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ARTICLE INFO	Sri Hartono and Agus Sobari (2016). The role of cluster cycle and pattern of interaction to competition strategy. *Problems and Perspectives in Management*, *14*(2), 74-83. doi:10.21511/ppm.14(2).2016.08
DOI	http://dx.doi.org/10.21511/ppm.14(2).2016.08
RELEASED ON	Wednesday, 11 May 2016
JOURNAL	"Problems and Perspectives in Management"
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
0	0	0

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The role of cluster cycle and pattern of interaction to competition strategy

Abstract

Many studies show that industrial clusters have been successfully promoting the progress of small and medium enterprises (SMEs). Therefore, many governments around the world, including Indonesia, enthusiastically perform comparative studies of cluster policy. Thus, it is important to understand the characteristics of the business of small and medium industries as input in formulating the policy of industrial clusters. Research objectives are focused on the early stages of analysis as to whether the cluster of wood and rattan furniture industry which has existed long enough in Jepara, Central Java, Indonesia, has formed a pattern of awareness among employers in considering the benefits proportionally between cooperation and competition. In various scientific literature reviews, this issue was named by the term coopetition. Thus, the benefits of this research are useful in formulating policy toward strengthening the industrial cluster furniture and rattan towards a more integrative of industrial clusters, and supporting industries involve complex, well integrated backward (backward linkage) and integrated into the front (forward linkage). In the end, it is expected that increasingly mature industrial clusters of wooden furniture and rattan will be transformed into a form of industrial agglomeration and positively impact on strengthening the competitiveness of the furniture industry widely influential in regional and national economy.

The test results show that nearly all of the dimensions of a differentiator (discriminant factor) are significant by influence on differentiating into three patterns of interaction between companies in the cluster of wooden furniture and rattan, while there is only one dimension that is not significant, i.e., the horizontal dimension of cooperation. These results indicate that the industrial cluster of wooden furniture and rattan in Jepara have long formed, where the cycles and patterns of cooperation are factors that could indicate variations in differences concerning perceptions of entrepreneurs in the wood and rattan furniture cluster. Results of the analysis with the approach of the discriminant also show the forming awareness of employers about balancing the important role of competition. It is, as well as cooperation in the industrial cluster wood and rattan furniture from Jepara being already cycle of clusters, characterized by maturity. The cooperation is characterized by bilateral, multilateral, and vertical indicating that the cluster is ready to metamorphose into a form more complicated than an agglomeration. This condition needs to be examined further to see the impact of the maturity cycle of an industrial cluster and more complex patterns of cooperation towards the formation prerequisite agglomeration, and its impact on industrial performance and competitiveness clusters in the aggregate, as well as the economic development of the region.

Keywords: cluster cycle, pattern of interaction, coopetition, competitiveness, industrial performance.
JEL Classification: L14.

Introduction

Networking function between organizations (companies) and between individuals in a group of industry is not new. Research conducted by Chetty and Agndal (2008) showed that at the beginning many companies are reluctant to collaborate in a zone (cluster) industry. However, the majority of them understand that in implementing the concept of a learning organization the company should ideally be able to maintain a balance between competition and collaboration (cooperation), if they want still to exist in the midst of the complexities of global business competition.

In the literature review of business strategy, there appears the term "coopetition" which is a combination of the two terms "cooperative" and "competition". This concept can be implemented by a pattern and a system of formal and informal relationships between actors at the organizational level (enterprise), as well as between individuals.

Cooperation and relationship between the companies is the key for companies to compete on the world market that demands not only a competitive advantage on the company level, but also at the level of clusters that would have far more powerful and far-reaching impact on the national industry excellence in integrated and long-term. Owing to excellence, a national industry will be more integrative and, eventually, will be able to create a strong competitive advantage, and, ultimately, can be felt by each of the companies that are in the scope of the zone (cluster) as a whole.

An externality is a condition where the consumer utility function and the production function manufacturers are not only influenced by market forces alone, but also affected by other economic actors (producers/consumers) (Stewart and Ghani, 1991). Part of circles consider those externalities as a form of market failure (market failures), so that

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market equilibrium is not reached. In the context of the cluster, externalities arise because of the agglomeration effects generated by business activity centered in a region. One classification of externalities that are relevant to the benefits of agglomeration externalities is real (real externalities) and externalities price (pecuniary externalities) (Stewart and Ghani, 1991).

