

MULTI-STAKEHOLDER COOPERATIVES FOR DEVELOPING ECONOMIC DEMOCRACY IN YOGYAKARTA PEOPLE'S MARKET: APPLICATION OF K-MEANS CLUSTERING USING ORANGE

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Abstract

There are still many problems faced by people's markets, such as loan sharks, price games, quality of human resources, and cooperative stagnation. It is compounded by unequal competition with modern retail and online markets. Single Stakeholder cooperatives have just been able to overcome these problems. Multistakeholder cooperatives have yet to develop in Indonesia people's market. This study aims to formulation of the key models/parameters for developing people's market multi-stakeholder cooperatives and the potential for developing multi-stakeholder cooperatives which can be a solution to the conditions and problems of people's markets in Yogyakarta. In accordance with the research formulation above, this research aims to map the model/parameters for developing people's market multi-stakeholder cooperatives and mapping potential clusters for the development of people's market multi-stakeholder cooperatives in Yogyakarta using k-means clustering. The study has formulate 3 dimension in input (carrying capacity), process (governance), and outcome (impact/benefit) consist with 52 parameters in measuring potential of multistakeholder-cooperative. Measurement using the instrument meet the potential of developing multistakeholder cooperative in people's market in Yogyakarta. Using k-means clustering find three cluster of the cooperative potential; very potential, potential, and less potential

Keywords: economic democracy, multistakeholder cooperative, people's market, k-means clustering

1. Introduction

The people's market plays a strategic role in the Indonesian economy. According to the Statistics Indonesia (BPS), there are 15,657 people's markets in 2021. The Ministry of Trade reports that Indonesia has 12.625.000 traders in the people's markets. When the numbers include the other economic actors working in the people's markets, such as suppliers, porters, retailers, and consumers, the people's market could cover 75% of the economic actor households in Indonesia (Santosa, 2020). The people's market reflects economic democracy because people voluntarily gather and manage the available economic resources to perform community-based economic activities and economic transactions (BP2KP-Kemendag, 2015). The people's market traders are also essential in distributing agricultural products that could not go to modern retailers. When the economic crisis occurred, traders and farmers who sent their products to people's markets were able to support the Indonesian people (Sahban, 2018). The people's market is the barometer of price stability and Indonesian economic trigger. Besides, it can create working opportunities for micro-scale economic actors with academic and economic disadvantages (Mauludi et al., 2021).

Despite the strategic roles, there have been some problems and challenges to people's markets due to economic liberalization and technological advances. Various studies show the decline of people's markets amidst the massive expansion of modern markets (Lee, 2017; Aliyah, 2017; Setyo, 2019). Liberalization in the retail sector aligns with decreased numbers and people's market share (Hermawan et al., 2018; Tulandi & Winarno, 2017). Similarly, many people's retailers experience a decreasing income because of the imbalance of service provided by the modern markets (Suyono, 2016; Martha H & K W, 2019). This situation mainly occurs in the people's markets around urban areas (Choerudin et al., 2018) and those that sell similar products to modern markets (Dotulong et al., 2019).

During the COVID-19 pandemic, the number of shoppers at the people's markets and the traders' income decreased by 50% (Azimah et al., 2021). In 2020, The Minister of Trade of the

Republic of Indonesia stated that 29% or around 3.6 million people's market traders quit their jobs due to the pandemic impact. According to data from the Research Division of the Indonesian Market Traders Association (Divisi Penelitian Ikatan Pedagang Pasar Indonesia - IKAPPI), 43% or around 5 million traders from people's markets closed their shops after several post-pandemic restrictions policy (Badrussalam, 2021).

Besides the impact of the modern market expansion and the COVID-19 pandemic, the people's market still faces a classic internal problem. Contemporary studies show that many people's market traders owed loan sharks with costly interest (Putri & Jayatri, 2020). The loan sharks have been part of the people's market for their accessibility, and historically, they have been close to the people's market traders (Triana & Naqiyah, 2020). This finding is similar to a study that reveals that the people's market's impediment occurs because of internal and personal problems in the market (Suryadarma et al., 2007).

Several studies have found that the main problem is the weakness of economic democracy, in which the main instrument is the people's market cooperative. Market cooperatives as a forum for human development, organization, and business development have yet to work optimally in market activities (Santosa, 2020). Research from the Center of Economic Democracy Studies of UGM reveals that the problems of cooperatives in the Special Region of Yogyakarta lie in the human resources, stagnation of business innovation, which only focuses on saving and loan activity and incomplete implementation of cooperative principles (Indroyono dan Santosa, 2011).

Another study found that cooperatives have not yet been able to improve the community and its member's welfare and a solution for redistribution of welfare (Dunggio & Yasa, 2016). Internally, some market cooperatives still experience the classic problems of stuck credit from their members (Suarjaya, 2015). The market cooperative has developed among the unresolved problems in planning management and the market environment (Tanuwidjaja & Wirawan, 2012). The problem of the study is relevant to the results of the Statistic Indonesia (BPS) in 2019 on 390 people's markets in 246 cities in Indonesia, stating that only 15.56% of traders of people's markets have undergone any assistance. The survey result also shows that only 46.55% of traders can improve their turnover after the market revitalization program (BPS, 2019).

A study on multistakeholder cooperatives is essential, considering the main weaknesses of market cooperatives in an open competition in the previous studies are human resource stagnation, membership, business, and networking. Theoretically, multistakeholder market cooperatives can solve the problems of both the quality and quantity of the members of market cooperatives (Münkner, 2014). The membership expansion from many elements can improve the economic scale so that the market cooperatives can efficiently operate with additional values to distribute equally for the suppliers, traders, retailers, and consumers. Multistakeholder cooperatives provide an adaptable solution to technology and business changes (Putra, 2021). Multistakeholder cooperatives can terminate the capitalism cycle by consolidating the economic strengths among local, inter-region, national, and international cooperatives (Faedlulloh, 2016).

