., 2010). The three dimensions of trust include utilitarian and affective elements in different degrees, which can be said to be important for understanding how trust informs relational behavior (Uche et al., 2021). Knowing the dimensions of trust can allow organizations to focus on how to build and enhance trust with their partners in an optimal way (Steinbruch et al., 2021). The dimensions of trust and trustworthiness are numerous. Three components are seen as the main determinants of trust (Malkamäki et al., 2021). In this study, it was found that trust in three key dimensions, (i) trust in information, (ii) trust in motives, and (iii) trust in competence were found to be important in the deliberation process (Mah et al., 2021).

Table 1
An overview of the three dimensions of trust and their associated indicators

Trust dimensions	Trust indicators	Sources
Trust in information	Transparency	Irwin (2006); Mah & Hills (2014); Rowe & Frewer (2000); Kim (2005)
	Comprehensiveness	
	Objectivity and reliability	
Trust in motives	Openness	Schweizer et al. (2016); Kim (2005); Irwin (2006); Mah & Hills (2014); Rowe & Frewer (2000)
	Integrity	
	Inclusiveness	
	Representativeness	
	Credible political commitment	
	Perceived policy outcomes	
Trust in competence	Capability in effectiveoperation	Kim (2005)
	Capability in risk management	

Source: Mah et al. (2021)

3. Methodology

This research was conducted in several community areas in East Java, which has the second highest population in Indonesia but with a good level of inter-institutional and community relations. The purpose of this research is to provide a trust level assessment on the social relationship aspect based on three trust criteria based on the 3D model. This research is statistical descriptive qualitative research by applying a decision- making method with three stages, namely: a) identification of factors on social relationships with the Delphi method; b) Analytical hierarchy process (AHP); c) TOPSIS. The dimensions of trust and priority analysis are calculated using the AHP method, which is then analyzed by TOPSIS to provide a classification of trust levels in social relationship factors and map them in a 3D matrix such as Octavian et al. (2020) and Putra et al. (2023). Questions related to trust level analysis on social relationship factors are framed on a five-point Likert scale ranging from 1 to 5 in Table 3. Table 3. Eight experts were selected such as Tseng et al. (2022), regarding the field of relationships in security institutions through purposive sampling who were contacted via email and google form (Akter et al., 2022) for data collection. Most of the experts in this study are high-ranking officials in the field of regional security. Two experts (two high-ranking officials who have been working for more than 5 years) and two PhDs for provincial security competencies were consulted. Their opinions and suggestions helped the authors build the threat hierarchy and refine the trust level analysis model on the social relationship factor between security institutions and the community.

3.1 Delphi

The Delphi method is an approach to decision-making that engages multiple experts in a process where they do not meet face-to-face and their identities remain confidential from one another. This strategy is designed to prevent any single expert'sdominance and to reduce the potential for biased opinions (Al-Jawhar & Rezouki, 2012). It recognizes that experts might have differing views due to their unique expertise, perspectives, or interpretations of evidence. Consequently, achieving consensus through the Delphi method does not necessarily confirm the accuracy or validity of the outcomes. Instead, it signifies a level of agreement among the experts involved (Grossard et al., 2023). As outlined by Pfeiffer in Karakikes and Nathanail (2020) the Delphi method encompasses three primary stages:

a. The first questionnaire was sent to the expert panelists to ask for some opinions(from experience or judgment), some predictions and recommendations.
b. In the second round, a recap of the results of the first questionnaire was sent to each expert panelist to be able to re-evaluate their first assessment on the questionnaire using the set criteria.
c. In the third round, the questionnaire was sent back with information about the panelists' assessment results and the consensus results. The panelists were again asked to revise their opinions or explain the reasons for disagreeing withthe group consensus.

In this study, the Delphi method was used to identify factors related to cyber threats indigital navigation. In the identification of factors, the Delphi method was used up to three rounds.

3.2 Content validity index (CVI)

In this study, the researcher employed in-depth interview techniques and utilized written questions to gather information on the research subject. Informants responded to these questions via Google Forms, allowing for the subsequent analysis of their answers. Data collection took place from January to July 2024, targeting specific sources. Prior to distributing the questionnaires, the questionnaire items were validated using the Content Validation Index (CVI) technique, adhering to the methodology proposed by Shrotryia and Dhanda (2019).

To assess the convergence of expert opinions across Delphi rounds, statistical measures such as the mean and standard deviation were calculated. A panel of experts independently evaluated the significance of each research objective, employing a 5-point Likert scale for their assessments (Rocha et al., 2020). The item- level content validity index (I-CVI) and the scale-level average content validity index (S-CVI/Ave) served as the primary tools for assessing content validity. For an S- CVI/Ave to be considered acceptable, it must exceed 0.90. Additionally, the criteria for I-CVI vary based on the panel size: for panels with ≤5 experts, an I-CVI of 1.00 is required, whereas for panels with more than 5 experts, an I-CVI of ≥0.78 is deemed satisfactory. Consensus is acknowledged when an item achieves a mean score above 4 in the expert evaluations, copled with over 51% of the experts assigning a score of 4 or higher, thus identifying it as a crucial component of research (Yang et al., 2022).

3.3 Analytical Hierarchy Process (AHP)

AHP is Multi-Criteria Decision Making Analysis or Multi-Criteria Decision Making (MCDM). At the pairwise comparison stage, a pairwise eigenvalue approach is used. It also provides a methodology for calibrating numerical scales in quantitative and qualitative performance measurements (Tyagi et al., 2018). The scale ranges from 1/9 for least worth comparing, 1 for equal, and 9 for

absolutely more important than, covering the entire comparison spectrum. This method was created by Saaty (2013) at the University of Pittsburgh (Gnanasekaran & Venkatachalam, 2019). AHP provides a relatively simple yet theoretically robust multi-criteria methodology for evaluating alternatives. It allows decision-makers to use simple hierarchical structuresto deal with complex problems and evaluate quantitative and qualitative data systematically under multiple conflicting criteria (Saini, 2022). The following are the AHP steps in brief:

a. Determine goals, criteria, and alternatives.
b. Create a questionnaire that will be used as research data.
c. Data processing by carrying out pairwise comparisons (reciprocal) of criteria that have been determined and assessed by experts to produce qualitative figures.
d. Carry out a consistency analysis using the CR (Consistency Ratio) value, witha formula:

$$CR = \frac{CI}{RI} \tag{1}$$

CI (Consistency Index),

$$CI = \frac{\lambda\, maximum - n}{n-1} \tag{2}$$

RI (*Random Index*) is obtained from table values.

Table 2
Random Index Values

N	3	4	5	6	7	8	9	10
RI	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

The threshold value of CI is 0.1. It can be interpreted that the level of confidencein decision-making is 90% (with 10% errors/inconsistencies). When used, the CI value must be below 0.1 to get the desired results.

3.4 Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)

In the TOPSIS process, performance rankings and criteria weights are given as appropriate values for solving multi-objective nonlinear programming problems. TOPSIS provides the decision maker with the closest alternative that is considered the best according to the score illustrated by his decision. Thus, if one decision maker gives a score to each alternative, the result will be a ranking of alternatives based on that score. If other decision-makers give different scores, then the ranking of the alternatives will be different (Marzouk & Sabbah, 2021). TOPSIS is a tool for decision-making that uses the concept of a proximity index to a positive ideal solution (Lai et al., 1994). This concept was developed by Hwang and Yoon (1981) by assuming that, in a decision-making problem with m criteria and n alternatives, several alternative points n can be mapped on a space of m dimensions. Hwang and Yoon assume that the optimal solution is the solution that has the shortest distance to the positive ideal solution and the furthest distance to the negative ideal solution (Sivalingam & Subramaniam, 2024). The following are the TOPSIS steps in brief:

a. Calculating the normalized vector matrix.

The normalized vector used to calculate, r_{ij}, calculated as follows:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x^2\, ij}}, i = 1, \dots, m; j = 1, \dots, n \tag{1}$$

b. Calculates normalized ratings with weights

The weighted normalized rating can be calculated with a formula:

$$v_{ij} = wjrij, i = 1,, m; j = 1,, n \tag{4}$$

v_{ij} is the weight of the *j* attribute

c. Identify positive ideal solutions and negative ideal solutions.

$$A^+ = \{(\max v_{ij} \,|\epsilon J_1), (\min v_{ij} \,|\epsilon J_2) \,|\, i = 1, \dots, m\} \quad (5)$$

$$A^+ = \{(\min v_{ij} \,|\epsilon J_1), (\max v_{ij} \,|\epsilon J_2) \,|\, i = 1, \dots, m\} \quad (6)$$

J_1 is a positive attribute (benefit), J_2 is a negative attribute (cost)

d. Calculate distance

The concept of calculating the distance between a positive ideal solution and a negative ideal solution using the Euclidean formula is as follows,

$$di^+ = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j)^2}, i = 1, \dots, m \quad (7)$$

$$di^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j)^2}, i = 1, \dots, m \quad (8)$$

e. Calculate the proximity index

Calculating the proximity index to the positive ideal solution with the formula;

$$Si^+ = \frac{di}{di^+ di^-}, i = 1, \dots, m \quad (2)$$

Sort the results by order Si^+ largest as the optimal solution.

