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# Identification of Credit Risk Management, Market Value and Their Interrelationship Using MICMACTOR Analysis

Ni Nyoman Aryaningsih* I Made Sarjana I Made Bagiada P. Rany Wedasuari
Accounting Departement, Politeknik Negeri Bali
Badung, Indonesia
Corresponding author, E-mail: nyomanaryaningsih@pnb.ac.id

**Abstract**
Credit risk management is currently a priority for microfinance institutions. Credit risk management also pays attention to market value as a credit institution's competitiveness and entrepreneurial spirit to realize company performance. The aim of this research is to identify key variables (CRM) through systematic literature. Next, try to create problem solving related to CRM variables and the relationships between variables using MICACTOR Analysis to form an Interpretive Structural Model (ISM). The research method used a qualitative approach. Data was collected from primary data through in-depth interviews and questionnaire instruments. The research results show that cooperative credit risk management is determined by strong relationships in financial management. Financial management in handling cooperative credit risk is strongly correlated with performance evaluation and accountability as well as market value, while entrepreneurial spirit has a weak relationship in managing credit risk in urban cooperatives. Recommendations for further research require a study of financial management and credit risk assessment on a technopreneur basis in credit cooperatives. The practical implication of the research results is that the ability to manage credit risk in microfinance institutions is able to create performance and accountability and company market value, but has not maximized the entrepreneurial spirit which has the potential to create income opportunities. The others practical implications the ability to manage credit risk in urban savings and credit cooperatives has a strong inter-relationship effect on the ability of market value competitiveness and individual innovation as business managers of non-bank financial institutions.
**Keywords:** MICMACTOR Analysis, Credit Risk Management, Market Value, Entrepreneurial Spirit
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## 1. INTRODUCTION

Credit risk is the impact of an activity carried out by every financial institution in distributing credit (Shehu & Salihu, 2020), including cooperatives without exception. This credit risk cannot be avoided by every economic actor. Credit risk arises from uncertainty and changes in information, individual knowledge, and technology transfer. The impact of risk is that it can change the value and emotional fluctuations of managing a business organization. The impact of risk in business is an unreasonable decrease in the value of company assets (Crouhy et al., 2000). As only happens in urban credit cooperatives, ownership structure and risk have a positive effect on company value and company performance (Chen, 2012). Credit cooperatives are one of the business organizations that were initially oriented towards service benefits and welfare (benefit oriented), but in their implementation the objectives of the cooperative have changed, namely being oriented towards increasing business results (profit oriented). The current implementation of credit cooperative operations is also faced with the challenge of managing risks, both internal and external. The impact of credit distribution capabilities can increase performance discrimination and reward individual performance (Wang et al., 2020)

The threat of COVID-19 is a natural risk that cannot be avoided by every individual. The importance of each individual's behavior in making risk management decisions (Cvetković et al., 2020). The impact of the risk of COVID-19 is a decrease in income value of 40-60%, then a decrease in welfare of around 70% and a decrease in the value of company assets. One of the impacts of this risk occurs in urban credit cooperatives, namely the city of Denpasar. Low capital collection [Kapoor & Lee, 2013] from cooperative members and weak credit management capabilities to anticipate risks are one of the causes of increasing bottlenecks in capital collection from members/community. According to credit risk is determined by customer behavior (Abdou & Pointon, 2011). However, on the one hand, urban credit cooperatives were able to survive and not go bankrupt even though they were faced with COVID-19 and have survived to this day. Based on these problems, in managing business organizations such as credit cooperatives in urban areas, a study of credit risk management due to the impact of the COVID-19 pandemic is needed, which currently lacks research studies. Credit risk is a risk that arises in managing financing for businesses in urban credit cooperatives. Credit risk can be managed well if management/business actors have the competence [Markman et al, 2009] to understand the target use of capital, the capital value of credit and the impact of risk, so that they are able to anticipate risks that arise. Management

 

views that risk as a trade-off, on the one hand can increase market value, (Aryaningsih et.al, 2017) while risk can also affect the entrepreneurial spirit and individual mentality. In line with this view (Banerjee et al., 2015) that the low level of microfinance investment is caused by effective costs and individual psychological status, but there is no evidence of the transformative impact of microfinance on the average borrower. For this reason, it is necessary to study the role of structural modeling, information and innovation, business communication skills, skills and abilities in managing business finances. (Zhang, et.al, 2019).