Real externality is when a business activity (production function) of a company impacts on business activities (production function) of other companies, while externalities price is when business activities of a company give effect to the price of other companies. Practically, real externalities can be described when the small and medium enterprises (SMEs) in an industrial cluster adopt printing technology, while other SMEs still use traditional production systems. There will be greater opportunities for all SMEs in the cluster to study and adopt the same technology, compared with other producers located outside clusters.

In a larger scale, real externalities can be seen from the rapid dissemination of knowledge (knowledge spillovers) of the invention and innovation by the research center in an industrial center. And dissemination of knowledge (knowledge spillovers) is also capable of changing motivation and attitude of businesses in the cluster, for example, of the workers who become entrepreneurs such as those found in the cluster software (software) in Bangalore, India. These trends will produce a cluster effect on the creation of new businesses (Caniëls and Romijn, 2003).

From the description, we could conclude that an economic perspective sees the cluster as a competitive strategy that is capable of spontaneously providing economic benefits for the cluster members. However, the passive benefits of agglomeration were supported by an active activity of the business doers to encourage the dynamics inside the cluster. However, considering the important role of clusters in improving the performance, the existence of the cluster can be seen not only from the purely economic point of view. Policy perspectives see the cluster as a program that can be planned, implemented, and evaluated at the same time to provide guidance for policy makers.

Research objectives focus on the early stages of analysis as to whether the cluster of wood and rattan furniture industry, which has existed long enough in Jepara, has formed a pattern of awareness among employers in considering the benefits proportionally between cooperation once competition (cooperation and competition). In various scientific literature reviews, this issue is named by the term coopetition.

Thus, the benefits of this research are useful in formulating policy toward strengthening the industrial cluster furniture and rattan in Jepara towards a more integrative on industrial clusters, and supporting industries involve complex, well integrated backward (backward linkage) and integrated into the front (forward linkage). In the end, it is expected that increasingly mature industrial clusters of wooden furniture and rattan in Jepara will be transformed into a form of industrial agglomeration and positively impact on strengthening the competitiveness of the furniture industry, widely influential in regional and national economy.

1. Theoretical review

1.1. Industrial cluster and competitiveness. Specifically, Chetty and Agndal (2008) revealed that the industrial cluster has been used by small and medium enterprises (SMEs) to expand their international markets, develop innovative products and marketing strategies, as well as to identify business opportunities. This industrial area enables SMEs to benefit from economies of scale. Policy makers have recognized the importance of SME leaders in acting as a catalyst to initiate the development of industrial clusters. Corporates that are in the industry cluster can make efforts to increase cooperation and establish networking together to foster healthy competition. Balancing cooperation and competition in such a way becomes an important aspect of an industrial cluster.

Strategic concept of merger (mix-strategic policy) between cooperation by creating competition is an important issue to be considered. Marshall (1920) has been a very long time to introduce the concept of co-partnerships, elements of social closeness and cooperation between industries. It incorporates the concept of industrial zones, urban development, and marketing.

Description of the elements of the concept of "soft"-relationship or personal contact between traders, customers and manufacturers, as well as the exchange of information in the form of the circulation of new ideas and the diffusion of innovation is one of the important ideas that are considered as a contribution to the theory of agglomeration by Marshall. In addition, Marshall also introduced the concept of economic externalities as the advantages of economies of scale derived from the establishment of industrial zones (Sato, 2000; Bellandi, 1987, 2001).

1.2. Pattern of industrial cluster. Indicators of 'software' of interaction (the soft elements of interaction), such as trust, commitment, sharing knowledge, pattern of communication, equivalent between partners are a form of indicators for the

initial formation of social networking among SMEs in the cluster. Subsequent impact of the initial conditions can lead to greater cooperation between companies. In addition, these elements, when combined with the system of historical and cultural values that have been ingrained and suit local conditions, are concerned, and the factors co-location with the interaction in the activities of the chain of raw materials and production inputs can trigger network and cooperation inter-enterprise in geographical areas (clusters) more broadly.

Basis for building networked cooperation is the concept of trust, which has been widely recognized, as social norms are major in organizing and coordinating the partnership (Gulati, 1995). Trust-based competence (Ganesan, 1994) will be realized when the cooperation partner consistently exhibits the characteristics, such as credibility and expertise. It reflects the extent to which partners are willing to rely on the expertise, capabilities, and assessment (Shah and Swaminathan, 2008).