3.5 Flow chart

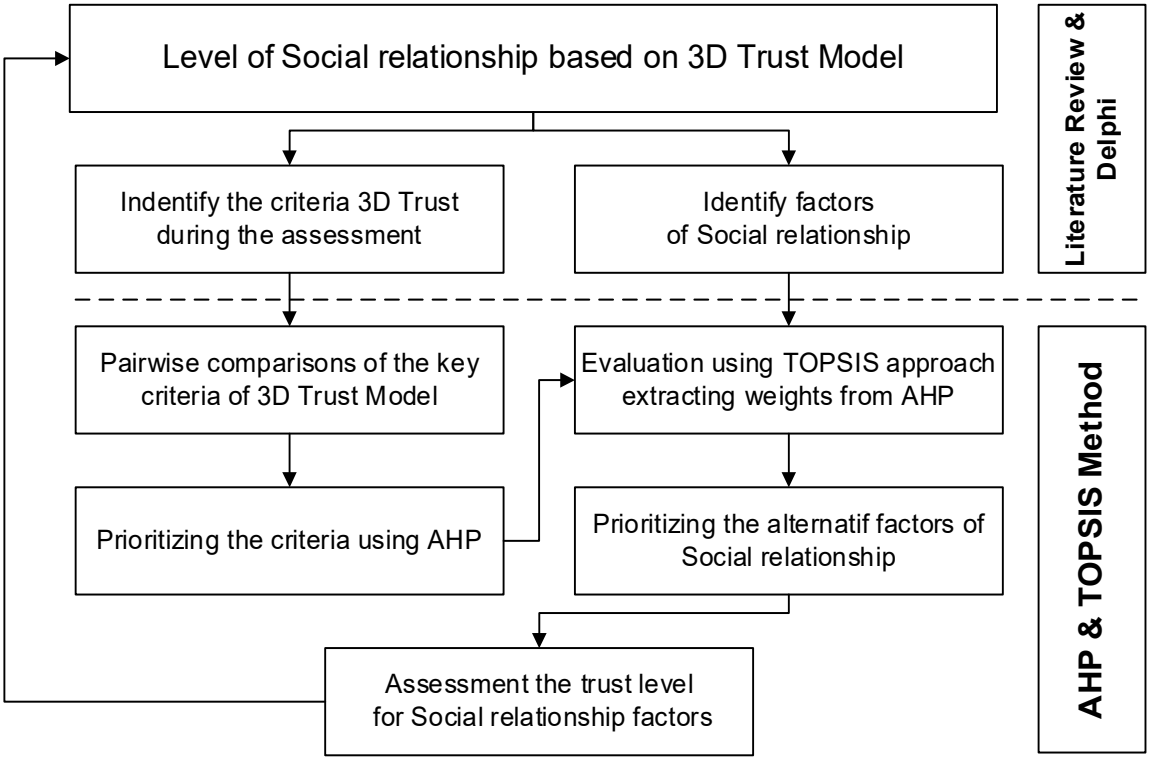

Fig. 1. Conceptual framework of Trust Level for Social Relationship
Adopted from Biancini (2016); Singh & Sarkar (2019), and Putra et al. (2023)

This research also develops a model that is able to provide assessment and measurement of trust levels on social relationship factors. The model mechanism illustrated in the flow chart shown in Figure 1 is divided into three phases modified byMenon & Ravi (2022) and Boutkhoum et al. (2017). The proposed conceptual framework of this study is presented in Figure 1. The research objectives consist of three parts, including:

- Stage 1 - This article discusses the assessment of trust levels, identifies socialrelationship factors in the 3D model (trust in information, trust in motives, trust in competence), defines criteria, and dimensions of trust through literature review and discussions with experts to generate an overview of all criteria thatneed to be considered in social relationship factors. This stage ends when a consensus on the social factors of the relationship has been reached.
- Stage 2 - Through literature review, criteria and dimensions of trust in social relationships. A questionnaire is administered to obtain responses to identify criteria and generate a hierarchical structure, followed by calculating the relative importance/weight of the criteria.
- Stage 3 - Analysis of trust level in social relationships evaluated based on parameters against 3D-based trust criteria. TOPSIS is adopted to rank and measure the level value in the decision-making process and map the social relationship factors.

Table 3
Scale of pairwise comparison for AHP and Likert scale for TOPSIS.

AHP Scale	Description	Likert	Trust Level
9	The evidence favoring one activity over another is the highest possible order of affirmation (absolutely more important)	5	Extreme
7-8	An element is a favor very strongly over another, and its dominance is demonstrated in the practice (demonstrated importance)	4	High
5-6	Experience and judgement strongly favor one element over another (essential, strong more important)	3	Medium
3-4	Experience and judgement slightly favor one element over another (moderately more important)	2	Low
1-2	Two elements contribute equally to the objective (equal importance)	1	Very Low

Source: modified from Octavian et al. (2020); Susilo et al. (2019)

Table 4
Trust levels for social relationship

Level	Trust Level	Description	Color
5	Complete	Completely trust this entity.	
4	High trust	More trustworthy than most entities.	
3	Mediumtrust	Mean trustworthiness. Most entities I know of havethis trust level	
2	Low trust	Not very trust worthy. Lowest possible trust.	
1	Ignorance	Cannot make trust-related judgments aboutentities.	

Source: modified from Abdul-Rahman & Hailes (1998; 1997); Iltaf et al. (2012)

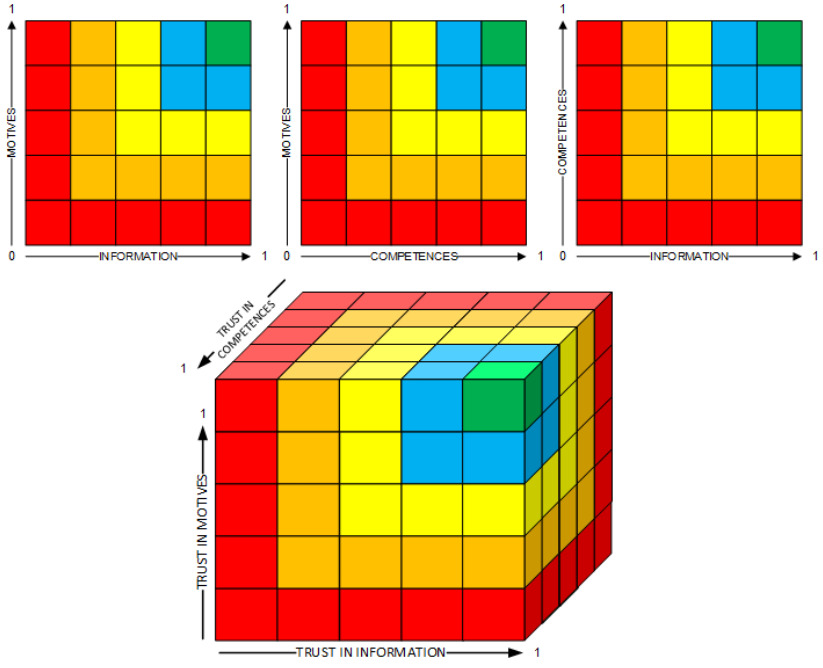

Fig. 2. 3D Trust model of social relationship in state institutions & society

Modified from Amirshenava & Osanloo (2018), Crotty & Daniel (2022), Putra et al. (2023).

4. Results and discussion

4.1 Identify social relationship factors

The proposed framework is used to identify factors in the social relationship between policies and publics to be adopted in the 3D model of trust aspects based on the level of trust. The first step is to finalize the social relationship factors to be implemented at the organizational level supported by the existing trust criteria. Due to the stringency of the factors, we used twelve experts who participated in the Delphi survey. Three rounds of surveys were completed by all panelists, the panel included twelve practitioner-level data specialists and academics with rich experience in operations research and inter-organizational relationships. The survey results are presented below in the same order as the questionnaire. In general, as shown in Figure 3, the responses from the third survey were consistent with the results from the initial round.

