Mapping Religious Harmony in the Special Capital Region Jakarta using K-Means Algorithm

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Abstract: D.K.I Jakarta, often referred to as the window of Indonesia, is a city beset by a multitude of complex social problems due to its status as one of the largest cities in Indonesia. The aim of this research is to identify and examine the state of religious harmony in DKI Jakarta. Previous studies on religious harmony have primarily utilized an index-based approach, which only provided a general overview of the state of religious harmony without pinpointing the specific factors influencing its measurement. In this research, a clustering approach is employed to analyze religious harmony in DKI Jakarta. The findings indicate that cluster 0 exhibits significant challenges that profoundly impact religious harmony compared to the other clusters. Therefore, local government policies aimed at fostering religious harmony should concentrate their efforts on cluster 0, particularly focusing on the variables that have been identified as having low levels, such as empathy, non-violence, national commitment, and adaptability to local culture.

Keywords: RELIGIOUS HARMONY; TOLERANCE; CLUSTERING; K-MEANS

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1. Introduction

Indonesia is one of the countries in Southeast Asia that has ethnicity, religion and culture. On the one hand, ethnic, religious and cultural pluralism is the potential to limit differences to become a joint strength in defending the country (Afandi, 2019). Multiculturalism recognizes that several different cultures can exist in the same environment and benefit one another (Mubit, 2016). On the other hand, the pluralistic and multicultural Indonesian nation with diversity in ethnicity, race, language, culture, and religious diversity has a strong tendency towards their respective religious identities, potentially creating conflict (Firdaus, 2014; Rizal and Kharis, 2022). Even though Indonesia has achieved its independence for more than seven decades, it has experienced significant and minor conflicts between religious communities since it proclaimed its independence. Religious harmony ensures unity and solidarity among religious communities

(Zulkefli et al., 2018). Indonesia's diversity of religions and cultures is a huge opportunity and challenge for the government to build inter-religious harmony so that people live peacefully (Priyantaka and Suharno, 2020; Zuo'an, 2013). Harmony between religious communities creates a harmonious and dynamic social condition where all religious groups can live together without compromising the fundamental rights of each to carry out their religious obligations (Safithri et al., 2022). To realize true inter-religious harmony, a concept of state life must be created that binds all members of social groups of different religions to avoid conflicts between religious communities (Afandi, 2018; Rambe, 2017).

Religious harmony is an issue that is always contextual within the Unitary State of the Republic of Indonesia. Religious harmony is one of the main pillars in maintaining the unity and integrity of the nation and the unity of the Republic of Indonesia (Ibrahim, 2017). Harmony between religious communities can also be interpreted as a harmonious and dynamic social condition when all religious groups can live together without reducing their respective fundamental rights to carry out their religious obligations (Safithri et al., 2022). Religious harmony that is not well established will result in various national development programs going to a dead end due to the absence of good cooperation between the government and the community (Sinulingga, 2014). At this level, religious harmony must be optimized by all elements of the nation who are aware of the importance of building a harmonious character and culture (Fatih, 2018).

Religious harmony is part of the pillars of development, which significantly influences success (Ismail, 2010). The National Medium-Term Development Plan 2020-2024 (RPJMN) regarding religious development policies has been implemented, one of which is through efforts to increase religious harmony. This mandate is in line with the strategic plan of the Ministry of Religion, namely strengthening religious harmony and harmony. Thus, the success of development in religion can be seen from the condition of inter-religious harmony. The religious harmony index is the main instrument used as a measurement tool for the achievement of harmony programs. The Religious Harmony Index was formed based on three main dimensions, tolerance, equality, and cooperation, based on the Joint Regulations of the Minister of Religion and the Minister of Home Affairs Number 9 of 2006 and Number 8 of 2006. The dimension of tolerance represents the dimensions of accepting each other and respecting differences. Equality reflects the desire to protect each other and give equal rights and opportunities without prioritizing superiority (Yunus et al., 2019). So, religious harmony will be formed in a society depending on tolerance, cooperation, mutual respect, mutual trust, and the ability to resolve a conflict in a community (Nuriyanto, 2018).