The element of trust is likely to be more important in the context of developing cooperation (alliance) specifically associated with a high risk, where the marketing alliance is between the companies participating in the same industry, often seen as competitors. Other elements of networking include equality, trust, credibility, integrity, honesty, knowledge and familiarity, commitment, better communication between the company and the trust between the parties (Morgan and Hunt, 1994; Coviello et al., 2002; Coote et al., 2003).

Starting from our research on strategies for improving the company's performance through the integration of the supply chain in small industries (Sri Hartono, 2010, 2011, 2012), the performance of the company, formerly by a result of the implementation of the integration of the supply chain production in small industries, is already influenced by the integration of the supply chain on production level governance policies individually. However, it is not only established by cooperation among similar companies in the industry cluster (Sri Hartono, 2008, 2009).

However, previous research was limited to a small industrial clusters formed naturally, not because of policy design. For the continuation of research, built on the research governance model of cooperation among SMEs in industrial clusters of cedar wood furniture and rattan in Jepara, we need reexamination related to initial conditions that allow the formation of cooperation. This initial study is planned for the research in the first year.

This research studies differentiating factors (discriminant analysis) of industrial infrastructure such as whether that had been awakened in the business sector cluster of wooden furniture and rattan in Jepara as a prerequisite to form patterns of similar cooperation among SMEs in clusters of wooden and rattan furniture.

1.3. Cycle of cluster. Cluster is the geographic concentration of interconnected companies and institutions in a particular field (Porter, 1998, p. 78). It consists of two components, competition and cooperation, in which they coexist. This condition occurs in different dimensions and between members of different clusters (Porter, 1998).

In addition, many groups are trying to develop a brand image and promotion of joint strategies to be used in foreign markets. With coopetition cluster, cluster members can take advantage of economic benefits from shared access to information and knowledge network, market intelligence and marketing, and supplier and distribution chain (Enright and Roberts, 2001).

Today, there is an increase of interest in the group companies to establish coopetition (Leat and Revoredo-Giha, 2008). Kottila and Ronni (2008) noted the importance of communication and trust between collaborative firms, but did not discuss the competition. Since, grape clusters are developed in New Zealand, wine clusters, unlike other industry groups, were traditionally formed in an area with superior natural resource for the wine-growing region of Waipara being no exception (Enright and Roberts, 2001).

Enright and Roberts (2001) argue that, although globalization has increased, paradoxically, a local group of the company's interest is in the same or related industries, or "cluster areas". Geographic clustering manufacturers can reduce the challenge by facilitating the proximity (Enright and Roberts, 2001). Moreover, such an action agenda localization helps to ensure that environmental, social and economic regional communities are satisfied (Enright and Roberts, 2001).

The research about bunch of grapes in New Zealand found that both competition and cooperation exist between New Zealand wine-makers (Harfield, 1999). While Hayward and Lewis (2008) study the dynamics of Marlborough wine region, they think that the maturity of the life cycle of clusters is the decisive factor in the competition and cooperation. Additionally, Aylward (2004) showed wine clasters in New Zealand developed past the embryonic stage cluster having a cohesive integration of winemakers, growers, suppliers, marketers, and education and infrastructure regulatory entities provide a structure in which companies compete and work together effectively.

Cluster cycle showed maturity in formation of cooperation. The long formation of cluster provides benefits to SMEs that are in the cluster and shows their level of maturity and the maturity of a cluster. Cluster conditions of wood-based furniture and rattan in Jepara regency showed that cycle conditions were fairly mature. It can be seen that relationships formed long enough and provide benefits to the company perceived by approximately 62.34%. Companies that are in the cluster, while the cycles that occur in clusters rattan furniture still.

In the early stages, as they are on a cycle, majority is still low and moderate in length develop of cooperation and benefit from the collaboration that formed not so perceived.

Patterns of relationships between companies in cluster of rattan furniture are quite varied. Patterns of relationships formed are bilateral, multilateral, horizontal and vertical. The pattern of bilateral relationship is relatively low, since the majority of companies in the wood and rattan cluster showed a low level of bilateral relations. This suggests that the relationships formed are quite complex and are not only bilateral relationship, but wider or multilateral.