There needs to be more research on multistakeholder cooperatives in the retail sector and people's market-based. There has yet to be an empirical study on multistakeholder cooperatives in Indonesian people's market since no cooperatives have ever initiated formal institutional innovation into multistakeholder cooperatives (Putra, 2021). The current study has a novelty as the first research in developing multistakeholder cooperatives in the trading sector with a people's market based in Indonesia. This study improves the entrepreneurship incubator model from Santosa's research (2018) in people's markets by developing multi-stakeholder-based market cooperatives, which include suppliers, traders, retailers, and consumers.

This paper is expected to contribute to advancing research and the implementation of economic democracy in people's markets in Indonesia. Previous research related to people's markets

tends to be partial without integrating it into the development of economic democracy. There needs to be research that links the various unsolvable problems in people's markets and market cooperatives. Research on market cooperatives still needs to be improved and tends to use conventional approaches. This paper employs an integrative literature review based on a transformative paradigm, which provides a thorough framework for social justice issues and consequent methodological decisions.

Based on the background of this problem, this research proposes a problem formulation of the key models/parameters for developing people's market multi-stakeholder cooperatives and the potential for developing multi-stakeholder cooperatives which can be a solution to the conditions and problems of people's markets in Yogyakarta. In accordance with the research formulation above, this research aims to map the model/parameters for developing people's market multi-stakeholder cooperatives and Mapping potential clusters for the development of people's market multi-stakeholder cooperatives in DIY.

2. Literature Review

Munkner (2004) defines multi-stakeholder cooperatives as cooperative societies with heterogeneous membership. Multi-stakeholder cooperatives are based at the local level, accommodate members' interests, and promote people's and communities' welfare (Munkner, 2004). Multi-stakeholder cooperatives provide a democratic vision among members and users of the cooperative. The stakeholders are all parties related to or affected by the cooperative activities, with various interests from investors, managers, customers, users, workers, borrowers, community members, and civic organizations (Gray, 2014). Correspondingly, Lund (2011) defines multi-stakeholder cooperatives as cooperatives formally managed by representatives of two or more stakeholders in the same organization, including consumers, producers, workers, volunteers, or community partners (Lund, 2011). Multi-stakeholder cooperatives tackle various limitations or weaknesses in conventional cooperatives. However, both models have their advantages and disadvantages.

Conventional cooperatives have limitations because they are isolated and fragmented. For example, agricultural cooperatives, where the members are only farmers, work to optimize value from the farmers' perspective, i.e., to obtain the best value for them. The best value from the farmer's perspective is the high/expensive price of the products. On the other hand, people, as consumers, have a different perspective on the best value, which is the lowest price. As a result, the relations between the two parties are dichotomous. So, when elaborated to the movement level, Jamison and Crowell see that the conventional cooperative movement tends to be fragmented in which each party only sees its interests (Putra, 2022).

Multistakeholder cooperatives respond to the market and government's failure to distribute products with fair pricing and value shared fairly across all economic actors in society (Reid & Fairbairn, 2011). Multistakeholder cooperatives can also actualize the various ideas, expertise, and networks of multistakeholder members for organizational development (Michaud & Audebrand, 2017). It is in line with the research of Vezina and Girard (2014), which found that diversity and flexibility are the background for developing multistakeholder cooperatives.

Multistakeholder cooperatives address the problems single-stakeholder cooperatives face, particularly concerning capital and market difficulties. It is equivalent to Bibby's (2015) research on the UK cooperative Hebden Bridge Fustian Manufacturing Cooperative. Due to crucial capital shortages and difficulty finding buyers, the cooperative expanded its membership to multistakeholder, including investors and consumers. In addition to the above reasons, the positive impacts and good socioeconomic performance of multistakeholder cooperatives are also logical reasons.

The reason for building multistakeholder cooperatives is also related to their capacity to increase the bargaining power of cooperatives at a fair price (Ajates, 2021). Economic value can then be distributed more equitably to all actors in the supply chain. Multistakeholder

cooperatives also contribute to social change, transformation, and innovation (Michaud & Audebrand, 2017; Ajates, 2021; Lund, 2011). Multistakeholder cooperatives have thus become an essential element of economic progress and growth at both local and national levels. Multistakeholder cooperatives are a medium for human resource development, which serves as a foundation for economic development (Reid & Fairbairn, 2011). They function as a medium of education and mutual learning for all members of the wider community (Michaud & Audebrand, 2017; Ajates, 2021). In addition, research also proves that the development of multistakeholder cooperatives is in line with the efforts to maintain environmental sustainability (Lund, 2011; Ajates, 2021) because multistakeholder cooperatives give serious attention to the environment while performing economic activities. Other benefits and positive impacts found in research on multistakeholder cooperatives are preventing co-optation by dominant actors (Ajates, 2021), improving the economic and financial performance of cooperatives (Maroua, 2015), supporting the development of alternative food systems (Ajates, 2021), and increasing satisfaction of cooperative members (Reid & Fairbairn, 2011).

3. Methods

This research uses a transformative paradigm and design. Transformative design is a design formed by researchers within a transformative theoretical framework. All other decisions such as interactions, priorities, timing, and blending are made in the context of a transformative framework (Creswell & Clark, 2018). This research combines an integrative literature review to map models/key parameters for the development of people's market multi-stakeholder cooperatives with quantitative methods through surveys to map clusters of potential development of people's market multi-stakeholder cooperatives in Yogyakarta.

This research was conducted in people's market cooperatives in the Special Region of Yogyakarta which covers five districts/cities. Yogyakarta was chosen as the research location because Yogyakarta is an educational city as well as a trading city which has many people's markets in accordance with the context and problems found in the research. The five regencies/cities also represent markets in the urban, border (sub-urban) and rural (rural) areas. This research combines an integrative literature review and quantitative methods through surveys conducted sequentially in two phases: key parameters mapping and cluster mapping survey..

The aim of this first phase is to map key models and parameters for the development of people's market multi-stakeholder cooperatives through an integrative literature review of various journal articles, papers and research reports related to multi-stakeholder cooperatives that have developed abroad. The results of the mapping are in the form of a chart of key models/parameters for the development of multi-stakeholder cooperatives which are then formulated into indicators and instruments for the purpose of surveying the potential for developing people's market multi-stakeholder cooperatives in Yogyakarta at the next stage. To fulfill the validity and reliability of the instrument, a validity and reliability test was carried out using SPSS, as well as a content validity test through expert judgment of multi-stakeholder cooperatives in Indonesia. In the research there were three Indonesian multi-stakeholder cooperative experts who tested parameters/instruments.