Special Capital Region of Jakarta (D.K.I Jakarta). Indonesia's capital city, has very high diversity due to so many backgrounds of its people. Therefore, D.K.I Jakarta is often called the window of Indonesia. As one of the largest cities in Indonesia, D.K.I Jakarta has various kinds of complex social problems. D.K.I Jakarta, as a metropolitan city, faces problems with polluted environments, poorly managed infrastructure, uncontrolled urbanization, and economic inequality resulting in high crime rates. Its connection with religious life is that it makes D.K.I Jakarta is prone to conflict due to existing inequalities. The people of D.K.I Jakarta, who are predominantly immigrants and typologically belong to an urban society with various characteristics, add to the causes of conflict between the fellow and inter-religious people. To realize true inter-religious harmony, a concept of state life must be created that binds all members of social groups of different religions to avoid conflicts between religious communities (Afandi, 2018; Rambe, 2017). Seeing the condition of D.K.I Jakarta, which has a multicultural society, it is necessary to research the religious harmony.

The development of harmony varies greatly in each region, where several aspects of harmony in certain areas become a concern and have been successfully realized or have become obstacles in promoting harmony. Therefore, it is necessary to look at the success of building religious harmony based on national achievements. Related to the index of inter-religious harmony, several previous studies with various perspectives and approaches are relevant to this research. First, research conducted by (Sulaiman et al., 2021) measures the level of tolerance in East Lombok Regency using the dimensions of perception, attitude, government attitude, and cooperation, people's expectations of the government. The study results show that the index of inter-religious tolerance is included in the high index category. Specifically, the dimensions of attitude and cooperation are categorized as sufficient. The dimensions of perception, government attitudes and expectations are in the high category. Research on the tolerance index in East Lombok Regency was also carried out by (Tohri et al., 2021). In this study, it was stated that the reality of tolerance as a social fact would not be sufficient if it were photographed only from one side, which was unable to reveal the meaning behind the fact because tolerance has an emic but also has an ethical dimension. The results of research conducted by (Tohri et al., 2021) reveal a more comprehensive understanding of tolerance as a dynamic social reality influenced by the times and social change. Second, the research was conducted by (Hermawati et al., 2017) by measuring interreligious tolerance in the city of Bandung. Using a quantitative method, measuring the value index of tolerance through three main dimensions: perception, attitude and cooperation between religions. The study results show that the Inter-religious Tolerance Index in the city of Bandung is in the high category, which indicates that the social interaction between religious communities in the city of Bandung has been going well and is within the limits of reasonable social distance.

However, the measurement of religious harmony using the index approach has a weakness and can only explain the condition of religious harmony in general. Meanwhile, the condition of religious harmony in each region has different factors affecting religious harmony. In other words, the religious harmony index approach needs to dig deeper into indicators of religious harmony. The religious harmony index approach can only identify which areas have good and poor religious harmony. The assessment of religious harmony not only measures the level of religious harmony in each region but also explores how potential conflicts will occur. In addition, index measurement as a measure of religious harmony leads to the homogenization of places and eliminates the complexity of factors that affect religious harmony.

Based on the discussion above, this research tries to identify and explore conditions of religious harmony in DKI Jakarta. This study uses a clustering approach to analyze religious harmony in DKI Jakarta. This research is based on the assumption that special causes do not necessarily lead to problems of religious harmony that appear on the surface today as many people perceive. Therefore, studying the condition of religious harmony in DKI Jakarta is necessary. This study aimed to obtain information on the strength and vulnerability mapping of inter-religious relations in DKI Jakarta. Policy makers or other relevant agencies can use this research to anticipate the emergence of conflicts. The results of this study can also be used as evaluation material to improve the quality of religious harmony in the future.

2. Methods

2.1 Sample and Research Variable

The approach used in this research is survey research. Survey research collects information about the characteristics, actions, and opinions of a representative group of respondents from the population . This research was conducted in D.K.I Jakarta Province with survey locations in Central Jakarta City, West Jakarta City, South Jakarta City and Kepulauan Seribu Regency. This research was conducted by distributing questionnaires to religious adherents who were selected randomly in selected villages. Villages or sub-districts were selected by multistage random sampling in 4 districts/cities in D.K.I Jakarta Province. This survey sample is Indonesian citizens aged 17 years and over or already married. The sample is determined using a tiered random sampling technique (multistage clustered random sampling).

This survey research aims to investigate the influencing falctor inter-religious harmony in D.K.I Jakrta Province by referring to six variable or dimensions: tolerance, equality, cooperation, anti violence, national commitment, and adaptive to local culture in Table 1. Each dimension is measured using a Linkert scale, the lowest point of the scale is given a score of one, and the highest point of the scale is given a score of four. To interpret the value or level of religious harmony, a common value is prepared with a score range of 0-100. Because the answers to each question vary between 1-4, set the standard value or level. The answer of respondent one will be given a score of 0, the answer of respondent two will be given a score of 25, the answering respondent three will be given a score of 75, and the answer to respondent four will be given a score of 100. In contrast, respondents who stated that they did not know or did not answer would be given a score of 50.