The aim of this research is to analyze the structural model in managing credit risk oriented towards market value and entrepreneurial spirit in urban cooperatives. The contribution of the results of this research is to provide solutions for handling credit risk, creating market value, and developing an entrepreneurial spirit in the management of urban cooperatives as a form of social service to economic institutions and society. The urgency of the research is that there is still a lack of studies using structural analysis with a MICMACTOR on credit risk management in urban cooperatives as an obstacle to the growth of cooperatives in urban areas, while urban areas have great potential as business opportunities and credit circulation. Another urgency is (1) the growth of young entrepreneurial motivation and the resulting increase in per capita income. (2) the growth of capital turnover among the younger generation, so that creativity grows well. This research is expected to produce a new concept regarding "New Social Entrepreneurship in handling financial risks in micro institutions".

In the following session explanation, a literature review of credit risk management and urban cooperative credit, market value, and entrepreneurial spirit are presented. In the methodology section, data sources, data analysis and interpretive structural model specification models are displayed. In the results section, an analysis of the validity and reliability of the questionnaire data, MICMATOR analysis, and interpretive structural model analysis are displayed. The final section displays the conclusions of the research results.

## 2. LITERATURE REVIEW

### 2.1 Credit Risk Management in Cooperatives

The concept of raising capital in cooperatives in developing businesses is very diverse among several economists. The conclusion stated by (Kapoor & Lee, 2013); Block (2018) is that capital accumulation can develop businesses and market competitiveness is currently also determined by the important role of the young generation in cooperative development. Like the findings (Nduwayo & Sayumwe, 2018) that non-profit business organizations need reaction and action strategies in order to survive in the global competitive market. Cultivating capital and distributing the model in the form of credit to cooperatives is often faced with financial risks. The financial risk phenomenon has occurred since the 2008 financial crisis. At that time, methods and tools were needed to manage financial risk to overcome weaknesses in monitoring and systematic risk reduction. One year later, in 2009, it was necessary to prevent future financial crises. In line with these problems stated by (Sackeyfio, 2021) a transformation of political power, economic and financial power is needed. However, on the other hand, economic policy uncertainty can increase credit risk (Chi & Li, 2017).

As stated by (Audretsch, 2002) there is a need to study the development of a network approach to risk management (NARM) for systematic risk modeling and analysis in the banking system. NARM can be used to predict bank failure and determine capital injection priorities in a banking crisis. However, this is different from the phenomenon of credit given by cooperatives as economic institutions, which does not take into account agency costs (Mervi Niskanen & Jyrki Niskanen, 2010). The finding by (Crouhy et al., 2000) is that credit distribution is carried out by considering the credit period, credit ceiling and asset value as collateral. Another finding by (Munangi & Sibindi, 2020) is that credit risk has a negative effect on company performance.

### 2.2 Market Value

Market value is the price agreed upon between the seller and the buyer without any obstacles. Market value will allow each seller and buyer to have the opportunity to bargain over the price, resulting in a price agreement between the two parties. The level of company profit growth is also determined by the opportunity formation process between business owners and stakeholders. As stated (Alvarez et.al, 2020]. The opportunity formation process can be classified from the aspects of uncertainty, knowledge, the process of entrepreneurial experimentation, failure, effective learning that forms opportunity pressures, the vision of entrepreneurs and stakeholders will be able to form new market value. In line with the findings ( Mutsonziwa, 2021) that formal credit with definite rules has better performance than informal credit which tends to have low performance and can reduce the market value of the credit. Furthermore, in line with previous views [Dileo & García Pereiro, 2019] entrepreneurial competence, including in credit distribution, also depends on entrepreneurship and personal skills. Findings (Munangi & Sibindi, 2020) credit risk has a negative effect on company performance. As stated by (Blankson & Nukpezah, 2019) that micro businesses are market-oriented strategies and will be able to increase welfare and economic growth.