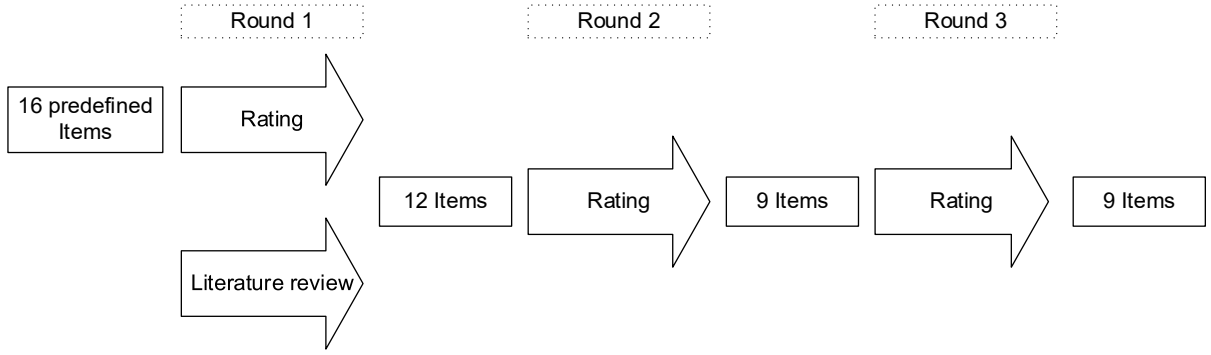

Fig. 3. Overview of different rounds and number of indicators

Table 5
Content validity index (CVI) of the Delphi technique at each round

No	Factors	Round 1			Round 2			Round 3			Code
		Mean	CVI	Result	Mean	CVI	Result	Mean	CVI	Result	
1	Communication	3.889	0.83	Strongly Agree	3.89	0.83	Strongly Agree	3.94	0.83	Strongly Agree	A1
2	Trust	4.000	0.94	Strongly Agree	4.00	0.94	Strongly Agree	4.11	1.00	Strongly Agree	A2
3	Legitimacy	3.667	0.78	Agree	3.44	0.67	Disagree				
4	Community Policing	4.000	0.72	Disagree							
5	Cultural	4.056	0.89	Strongly Agree	4.06	0.89	Strongly Agree	4.06	0.89	Strongly Agree	A3
6	Accountability	3.778	0.67	Disagree							
7	Procedural Justice	4.222	0.94	Strongly Agree	4.22	0.94	Strongly Agree	4.22	0.94	Strongly Agree	A4
8	Conflict Resolution	4.000	0.72	Disagree							
9	Problem-Solving	4.444	1.00	Strongly Agree	4.44	1.00	Strongly Agree	4.39	1.00	Strongly Agree	A5
10	Transparency	3.944	0.89	Strongly Agree	3.94	0.89	Strongly Agree	3.94	0.89	Strongly Agree	A6
11	Engagement	4.389	0.89	Strongly Agree	4.39	0.89	Strongly Agree	4.39	0.89	Strongly Agree	A7
12	Human Rights	4.111	0.94	Strongly Agree	3.78	0.72	Disagree				
13	Training and Education	4.556	1.00	Strongly Agree	3.89	0.67	Disagree				
14	Collaboration	4.167	0.89	Strongly Agree	4.17	0.89	Strongly Agree	4.17	0.89	Strongly Agree	A8
15	Responsive Service Delivery	4.167	0.72	Disagree							
16	Empowerment	3.889	0.83	Strongly Agree	3.89	0.83	Strongly Agree	3.89	0.83	Strongly Agree	A9
Sum of I-CVI		13.667			10.167			8.17			
S-CVI/Ave		0.854			0.85			0.91			
Category		Accepted			Accepted			Accepted			

Twelve experts invited to compose the expert panel, all returned their assessments. The experts' questionnaire answers and CVI are described in Table 5. In the first round, the content experts were asked to rate the CVI of 16 items. All itemshad a mean value ≥3.0. In the overall assessment tool evaluation, the mean expert proportion of the S-CVI instrument was 0.854. This validated the overall assessment modeling tool. In the first round, a total of 16 factors were identified in the session andthe output of the first round was 12 items.

In the second round, the content experts were asked to rate the CVI of 12 items. All items had a mean value ≥3.0. In the overall assessment tool evaluation, the expert proportion of the S-CVI instrument mean was 0.85. This validated the overall assessment modeling tool. In the second round, the overall 12 items were identified inthe session and the output of the first round became 9 items.

The aim of the third round was to finalize the ranking. All respondents to the second round questionnaire (i = 9) were asked to re-rate the remaining factors. This questionnaire differed per stakeholder group in that the survey contained controlled feedback of

group responses expressed in mean scores ≥3.0, so that participants hadknowledge of specific groups while maintaining group anonymity. The third round involved evaluating all the information provided by the experts and the updated information, which was revised in the second round. Experts were asked to re-rate each item as in the previous round. However, in addition to rating the importance of each item, they were asked to clarify the redundancy and syntax of each statement orcomprehension-related issues. Of the 12 experts who responded in the second round,all experts responded in the third round. The response rate in the third round was 100%. Of the 9 items directed to the third round, all obtained a consensus of ≥78%, resulting in nine social relationship factors. The nine factors include:

a. Communication (A1). Effective communication is critical to building trust and understanding between the police and the community. Clear and respectful communication can help bridge the gap between law enforcement agencies and the community, leading to better cooperation and collaboration (Farivar et al., 2021; Wang et al., 2021).
b. Trust (A2). Trust serves as a foundational element for social cohesion and cooperation, facilitating interactions between institutions and communities.(Martin, 2015). Trust is not just an individual sentiment, but a collective phenomenon that shapes the dynamics of governance, community engagement and social capital (An & Jang, 2018).
c. Cultural (A3). Understanding and appreciating the diverse cultural backgroundswithin a community is essential for effective law enforcement. Cultural competence involves recognizing and addressing the unique needs, values, and perspectives of various demographic groups (Harris & Orth, 2020; Holt-Lunstad, 2018; Sirola et al., 2023)**.**
d. Procedural Justice (A4). In social relations between institutions and society, procedural justice emphasizes the importance of fair and transparent procedures in the decision-making process. Procedural justice states that individuals tend to accept and comply with decisions made by authorities if theyconsider the process to be fair, regardless of the outcome (Hendry, 2001).
e. Problem-Solving (A5). A collaborative problem-solving approach involves identifying and addressing underlying problems that contribute to crime or public safety issues within a community (Pietromonaco & Overall, 2022). Police-community partnerships in problem solving can lead to sustainable solutions (Harris & Orth, 2020).
f. Transparency (A6). Openness and transparency in policing practices, policies and decision-making processes are essential to foster public trust. Transparentcommunication about law enforcement activities can enhance accountability and credibility (Bilal et al., 2021; Hayward et al., 2022).
g. Engagement (A7). Actively engaging community members in decision-making processes related to policing initiatives, policies and programs is a key dimension of social relationships (Farivar et al., 2021; Martínez-López et al., 2023). Engagement with a wide range of stakeholders can lead to more inclusive and effective policing strategies (Anyan & Hjemdal, 2022; Nkhata et al., 2008)**.**
h. Collaboration (A8). Building collaborative partnerships with local organizations,government agencies, schools, businesses, faith-based groups, and other stakeholders can improve police-community relations by collectively addressing shared issues.
i. Empowerment (A9). Providing responsive, fair and timely services to all members of the community contributes to positive social interactions between the police and the community (Green-Thompson et al., 2017; Zembe et al., 2015)**.**

4.2. Criteria Weighting

As discussed in the previous section, the complex problem in AHP is first decomposed into factors and subfactors for the trust criteria presented in Fig. 4. In this stage of AHP, the weighted values of the 3D of trust criteria and subcriteria are broken down into three levels of hierarchy. After that, pairwise comparisons between factors within the same level and between subfactors within thesame level are performed to obtain their relative weights as shown in table 3. Finally,the relative weights are synthesized to obtain the overall score of the trust level.

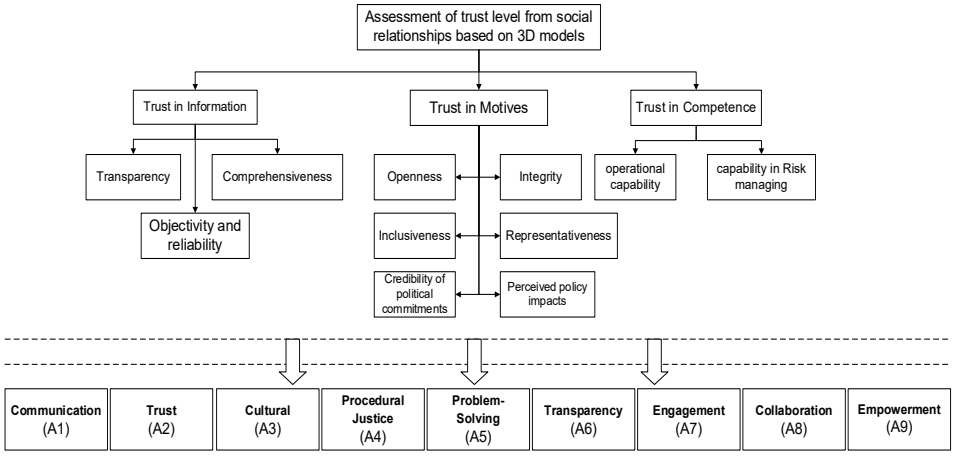

Fig. 4. Hierarchical analysis of trust level in social relationship based on 3D model

At this level of trust, criteria and subcriteria are identified among all dimensions beingcompared. The questionnaire template of relative weights with respect to AHP objectives is based on pairwise comparisons between trust in information and other subfactors within the same level only, so further pairwise comparisons are required toobtain the relative weights of the remaining subfactors. The consistency ratio (CR) is used to indicate the consistency of pairwise comparisons and less than 0.1 isacceptable in each case. This understanding is essential for obtaining relevantinformation during evaluation and pairwise comparisons. The weighting results of howthe criteria and sub-criteria trust are as follows. Fig. 4 shows the hierarchical decision-making graph. Three levels of hierarchy are proposed in this study, namely, organizational level, individual level, and indicators. Saaty (2008) suggested that the maximum number of analytic hierarchy levels is nine. Thus, the three-level hierarchicalconstruction of this study is acceptable.