Second phase is to carry out cluster mapping of potential development of people's market multi-stakeholder cooperatives in five (5) regencies/cities. In this first phase of research, a survey will be conducted of all market cooperatives using the valid and reliable structured questionnaire above. Market cooperative data is based on recommendations from the Department of Cooperatives and SMEs in each Regency/City as well as the Department of Cooperatives and SMEs, as well as information found directly by researchers in the field. In each market cooperative that was willing to participate, respondents were taken who represented elements of the management/supervisors and members of the market cooperative.

Data collected from the field survey was analyzed using the k-means clustering data

mining analysis tool using the Orange application . Cluster analysis is a data mining method that is used to search for data and then group it based on the similarity (similarity of characteristics) between one data and another, so that observations in the same group have relatively homogeneous properties than those in different groups (Santoso & Manzilati , 2019). In line with the aim of this research, namely wanting to combine several objects into groups (clusters) so that each group is similar to each other, and members of one group are different from other groups. The clusters formed have minimum diversity within a cluster and maximum diversity between clusters (Mattjik & Sumertajaya, 2011) .

K-means clustering is a non-hierarchical data clustering method that partitions data into one or more clusters, so that data that has the same characteristics will be grouped into the same group and data that has different characteristics will be grouped into groups. another. K-Means Clustering is a clustering method that groups data into k groups based on the centroid of each group. The k-means method is a distance-based clustering algorithm that divides data into a number of clusters and this algorithm only works on numerical attributes. Before carrying out clustering, a multicollinearity check is first carried out to avoid strong correlation between two or more groups formed (Widyadhana et al., 2021). The results of the analysis are a visualization of a cluster map of the potential development of people’s market multi-stakeholder cooperatives in Yogyakarta.

4. Result and Discussion

Mapping of key models/parameters for the development of people’s market multi-stakeholder cooperatives was carried out through an integrative literature review of research results related to multi-stakeholder cooperatives published in various journals abroad. The results of the mapping are a classification of key factors for the development of multi-stakeholder cooperatives which are divided into three development dimensions, namely input (resources), process (governance) and outcome (impact). Systematically, various studies related to multistakeholder cooperatives can be classified into three parts, namely inputs (resources), processes (governance), and impacts (outcomes) as presented in the table 1 below:

Table 1. Research Classification of Multistakeholder Cooperative Key Factors

Inputs/Resources	Process/Governance	Outcome/Impact
Financial capital (Bibby, 2015)	Profit Distribution (Bibby, 2015; Vezina & Girard, 2014); Lund, (2011))	Efficiency & fairness (Borzaga & Depedri, 2010)
Supporting members (Michaud & Audebrand, 2017)	Bonus to Employee (Bibby. 2015)	Social cohesion and inclusion (Langlois & Girard, 2005; Lund, 2011; Levi, 1998; Michaud & Audebrand, 2017; Ajates, 2021)
Diverse ideas, expertise, and networks (Michaud & Audebrand, 2017)	Multi-stakeholder Management (Bibby, 2015; Vezina & Girard, 2014; Reid & Fairbairn, 2011; Lund, 2011; Shaccetti & Birchall, 2019)	Human resource development (Reid & Fairbairn, 2011))
Heterogeneity and flexibility of the members (Vezina & Girard, 2014)	Diversification of business and services (Vezina & Girard, 2014)	Transformational (Lund, 2011; Ajates, 2021)
Regulations/laws, fiscal incentives, the tax deductions (Vezina & Girard, 2014)	Concern for the community (Vezina & Girard, 2014; Reid & Fairbairn, 2011)	Bonding, Bridging, & Linking Social Capital (Lund, 2011; Ajates. 2021)

Source: compiled by the researcher from various journals (2024)

Table 1. Continued

Inputs/Resources	Process/Governance	Outcome/Impact
Active participation and involvement of members (Hansmann, 1996; Ostrom, 2007; Langlois & Girard, 2005; Girard, 2009; Shaccetti & Birchall, 2019)	Trust between parties (Mukner, 2004; Girard, 2009; Lund, 2011)	Empowerment of marginalized communities (Levi, 1998)
Economic environment (Reid & Fairbairn, 2011)	Openness and Increased Level of information (Mukner, 2004; Girard, 2009; Lund, 2011)	Members satisfaction (Reid & Fairbairn, 2011)
Common goal& social mission (Lund, 2011; Tomas, 2004; Michaud & Audebrand, 2017)	Reinforcement cycle (Sundaramurthy & Lewis, 2003; Michaud & Audebrand, 2017)	Cooperative performance (Maroua, 2015)
Solidarity (Lund, 2011)	Ability of cooperative workers (Borzaga & Depedri, 2010)	Social Inovation (Michaud & Audebrand, 2017; Ajates, 2021)
	Multi-stakeholder board cooperation (Langlois & Girard, 2005; Chagnon, 2004)	Education & mutual learning(Michaud & Audebrand, 2017; Ajates, 2021)
	Dialogue & Ability to reach consensus (Reid & Fairbairn, 2011; Lund, 2011; Shaccetti & Birchall, 2019)	Community and local economic empowerment (Lund, 2011)
	Understanding the roles of the parties (Reid & Fairbairn, 2011)	Environmental sustainability (Lund, 2011; Ajates, 2021)
	Availability of technical assistance (Reid & Fairbairn, 2011)	Cooptation Risk (Ajates, 2021)
	Cooperative network closeness (Reid & Fairbairn, 2011)	Bargaining power & fair pricing (Ajates, 2021)
	Management commitment (Reid & Fairbairn, 2011)	Alternative food systems (Ajates, 2021)
	Organizational democratic commitment (Reid & Fairbairn, 2011)	
	Control Distribution (Turnbull, 2001)	
	Legitimate Convention (Orlean, 1997; Aaroumi, 2021)	

Source: compiled by the researcher from various journals (2024)

As shown in Table 1 above, Girard and Vezina's (2014) study of three multistakeholder cooperative models: social cooperatives in Italy, solidarity cooperatives in Quebec (Canada), and cooperative communities in France found that multistakeholder cooperatives offer unlimited resources to address the socioeconomic challenges in communities and society. Through a flexible regulatory framework like in solidarity cooperatives in Quebec, multistakeholder cooperatives can transform from single-stakeholders to a more inclusive cooperative that integrates the needs of communities with different types of organizations (Vézina & Girard, 2014).