Furthermore ( Meager, 2019) found that the impact of microcredit access was very small (5%) and uncertain on household businesses. Thus, microfinance institutions such as credit cooperatives in distributing credit also consider changes in market values, especially changes in credit interest rates. The higher the credit interest rate

 

given, the less the amount of credit that can be distributed to customers/credit customers. However, findings (García-Teruel & Martínez-Solano, 2010) stated that business actors with higher growth opportunities use more trade credit to finance sales growth. This is then reinforced by (Albaity et al., 2022) that positive market sentiment can increase credit growth through diversification and credit portfolios. increase welfare and economic growth. Furthermore ( Meager, 2019) found that the impact of microcredit access was very small (5%) and uncertain on household businesses. Thus, microfinance institutions such as credit cooperatives in distributing credit also consider changes in market values, especially changes in credit interest rates. The higher the credit interest rate given, the less the amount of credit that can be distributed to customers/credit customers. However, findings (García-Teruel & Martínez-Solano, 2010) stated that business actors with higher growth opportunities use more trade credit to finance sales growth. This is then reinforced by (Albaity et al., 2022) that positive market sentiment can increase credit growth through diversification and credit portfolios.

### 2.3 Credit Risk Management in Cooperatives

Entrepreneurial innovation is really needed in business management as an option (Kapoor & Lee, 2013). Along with changes in human civilization and the innovative modernization of entrepreneurship as technopreneurship (Markman et al., 2009). Technopreneurship is a technology and entrepreneurship concept to produce outcomes and increase individual creativity. . Both are needed nowadays in managing small, medium and large scale businesses.

In line with the concept (Aryaningsih et al., 2018) it proves that technology-entrepreneurship is a strong variable in business and as a whole. Wordwide web report in October 2006, online retail revenue in the United States was estimated to reach 1/4 trillion US dollars in 2011. (Zhang et al., 2019), e-commerce activities as e-business applications related to commercial transactions, such as : electronic funds transfer, electronic marketing, online transaction processing, electronic data exchange. As reported by (Audretsch et al., 2002) (Zhang et al., 2019), the e-digital based e-transaction model in Indonesia includes classified ads, retail and marketplace.

The results of several experts show that e-transactions of the productive age (Blankson et al., 2018) tend to choose marketplaces as providers of online mall services. Related to the research results, it is shown (Kuhn et al., 2016) that individual E-transaction behavior and social net working determine business behavior. In line with this view, business experience can increase career paths, so knowledge and skills are also needed at all times. Based on observations during the new normal, business management in Bali, a 5% increase in the number of customers led to a 50% increase in customer profits. This is confirmed by research results, where selling products appropriately to consumers by using digital transactions averages expenditure of 30%, utilization of savings and loan institutions for business is 73% (Aryaningsih et al., 2022) causing an increase in results of 52%. Intensive education and competency training influences the intensity and repetition of transactions by 80%. Furthermore, the findings (Fowosire et al., 2017) show that techno-preneurs as a process play an important role in strategic thinking to increase success in global economic competition. In this way, technopreneurship is being considered as a constituent element in the management of economic institutions and business strategies.

Tabel 1. Variables Identification from Literature Review

| Variables | References |
|---|---|
| **Credit Risk Managing:** | |
| Micro Finance: business organization, efficiency, strategic action. | Kotishwar, (2020); Nduwayo & Sayumwe,(2018) Meager ( 2019) |
| Policy: time of maturity, wages | (Crouhy et al., 2000) (Chi & Li, 2017) |
| Performance evaluation: reporting financial, reporting system, reward and performance | Mutsonziwa (2021) Munangi & Sibindi, (2020) |
| **Market Value:** | |
| Transaction Intensity: intensity of e-transaction, quick of transaction | (Setor et al., 2021) |
| Transaction Instrument: transfer bank, cash transaction | (Kosadi et al., 2021) and Vijayalakshmi et al.(2019) |
| Value of capital; working capital | Albaity et al.(2022) |
| **Entrepreneurial Spirit** | |
| Creative Product: creative services, thinking creative | Fowosire et al.(2017) |
| E-marketing: marketplace, technology digital | Zhang etal.,(2019) Chopra & Ranjani, (2020) |
| Market net-working: social media; personal relationship | Hokkanen et al.(2021) |

 

## 3.RESEARCH METHODOLOGY

### 3.1 Data Sources

This research uses a qualitative approach. Data sources are primary data obtained through in-depth interviews and questionnaires. The validity test was carried out with and the reliability of the questionnaire was carried out with a Sig value (2-tailed <0.05, and the Pearson Correlation was positive, then the Ijen questions were declared Valid. The questionnaire reliability test was carried out with a Cronbach's Alpha value of 0.60, then the questionnaire question items were declared reliable. The number of respondents is 60 people. Invalid and reliable questionnaire test results will be reduced from the questionnaire items. Validity and reliability test results are used as a reference for exploring primary data. Sources of primary data are carried out through in-depth interviews. The number of informants is 10 people.