Multilateral relationship, that is, built up in the two clusters shows that companies have an established relatively high multilateral relationship (at 63.54%), especially on clusters of wooden furniture and rattan furniture cluster, while the bilateral and multilateral relationships that are formed are relatively low even tend to be low.

Pattern of relationships can also be horizontal so that there is cooperation of the company in one level or cooperative production. Greater relationship can also be formed in the form of vertical cooperation undertaken by large companies and cooperation, not only production, but also other forms of cooperation get expediency for company.

Horizontal cooperation formed on both clusters is relatively high. It can be seen from as many as 92 companies of 101 companies as respondents that have built a horizontal cooperation. This shows that horizontal cooperation awakened in the cluster is relatively good. While cooperating, vertical integration has been done on both clusters showing that the number of companies that have built the vertical relationship is quite high, especially in clusters of wooden furniture as many as 46 companies out of 77 companies, or more than 50%. While the vertical relationship on the rattan, furniture cluster has not much to do, because the new cluster is at the beginning of the cycle.

The main objective is to improve the formation of clusters reinforcement (coopetition) for cluster members that can provide benefits for integration in the cluster. The cluster coopetition is realized with high woke cooperation and competition formed. The form of cooperation and competition are divided into three (3) groups, namely the competitiveness of high, medium, and low lewel perceived by companies that are on the cluster.

Coopetition conditions felt by companies on both cluster perceived by integration in the furniture cluster are quite high. It can be seen from the number companies that feel the cluster coopetition: 49 companies out of 77 companies, or about 64%. Jepara furniture industry cluster has the benefit that is high enough for a large part of companies that are in the cluster. While coopetition is perceived by the company in relatively low cane cluster, coopetition is not even existing between companies that feel the high coopetition. Conditions indicate that the cluster has not been formed properly, because there are not many benefits for the cluster members.

1.4. The concept of coopetition. Coopetition between companies has long been a topic for research. Coopetition is a situation where the organization simultaneously cooperates and competes (Brandenburger and Nalebuff, 1996). Lado, Boyd and Hanlon (1997) argue that success in today's business world is supported by the company's success to pursue both strategies, cooperative and competitive, at the same time. The airline industry is an example of coopetition models that have long been used to help each other in doing business with competitors (Nason, 2008).

Porter (1998) suggested that the emerging industrial companies face the dilemma of personal interest or advocacy competitive industrial cooperative. Competition and cooperation can help companies to take advantage of the economic benefit. They share knowledge, information, marketing and distribution chain intelligence (Enright and Roberts, 2001). Even small companies can now benefit from an unbalanced competition in which they leverage larger competitors. Similarly, Cefis, Ghita and Sabidussi (2009) focused on cooperation, but not competition among SMEs.

They argue that the benefits of collaboration seem to be higher for SMEs and, by joining with other companies, SMEs can overcome the limits stemming from their limited resources and become a dynamic innovator (Cefis, Ghita and Sabidussi, 2009). Although coopetition is not unilateral and simple, often positive impact (benefit) is greater than the negative impact, when businesses make the decision to take part in such a cohesive strategy, as revealed by Padula and Dagino (2007).

2. Research methods

The samples of this study are all small and medium enterprises (SMEs) engaged in the business of wood furniture and rattan in Jepara cluster. Multistage sampling method and purposive sampling, i.e., sampling technique was conducted in 3 phases. The first stage is choosing companies in each cluster research. The second stage is classifying companies into two groups, namely, networks who have conducted cooperation in clusters and those who have not. The third stage is of selecting unique characteristics in each of the related companies:

- Cycle of relationship between issues related to the pattern of relations and cooperation between small and medium sized enterprises in the industrial cluster of wooden furniture and rattan in Jepara that will be impact of positive externalities in an effort to build the competitiveness of the industry that would be quite difficult, if developed by individual companies.
- The proximity and linkages location (co-location) and the effect of the pattern of cooperation networks (social) inter-company to synergize the strength and influence in marketing performance and competitiveness.
- Compare the performance of supply chain and marketing success between two groups of wooden furniture and rattan in Jepara, conducting a pattern of cooperation with not cooperating in the same cluster.

2.1. Indicators. To be consistent with previous research that has been done, the scale used by Morgan and Hunt (1994), Coote et al. (2003), Coutler (2003) is the basis for measuring the same concept in this study. However, a new item is added in the form of indicators for measurement of the construct (variables) that are proxies relating to specific indicators that are tailored to the context of the environmental condition of the wood and rattan furniture industry in Jepara.