2.2 K-Means Algorithm

Clustering is a popular algorihtm of data analysis and plays an essential role in data mining (Jiang et al., 2010). Clustering is an unsupervised learning technique because there is no target label in the process (He and Tan, 2012), which aims to group data into several groups or clusters (Zhang et al., 2010) so that data in one group has the maximum level of similarity and data between groups has a minimum level of similarity (Han et al., 2012). The smaller the distance between the data, the higher the similarity between the data and vice versa (Gan et al., 2007). Cluster analysis has been widely applied in various fields including market research (Shahbaba and Beheshti, 2014), health and banking (Ammar et al., 2014), image segmentation (Xu et al., 2015), pattern recognition, decision-making, and machine learning (Yi et al., 2010).

According to Han dan Kamber (Han et al., 2012), many clustering algorithms exist. However, in general, the primary in cluster analysis can be grouped based on the partitioning, hierarchical, density-based and the gridbased algorithms. The most popular clustering algorithms are the hierarchical and partition algorithms (De Carvalho et al., 2012). The partition algorithm divides the data into groups (Nanda and Panda, 2014), where each partition represents a cluster (Fahad et al., 2014). The advantage of this technique is that it can manipulate large datasets (Pimentel and de Souza, 2013).

Table 1. Variable of religious harmony

VARIABLE	QUESTIONS					
	1. Living next door to followers of other					
	religions.					
	2. Followers of other religions build houses					
	of worship in the village where you live					
77 1	after obtaining permission from the local					
Tolerance	government.					
	3. Followers of other religions hold religious					
	celebrations in your neighborhood.					
	4. Your children play/make friends with					
	children of other religions.					
	1. All religious groups should be given the					
	right to broadcast their religious teachings					
	2. Every citizen is equal before the law					
	regardless of religion.					
	3. Every citizen has the right to get the same					
	public services, regardless of religion.					
	4. Every citizen has the right to get a decent					
E	job, regardless of religion.					
Equality	5. Indonesian citizens, regardless of religion,					
	have the right to become regional heads.					
	6. Indonesian citizens, regardless of religion,					
	have the right to be President of the					
	Republic of Indonesia.					
	7. Every student has the right to receive					
	religious education at school in accordance					
	with his/her religion.					
	1. Visiting houses of other religions					
	2. Participate in environmental/social					
	activities involving followers of other					
	religions					
	3. Helping friends or neighbours who are					
	followers of other religions who are					
	experiencing difficulties or calamities					
Cooperation	4. Involved in a business managed with					
	friends of different religions					
	5. Buying and selling (transactions) with					
	neighbours/friends/sellers of different					
	religions					
	6. Participate in community/professional					
	organizations that involve adherents of					
	other religions					
Anti	1. Avoid violence in solving problems					
Violance	2. Prioritizing dialogue and deliberation in					
	matters of religious conflict					
	3. Complete legally for all perpetrators of					
	violence in the name of religion					
National	1. Accept the UUD 1945 (Constitution)					
Commitment	which citizens must adhere to					
	2. Accepting Pancasila as the basis of the					
	state (ideology)					
	3. United as one nation, the Unitary State of					
	the Republic of Indonesia					
	4. A democratic system that is not opposed to					
	religious teachings					
	5. Legally process all attempts to change the					
A.1	agreement					
Adaptive to	1. Appreciate religious traditions with local					
LOCAL						
Culture	2. Maintaining good traditions (traditions					
	that benefit many people according to					
	religious teachings)					
	3. Utilizing traditions and/or local wisdom to					
	strengthen national unity and progress					
	4. Do not dissolve cultural activities, local					
	traditions unilaterally					

Mapping Religious Harmony in the Special Capital Region Jakarta using K-Means Algorithm (Istiawan et al)