Profit distribution mechanisms are critical to the success of such multistakeholder cooperatives (Bibby, 2015). Evidence shows that workers at Hebden Bridge earn 10% more than non-cooperative workers. It does not include the distribution of dividends. As a result, multistakeholders can effectively mediate their dichotomous relations and transform them into new and more humane patterns of relations (Putra, 2022). In addition, employee bonuses are also an integral part of the profit distribution mechanism that determines the performance of multistakeholder cooperatives (Bibby, 2015).

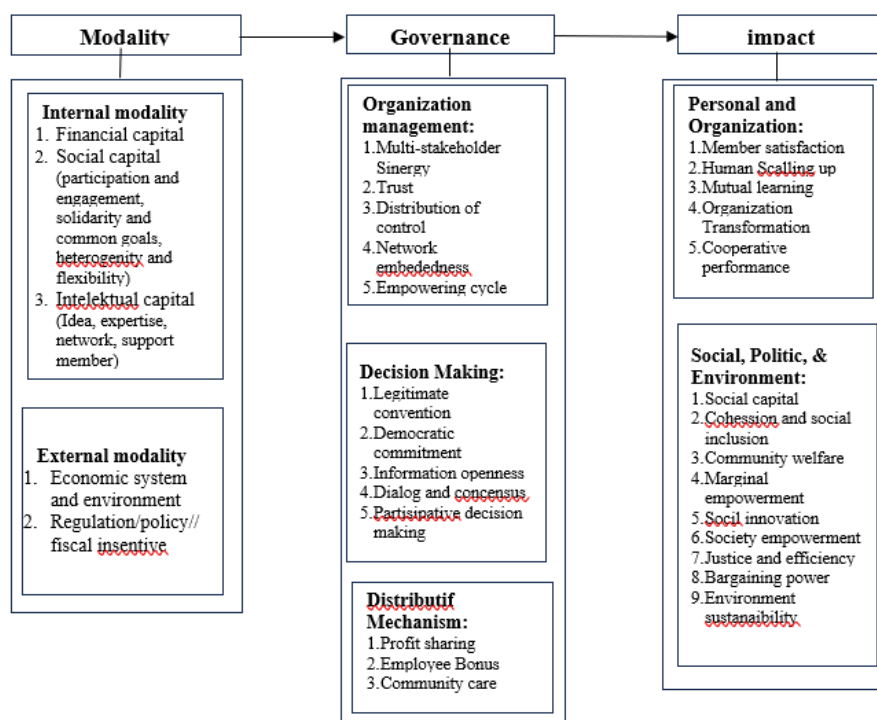
Meanwhile, Reid and Fairbairn's (2011) study describes the achievements of a multistakeholder cooperative in Quebec, Canada, where most respondents were highly satisfied with its

management. More than 90% of respondents expressed a high level of participation in cooperative decision-making. There is an ability to reach a consensus between different actors in the cooperative. Multistakeholder cooperatives can also express the interests of different parties and increase member participation to achieve mutual benefits according to organizational goals (Reid & Fairbairn, 2011). Research by Hansmann (1996), Chagnon (2004), Tomas (2004), and Reid & Fairbairn (2011) support that decision-making participation is one of the essential factors that influence the success of multistakeholder cooperatives. Moreover, dialogue and the ability to reach consensus are also relevant factors (Reid & Fairbairn, 2011; Lund, 2011; Shaccetti & Birchall, 2019).

One of the essential issues in developing multi-stakeholder cooperatives is the heterogeneity of the members. It is assumed to be an obstacle in decision-making, conflict, and high costs (Aarroumi, 2021). However, research conducted by Reid and Fairbrain (2011) on 73 multi-stakeholder cooperatives in Canada proves this is not the case. The governance structure of multi-stakeholder cooperatives has accommodated some parties in the management so that comprehensive decisions can be made after considering recommendations from the parties' representatives (Putra, 2022). In line with Sachetti and Birchall's (2019) view, a multi-stakeholder cooperative's ownership principle can give different parties the same perception, goals, and vision. Relevant factors that determine a successful multi-stakeholder cooperative are the organization's democratic commitment (Reid & Fairbairn, 2011), distribution of control (Turnbull, 2001), and legitimized conventions (Orlean, 1997; Aarroumi, 2021).

A democratic and informed decision-making and connectivity between all parties in the business also determine the development of multi-stakeholder cooperatives (Lund, 2011). Good multi-stakeholder management will affect the performance of the multi-stakeholder cooperative. It corresponds to the research conducted by Bibby (2015), Vezina & Girard (2014), Reid & Fairbairn (2011), Lund (2011), and Shaccetti & Birchall (2019). Management and teamwork of multi-stakeholder cooperation (Langlois & Girard, 2005; Chagnon, 2004), understanding of the roles (Reid & Fairbairn, 2011), and management commitment (Reid & Fairbairn, 2011) are also essential factors.

Figure 1. Multistakeholder Cooperative Development Framework Chart



Source: compiled by the researcher from various journals (2024)

Other key factors that determine successful multi-stakeholder cooperatives are active member participation and engagement (Hansmann, 1996; Ostrom, 2007; Langlois & Girard, 2005; Girard, 2009; Shaccetti & Birchall, 2019), multi-stakeholder solidarity (Lund, 2011), and trust between parties (Mukner, 2004; Girard, 2009; Lund, 2011). In addition, the availability to access information (Mukner, 2004; Girard, 2009; Lund, 2011), the reinforcement cycles (Sundaramurthy & Lewis, 2003; Michaud & Audebrand, 2017), the solidity of cooperative networks (Reid & Fairbairn (2011)), the diversification of businesses and services (Vezina & Girard, 2014), the community concern (Vezina & Girard, 2014; Reid & Fairbairn, 2011), and the cooperative workers ability (Borzaga & Depedri, 2010) are also key factors for multi-stakeholder cooperatives. Based on the results of the above literature review, the following framework for the development of multi-stakeholder cooperatives can be developed in Figure 1.