Table 6
Pairwise comparison matrix for Main criteria

Criteria	Information	Motives	Competence	weight
Information	1	1/2	1/2	0.198
Moti	2	1	1/2	0.312
Competence	2	2	1	0.490
CR=	0.046			1.000

Table 7
Pairwise comparison matrix for Subcriteria Trust in Information

Criteria	C11	C12	C13	weight
C11	1	1/2	2	0.312
C12	2	1	2	0.490
C13	1/2	1/2	1	0.198
CR=	0.046			1.000

Table 8
Pairwise comparison matrix for Subcriteria Trust in Motives

Criteria	C21	C22	C23	C24	C25	C26	Weight
C21	1	1/2	1	2	2	1	0.179
C22	2	1	3	2	2	1	0.258
C23	1	1/3	1	1/2	1/2	1/2	0.094
C24	1/2	1/2	2	1	1/3	1/2	0.107
C25	1/2	1/2	2	3	1	1	0.171
C26	1	1	2	2	1	1	0.191
CR =	0.054						1.000

Table 9
Weights of all trust criteria and sub-criteria for social relationships (aggregated results)

Code	Trust Criteria	Evaluation Sub Criteria	Weight (Prioritized)	Overall Weight (Prioritized)	Rank
C1	Trust in Information		0.1976	1st (Criteria)	
C11	Transparency		0.3119	0.0616	5
C12	Comprehensiveness		0.4905	0.0969	3
C13	Objectivity and reliability		0.1976	0.0391	9
C2	Trust inMotives		0.3119	2nd (Criteria)	
C21	Openness		0.1785	0.0557	7
C22	Integrity		0.2583	0.0806	4
C23	Inclusiveness		0.0942	0.0294	11
C24	Representativeness		0.1066	0.0332	10
C25	Credibility of political commitments		0.1713	0.0534	8
C26	Perceived policy impacts		0.1910	0.0596	6
C3	Trust in Competence		0.4905	3rd (Criteria)	
C31	Operational capability		0.5000	0.2452	1
C32	Capability in Risk managing		0.5000	0.2452	1

Table 9 presents the relative importance of weight values at the criterion level, namely trust in Information (C1) (19.8%); Trust in Motives (C2) (31.2%); Trust in Competence (C3) (49%). At the sub-criteria level, the overall weight value of each is Transparency (C11) (6.16%); Comprehensiveness (C12) (9.69%); Objectivity and reliability (C13) (3.91%); Openness (C21) (5.57%); Integrity

(C22) (8.06%); Inclusiveness (C23) (2.94%); Representativeness (C24) (3.32%); Credibility of political commitments (C25) (5.34%); Perceived policy impacts (C26) (5.96%); Operational capability (C31) (24.52%); Capability in risk managing (C32) (24.52%).

In the aspect of trust in competence, Competence may initially play a more important role in building trust, while in mature organizations, integrity becomes more important for maintaining trust. The dimension of competence in building trust increases with the length of the relationship (Dale Stoel & Muhanna, 2012). This suggests that the dynamics of trust evolve as social relationships mature (Lewicka & Krot, 2012) between institutions and society. On the one hand, competence is more important than shared values or personal preferences in building trust (Wiethoff & Lewicki, 2005). However, according to Firmansyah et al. (2019) competence has no significant effect on trust, which suggests that in the context of friendship, personal attributes related to kindness and moral character are more important than the ability to perform tasks or roles effectively. This challenges some traditional views that prioritize competence in building trust.

Moreover, operational capability is important for building positive relationships, as it includes not only the technical skills and knowledge of police officers but also their interpersonal skills, cultural competence, and commitment to transparency. When police forces demonstrate their operational capabilities through effective communication, responsiveness to community concerns, and accountability for their actions, they can increase community trust. This trust is essential for collaborative efforts in security and order stability and community safety. It is imperative for police organizations to actively work to rebuild this trust through community policing strategies that prioritize engagement over law enforcement. The relationship between operational capability and trust is reciprocal; as communities begin to perceive the police as competent and trustworthy, they are more likely to cooperate with law enforcement efforts. This cooperation can lead to increased crime reporting rates, increased willingness to participate in community programs, and improved overall public safety outcomes. Developing operational capabilities that emphasize competence in social relations is therefore critical to modern policing strategies aimed at creating safer communities through mutual respect and collaboration.

Risk management capability in the context of trust and competence in social relations between the community and the police is a multifaceted concept. It refers to the ability of law enforcement agencies to assess potential risks associated with their operations while fostering trust among community members. This understanding enables a customized approach to policing that respects community values while addressing safety concerns. Competent risk management practices involve transparent communication about policing strategies, which helps demystify law enforcement actions and fosters a sense of shared responsibility for public safety.

4.3 Assessment of trust level on social relationship factors

Using the weights of the sub-criteria of the dimension of trust, the factors in the social relationship are analyzed for trust level values by the TOPSIS method and then the factors related to the social relationship as alternatives are mapped in a 3-Dimensional model. At this stage, the decision-making group assigns a score between 1 and 5 points to the specified social relationship factors. The factors are preliminarily assessed using these Likert scores and confronted with the sub-criteria weights of the trust dimension. The decision matrix collected in Table 10 was obtained for the data, for which the experts evaluated the factors. The core of the decision matrix has alternative values that indicate the importance of each social relationship factor. The values are given in Table 10 of the normalized values, and the normalized decision matrix is constructed starting with Eq. (3).

Table 10
Decision matrix constructed for the AHP TOPSIS method

	Trust in Information (X)					**Trust in Motives (Y)**				**Trust in Competence (Z)**	
Weight	0.062	0.097	0.039	0.056	0.081	0.029	0.033	0.053	0.060	0.245	0.245
Alt	**C11**	**C12**	**C13**	**C21**	**C22**	**C23**	**C24**	**C25**	**C26**	**C31**	**C32**
A1	4.729	4.862	4.472	4.599	4.729	4.229	4.229	4.349	4.349	4.862	4.599
A2	4.472	4.349	4.229	4.472	4.229	4.349	4.599	4.729	4.229	4.599	4.472
A3	4.349	4.599	4.229	4.599	4.599	4.229	4.229	4.472	4.472	4.599	4.729
A4	4.862	4.599	4.229	4.229	4.349	4.472	4.729	4.729	4.229	4.599	4.472
A5	4.472	4.472	4.472	4.599	4.599	4.349	4.000	4.229	4.229	4.472	4.472
A6	4.349	4.862	4.349	4.599	4.472	4.229	4.729	4.349	4.229	4.599	4.729
A7	4.472	4.472	4.349	4.729	4.472	4.599	4.729	4.229	4.349	4.599	4.599
A8	4.472	4.349	4.229	4.229	4.349	4.729	4.349	4.349	4.229	4.729	4.472
A9	4.599	4.349	4.729	4.472	4.229	4.599	4.349	4.229	4.599	4.472	4.599

The consistent rating scale on the weighting of criteria and sub-criteria of the trust dimension has been discussed in Table 9. Table 9. Since different alternative traits have different scoring standards, users are required to specify their scoring standards before scoring the alternatives. Table 11 shows the decision matrix for alternative assessment of social relationship for trust level measurement using TOPSIS based on the factors of criteria and sub-criteria as defined earlier in a consistent measurement scale. The relative weights as shown in Table 10.

Table 11
Normalized decision matrix

Alt	C11	C12	C13	C21	C22	C23	C24	C25	C26	C31	C32
A1	0.427	0.441	0.417	0.415	0.435	0.387	0.391	0.404	0.406	0.427	0.410
A2	0.404	0.395	0.395	0.404	0.389	0.398	0.425	0.439	0.395	0.404	0.399
A3	0.393	0.417	0.395	0.415	0.423	0.387	0.391	0.415	0.417	0.404	0.422
A4	0.439	0.417	0.395	0.382	0.400	0.409	0.437	0.439	0.395	0.404	0.399
A5	0.404	0.406	0.417	0.415	0.423	0.398	0.370	0.393	0.395	0.393	0.399
A6	0.393	0.441	0.406	0.415	0.411	0.387	0.437	0.404	0.395	0.404	0.422
A7	0.404	0.406	0.406	0.427	0.411	0.421	0.437	0.393	0.406	0.404	0.410
A8	0.404	0.395	0.395	0.382	0.400	0.433	0.402	0.404	0.395	0.416	0.399
A9	0.416	0.395	0.441	0.404	0.389	0.421	0.402	0.393	0.429	0.393	0.410

The next step is to rank the alternatives. The next normalized decision matrix is the weighted normalized matrix process. The weighted normalized matrix is obtained by multiplying the normalized parameters of the weight matrix obtained from the pairwise comparison matrix. The resulting weighted normalized matrix can be seen in Table 12.

Table 12
Weighted Normalization Matrix

Alt	C11	C12	C13	C21	C22	C23	C24	C25	C26	C31	C32
A1	0.026	0.043	0.016	0.023	0.035	0.011	0.013	0.022	0.024	0.105	0.101
A2	0.025	0.038	0.015	0.022	0.031	0.012	0.014	0.023	0.024	0.099	0.098
A3	0.024	0.040	0.015	0.023	0.034	0.011	0.013	0.022	0.025	0.099	0.103
A4	0.027	0.040	0.015	0.021	0.032	0.012	0.015	0.023	0.024	0.099	0.098
A5	0.025	0.039	0.016	0.023	0.034	0.012	0.012	0.021	0.024	0.096	0.098
A6	0.024	0.043	0.016	0.023	0.033	0.011	0.015	0.022	0.024	0.099	0.103
A7	0.025	0.039	0.016	0.024	0.033	0.012	0.015	0.021	0.024	0.099	0.101
A8	0.025	0.038	0.015	0.021	0.032	0.013	0.013	0.022	0.024	0.102	0.098
A9	0.026	0.038	0.017	0.022	0.031	0.012	0.013	0.021	0.026	0.096	0.101

The next step is to determine the positive ideal solution (PIS) and negative ideal solution (NIS), then determine the distance of each alternative to the positive ideal solution and negative ideal solution. The normalized weight in the decision matrix (yij) is used to determine the positive ideal solution A+ and the negative ideal solution A-.