### 3.2 MICMACTOR Analysis

The MICMAC method was developed by Duperrin & Godet (1973) with the Matrix d'impacts multiplication appliquée á un classment (MICMAC). The cross impact matrix multiplication applied to classification is a structural prospective analysis used to study indirect relationships [(Saxena et al., 1990). In an indirect relationship, three variables can be observed and there is a direct influence between variables, an indirect influence between variables, and one that does not have a direct influence, but is cross-correlated. This analysis was also developed by (Dubey & Ali, 2014); [(Sushil, 2012). MICMAC analysis is equipped with the development of graphs that classify factors based on driver power and defense power. MICMAC analysis is used to classify factors and validate interpretive structural model factors in research to reach results and conclusions. MIMACTOR analysis also determines the matrix factor value. The next stage of analysis is with MICMACTOR, namely to determine the structural form of the model of interrelation factors, influence factors, and dependence factors. This analysis refers to (Sushil, 2012);(Chatziioannou & Alvarez-Icaza, 2017);(Sorokhaibam Khaba, 2018) and (Solke & Singh, 2018). This research uses credit risk managing variables, including micro finance, policy, managing finance, performance evaluation. Market value (MV) variables include: transaction intensity, transaction instrument, value of capital. The entrepreneurial spirit variable includes: creative product, e-marketing, and market net working.
The methodology stages with the MICMATOR Method refer to (Sushil, 2012) as this follows;
Step 1. Considering variables
Step 2. Description relationship between the variables
Step 3.Identifies the key Variables; in defying the key variables: first direct classification, indirect classification, potential direct classification.
Step 4. Examination of direct and potential direct inter-relationship matrix
Step 5. Based on the relationships given above in the reachability matrix, a directed graph
Step 6. The resultant graph is converted into an ISM.

## 4. RESULTS AND DISCUSSION

MICMACTOR Method is structural analysis. Structural analysis is the first tool for organizing ideas. This analysis tool provides the possibility of describing a system with the help of a matrix that connects all its components. This MICMACTOR method is able to describe possible relationships between important variables in a system, so that it can be used as a basis for decision making. To see the relationship between variables in various scenarios from this research, MICMATOR Analysis is needed.

### 4.1 Matrix Direct Influences (MDI) Analysis

The steps in using MICMACTOR Methods are to consider variables; describing the relationship between variables, compiling matrices, making maps and graphs of the relationship between variables. The results of this study only chose to use MDI and MPDI. However, Matrix MDI and MPDI have the same of matrix value, so that Value matrix can be used in MDI. Some of the matrices in MICMAC Analysis are Matrix Direct Influences (MDI), and Matrix Potential Indirect Influences (MPII). Matrix Direct Influence (MDI) explains the direct influence relationship between variables in a system. Matrix Direct Influences (MDI) in Table II.

 

Table II. *Matrix Direct Influence Characteristics*

| Matrix size | 11 |
|---|---|
| Number of iterations | 9 |
| Number of zeros | 11 |
| Number of ones | 32 |
| Number of twos | 65 |
| Number of threes | 13 |
| Number of P | 0 |
| Total | 110 |
| Fillrate | 90,90% |

Sources : primer data processed (2023)

Table II. shows the characteristics of the direct influence matrix between variables with a matrix size of 9. The number of iterations is 9; the value of matrix 0 is 11; the value of matrix 1 is 32; matrix 2 value is 65; Matrix 3 value is 13, potential matrix value is 0. From all matrix iterations the filtration results are 90.90%. Next, the values in the matrix size are the result of variable decisions that will be arranged and iterated in the system to form a new matrix called the Direct Influence Row and Column Sum Matrix.