According to the framework chart in Figure 1 above, the instrument was used to conduct a cluster mapping survey of the potential development of people’s market multi-stakeholder cooperatives in DIY which was analyzed using k-means clustering with the Orange application. The survey obtained all of 26 market cooperatives in DIY with the number of respondents varying between market cooperatives and a total of 73 respondents including administrators and members of market cooperatives in DIY. The research respondents, 73 people representing all of 26 market cooperatives in DIY, had various views regarding each dimension of multi-stakeholder cooperative development in people’s markets.

In the input dimension which consists of 12 parameters, there are 6 parameters which have a mean value in the strongly agree category (mean value above 4.210), namely the need for cooperatives to add a variety of ideas, expertise and networks, the need for cooperatives to obtain fiscal incentives from the government (eg tax reduction), the need for active involvement of all members, the need for an economic environment that is conducive to business development, the need to increase solidarity between cooperative members, and the need to improve the local economy. Overall the average value of this input dimension is 4.141 and is in the Agree category shown in Table 2 below.

Table 2. Descriptive Statistics of Input Dimensions (Carrying Capacity)

No	Statement	Mean value	Category
1	My cooperative needs to increase capital from outside members	3,835	Agree
2	My cooperative needs to add additional members from the companion	3,726	Agree
3	My cooperative needs to add a diversity of ideas, skills and networks	4,273	Strongly agree
4	My cooperative will be better with heterogeneous membership (from various parties such as producers, retailers and consumers)	4,095	Agree
5	My cooperative needs fiscal incentives from the government (e.g. tax reduction)	4,273	Strongly agree
6	My cooperative needs to play a bigger role in the market trade system than it does now	4,054	Agree
7	My cooperative needs active involvement from all members	4,452	Strongly agree
8	My cooperative needs an economic environment that is conducive to business development	4,342	Strongly agree
9	My cooperative needs to be developed because the current trading system is often detrimental to market traders	3,849	Agree
10	My cooperative needs to have a social mission and shared common goals	4,150	Agree
11	My cooperative needs to increase solidarity between members	4,369	Strongly agree
12	My cooperative needs to improve the local economy	4,369	Strongly agree
	Overall average	4,141	Agree

Source: primary data (2024)

Meanwhile, in the process dimension (governance) which consists of 21 key parameters, there are 3 parameters which have an average answer value above 4.210 and are included in the Strongly Agree category, namely the parameters of the need for cooperatives to develop trust between members/between parties, the need for cooperatives to improve their capabilities. cooperative employees, as well as the need for cooperatives to increase cooperation between management from various parties. The overall average value of the process dimension (governance) is 4.066, which is in the Agree category shown in Table 3 below.

Table 3. Process Dimension Descriptive Statistics (Governance)

No	Statement	Mean Value	Category
1	My cooperative needs to have a fair profit distribution scheme to all members/parties	4,136	Agree
2	My cooperative needs to have bonuses given to employees who perform well	4,178	Agree
3	My cooperative needs to develop governance (management) that involves various parties	4,123	Agree
4	My cooperative needs to innovate and diversify its business/services	4,164	Agree
5	My cooperative needs to increase awareness of the community	4,013	Agree
6	My cooperative needs to make participatory decision making	4,082	Agree
7	My cooperative needs to develop trust between members/between parties	4,301	Strongly agree
8	My cooperative needs to implement information disclosure to all members/parties	4,191	Agree
9	My cooperative needs to carry out ongoing institutional strengthening	4,150	Agree
10	My cooperative needs to improve the capabilities of cooperative employees	4,328	Strongly agree
11	My cooperative needs to increase cooperation between management from various parties	4,232	Strongly agree
12	My cooperative needs to develop dialogue and the ability to reach consensus	3,958	Agree
13	My cooperative needs to improve understanding of the roles of the parties	3,972	Agree
14	My cooperative requires technical assistance from external parties	3,726	Agree
15	My cooperative needs to increase network ties with other cooperatives	3,904	Agree
16	My cooperative needs to increase management commitment	4,054	Agree
17	My cooperative needs to increase the democratic commitment of the organization	3,917	Agree
18	My cooperative needs to carry out distribution control/supervision	4,082	Agree
19	My cooperative requires a convention (collective agreement) that is supported by all members/parties	4,095	Agree
20	My cooperative needs to do a social audit	3,726	Agree
21	My cooperative needs to strike a balance between the market and cooperative principles	4,027	Agree
	Overall Average	4,066	Agree

Source: primary data (2024)

As for the outcome dimension (impact/benefit) which consists of 19 key parameters, there are 3 parameters that have an average answer value above 4.210 and are included in the Strongly Agree category, namely the parameters for the need for cooperatives to develop human resources, the need for cooperatives to increase member satisfaction. , and the need for

cooperatives to improve organizational performance. Overall, the average answer value for the outcome dimension (impact/benefit) is 3.992, which is in the Agree category shown in Table 4 below.

Table 4. Descriptive Statistics of Outcome Dimensions (impact/benefit)

No	Statement	Mean Value	Category
1	My cooperative needs to be efficient because of the long supply chain	3,698	Agree
2	My cooperative needs to share added value fairly among farmers, retailers and consumers	3,726	Agree
3	My cooperative needs to overcome the price problem because distribution is dominated by large investor distributors	3,657	Agree
4	My cooperative needs to improve social cohesion and inclusion in the market	3,767	Agree
5	My cooperative needs to develop human resources	4,287	Strongly agree
6	My cooperative needs to carry out business and institutional transformation	3,904	Agree
7	My cooperative needs to increase social capital	3,958	Agree
8	My cooperative needs to improve the social and cultural welfare of the community	3,917	Agree
9	My cooperative needs to empower marginalized communities	3,835	Agree
10	My cooperative needs to increase member satisfaction	4,342	Strongly agree
11	My cooperative needs to improve organizational performance	4,287	Strongly agree
12	My cooperative needs to carry out social innovation	4,054	Agree
13	My cooperative needs to carry out education and learning collectively	4,068	Agree
14	My cooperative needs to empower the community and local economy	4,123	Agree
15	My cooperative needs to support environmental sustainability and sustainability	4,109	Agree
16	My cooperative needs to reduce the risk of co-optation or domination by a few people/parties	4,109	Agree
17	My cooperative needs to increase its bargaining power and fair prices for all parties	3,986	Agree
18	My cooperative needs to support the development of alternative food systems	3,849	Agree
19	My cooperative needs to improve both financial and non-financial performance	4,178	Agree
	Overall Average	3,992	Agree