Table 13
Distances of the alternatives from ideal positive (A+) and ideal negative (A-)

A+	0.024	0.038	0.017	0.021	0.031	0.011	0.015	0.023	0.024	0.105	0.098
A-	0.027	0.043	0.015	0.024	0.035	0.013	0.012	0.021	0.026	0.096	0.103

The next step is to determine the distance between the value of each alternative and the positive ideal solution matrix (Di+) and the distance between the value of each alternative and the negative ideal solution matrix (Di-). The distance between alternatives Ai with positive and negative ideal solutions can be formulated with Eqs. (7-8). The weighted value of the distance of each alternative to the positive ideal solution and negative ideal solution can be seen in Table 14.

Table 14
D+ and D-; CCi and decision assessment for alternative

	Trust in Information (X)			Trust in Motives (Y)			Trust in Competence (Z)		
ALT	**D+**	**D-**	Si^+	**D+**	**D-**	Si^+	**D+**	**D-**	Si^+
Communication	0.005	0.001	0.336	0.005	0.002	0.316	0.003	0.009	0.763
Trust	0.002	0.005	0.871	0.001	0.005	0.806	0.006	0.006	0.723
Cultural	0.003	0.004	0.714	0.004	0.002	0.367	0.008	0.003	0.454
Procedural Justice	0.004	0.002	0.515	0.001	0.005	0.833	0.006	0.006	0.723
Problem-Solving	0.002	0.004	0.874	0.005	0.003	0.553	0.008	0.006	0.600
Transparency	0.005	0.003	0.530	0.003	0.004	0.751	0.008	0.003	0.454
Engagement	0.002	0.004	0.834	0.004	0.003	0.641	0.006	0.004	0.584
Collaboration	0.002	0.005	0.871	0.003	0.004	0.820	0.003	0.008	0.732
Empowerment	0.001	0.005	0.935	0.004	0.004	0.720	0.009	0.003	0.243

At the next stage, give a preference value for each alternative. The preference value for each alternative (Vi) is given as equation (9). From the results of the Si calculation, the Si alternative with the largest best solution value and the first priority. Alternative assessments of the level of trust in the social relationship between the community and the police are shown in Table 14. Based on Table 14 shows that in the trust in information (C1) criteria, there are two alternatives with the highest value, namely

Empowerment (A9) and Problem-solving (A5) with a closeness coefficient of 0.935 and 0.874 respectively. Furthermore, in the trust in information (C2) criteria, there are two alternatives with the highest value, namely Procedural Justice (A4) and Collaboration (A8) with a closeness coefficient of 0.833 and 0.820 respectively. Meanwhile, in the trust in competence (C3) criteria, there are two alternatives with the highest scores, namely Communcation (C1) and Collaboration (C8) Procedural Justice (A4) and Collaboration (A8) with proximity coefficients of 0.763 and 0.732 respectively.

Table 15
Level of trust value in 3D model-based social relationship

ALT	Code	Information	Motives	Competence	Trust Level	Color
Communication	A1	0.336	0.316	0.763	Low Trust	
Trust	A2	0.871	0.806	0.723	High Trust	
Cultural	A3	0.714	0.367	0.454	Low Trust	
Procedural Justice	A4	0.515	0.833	0.723	Medium trust	
Problem-Solving	A5	0.874	0.553	0.600	Medium trust	
Transparency	A6	0.530	0.751	0.454	Medium trust	
Engagement	A7	0.834	0.641	0.584	Medium trust	
Collaboration	A8	0.871	0.820	0.732	High Trust	
Empowerment	A9	0.935	0.720	0.243	Low Trust	

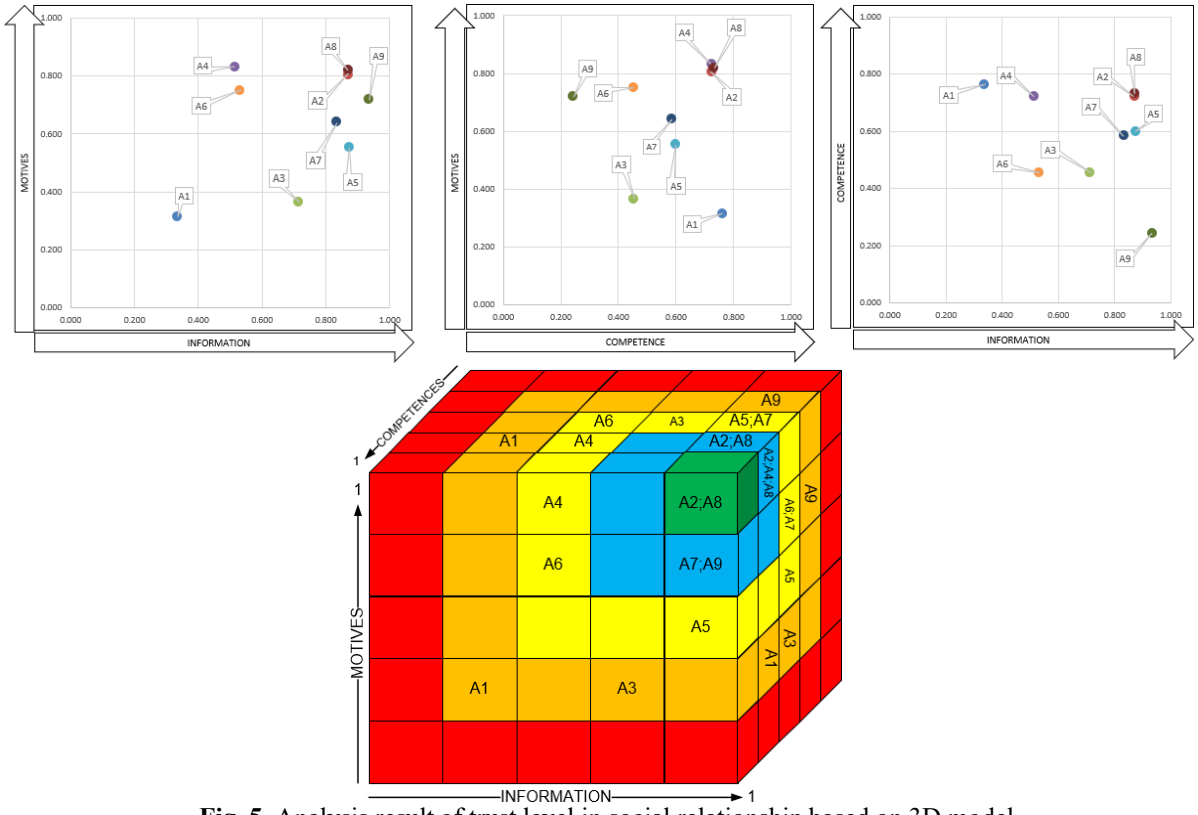

Fig. 5. Analysis result of trust level in social relationship based on 3D model

At Table 15 and Fig. 5, based on the results of the 3D trust level-based mapping analysis on social relationships, of the nine alternatives there are no factors with complete level (level 5) and Ignorance (Level 1). Overall, there are two alternative social relationship factors with high trust level (level 4), namely Trust (A2) and Collaboration (A8). Four factors with medium trust level (level 3) are Procedural Justice (A4); Problem-Solving (A5); Transparency (A6); Engagement (A7). In addition, there are also three factors with low trust levels, including Communication (A1); Cultural (A3); Empowerment (A9). These findings suggest that social relationship factors, such as trust (A2) and Collaboration (A8), play an important role in increasing the trust value of trust-related institutions from the public, which may inform theoretical models that integrate social relationships into trust levels. Collaboration between police and community organizations plays an important role in improving social relations. Trust is essential for performance and collaboration (McKnight & Chervany, 2000). The discussion also touches on the relationship between trust and performance, noting that a breach of trust can have a significant impact on interorganizational relationships and that rebuilding trust requires active effort (Adams et al., 2010). Trust is characterized by reliability, capability, integrity and benevolence, which are essential for fostering effective collaboration and communication between its stakeholders. On the one hand, communication

plays a fundamental role in building trust, and that frequent and clear communication can help reduce barriers to collaboration (Law & Le, 2023).

4.4 Implication

Theoretical implication

This research shows that the social relationship between the community and the public institution, namely the police in the region, has a different perspective on the level of trust when faced with dimensional aspects of trust, especially social relationship factors that have a low level of trust so that it can be a benchmark in increasing the value of trust in the community, especially through these social relationships. The existence of a community with a given level of trust shows that the theory of trust and social relations between organizations can be further explored in the context of community resilience analysis. Trust is not just an individual trait but is influenced by the dynamics of community social relations. Good social relations between the community and government institutions such as the local police can create opportunities to build social capital that can be utilized in encouraging cooperative strategies to create security and stability in the environment or local government. Social relationship factors and trust levels as multidimensional and dynamic phenomena can be modeled through different stages in understanding how trust and social relationships develop over time. In addition, it is necessary to consider the context of fostering social relationships and trust in understanding the dynamics of trust which shows that increased trust can lead to greater trustworthiness and vice versa. This condition can inform the theoretical framework regarding the dynamics of the level of trust in social relations in society, especially in areas that prioritize integrity in the process of building trust in society. By clarifying the definitions and relationships between different types of trust in society, the findings suggest that social relationships act as a catalyst for police institutions' trust in the public suggesting that fostering trust in social relationships can be a strategic approach to increasing overall trust in government.