Table III. *Matrix Direct Influence Row and Column Sum*

| No | Variables | Total number of Row | Total number of column |
|---|---|---|---|
| 1 | Institution | 12 | 13 |
| 2 | Policy | 11 | 11 |
| 3 | Financial Management | 11 | 14 |
| 4 | Market Value | 12 | 10 |
| 5 | Entrepreneurial Spirit | 10 | 8 |
| 6 | Performance Evaluation | 11 | 11 |
| | Total | 67 | 67 |

Sources data processed (2023)

Table III shows the Direct Influence Row and Column Sum Matrix consisting of rows and columns [ai;ji]. Table III also shows 6 variables that have row and column values. The variables arranged to form a matrix include: institutional; operational policy and procedure guidelines; financial management; market value; entrepreneurial spirit; and performance evaluation and accountability. Institutional matrix [12;13]. Operational policy and procedure guidance matrix [11;11]. Financial management matrix [11;14]. Market value matrix [12;10]. Entrepreneurial spirit matrix [10; 8]. Performance evaluation and accountability matrix [11;11]. This matrix is iterated to form the Direct Influence Stability Matrix Table IV.

Table IV. Matrix Direct Influence Stability

| Iteration | Influence | Dependence |
|---|---|---|
| Number of iterations | 60% | 100% |
| Number of zeros | 83% | 100% |

Sources data processed (2023)

Table IV shows the Direct Influence Row and Column Sum Matrix. The number of influence iterations is 60%, while the number of dependence iterations is 100%. The number of zero influence iterations is 83%, while the number of zero dependence iterations is 100%. This means that the influence iteration has lower stability than the dependence iteration. Variables arranged in a matrix have greater strength as dependence variables. This will be proven by the structural map in Fig.1 and Fig.2. The graphs produced by the relationships between variables as in Figures 3 and 4.

 

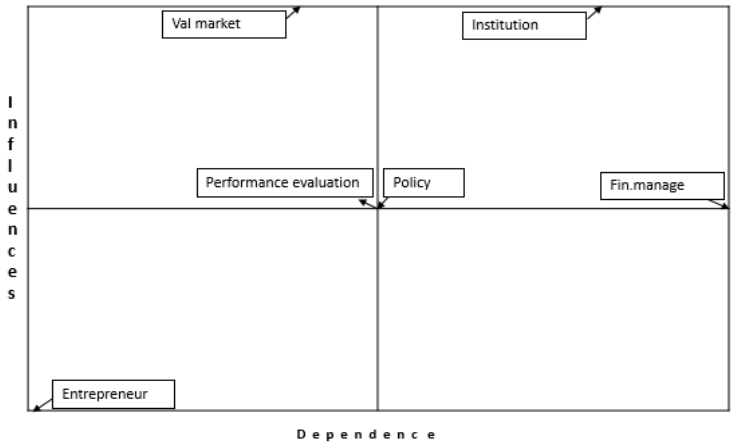


**Figure 1**. *Maps Direct Influence/Dependence*

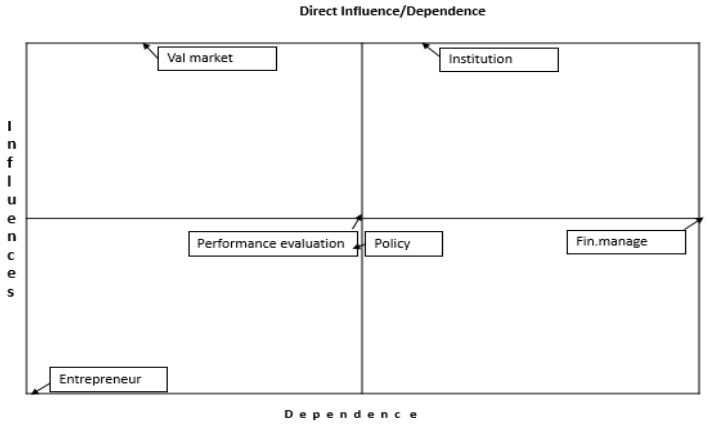


**Figure 2**. *Maps Potential Direct Influence/Dependence*

Figure 1 shows the Direct Influence/Dependence Maps. Figure 2 shows the Potential Direct Influence/Dependence. The financial management variable has the highest dependence position (right), market value has the highest influence position (top). The entrepreneurial spirit has a weak position of influence and dependence. Performance evaluation and accountability, policy guidelines and operational procedures have influence and dependence positions in the middle (médium). Institutional variables have the potential to influence and dependence.