Constructs or variables in this research are formerly associated with the element/social dimension of the practice of production and marketing networks of cooperation. It was being referent on Granovetter (1973) and Coviello et al. (2002). It is necessary to ensure the validity of the survey questionnaire. In this study, we will also use the advice pre-survey of businesses in the wood and rattan furniture industry and the participating companies. This means that it is possible to modify the measurement tools are better than ever. Carrying out modifications for measurement instruments was done in this research.

The indicators of each variable in this study are as follows:

- Life cycle (networking) clusters: interaction (the soft elements of interaction), where researchers earlier articulate this dimension into the indicators, including: trust, commitment, knowledge sharing, communication patterns were equivalent between partners and can help to build social networks which are integrated with production, production chain, technological cooperation, joint marketing, collaboration management, business information.

All indicators of the life cycle of industrial clusters mentioned above are adopted in studies to establish indicators to distinguish the characteristics of the cycle cluster into two types of dimensions (variables). They are, namely: first, variable cycle stages of early adulthood, with the indicators: a period of time, linkage, the breadth of relationship, communication awake, and, second, active-dynamic variable cycle indicators: ways of conflict resolution, positive benefits, and cluster members are active, the orientation of cooperation, improved bargaining power and solidity cooperation awakened.

- Patterns of cooperation of industrial clusters, in this study, are divided into four types that lead to a form of cooperation: bilateral, multilateral, horizontal and vertical.

Indicators for the variable pattern of bilateral cooperation are two-way relationship incentives, the level of trust, risk, and the intensity of the relationship. The indicators of the variable pattern forming multilateral cooperation are as follows: multi-directional relationship, the benefits of multi-direction, self-confidence, and risk preparedness, as well as the foundation of a multi-directional relationship. Meanwhile, a variable pattern of horizontal cooperation is formed by the indicators involvement furniture companies that have the scale and size of the same effort, and variable vertical cooperation reflected by indicators of cooperation involving furniture companies with the scale and size of the different businesses.

- Coopetition: this variable consists of two dimensions. They are cooperation and competition. There are the indicators consisting of twelve items. They are share market information, complementary supply of goods to the market, supply share of raw materials and production equipment, mutual aid undercapitalized production, sharing tips and how to campaign, sharing design models and motives of goods, mutual any production techniques, helping each other skilled personnel and experts, prudently healthy competition in terms of: price, supply of raw materials, obtaining skilled personnel, and access to venture capital.

3. Discriminant analysis

According to Johnson and Wichern (2007), the authors used discriminant analysis to classify individuals into one, two or more groups. A discriminant function deserves to be formed, if there is a difference between the mean values for existing groups.

Before forming discriminant function, it is necessary to test the difference in the average value of these groups. In these tests, the assumption of discriminant analysis is:

- Independent variables should have a multivariate normal distribution (multivariate normality), if the data are not normal, it will cause problems in the accuracy of function (model) discriminant.
- Variance and covariance matrix of all group from the independent variables should be the same.
- No data are very extreme (outliers) on the independent variable, if there are extreme data which will be processed, it can result in reduced accuracy of the classification of the discriminant function.
- There is no strong correlation between the independent variables, if the two independent variables have a strong correlation, multicollinearity is said to occur. The existence of multicollinearity can be determined by looking at the correlation between the independent variable (r), i.e., if the value of $r >$ 0.6 indicates multicollinearity.

This study is carried out in these terms:

1. Calculation of average value, standard deviation, and the value of variance, covariance, variance-covariance matrix and the variance covariance matrix of the combined group on any group or groups.
2. Calculate of correlation between independent variables (predictors) in each group to see multicollinearity at independent variables.
3. Calculation of value of homogeneity of variance covariance matrix in the group.
4. Calculation of value of the F test and Wilk's Lambda to see the difference in the independent variable in each group.
5. Test of all variables to determine whether all the independent variables differ significantly based on the dependent variable.
6. Looking for the significance of the discriminant function with the value of the F test and Wilk's Lambda.
7. Determination a discriminant function of the independent variables that could discriminate or differentiate among the dependent variable (distinguishing an object entered in the Group I or II).
8. Determining of the classification of the object, if an object included in the Group.
9. Test of the classification accuracy of discriminant function.