Practical implication

This research emphasizes the importance of developing a systematic approach to trust-based social relations in a 3D-level model. The findings suggest that institutions should regularly assess their social relations strategies and adapt them based on the 3D analytical model to enhance the value of trust and social relations management with the community. The importance of social relations in the aspect of trust as a relationship commodity in the interaction between the community and the local police institution, which shows that understanding how social relations operate in the level of trust can provide significant benefits for stakeholders. Public institutions can leverage the level of trust they have built to foster mutually beneficial relationships with communities, enhancing their strategic options during times of need in maintaining the security and stability of the local area. This can make the institution more attractive as a trust relationship partner. In addition, the open exchange of information in social relations can create goodwill and strengthen trust in the eyes of the community. Understanding social relationships can improve insights into social exchanges among the evolving society, potentially leading to the application of trust-building strategies to social interactions that may otherwise be detrimental to the institution. In addition, it is important to understand how trust is built between the police institution and the community, which is essential for fostering long-term relationships. Institutions are encouraged to implement long-term strategies that emphasize strengthening professional social relationships to significantly build trust in social relationships with the community. Building trust should be an ongoing process, which requires time and effort from both parties involved.

5. Conclusion

Trust develops over time and is seen as an expectation that the other person will act as predicted and acceptable to both parties. Trust is a key attribute of social cohesion as participation in community activities, social trust, and a sense of belonging are key phenomena in social relationships. This research aims to trust levels in social relationships and understand how social relationships affect the level of trust in an organization in maintaining the stability of the organization. In the identification of factors in the social relationship between policy and society, nine social relationship factors were obtained, including Communication (A1); Trust (A2); Cultural (A3); Procedural Justice (A4); Problem-Solving (A5); Transparency (A6); Engagement (A7); Collaboration (A8); Empowerment (A9). On the one hand, in the context of relative importance, the weight value at the criterion level is trust in Information (C1) (19.8%); Trust in Motives (C2) (31.2%); Trust in Competence (C3) (49%). At the sub-criteria level, the overall weight value of each is Transparency (C11) (6.16%); Comprehensiveness (C12) (9.69%); Objectivity and reliability (C13) (3.91%); Openness (C21) (5.57%); Integrity (C22) (8.06%); Inclusiveness (C23) (2.94%); Representativeness (C24) (3.32%); Credibility of political commitments (C25) (5.34%); Perceived policy impacts (C26) (5.96%); Operational capability (C31) (24.52%); Capability in risk managing (C32) (24.52%). Based on the results of the 3D trust level-based mapping analysis on social relationships, of the nine alternatives there are no factors with complete level (level 5) and Ignorance (Level 1). Overall, there are two alternative social relationship factors with high trust level (level 4), namely Trust (A2) and Collaboration (A8). Four factors with medium trust level (level 3) are Procedural Justice (A4); Problem-Solving (A5); Transparency (A6); Engagement (A7). In addition, there are also three factors with low trust levels, including Communication (A1); Cultural (A3); Empowerment (A9). These findings suggest that social relationship factors, such as trust (A2) and Collaboration (A8), play an important role in increasing the trust value of institutions related to trust from the community.

This study has several limitations that can be suggested in the future. First, future research could present an exploration of the antecedents of trust in public institutions, a deep dive into the institutional, political, and social factors that contribute to trust in public institutions, and the conduct of further content analysis to address the existing reflections in the suggested model for trust in public institutions. Second, the need to focus on a more comprehensive development model that includes elements to increase public trust in public institutions and test the suggested empirical model to assess its validity and effectiveness. Third, future research can explore alternative mechanisms that influence trust formation apart from social relationship factors through channel characteristics, community support, and institutional protection. Fourth, further research on the multifaceted nature of trust and distrust assessments, nuanced trust/distrust management approaches, and the importance of trust across different levels of social relationships in other government organizations.

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References

Abdui-Rahman, A., & Hailes, S. (1998). Distributed Trust Model. *Acm*, 48–60.

Abdul-Rahman, A., & Hailes, S. (1997). Using Recommendations for Managing Trust in Distributed Systems. *IEEE Malaysia International Conference on Communication*, *97*. http://discovery.ucl.ac.uk/35011/

Adams, B. D., Flear, C., Taylor, T. E., Hall, C. D., & Karthaus, C. (2010). Review of interorganizational trust models. *Computer Supported Cooperative Work (CSCW)*, *22*(4–6), 88.

Ahrnberg, H., Appelqvist-Schmidlechner, K., Mustonen, P., Fröjd, S., & Aktan-Collan, K. (2021). Determinants of positive mental health in adolescents–a cross-sectional study on relationships between positive mental health, self-esteem, character strengths and social inclusion. *International Journal of Mental Health Promotion*, *23*(3), 361–374. https://doi.org/10.32604/IJMHP.2021.016408

Akrout, H., & La Rocca, A. (2019). Interpersonal and inter-organizational trust in high-involvement customer supplier relationships: Antecedents, consequences, and moderators. *Advances in Business Marketing and Purchasing*, *26*, 87–102. https://doi.org/10.1108/S1069-096420190000026008

Akter, S., Debnath, B., & Bari, A. B. M. M. (2022). A grey decision-making trial and evaluation laboratory approach for evaluating the disruption risk factors in the Emergency Life-Saving Drugs supply chains. *Healthcare Analytics*, *2*(October), 100120. https://doi.org/10.1016/j.health.2022.100120

Al-Jawhar, H. D., & Rezouki, S. E. (2012). Identification of Procurement System Selection Criteria in the Construction Industry in Iraq by Using Delphi Method. *International Proceedings of Economics and Development Research 2012*, 142–147.

Amirshenava, S., & Osanloo, M. (2018). Mine closure risk management: An integration of 3D risk model and MCDM techniques. *Journal of Cleaner Production*, *184*, 389–401. https://doi.org/10.1016/j.jclepro.2018.01.186

An, S., & Jang, Y. (2018). The role of social capital in the relationship between physical constraint and mental distress in older adults: a latent interaction model. *Aging and Mental Health*, *22*(2), 245–249. https://doi.org/10.1080/13607863.2016.1247431

Anyan, F., & Hjemdal, O. (2022). Loneliness in social relationships: Mapping the nomological network of loneliness with key conceptual domains and theoretical constructs. *Journal of Social and Personal Relationships*, *39*(2), 132–154. https://doi.org/10.1177/02654075211033035

Ayalew, S., & Andualem, T. (2023). The relationships of social capital, institutional support, and emotional and behavioral adjustment of vulnerable children in Addis Ababa. *Cogent Psychology*, *10*(1). https://doi.org/10.1080/23311908.2023.2260109

Bastos, L. A. V. M., Bichara, J. L. P. L. P., Nascimento, G. S. S., Villela, P. B. B., & de Oliveira, G. M. M. M. M. (2022). Mortality from diseases of the circulatory system in Brazil and its relationship with social determinants focusing on vulnerability: an ecological study. *BMC Public Health*, *22*(1). https://doi.org/10.1186/s12889-022-14294-3

Bedué, P., & Fritzsche, A. (2022). Can we trust AI? An empirical investigation of trust requirements and guide to successful AI adoption. *Journal of Enterprise Information Management*, *35*(2), 530–549. https://doi.org/10.1108/JEIM-06-2020-0233

Biancini, A. (2016). 3PL provider selection by AHP and TOPSIS methodology. *Benchmarking: An International Journal*.

Bilal, M., Hussain, S., Rafiq, M., Ahmad, N., Quddus, A., & Pha, T. P. (2021). Does quality of corporate governance moderate the relationship between corporate social responsibility and stock price crash exposure. *Estudios de Economia Aplicada*, *39*(12). https://doi.org/10.25115/eea.v39i12.6396

Boutkhoum, O., Hanine, M., Agouti, T., & Tikniouine, A. (2017). A decision-making approach based on fuzzy AHP-TOPSIS methodology for selecting the appropriate cloud solution to manage big data projects. *International Journal of System Assurance Engineering and Management*, *8*(s2), 1237–1253. https://doi.org/10.1007/s13198-017-0592-x

Burchi, F., Loewe, M., Malerba, D., & Leininger, J. (2022). Disentangling the Relationship Between Social Protection and Social Cohesion: Introduction to the Special Issue. *European Journal of Development Research*, *34*(3), 1195–1215. https://doi.org/10.1057/s41287-022-00532-2

Clark, W. R., Scholder Ellen, P., & Boles, J. S. (2010). An examination of trust dimensions across high and low dependence situations. *Journal of Business-to-Business Marketing*, *17*(3), 215–248. https://doi.org/10.1080/10517120903000439

Crotty, J., & Daniel, E. (2022). Cyber threat: its origins and consequence and the use of qualitative and quantitative methods in cyber risk assessment. *Applied Computing and Informatics*. https://doi.org/10.1108/ACI-07-2022-0178

Dale Stoel, M., & Muhanna, W. A. (2012). The dimensions and directionality of trust and their roles in the development of shared business-IS understanding. *Information and Management*, *49*(5), 248–256. https://doi.org/10.1016/j.im.2012.06.001

Dowell, D., Heffernan, T., & Morrison, M. (2013). Trust formation at the growth stage of a business-to-business relationship: A qualitative investigation. *Qualitative Market Research*, *16*(4), 436–451. https://doi.org/10.1108/QMR-06-2011-0006

Farivar, S., Wang, F., & Yuan, Y. (2021). Opinion leadership vs. para-social relationship: Key factors in influencer marketing. *Journal of Retailing and Consumer Services*, *59*(November 2020), 102371. https://doi.org/10.1016/j.jretconser.2020.102371