Source: primary data (2024)

In cluster analysis, the data merging/simplification method (data preprocessing) uses Excel. The initial data contained 71 instances with 52 features and 5 attributes (respondent, age, cooperative name, education level, gender). Cluster analysis is carried out by looking at the name of the cooperative, so that the data is preprocessed by combining and summarizing the attributes with the following conditions: Cooperative-based attribute data set, respondent data in the same cooperative is considered to represent the cooperative and is combined into one. Cluster analysis with K-means with ORANGE using Cluster sets 3 to 6, obtained 4 clusters with a maximum iteration of 300 as shown in Table 5 below.

Table 5. Data Set and Results of Market Cooperative Clusters in DIY

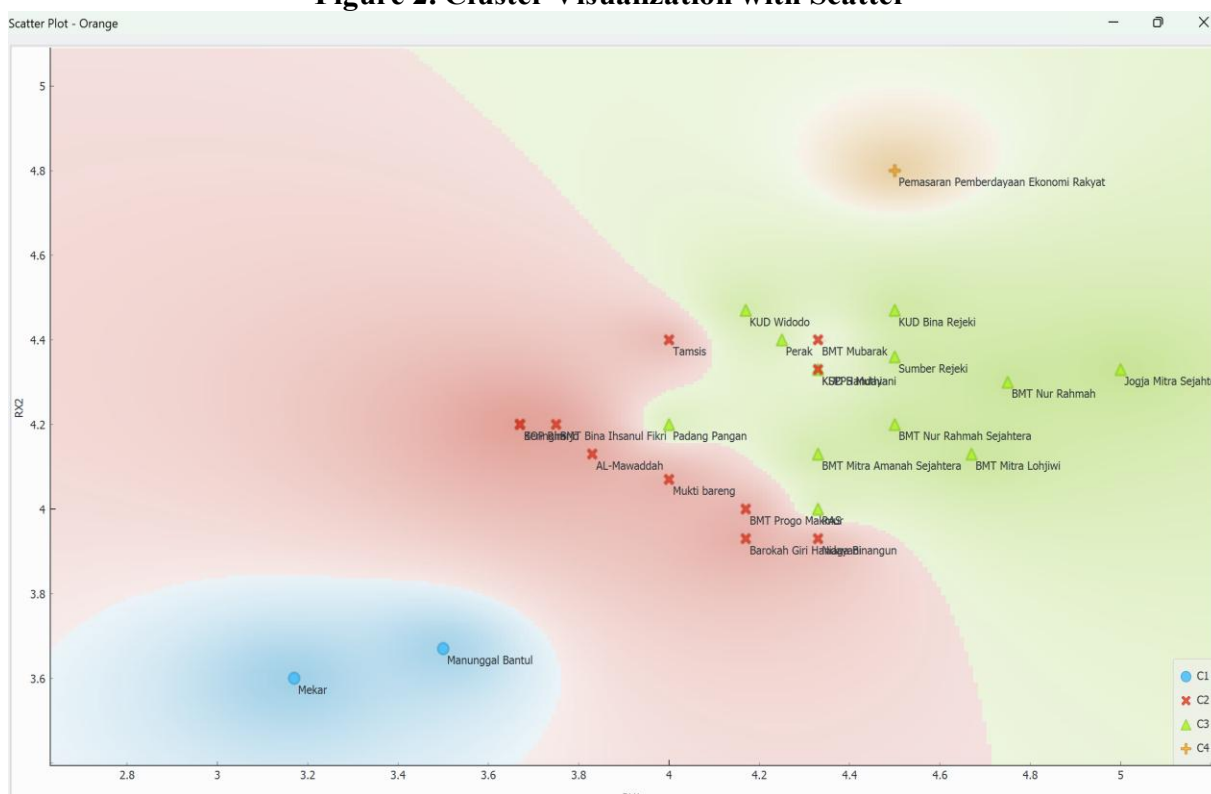
	Cooperative	Cluster s	Silhouettes	X1	X2	Y1	Y2	Y3	Z1	Z2	Z3
1	AL-Mawaddah	C2	0.624691	4.38	4.13	3.83	3.9	3.63	3.67	4.07	3.89
2	Barakah Giri Handayani	C2	0.630001	4	3.93	4.17	4	3.7	3.87	4	3.78
3	Beringharjo	C2	0.618061	3.9	4.2	3.67	3.93	3.93	4.07	4.07	3.93
4	BMT Bina Ihsanul Fikri	C2	0.583112	4.29	4.2	3.75	3.8	3.72	3.8	3.5	3.56
5	BMT Mitra Amanah Sejahtera	C3	0.57515	4.24	4.13	4.33	4.2	4.26	4.13	4.33	3.96
6	BMT Mitra Lohjiwi	C3	0.616345	4.57	4.13	4.67	4.6	4.37	4.6	4.47	3.93
7	BMT Mubarak	C2	0.535695	4.19	4.4	4.33	4	3.74	4.13	4.2	3.93
8	BMT Nur Rahmah	C3	0.527594	3.57	4.3	4.75	3.85	4.06	4.2	4.6	3.89
9	BMT Nur Rahmah Sejahtera	C3	0.624132	4	4.2	4.5	4.3	4.33	4.4	4.4	4.11
10	BMT Progo Makmur	C2	0.570617	4.19	4	4.17	4.27	4.15	4	3.93	3.67
11	Jogja Mitra Sejahtera	C3	0.594375	4.86	4.33	5	4.53	4.63	4.53	4.4	3.93
12	KOP Rim	C2	0.609992	4.14	4.2	3.67	3.9	3.85	4.2	4	4
13	KSPPS Muthia	C2	0.609558	4.1	4.33	4.33	4.1	3.81	3.87	3.87	3.59
14	KUD Bina Fortune	C3	0.59842	4.33	4.47	4.5	4.07	4.19	4.27	4.33	4.07
15	Handayani KUD	C3	0.521311	4.29	4.33	4.33	3.83	4	4.4	4.33	3.96
16	KUD Widodo	C3	0.600206	4.29	4.47	4.17	4.43	4.48	4.6	4.07	4.19
17	Manunggal Bantul	C1	0.649805	3.33	3.67	3.5	3.7	3.48	3.6	3.67	3.41
18	Mekar	C1	0.679581	3.48	3.6	3.17	3.53	3.26	3.6	3.33	3.07
19	Mukti Bareng	C2	0.610412	4	4.07	4	4.03	4	4.07	4	3.93
20	Niaga Binangun	C2	0.574087	3.86	3.93	4.33	4.33	3.96	3.4	4.13	3.78
21	Padang Pangan	C3	0.600078	4.24	4.2	4	4.47	4.63	4.27	4.33	4.3
22	Pemberdayaan Ekonomi Rakyat	C4	0.5	5	4.8	4.5	4.6	4.33	3.4	4.2	3.33
23	Perak	C3	0.510441	4.43	4.4	4.25	4.2	4.28	3.9	4.1	3.94
24	Rukun Agawe Santoso	C3	0.543465	4.05	4	4.33	4.17	4.3	4.13	4.27	4
25	Sumber Rejeki	C3	0.625415	4.11	4.36	4.5	4.28	4.27	4.36	4.32	4.13
26	Tamsis	C2	0.565557	3.86	4.4	4	4	4	4.2	4	4