4. Research finding

In an effort of cluster development, especially in improving the competitiveness cluster, then, at an early stage, it is necessary to perform a study related to the identification of the factors that can distinguish the level or type of cooperation that has been established in an industrial cluster. This study is focused on industrial cluster furniture wood and rattan in Jepara regency. The variables of life cycle of cluster are early-adult cluster and the dynamics cluster (active-dynamic). They are built of four kinds of patterns of cooperation. Formerly, they are bilateral, multilateral, horizontal, and vertical. It is necessary to identify which variable is to be decisive in distinguishing (discriminant) awareness of the wooden and rattan furniture producers in Jepara on the perception of the importance of developing cooperation, but, at the same time, coopetition. The results of discriminant analysis of variable life cycle (early-adult) and the dynamics of the cluster (active-dynamic), and four forms of pattern of cooperation (bilateral, multilateral, horizontal, and vertical) that have been built over the years to form consciousness coopetition can be seen in Table 1 to Table 6 as follows:

Table 1. Test significance of the variables distinguishing

Variable	Wilk's Lambda	F	DF1	DF2	Sig.
Early-adult (X_1)	.693	21 667	2	98	.000
Active-dynamic (X_2)	.565	37 703	2	98	.000
Bilateral (X_3)	.843	9.120	2	98	.000
Multilateral (X_4)	.755	15 933	2	98	.000
Horizontal (X_5)	.944	2.891	2	98	.060
Vertical (X_6)	.415	69 068	2	98	.000

Source: author's own research.

Table 1 shows the results of tests of significance of each independent variable through the procedure of the test of equality of group, means. It indicates that, based on the value of Wilk's Lambda and univariate F ratio, all independent variables are significant. Hereby, it can be possible to differentiate the type or level "of cooperation once the competition" (coopetition) as the dependent variable (Y). All variables are statistically significant with a significance level below 1%, except for the variables of the association horizontal (X_5) that are below 10%.

Table 2. Best differentiator variables

Step	Entered	Min. D squared					
		Statistics	Between groups	Exact F			
				Statistics	DF1	DF2	Sig.
1	Active-dynamic (X_2)	1.862	2 and 3	43 405	1	98,000	2.237E-9
2	Vertical (X_6)	3.129	1 and 2	8106	2	97,000	.001
3	Horizontal (X_5)	4.613	1 and 2	7885	3	96,000	9.330E-5

Source: author's own research.

To determine which variables are the most efficient or best in distinguishing the level of awareness of employer's coopetition wood and rattan furniture industry in Jepara, stepwise procedure is usually used. Table 2 describes a stepwise procedure that can provide indicators of "Mahalanobis distance". It is known that the best variables have the greatest strength in differentiating (discriminant) determinant of the level of awareness of coopetition (Y).

The maximum value of "Mahalanobis distance D^2" is variable cycle dynamics (active-dynamic) of 43.40, followed by the variable forms of cooperation pattern (vertical) at 8:10, and the third best is variable forms of cooperation pattern (horizontal) of 7.88. Thus, these three variables are most precise in predicting three dichotomous distinction coopetition, compared with other variables.

Meanwhile, Table 3 measures the level of significance of the discriminant function (testing the effects of all discriminators simultaneously), the procedure of calculating Eigen values and Wilk's Lambda, can be used to determine it. Table 3 shows that the canonical correlation (CR) is of 79.3% (CR^2 = 62.88%) for the discriminant function 1 and CR = 25.9% = 6.7% CR^2. Thus, the ability of the discriminant function 1 in explaining the variability of coopetition (Y) is equal to 62.88%.

This indicator should be quite good. However, discriminant function 2 can only explain the variability of coopetition (Y) of 6.7%. This figure could be somewhat lower, however, discriminant function 2 is still considered significant by less than 5% alpha (α = 0.034). Thus, if the discriminant function can be inferred statistically significant, it means that the mean score discriminant for all three groups of respondents (in this case, the perception is categorized in coopetition: low, medium, high) is significantly different. Furthermore, to assess the importance and meaning of the discriminant variable, discriminant function can be done by looking at standardized discriminant function.

Table 3. Coefficient of determination

Eigen values				
Function	Eigen value	% of variance	Cumulative %	Canonical correlation
1	1.691a	95.9	95.9	.793
2	.072a	4.1	100.0	.259
Wilk's Lambda				
Test of function (s)	Wilk's Lambda	Chi-square	df	Sig.
1 through 2	.347	102 770	6	.000
2	.933	6757	2	.034

Source: author's own research.