Firmansyah, M. R., Amelia, R., Jamil, R. A., Faturochman, F., & Minza, W. M. (2019). Benevolence, Competency, and Integrity: Which Is More Influential on Trust in Friendships? *Jurnal Psikologi*, *18*(1), 91. https://doi.org/10.14710/jp.18.1.91-105

Gille, F., Smith, S., & Mays, N. (2017). Towards a broader conceptualisation of "public trust" in the health care system. *Social Theory and Health*, *15*(1), 25–43. https://doi.org/10.1057/s41285-016-0017-y

Gnanasekaran, S., & Venkatachalam, N. (2019). A review on applications of multi-criteria decision making (MCDM) for solar panel selection. *International Journal of Mechanical and Production Engineering Research and Development*, *9*(2), 11–20. https://doi.org/10.24247/ijmperdapr20192

Green-Thompson, L. P. P., McInerney, P., & Woollard, B. (2017). The social accountability of doctors: A relationship based framework for understanding emergent community concepts of caring. *BMC Health Services Research*, *17*(1). https://doi.org/10.1186/s12913-017-2239-7

Grossard, C., Bettencourt, C., Kellems, R., Chetouani, M., & Cohen, D. (2023). Building the design ICT inventory (DICTI): A Delphi study. *Computers in Human Behavior Reports*, *9*(October 2021), 100261. https://doi.org/10.1016/j.chbr.2022.100261

Han, W., Huang, Y., Hughes, M., & Zhang, M. (2021). The trade-off between trust and distrust in supply chain collaboration. *Industrial Marketing Management*, *98*(June), 93–104. https://doi.org/10.1016/j.indmarman.2021.08.005

Harris, M. A., & Orth, U. (2020). The link between self-esteem and social relationships: A meta-analysis of longitudinal studies. *Journal of Personality and Social Psychology*, *119*(6), 1459–1477. https://doi.org/10.1037/pspp0000265

Hayward, M., Hunt, R., & Miller, D. (2022). How vulnerability enriches family firm relationships: A social exchange perspective. *Journal of Family Business Strategy*, *13*(1), 100450. https://doi.org/10.1016/j.jfbs.2021.100450

Henderson, M., & Furnham, A. (1985). The rules of social relationships. *British Journal of Social Psychology*, *24*(2), 125–139. https://doi.org/10.1111/j.2044-8309.1985.tb00671.x

Hendry, J. (2001). Economic contracts versus social relationships as a foundation for normative stakeholder theory. *Business Ethics: A European Review*, *10*(3), 223–232. https://doi.org/10.1111/1467-8608.00236

Holt-Lunstad, J. (2018). Why Social Relationships Are Important for Physical Health: A Systems Approach to Understanding and Modifying Risk and Protection. *Annual Review of Psychology*, *69*, 437–458. https://doi.org/10.1146/annurev-psych-122216-011902

Hou, X., Wang, B., & Gao, Y. (2020). Stakeholder protection, public trust, and corporate social responsibility: Evidence from listed SMEs in China. *Sustainability (Switzerland)*, *12*(15). https://doi.org/10.3390/su12156085

Hwang, C.-L., & Yoon, K. (1981). *Multiple Attribute Decision Making: Method and Application*. https://doi.org/10.1007/978-3-642-48318-9_2

Iltaf, N., Ghafoor, A., & Hussain, M. (2012). Modeling interaction using trust and recommendation in ubiquitous computing environment. *Eurasip Journal on Wireless Communications and Networking*, *2012*(December). https://doi.org/10.1186/1687-1499-2012-119

Irwin, A. (2006). The politics of talk: Coming to terms with the "new" scientific governance. *Social Studies of Science*, *36*(2), 299–320. https://doi.org/10.1177/0306312706053350

Jones, A., Nnadi, I., Centeno, K., Molina, G., Nasir, R., Granger, G. G. G., Mercado, N. R. R., Ault-Brutus, A. A. A., Hackett, M., & Karaye, I. M. M. (2023). Investigating the Spatial Relationship between Social Vulnerability and Healthcare Facility Distribution in Nassau County, New York. *International Journal of Environmental Research and Public Health*, *20*(5). https://doi.org/10.3390/ijerph20054353

Karakikes, I., & Nathanail, E. (2020). Using the Delphi Method to Evaluate the Appropriateness of Urban Freight Transport Solutions. *Smart Cities*, *3*(4), 1428–1447. https://doi.org/10.3390/smartcities3040068

Kim, S. E. (2005). The role of trust in the modern administrative state an integrative model. *Administration and Society*, *37*(5), 611–635. https://doi.org/10.1177/0095399705278596

Lai, Y. J., Liu, T. Y., & Hwang, C. L. (1994). TOPSIS for MODM. *European Journal of Operational Research*, *76*(3), 486–500. https://doi.org/10.1016/0377-2217(94)90282-8

Law, S. F., & Le, A. T. (2023). A systematic review of empirical studies on trust between universities and society. *Journal of Higher Education Policy and Management*, *45*(4), 393–408. https://doi.org/10.1080/1360080X.2023.2176598

Lehtonen, M., Prades, A., Espluga, J., & Arapostathis, S. (2022). Introduction to the special issue "Trust, mistrust, distrust, and trust-building in the nuclear sector: historical and comparative experience from Europe." *Journal of Risk Research*, *25*(5), 547–561. https://doi.org/10.1080/13669877.2022.2067892

Lewicka, D., & Krot, K. (2012). The importance of trust in leadership. *Research Management Review*, *10*(3), 224–233. http://eric.ed.gov/?id=EJ1038828

Lewicka, D., & Zakrzewska-Bielawska, A. F. (2022). Trust and distrust in interorganisational relations-Scale development. *PLoS ONE*, *17*(12 December), 1–28. https://doi.org/10.1371/journal.pone.0279231

Lim, D. H., Oh, J. M., & Kwon, G. H. (2016). Mediating effects of public trust in government on national competitiveness: Evidence from Asian countries. *International Review of Public Administration*, *21*(2), 125–146. https://doi.org/10.1080/12294659.2016.1189196

Mah, D. N. yin, Cheung, D. M. wai, Lam, V. W. Y., Siu, A., Sone, Y., & Li, K. yan. (2021). Trust gaps in energy transitions: Japan's National Deliberative Poll after Fukushima. *Environmental Innovation and Societal Transitions*, *39*(February), 249–269. https://doi.org/10.1016/j.eist.2021.03.002

Mah, D. N. yin, & Hills, P. (2014). Participatory governance for energy policy-making: A case study of the UK nuclear consultation in 2007. *Energy Policy*, *74*(C), 340–351. https://doi.org/10.1016/j.enpol.2014.08.002

Malkamäki, K., Hiltunen, E., & Aromaa, E. (2021). The Role of Trust in the Strategic Management Process: A Case Study of Finnish Grocery Retail Company Kesko Ltd. *South Asian Journal of Business and Management Cases*, *10*(1), 21–34. https://doi.org/10.1177/22779779211006801

Martin, S. A. (2015). A framework to understand the relationship between social factors that reduce resilience in cities: Application to the City of Boston. *International Journal of Disaster Risk Reduction*, *12*, 53–80. https://doi.org/10.1016/j.ijdrr.2014.12.001

Martínez-López, Z., Moran, V. E., Mayo, M. [a]E, Villar, E., & Tinajero, C. (2023). Perceived social support and its relationship with self-regulated learning, goal orientation self-management, and academic achievement. *European Journal of Psychology of Education*, *0123456789*. https://doi.org/10.1007/s10212-023-00752-y

Marzouk, M., & Sabbah, M. (2021). AHP-TOPSIS social sustainability approach for selecting supplier in construction supply chain. *Cleaner Environmental Systems*, *2*(March), 100034. https://doi.org/10.1016/j.cesys.2021.100034

McKnight, D. H., & Chervany, N. L. (2000). What is Trust ? A Conceptual Analysis and an Interdisciplinary Model. *Proceedings of the 2000 Americas Conference on Information Systems AMCI2000 AIS Long Beach CA August 2000*, *346*, 382. http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1876&context=amcis2000

Menon, R. R., & Ravi, V. (2022). Using AHP-TOPSIS methodologies in the selection of sustainable suppliers in an electronics supply chain. *Cleaner Materials*, *5*(February), 100130. https://doi.org/10.1016/j.clema.2022.100130

Mohammadi, M. R., Zarafshan, H., Bashi, S. K., Mohammadi, F., & Khaleghi, A. (2020). The role of public trust and media in the psychological and behavioral responses to the COVID-19 pandemic. *Iranian Journal of Psychiatry*, *15*(3), 189–204. https://doi.org/10.18502/ijps.v15i3.3811

Montesi, J. L. L., Conner, B. T. T., Gordon, E. A. A., Fauber, R. L. L., Kim, K. H. H., & Heimberg, R. G. G. (2013). On the relationship among social anxiety, intimacy, sexual communication, and sexual satisfaction in young couples. *Archives of Sexual Behavior*, *42*(1), 81–91. https://doi.org/10.1007/s10508-012-9929-3

Nkhata, A. B., Breen, C. M., & Freimund, W. A. (2008). Resilient social relationships and collaboration in the management of social-ecological systems. *Ecology and Society*, *13*(1). https://doi.org/10.5751/es-02164-130102

Octavian, A., Widjayanto, J., Putra, I. N., Susilo, A. K., & Suharyo, O. S. (2020). Risk analysis of islamic state (Is) network development in southeast asia based on 3d matrix. *International Journal of Operations and Quantitative Management*, *26*(2), 195–223. https://doi.org/10.46970/2020.26.3.3

Oláh, J., Hidayat, Y. A., Gavurova, B., Khan, M. A., & Popp, J. (2021). Trust levels within categories of information and communication technology companies. *PLoS ONE*, *16*(6 June 2021), 1–21. https://doi.org/10.1371/journal.pone.0252773

Paliszkiewicz, J., & Klepacki, B. (2013). Tools of building customer trust. *Management, Knowledge And Learning International Conference*, 1287–1294.