Source: primary data (2024)

Based on the k-means clustering dataset for each market cooperative in DIY which was processed using Orange in the Table 5 above, 4 market cooperative clusters were obtained which can be used as an illustration/reference for the potential development of multi-stakeholder cooperatives in people’s markets in DIY. According to the k-means value as shown in Figure 2 below, it results that cluster one (1) is a market cooperative that has little potential to be developed into a multi-stakeholder cooperative, where those included in the cluster 1 category are the market cooperatives BMT Mitra Amanah Sejahtera, BMT Mitra Lohjiwi, BMT Nur Rahmah , BMT Nur Rahmah Sejahtera, Jogja Mitra Sejahtera, KUD Widodo, KUD Handayani, KUD Bina Rejeki, Koppas Padang Pangan, Koppas Rukun Agawe Santosa (RAS), Perak Cooperative, and Sumber Rejeki Cooperative.

Cluster two (2) is a market cooperative that has the potential to be developed into a multistakeholder cooperative, where those included in the cluster 2 category are Koppas Manunggal Bantul and Mekar Cooperative. Meanwhile cluster three (3) is a market cooperative that has the potential to be developed into a multi-stakeholder cooperative, where those included in this cluster category are the Al Mawadah cooperative, Giri Handayani Cooperative, Koppas Beringharjo, BMT Bina Insanul Fikri, BMT Mubarak, BMT Progo Makmur , RIM Cooperative, KSPPS Muthia, BMT Tamzis, Koppas Mukti Bareng, and Koppas Niaga Binangun. Laster four (4) is a market cooperative that has great potential to be developed into a multi-stakeholder cooperative, where the only cooperative in cluster 4 is the People's Economic Empowerment Marketing Cooperative. The each cooperative cluster as shown in Figure 2 below:

Figure 2. Cluster Visualization with Scatter

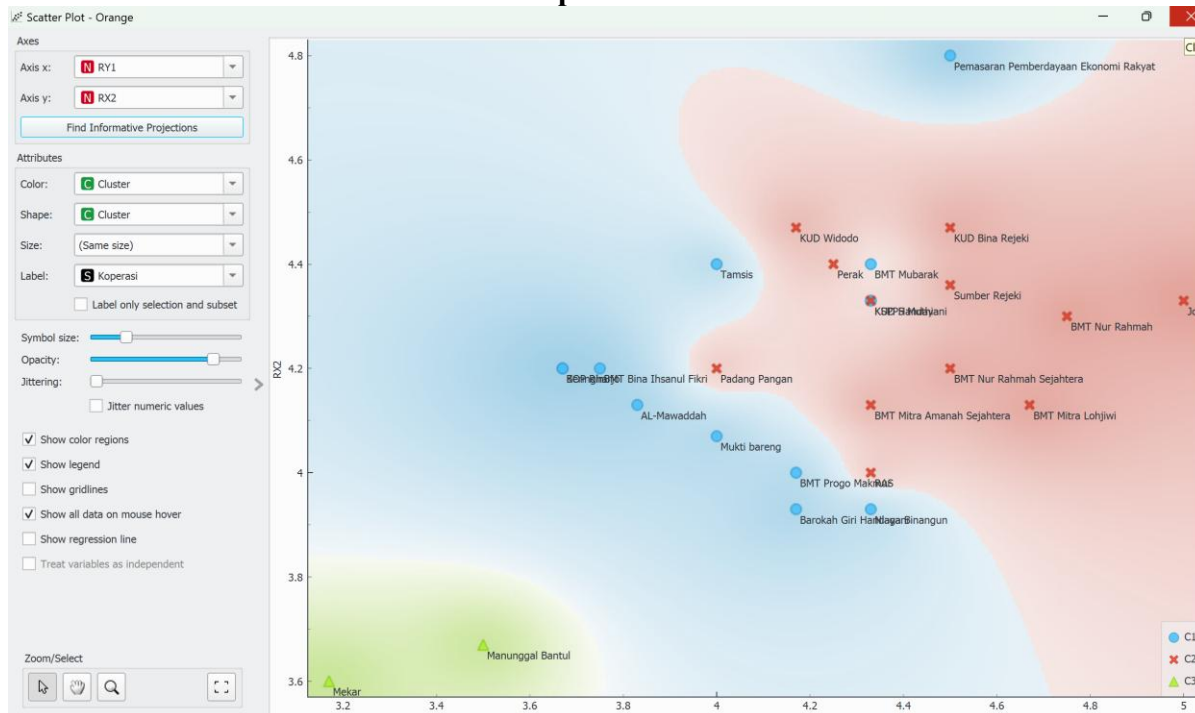


Source: primary data (2024)