K-means is a hard partition algorithm that is widely used for grouping data (Jain, 2010). The K-means algorithm is the basis of the partitioning algorithm grouping, which was published by Lloyd of Bell Telephone Laboratories in 1957 (Nanda and Panda, 2014). Research on K-means can be traced back to the middle of the last century, conducted by various researchers across different disciplines (Wu, 2012) most notably by Lloyd (1957) (Lloyd, 1982), Forgey (1965) (Forgy, 1965), Friedman and Robin (1967) (Friedman, H., Rubin, 1967) and MacQueen (1967) (Macqueen, 1967). K-means can be defined as a clustering algorithm that groups data into k clusters based on the closest distance to the cluster centre. The K-means algorithm is very efficient for grouping large datasets (Fahad et al., 2014), ease of application (Jain, 2010) and computationally efficient algorithms (Cura, 2012; Hasan et al., 2009) is the main reason for the popularity of K-means, even though it was proposed more than 50 years ago (Jain, 2010). K-means works by determining the number of partitions, as many as k according to the group to be formed, then generating initial cluster centres randomly. Furthermore, each object will be grouped based on the closest distance to the cluster centre

The K-means algorithm is an iterative grouping algorithm that partitions data into predetermined groups. Historically, the primary form of K-means was discovered by several researchers from across disciplines. The most influential was Lloyd (1982) (Lloyd, 1982), Forgy (1965) (Forgy, 1965) Friedman and Rubin (1967) (Friedman, H., Rubin, 1967) and MacQueen (1967) (Macqueen, 1967). he K-means algorithm classifies objects so that objects in one cluster are more similar than objects in different clusters. K-means begins by determining the number of clusters as much as, then generating cluster centres randomly. Furthermore, each object will be grouped based on the closest distance to the cluster centre, and the cluster centre will be updated based on the data points in each cluster. This process is repeated until the convergent criteria are met. The following are the stages of the Kmeans algorithm:

- Determine the value of the number of clusters formed.
- Choose *k* cluster centers randomly to be the initial cluster centers.
- Allocate all data to the nearest cluster centre with a distance matrix.
- Recalculate the new cluster centre based on data following each cluster.
- Repeat steps 3 and 4 until convergence conditions are reached, or no data moves from one cluster to another.

2.3 Davies-Bouldin Index

The Davies-Bouldin Index (DBI) metric was introduced by David L. Davies and Donald W. Bouldin (1979) (Davies and Bouldin, 1979) which is used to evaluate clusters. Internal validity is how well clustering has been done by calculating the quantity and derived features of the dataset. The sum of squares within cluster (SSW) as a cohesion metric in a cluster i is formulated in

Eq. (1).

$$SSW_i = \frac{1}{m_i} \sum_{j=1}^{m_i} d(x_j, c_i)$$
(1)

 m_i is the amount of data in the *i*-th cluster, while c_i is the *i*-th cluster center. Meanwhile, the metric for the separation between two clusters, for example cluster *i* and *j*, uses the formula sum of square between clusters (SSB) by measuring the distance between the centers of clusters c_i and c_j as following in Eq. (2).

$$SSB_{i,j} = d(c_i, c_j) \tag{2}$$

Defined $R_{i,j}$ is a ratio size comparison of how well the comparison value is between the *i*-th cluster and the *j*-th cluster as formulated in Eq. (3). The value is obtained from the cohesion and separation components. A good cluster is one that has the smallest possible cohesion and the largest possible separation.

$$R_{i,j} = \frac{SSW_i + SSW_j}{SSB_{i,j}} \tag{3}$$

The Davies-Bouldin Index (DBI) value is obtained from the following Eq. (4)

$$DBI = \frac{1}{K} \sum_{i=1}^{K} \max(R_{i,j})$$
(3)

K is the specified number of clusters. The Davies-Bouldin Index measures the average similarity between each cluster and one more similar cluster. The lowest average on the Davies-Bouldin Index shows that the clusters formed are compact and can be separated in the right cluster.

3. Results and Discussion

Based on data from the Directorate General of Population and Civil Registration of the Ministry of Home Affairs, the population of DKI Jakarta is 11.25 million. This number is equivalent to 4.13% of Indonesia's total population of 272.23 million people. In detail, as many as 9.43 million (83.81%) of the population in the capital are Muslims. As many as 963.19 thousand (8.56%) of Jakarta's population are Christians. Then, 438.13 thousand (3.9%) residents of Jakarta follow the Catholic religion. There are also 396.91 thousand (3.53%) of Jakarta's population who are Buddhists. As many as 20.34 thousand (0.18%) of Jakarta's population are recorded as Hindus. Then, Jakarta's Confucian population is 1665 people (0.01%). Meanwhile, 260 residents of Jakarta adhere to religious beliefs. Based on gender, 5.65 million (50.28%) Jakarta residents are male. The remaining 5.59 million people are female. According to marital status, the population of Jakarta who is not married is 5.38 million people (47.82%), married 5.33 million people (47.37%), divorced 159.29 thousand people (1.42%), and divorced 381.6 thousand people (3.39%) (Kusnandar, 2021). Based on these data, studying the characteristics of harmony between religious communities in D.K.I Jakarta Province is interesting.