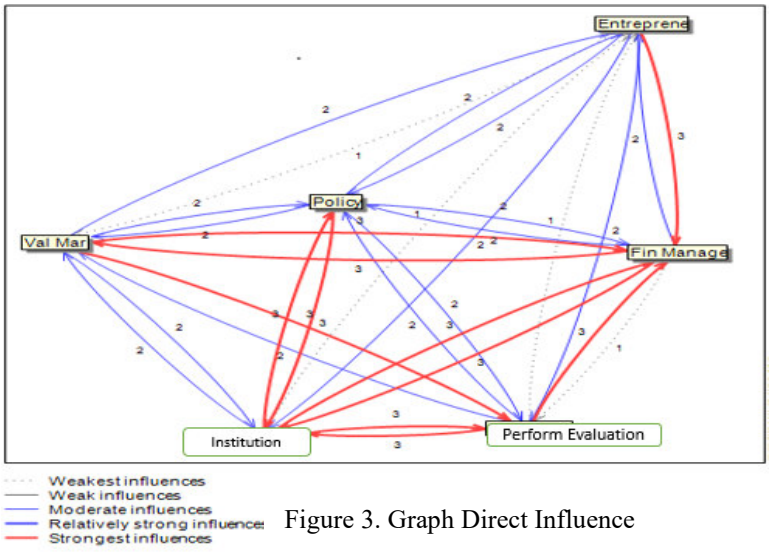


Figure 3. Graph Direct Influence

Figure 3 shows that the variable that has the strongest influence is financial management. Financial management variables are strongly correlated with performance evaluation and accountability, institutions, market value and entrepreneurial spirit. Institutions are strongly correlated with financial management, performance evaluation and accountability, policy guidelines and operational procedures. Performance evaluation is strongly

 

correlated with financial management and market value. Market value is strongly correlated with performance evaluation and accountability and financial management. Operational policy and procedure guidelines have a relatively strong relationship with financial management, performance evaluation and accountability, market value, operational policy and procedure guidelines. Entrepreneurial spirit has a very weak relationship with institutions, performance evaluation and accountability, and market value. So that, the graph of Potential Direct Influence in Fig.4.

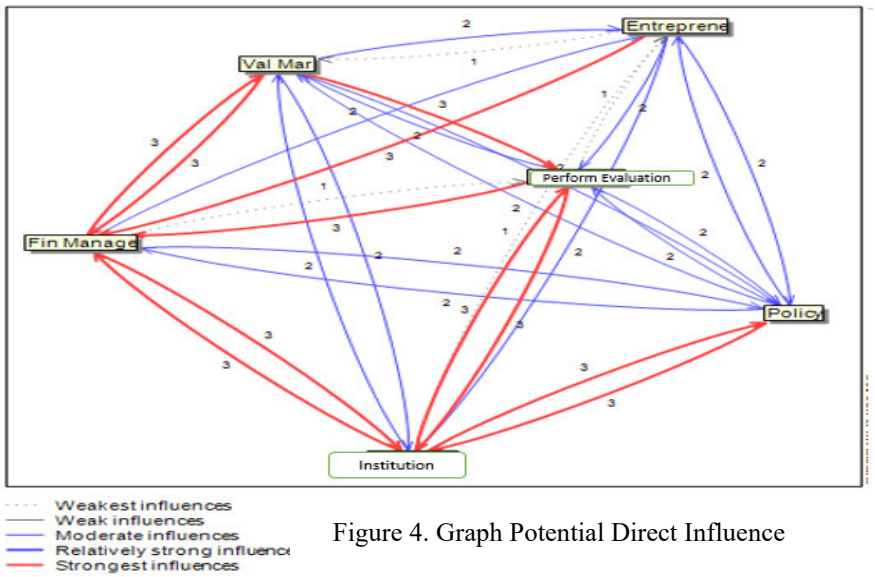


Figure 4. Graph Potential Direct Influence

Figure 4 shows that the variable that has the strongest influence is financial management. Financial management variables are strongly correlated with performance evaluation and accountability, institutions, market value and entrepreneurial spirit. Institutions are strongly correlated with financial management, performance evaluation and accountability, policy guidelines and operational procedures. Performance evaluation is strongly correlated with financial management and market value. Market value is strongly correlated with performance evaluation and accountability and financial management. Operational policy and procedure guidelines have a relatively strong relationship with financial management, performance evaluation and accountability, market value, policy guidelines and operational procedures. Entrepreneurial spirit has a very weak relationship with institutions, performance evaluation and accountability, and market value.