Meanwhile, if K-mens is set manually with a predetermined number of clusters of 3 clusters with a dataset of each market cooperative in DIY which is processed using Orange, we get 3 market cooperative clusters which can be used as an illustration/reference for the potential development of multi-stakeholder cooperatives in the market. people’s DIY as shown in Figure 3 below. According to the k-means value, it is clear that cluster one (1) is a market cooperative that has great potential to be developed into a multi-stakeholder cooperative, where those included in the cluster 1 category are the Al Mawaddah cooperative, Giri Handayani Cooperative, Koppas Beringharjo, BMT Bina Insanul Fikri, BMT Mubarak, BMT Progo Makmur, RIM Cooperative, KSPPS Muthia, BMT Tamzis, Koppas Mukti Bareng, People's Economic Empowerment Marketing Cooperative and Koppas Niaga Binangun.

Cluster two (2) is a market cooperative that has the potential to be developed into a multistakeholder cooperative, where those included in the cluster 2 category are the market cooperatives BMT Mitra Amanah Sejahtera, BMT Mitra Lohjiwi, BMT Nur Rahmah, BMT Nur Rahmah Sejahtera, Jogja Mitra Sejahtera, KUD Widodo, KUD Handayani, KUD Bina Rejeki, Koppas Padang Pangan, Koppas Rukun Agawe Santosa (RAS), Cooperative Perak, and Cooperative Sumber Rejeki. Meanwhile, cluster three (3) is a market cooperative that has little potential to be developed into a multi-stakeholder cooperative, where those included in this cluster category are Koppas Manunggal Bantul and Mekar Cooperative. The each cooperative cluster as shown in Figure 3 below:

Figure 3. Cluster Visualization of Potential Development of Multistakeholder Market Cooperatives in DIY



Source: primary data (2024)

5. Conclusion

There are 3 dimensions which include 52 parameters that can be used to assess the potential for developing multi-stakeholder cooperatives in DIY people's markets which were formulated based on an integrative literature review and have gone through validation tests by three Indonesian multi-stakeholder cooperative experts and the instruments were prepared after passing validity and reliability tests. . The first dimension is the Input Dimension (Carrying Capacity), which includes the parameters Financial capital, Supporting members, Diverse ideas, expertise and networks, Membership heterogeneity and flexibility, Regulation/law, fiscal incentives, tax reduction, Market & government failure, Participation and involvement active members, economic environment, shared common goals and social missions, solidarity and localism.

The second dimension is the Process Dimension (Governance), which includes the parameters of Profit Distribution, Bonuses to Employees, Multi-stakeholder Management, Diversification of business and services, Concern for the community, Participative decision making, Trust between parties, Openness and Increased Level of information, Reinforcement cycle, Ability of cooperative workers, Collaboration of multi-stakeholder management, Dialogue and ability to reach consensus, Understanding of the roles of the parties, Availability of technical assistance, Cooperative network cohesion, Management commitment, Democratic commitment of the organization, Distribution of control, Legitimized convention, Social audit, Stakeholder democracy, Duality, Collective Management, and Balance between market and cooperative principles.

The third dimension is the Outcome Dimension (Impact/Benefits), which includes the parameters of Efficiency & justice, Social cohesion and inclusion, Human resource development, Transformational, Bonding, Bridging and Linking Social capital, Social and cultural welfare of the community, Empowerment of marginalized communities, Satisfaction members, cooperative performance, social innovation, education and mutual learning, community and local economic empowerment, environmental sustainability, avoiding the risk

of co-optation, bargaining power and fair prices, alternative food systems, positive externalities, efficiency and profitability, and financial and non-financial performance. finance. Mapping of potential clusters for the development of multi-stakeholder cooperatives in DIY people's markets using k-means clustering via the Orange application with K-means set manually with a predetermined number of clusters of 3 clusters with a dataset of each market cooperative in DIY resulting in 3 clusters market cooperatives which can be used as an illustration/reference for the potential development of multi-stakeholder cooperatives in DIY people's markets. According to the k-means value, it is concluded that market cooperative that has great potential to be developed into a multi-stakeholder cooperative, where those included in the cluster 1 category are the Al Mawadah cooperative, Giri Handayani Cooperative, Koppas Beringharjo, BMT Bina Insanul Fikri, BMT Mubarak, BMT Progo Makmur, RIM Cooperative, KSPPS Muthia, BMT Tamzis, Koppas Mukti Bareng, People's Economic Empowerment Marketing Cooperative and Koppas Niaga Binangun.

Based on the conclusions above, it is recommended that the development of multi-stakeholder cooperatives in DIY people's markets be prioritized on cooperatives that are included in high potential clusters and potential clusters. In this case, the government is advised to provide education and technical assistance related to multi-stakeholder cooperative governance for managers and members of market cooperatives included in the cluster. Universities as support groups need to play an active role in the education and mentoring process, as well as being one of the parties in the transformation of market cooperatives from conventional to multi-stakeholder cooperatives. The government, through the Department of Cooperatives and SMEs along with universities as supporting groups, needs to immediately initiate this transformation by involving various parties outside the people's markets of DIY, such as cooperatives/farmers' groups, employee cooperatives, and various marketing groups whose activities are related to people's markets in DIY.

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Conflict Of Interest Declaration

The authors certify that we have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Informed Consent Declaration

The authors certify that we have been anonymised and the article does not include any potential identifiers. Participants, or their legal representatives, must have provided informed consent prior to enrolment in the research.

We provided informed consent and whether consent was written or verbal (if consent was verbal, authors should indicate the reason why and how it was recorded). If an appropriate professional, ethical or legal organisation or agency has waived the need to obtain participants' consent, authors should disclose in their declaration the name of the organisation or agency and the reasons for the waiver.

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