3.1 Responden Profile

The description of the research data aims to determine

the general trend of the characteristics of respondents and samples in each research variable. Characteristics of respondents seen from Religion, and last education. The number of respondents in this study was 400, spread over four regencies/cities, namely Central Jakarta City, West Jakarta City, South Jakarta City, and Kepulauan Seribu Regency, with 100 respondents each. The government of the Republic of Indonesia has officially recognized six religions embraced by its citizens, namely Islam, Protestantism, Catholicism, Hinduism, Buddhism and Confucianism. Even though Indonesia is not an Islamic country, most of the population adheres to religion. It is the country with the most adherents of the Islamic religion in the world. However, its residents respect each other's differences by applying the motto "Bhinneka Tunggal Ika", which means that although we are different, we are still one. Table 2 shows the profile of respondents in D.K.I Jakarta based on their religion. The majority of respondents in D.K.I Jakarta are Muslim, namely 94.8%; Christian respondents are the second most, 2.8%, followed by Catholic respondents, 1.5%. Buddhist and Confucian respondents are 0.8% and 0.3%, respectively.

RELIGIONS	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
Buddha	3	0.8	0.8	0.8
Islam	379	94.8	94.8	95.5
Catholic	6	1.5	1.5	97
Konghucu	1	0.3	0.3	97.3
Christian	11	2.8	2.8	100
Total	400	100	100	

Table 2. Number of Respondents Based on Religion

The distribution of Jakarta residents who were respondents in this study is by data published by Jakarta that the majority of the population of D.K.I Jakarta are predominantly Muslim, with Christians being the second largest. Not only Islam and Christianity, D.K.I Jakarta is also an area with the spread of Catholicism, Buddhism and Confucianism (BPS D.K.I Jakarta, 2020). The distribution of religious adherents in Jakarta causes religious pluralism, as seen in the Istiqlal Mosque, which stands opposite the Cathedral Church in Central Jakarta. In addition, D.K.I Jakarta is considered a miniature barometer of religious harmony due to the plurality and heterogeneity of society in the nation's capital.

Various efforts have been made to maintain the nation's integrity, such as requiring general education for students in Indonesia from elementary school to the high school level, even in college. This is solely an essential support for Indonesian students' abilities when directly involved in the community. Majority of respondents having the last education graduated from high school 46.30%, this shows that respondents in D.K.I Jakarta have undergone nine years of compulsory education set by the government. Respondents in D.K.I Jakarta, who continued their education to tertiary education, was 15.30% consisting of 2.8% D3 graduates, 12% S1 graduates and 0.5% S2 graduates. Education for the younger generation, both theoretical education and character education at this time, needs to be instilled as early and as good as possible to protect the younger generation from the threats of various harmful effects of globalization because the younger generation is exposed to bad things, such as intolerance, promiscuity, radicalism and other destructive effects (Averoezy et al., 2021).

3.2 Clustering of Religiuos Harmony

In this section, the results of the clustering experiment on religious harmony will be explained using the K-Means algorithm. The clustering results will be used to analyze the characteristics of religious harmony in DKI Jakarta. Based on Fig. 1, it can be seen that the DavisBouldin Index value has decreased quite drastically in the number of clusters 3 and has increased in the number of clusters 4 to 8. The lowest average on the Davies-Bouldin Index indicates that the clusters formed are compact and can be separated in the right cluster. Thus, it can be concluded that the analysis of religious harmony in this study uses 3 clusters as the optimal number of clusters.



Fig 1. Davies-bouldin index

As you can see in Table 2, it can be seen that on the average variable in cluster 0 there are 4 variables that have low scores affecting the level of religious harmony, namely empathy, anti-violence, national commitment, and adaptive to local culture. Whereas in cluster 1 there are 2 variables that have low scores affecting the level of religious harmony, namely tolerance and cooperation. In cluster 3 there are no low value variables. Therefore, local government policies related to increasing religious harmony can be focused more on cluster 0, especially on variables that have low values affecting religious harmony in D.K.I Jakarta. Based on Fig. 2, there are 169 respondents in cluster 0, 63 respondents in cluster 1 and 168 respondents in cluster 2. Based on the average variable in each cluster, respondents in cluster 0 have a lower level of religious harmony than the cluster other.