### 4.2 Interpretive Structural Model Analysis

Figure 5 is an Interpretive Structure model. This image is derived from the results of graphs of direct influence and potential direct influence. The figure shows the relationship between the constituent elements of key variables which have been explained using the micro analysis process. The relationship between the constituent elements is shown by the arrow lines in Figure 5.

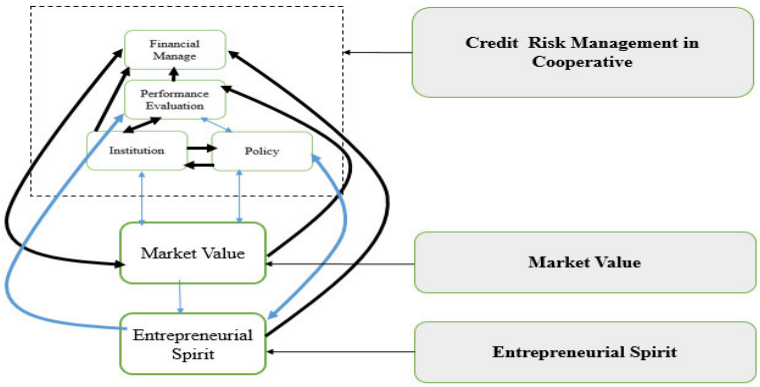


Figure 5. Interpretive Structural Model and Interrelationship between constituent element

Figure 5 can be explained that credit risk management in cooperatives, the main elements lie in financial management, performance assessment by institutions and institutional policies equipped with clear operational procedures. In this way, management's responsibility for each task is visible, so that risks in credit distribution can

 

be anticipated and eliminated. This is in line with the findings (van Oordt & Zhou, 2019) that in systematic risk it is very important to evaluate the direction of micro and macro policies in business. The link between credit risk management in cooperatives and market value is that institutions and policies made can be correlated with each other, but the intercorrelation is weak. Furthermore, credit management in cooperatives by paying attention to financial management elements has a strong intercorrelation with market value. Thus, it can be concluded that credit risk and market value have a very strong relationship. Likewise, the strength of the entrepreneurial spirit determines financial management in cooperatives. This is in line with the findings (Amit & Wernerfelt, 2018) that reducing risk in business is not only operational cost efficiency and market competitiveness, but is also determined by the manager's perspective as a form of innovation and entrepreneurial spirit. Furthermore (Shad et al., 2019) that business risk and economic market value are determined by the company's strategy and the ability to access information used in managing company finances. In this way, company cost efficiency and sustainable business can be generated.

## 5. CONCLUSION

Based on the aim of this research, it is to analyze the credit risk management model measured from institutional dimensions, policy guidelines and operational procedures, financial management based on market value and entrepreneurial spirit. The credit risk management model is measured from institutional dimensions, policy guidelines and operational procedures, financial management based on market value and an entrepreneurial spirit which has been able to produce/form two Structural Models based on the Direct Influence Matrix and the Potential Direct Influence Matrix. The results of the model formation show that the financial management variable is the strongest dependence power in credit risk management, while the market value and entrepreneurial spirit variables have the 'driving force' influence in credit risk management.

The credit risk management model in cooperatives as the main element lies in financial management, performance assessment by institutions and institutional policies equipped with clear operational procedures. Management's responsibility for each task is to eliminate and anticipate risks in credit distribution. The relationship between credit risk management in cooperatives and market value is that institutional constituent elements and the policies made can be correlated with each other. Furthermore, credit management in cooperatives by paying attention to financial management elements has a strong inter-correlation with market value. The strength of the influence of the entrepreneurial spirit is very determining in managing finances and credit risks in cooperatives.

The theoretical implication of this research is that financial management for credit for a producer needs to be considered: costs incurred, systematic risk, time period for money to be transferred and expected return, consumer characteristics and collateral. The practical implication of the research is that the ability to manage credit risk in urban savings and credit cooperatives has a strong inter-relationship effect on the ability of market value competitiveness and individual innovation as business managers of non-bank financial institutions. Cooperative management needs to pay attention to the micro-policy direction of the planned business.

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