Pietromonaco, P. R., & Overall, N. C. (2022). Implications of social isolation, separation, and loss during the COVID-19 pandemic for couples' relationships. *Current Opinion in Psychology*, *43*, 189–194. https://doi.org/10.1016/j.copsyc.2021.07.014

Putra, I. N., Octaviana, A., Susilo, A. K., & Prabowo, A. R. (2023). A hybrid AHP-TOPSIS for risk analysis in maritime cybersecurity based on 3D models. *Decision Science Letters*, *12*, 759–772. https://doi.org/10.5267/dsl.2023.6.005

Ramesh, R. (2017). Does Trust Matter? An Inquiry on Citizens' Trust in Public Institutions of Sri Lanka. *Millennial Asia*, *8*(2), 123–145. https://doi.org/10.1177/0976399617715820

Rocha, K. S. S., Cerqueira Santos, S., Boaventura, T. C., dos Santos Júnior, G. A., de Araújo, D. C. S. A., Silvestre, C. C., de Jesus, E. M. S., & de Lyra Júnior, D. P. (2020). Development and content validation of an instrument to support pharmaceutical counselling for dispensing of prescribed medicines. *Journal of Evaluation in Clinical Practice*, *26*(1), 134–141. https://doi.org/10.1111/jep.13102

Rowan, S., & Kwiatkowski, K. (2020). Assessing the relationship between social vulnerability, social capital, and housing resilience. *Sustainability (Switzerland)*, *12*(18). https://doi.org/10.3390/su12187718

Rowe, G., & Frewer, L. J. (2000). Public participation methods: A framework for evaluation. *Science Technology and Human Values*, *25*(1), 3–29. https://doi.org/10.1177/016224390002500101

Saaty, T L. (2013). The modern science of multicriteria decision making and its practical applications: The AHP/ANP approach. *Operations Research*. https://doi.org/10.1287/opre.2013.1197

Saaty, Thomas L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences*, *1*(1), 83–98. https://doi.org/10.1108/JMTM-03-2014-0020

Saechang, O., Yu, J., & Li, Y. (2021). Public trust and policy compliance during the covid-19 pandemic: The role of professional trust. *Healthcare (Switzerland)*, *9*(2), 1–13. https://doi.org/10.3390/healthcare9020151

Saini, S. (2022). *Reckoning with the barriers to Lean implementation in Northern Indian SMEs using the AHP-TOPSIS approach*. *13*(3), 683–712. https://doi.org/10.1108/JSTPM-02-2020-0032

Schweizer, P. J., Renn, O., Köck, W., Bovet, J., Benighaus, C., Scheel, O., & Schröter, R. (2016). Public participation for infrastructure planning in the context of the German "Energiewende." *Utilities Policy*, *43*, 206–209. https://doi.org/10.1016/j.jup.2014.07.005

Shrotryia, V. K., & Dhanda, U. (2019). Content Validity of Assessment Instrument for Employee Engagement. *SAGE Open*, *9*(1), 1 –7. https://doi.org/10.1177/2158244018821751

Singh, P. K., & Sarkar, P. (2019). A framework based on fuzzy AHP-TOPSIS for prioritizing solutions to overcome the barriers in the implementation of ecodesign practices in SMEs. *International Journal of Sustainable Development and World Ecology*, *26*(6), 506–521. https://doi.org/10.1080/13504509.2019.1605547

Sirola, A., Nyrhinen, J., & Wilska, T. A. (2023). Psychosocial Perspective on Problem Gambling: The role of Social Relationships,

Resilience, and COVID-19 Worry. *Journal of Gambling Studies*, *39*(3), 1467–1485. https://doi.org/10.1007/s10899-022-10185-9

Sivalingam, C., & Subramaniam, S. K. (2024). Cobot selection using hybrid AHP-TOPSIS based multi-criteria decision making technique for fuel filter assembly process. *Heliyon*, *10*(4), e26374. https://doi.org/10.1016/j.heliyon.2024.e26374

Smith, K. E. E., & Pollak, S. D. D. (2021). Social relationships and children's perceptions of adversity. *Child Development Perspectives*, *15*(4), 228–234. https://doi.org/10.1111/cdep.12427

Steinbruch, F. K., Nascimento, L. da S., & de Menezes, D. C. (2021). The role of trust in innovation ecosystems. *Journal of Business and Industrial Marketing*, *37*(1), 195–208. https://doi.org/10.1108/JBIM-08-2020-0395

Sundler, A. J. J., Bergnehr, D., Haffejee, S., Iqbal, H., Orellana, M. F. F., Vergara Del Solar, A., Angeles, S. L. L., Faircloth, C., Liu, L., Mwanda, A., Sepúlveda Galeas, M., Simelane, T., Twamley, K., & Darcy, L. (2023). Adolescents' and young people's experiences of social relationships and health concerns during COVID-19. *International Journal of Qualitative Studies on Health and Well-Being*, *18*(1). https://doi.org/10.1080/17482631.2023.2251236

Susilo, A. K., Ciptomulyono, U., Putra, I. N., Ahmadi, & Suharyo, O. S. (2019). Navy development strategy to encounter threat of national maritime security using SWOT-fuzzy multi criteria decision making (F-MCDM). *Journal of Maritime Research*, *16*(1), 3–16.

Tanny, T. F. (2023). Dimensions of Trust: A Review of Trust in Government. *Indian Journal of Public Administration*, *69*(1), 22–36. https://doi.org/10.1177/00195561221136256

Tanny, T. F., & Al-Hossienie, C. A. (2019). Trust in Government: Factors Affecting Public Trust and Distrust. *Jahangirnagar Journal of Administrative Studies, Department of Public Administration*, *12*, 49–63.

Thomas, C. W. (1998). Maintaining and restoring public trust in government agencies and their employees. *Administration and Society*, *30*(2), 166–192. https://doi.org/10.1177/0095399798302003

Tseng, Y. P., Huang, Y. C., Li, M. S., & Jiang, Y. Z. (2022). Selecting Key Resilience Indicators for Indigenous Community Using Fuzzy Delphi Method. *Sustainability (Switzerland)*, *14*(4), 1–19. https://doi.org/10.3390/su14042018

Tyagi, M., Kumar, P., & Kumar, D. (2018). Assessment of CSR based supply chain performance system using an integrated fuzzy AHP-TOPSIS approach. *International Journal of Logistics: Research and Applications*, *0*(0), 1–29. https://doi.org/10.1080/13675567.2017.1422707

Uche, D. Ben, Osuagwu, O. B., Nwosu, S. N., & Otika, U. S. (2021). Integrating Trust into Technology Acceptance Model (TAM), the Conceptual Framework for E-Payment Platform Acceptance. *British Journal of Management and Marketing Studies*, *4*(4), 34–56. https://doi.org/10.52589/bjmms-tb3xtkpi

Vallejos-Romero, A., Cordoves-Sánchez, M., Jacobi, P., & Aledo, A. (2020). In transitions we trust? Understanding citizen, business, and public sector opposition to wind energy and hydropower in Chile. *Energy Research and Social Science*, *67*(February), 101508. https://doi.org/10.1016/j.erss.2020.101508

Vonneilich, N., Jöckel, K.-H., Erbel, R., Klein, J., Dragano, N., Weyers, S., Moebus, S., Siegrist, J., & Von Dem Knesebeck, O. (2011). Does socioeconomic status affect the association of social relationships and health? A moderator analysis. *International Journal for Equity in Health*, *10*. https://doi.org/10.1186/1475-9276-10-43

Vu, V. T. (2021). Public Trust in Government and Compliance with Policy during COVID-19 Pandemic: Empirical Evidence from Vietnam. *Public Organization Review*, *21*(4), 779–796. https://doi.org/10.1007/s11115-021-00566-w

Wang, G., Wang, Y., Li, J., & Liu, K. (2021). A multidimensional network link prediction algorithm and its application for predicting social relationships. *Journal of Computational Science*, *53*(15), 101358. https://doi.org/10.1016/j.jocs.2021.101358

Wiethoff, C. M., & Lewicki, R. J. (2005). Trust and distrust in work relationships: A grounded approach. *Available at SSRN 736273*.

Yang, J., Wang, X., Wang, Y., Li, Z., Xia, H., Hou, Q., Ge, Y., Lei, K., Liao, Y., Luan, Z., & Li, X. (2022). CVIS: Automated OCT-scan-based software application for the measurements of choroidal vascularity index and choroidal thickness. *Acta Ophthalmologica*, *100*(8), e1553–e1560. https://doi.org/10.1111/aos.15152

Zembe, Y. Z. Z., Townsend, L., Thorson, A., Silberschmidt, M., & Ekstrom, A. M. M. (2015). Intimate partner violence, relationship power inequity and the role of sexual and social risk factors in the production of violence among young women who have multiple sexual partners in a peri-urban setting in South Africa. *PLoS ONE*, *10*(11). https://doi.org/10.1371/journal.pone.0139430.