Fig. 2 shows that cluster 0 has major problems that affect religious harmony compared to other clusters. The

number of respondents included in cluster 0 is 169 respondents. In cluster 0 there are three variables that have low scores below the average, namely adaptive to local culture is on average 29.30% smaller, national commitment is on average 28.73 smaller and anti-violence is on average 18.95% smaller. The three variables that have low value in influencing religious harmony in DKI Jakarta are the dimensions of religious moderation. Religious moderation is one of the programs prioritized by the government to build a harmonious religious life and national and religious life. Religious moderation has an important role in managing the diversity of a diverse and multicultural society. In this context, religious moderation has the goal of accommodating differences through religious attitudes and expressions that uphold the values of tolerance and equality in preserving the nation's cultural values. Respondents who are in cluster 0 need to be given counseling regarding the dimension of religious moderation, namely related to adaptive values to local culture, national commitment, and anti-violence. This can be done by the Forum for Religious Harmony (FKUB) by opening a dialogue space attended by various interfaith leaders and community leaders to jointly discuss various things in order to realize religious harmony. Accommodate religious and societal aspirations in the socio-cultural pluralism of the people of DKI Jakarta and the spirit of nationalism.

Cluster 1 has two main problems related to religious harmony which has a value below the average variable, namely tolerance is on average 64.45% smaller and cooperation is on average 12.73% smaller. Tolerance is an attitude or character of tolerance, i.e., respecting and allowing an opinion, opinion, view, belief, or other that differs from one's stance (Abdullah et al., 2016; Prayitno et al., 2022). Mutual respect can also improve interreligious relations in community life (Zulkefli et al., 2018). Respecting the existence of diversity can also contribute to political and national stability. In addition, tolerance has also been shown to have economic consequences. The more tolerant a place is, the more likely it is to create a more dynamic economy (Berggren and Nilsson, 2016). Tolerance is the basis for developing an inclusive society and democratic governance, and tolerance is included in the global sustainable development goals (Ardi et al., 2021). Harmony must give birth to cooperation to achieve common goals, so that religious harmony is dynamic and not theoretical but must reflect the togetherness of religious people as a community or society (Rachmadhani, 2018). Cooperation between religious communities is essential because we are always commanded to live alongside people of other religions. Religious cooperation is the relationship between religious communities based on tolerance, mutual understanding, mutual respect, and mutual respect in the practice of equality of religious teachings and cooperation in the life of society and the state. Cooperation acts occupy the highest variable of harmony because cooperation can be realized when tolerance and equality are in good condition.

		Tabl	e 3. Religious harmo	ony cluster centroi	d	
CLUSTER	TOLERANCE	EMPATY	COOPERATION	ANTI VIOLANCE	NATIONAL COMMITMENT	ADAPTIVE TO LOCAL CULTURE
Cluster 0	73.669	78.55*	75.148	75.148*	78.107 *	73.817*
Cluster 1	42.063*	82.54	72.619*	90.476	94.048	83.730
Cluster 2	83.929	90.774	86.607	97.321	99.107	93.601
*Low indicators in ea	ach cluster					

Cluster 0 169					
Adaptive to Local Culture is on average 29.30% smaller, National Commitment is on average 28.73% smaller, Anti Violance is on average 18.95% smaller					
Cluster 1 63					
Tolerance is on average 64.45% smaller, Cooperation is on average 12.73% smaller, National Commitment is on average 11.69% larger					
Cluster 2 168					
Adaptive to Local Culture is on average 29.43% larger, National Commitment is on average 24.52% larger, Tolerance is on average 22.77% larger					

Fig 2. Characteristics of respondents in each cluster

4. Conclusion

This research contributes to the development of mapping religious harmony in D.K.I Jakarta. This study uses a clustering analysis approach. The clustering analysis algorithm used in this study is K-Means to optimize the clustering results. The results of grouping respondents with the K-Means algorithm show that cluster 0 has four variables that have low scores, namely empathy, anti-violence, national commitment, and adaptive to local

culture. Therefore, local government policies related to increasing religious harmony can be focused more on cluster 0, especially on variables that have low values affecting religious harmony in D.K.I Jakarta. The theoretical implications of this research show that indicators of religious moderation in D.K.I Jakarta (national commitment, non-violence, tolerance, and adaptability to local culture) can become a paradigmatic foundation in fostering inter-religious harmony.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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