Table 4 shows standardized canonical discriminant function coefficients. This calculation indicates that the discriminant function for first model coefficient is the largest value-variable vertical cooperation, namely, 0866, followed by the variable dynamics of the cluster (active-dynamic) with a value of 0312, and followed by other variables, whereas the second model shows the coefficient standardized of discriminant function as the horizontal variable at -0866, followed by multilateral variables for 0722. Thus, the higher the coefficient that is standardized by more important of these variables compared to other variables in the formation of the discriminant model, the smaller role it has compared with other variables. Furthermore, indicators of the correlation between the scores of discriminant (Y) with variables discriminator (X) seen from the loading on the structure matrix show that the closer the absolute value of 1, the higher the correlation between the variables X and Y, and if it is getting closer to absolute 0, then, the smaller is the value of the correlation. From these indicators, the discriminant function Model I, the variable vertically and active-dynamic occupies the highest correlation value by 0898 and 0661. Whereas, respectively, for the discriminant function Model 2, the variable horizontal and early-adult have a correlation value -0647 and 0395, respectively.

Table 4. Role and contributions distinguishing partial variables

Standardized canonical discriminant function coefficients			Structure matrix		
	Discriminant function			Discriminant function	
	Model 1	Model 2		Model 1	Model 2
Early-adult (X_1)	.123	.512	Vertical (X_6)	.898*	-.279
Active-dynamic (X_2)	.312	.059	Active-dynamic (X_2)	.661*	.309
Bilateral (X_3)	-.089	.158	Early-adult (X_1)	.495*	.395
Multilateral (X_4)	-.133	.722	Multilateral (X_4)	.432*	.088
Horizontal (X_5)	-.163	-.892	Bilateral (X_3)	-.327*	-.032
Vertical (X_6)	.866	-.517	Horizontal (X_5)	.099	-.647*

Source: author's own research.

Furthermore, the establishment of the discriminant function can be seen in Table 5. This Table presents the information about the basis of the calculation of canonical discriminant function coefficients, then, the equation of the discriminant function is as follows:

$$Z1 = -6413 + 0.039X_1 + 0.060X_2 - 0.09X_3 - -0.019X_4 - 0.222X_5 + 0.776X_6$$

for the model (function) I,

$$Z2 = 3,843 + 0.162X_1 + 0.011X_2 - 0.017X_3 - -0.101X_4 - 1.217X_5 - 0.463X_6$$

for the model (function) II.

To determine the point of intersection (cutting point) between groups in discriminant variable (*Y*), the calculation of the output of function at group's centroids can be used as guidance.

Table 5. Magnitude canonical discriminant function coefficients

Canonical discriminant function coefficients		
	Discriminant function	
	Model 1	Model 2
Early-adult (X_1)	.039	.162
Active-dynamic (X_2)	.060	.011
Bilateral (X_3)	-.009	.017
Multilateral (X_4)	-.019	.101
Horosontal (X_5)	-.222	-1217
Vertical (X_6)	.776	-.463
Constants	-6413	3,843

Source: author's own research.

Table 6 informs that the function group centroid first high-level coopetition is separate from the other groups, of which two (2) other groups are cutting its negative point, while cutting point for high coopetition is positive. Meanwhile, for the function group 2 level centroid is coopetition be separated from the other groups, of which two (2) other groups are cutting its negative point, when its cutting point for coopetition is positive. Cutting point score indicates a weighted average of the other values pairs discriminant scores can range coopetition grouping into three groups: coopetition low, medium, and high.

Table 6. Cutting point inter group in discriminant variable (*Y*)

Functions at group centroids		
Coopetition	Discriminant function	
	Model 1	Model 2
Coopetition is low	-2909	-1026
Coopetition is moderate	-1087	.273
Coopetition is high	1.148	-.093

Source: author's own research.

To assess how well the discriminant function, the score results of the classification, as revealed from the results of the calculation of indicators "classification results", can be observed from Table 7. Thus, discriminant function is capable of classifying discriminant variable (*Y*) into three groups amounted to 84.83%. This figure is well and produces precision in predicting quite high at 84.83%, in which was obtained from the average value (83.3% + 80.5% + 90.7%)/3.

Table 7 indicates that the discriminant function classifies the ability of three (3) perceptions of the respondents (wood and rattan furniture producers) against discriminant variable (*Y*) into low, medium, and high.

Table 7. Ability to grouping of discriminant variable (*Y*)

Classification results						
		Coopetition (Y)	Predicted group membership			Total
			Low	Moderate	High	
Original	Count	Low	5	1	0	6
		Moderate	4	33	4	41
		High	1	4	49	54

Table 7 (cont.). Ability to grouping of discriminant variable (*Y*)

Classification results						
		Coopetition (Y)	Predicted group membership			Total
			Low	Moderate	High	
Original	%	Low	83.3	16.7	.0	100.0
		Moderate	9.8	80.5	9.8	100.0
		High	1.9	7.4	90.7	100.0

Source: author's own research.

5. Discussion

Results of discriminant analysis showed that all factors discriminators include factors cycle cluster. Represented by two discriminators, they are: initial variable-up and variable active-dynamic, and the factor of interaction pattern, which is represented by four discriminators, namely: bilateral variable, multilateral variable, horizontal and vertical variables. All of them are significant in differentiating (discriminate) the perception of respondents (entrepreneurs of wooden furniture and rattan in Jepara) to the understanding of cooperation and competition (coopetition). In this context, an understanding of coopetition is used as a discriminant variable (*Y*) which is dichotomous.

To understanding of the concept and implementation of coopetition, this study serves as a discriminant variable (*Y*) in which dichotomous scale for the discriminant variable (*Y*) is classified into three groups, namely "poor perception", "perception of being", and "high perception".

"Low" perception of coopetition characterized by lowering their perception of competition and cooperation among fellow entrepreneurs' furniture industries related to existing and rattan furniture cluster in which they are located, while the perception of coopetition perception that it is formerly by one of the perception of cooperation or competition, while other low height. Meanwhile, perception of coopetition "high" is characterized by a high understanding simultaneously either on the concept of competition and cooperation.

Ability to grouping discriminant model in predicting the discriminant variable (*Y*) is good. This mark with the value of CR^2 and success indicators classify is also high, above 60% and 80%, respectively. Thus, it does the value of the relationship (correlation) of each variable partial discriminator (*X*) with a variable discriminator (*Y*).

Technical discriminant analysis with stepwise procedure can provide indicators of "Mahalanobis distance" able to identify the best variables that have the greatest strength in differentiating discriminant values of the level of awareness of coopetition (*Y*). The maximum value "Mahalanobis distance/D2" is cycle of dynamics (active-dynamic) variable. After that, followed by the variable forms of cooperation pattern (vertical), the third one is variable form of cooperation pattern (horizontal). Thus, these three variables are most precise in predicting three dichotomous of coopetition strategy.

This result is confirmed in research by Enright and Roberts (2001) in which the groups of clusters are trying to develop a brand image and promote joint strategies to be used in markets. Coopetition in the cluster can take advantage of economic benefits from shared access to information and knowledge network, market intelligence and marketing, and supplier and distribution chain.

The research by Padula and Dagino (2007) shows that the benefits of collaborative seem to be higher for SMEs if they joint with other companies. It is in line with the research by Cefis, Ghita, and Sabidussi (2009) who support the point that SMEs can overcome the limits stemming from their limited resources and become a dynamic innovator. Although coopetition is not unilateral and simple, often positive impact (benefit) is greater than the negative impact, when businesses take the decision to take part in such a cooperative strategy.

Conclusion

From the analysis, it can be concluded that the main factors in the formation of clusters coopetition are the maturity cycle and degree pattern of bilateral, multilateral and vertical. Characteristics of clusters that meet those criteria are expected to influence on the formation of more complex clusters that can be morphed into the form of an agglomeration with the creation of a system of integrated industry supply chain from downstream to upstream.

In an effort to increase competitiveness, clusters are realized in a high-level coopetition and need be mature in cooperation among members in the cluster with the pattern of bilateral and multilateral cooperation and more emphasis on vertical cooperation with not just reliance on horizontal cooperation. It is based on the findings of research that the cluster developed into an agglomeration is characterized by higher healthy cooperation and competition (coopetition) among entrepreneurs in the same cluster. However, the results of study show that the benefits of cluster were supported by activity of the business doers to encourage the dynamics inside the cluster. However, considering the important role of clusters in improving the performance, the existence of the cluster can be seen not only from the purely economic point of view.

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