Regional Innovation System in Rural Economic Institutional: Empirical Evidence From Semarang, Indonesia

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***Abstract***

*This study aims to analyze the factors that influence the innovation capacity of the rural economic institution and its impact on institutional performance.Research was conducted by interviewing 111 managers of rural economic institutions in Semarang regency, Indonesia. Factors of policy and regulation, development of innovation infrastructure, assistance and integration of knowledge were used to analyze the role of the Government and Higher Education in the village innovation system. The institutional management and innovation culture capacity factors were used to analyze the role of rural economic institutions. Policy and regulatory factors, innovation infrastructure, management capacity, assistance capacity, innovation culture and knowledge integration were measured based on the preference of the rural economic institution manager. The qualitative model was examined through an empirical analysis to fulfill the proposed aim of the research.The results of the study showed that: the influential factors on the innovation capacity in rural areas were policy and regulation support, innovation infrastructure, management capacity, innovation culture and knowledge management. Innovation Capacity had a positive impact on institutional performance.The implication of this study highlighted the importance of strengthening institutional and knowledge-based rural economic organizations which was integrated among stakeholders as actors in the rural innovation system.*

***Keywords:****regional innovation system, rural economic institution*

***JELclassification:O31***

# INTRODUCTION

Free trade provides opportunities for businesses in Indonesia to compete by increasing the efficiency and quality of products, giving wider market opportunities and reducing trade barriers (Uhl-Bien et al., 2007: 3). In the era of free markets like today, small-scale farmers, traders and industries that are mostly in rural areas have difficulty competing due to economic scale factors and limitations in accessing resources (Royer, et al., 2016: 144). Based on New Institutional Economic Theory (NIE) (Coase, 1937; North, 1991; Williamson, 2000) icro-scale and small-scale businesses can collaborate by: forming institutions (which are based on contracts, vertical and horizontal organizations, and partnerships), increasing governance in accessing resources (raw materials, information and market, finance, technology and innovation), increasing economic scale so that they have the ability to compete in the free market era.

Semarang Regency is one of the regions in Central Java Province, Indonesia; economic growth of which is supported by the leading sectors of industry, agriculture and tourism (Semarang Regency Bappeda, 2016: 1). Most villagers (72.6%) live in the agricultural and industrial sectors (BPS, 2016). The agricultural sector, processing industry and services are the leading sectors of Semarang Regency to compete in the global era (Semarang Regency Bappeda, 2016: 4). The development of the agricultural and industrial sectors in the countryside is one of the strategies to compete in the global era based on local wisdom. Rural areas provide not only basic natural resources, but also the source of local wisdom (Brillyanes and Wilopo, 2017: 2). Rural development aims to improve the quality of human life and to alleviate the poverty through the provision of basic needs, the construction of facilities and infrastructure, the development of potential of local economy, and the sustainable use of natural and environmental resources, by promoting togetherness, kinship and mutual cooperation (Pyburn and Woodhill, 2014: 73). However, in rural areas, natural resources and agricultural land are increasingly limited along with population growth (Kurniati, 2014), so that innovation in rural areas is needed in such dynamically changing environmental conditions.

The Rural Innovation System Program (RISP) (Sumpeno et al., 2017) is one of the strategies in national innovation system that embodies the process of interaction between the strengthening components of the innovation system in rural areas. Each village must conduct some important actions to strengthen RISP, i.e. creating a policy to establish coordination team and RISP Roadmap, structuring RISP in the area of both institution and RISP resources, developing RISP through local potential, and coordinating and reporting to the central government. Actors in the Rural Innovation System Program include: 1) Government, 2) economic (industry) actors both individuals and institutions and communities, 3) Universities.

At the level of economic institutions, the success of the Rural Innovation System Program is influenced by: policy and regulation, innovation infrastructure, institutional capacity and culture of innovation (BPPT, 2013; Verheul, 2001). From the regulation perspective, government has strived for providing incentives for innovation conducts, but the problem is that there is no legal guarantee for violations of Intellectual Property Rights. In terms of infrastructure, guidelines for village innovation, innovation grants, assistance, innovation / appropriate technology exchanges are available for facilitating innovators (at the level of economic institutions) to undertake rural innovation activities. However, many rural areas in many developing countries have a weak institutional capacity, a low culture of innovation and entrepreneurship, and tend to be resistant to the change (Dorward et al., 2003). Various policies and regulations, the development of innovation infrastructure (guidelines, applications, IT), institutional capacity (training) and culture of innovation (empowerment) have been carried out by the government, but innovation activities at the rural institutions level (such as: Bumdes, Gapoktan) have not been optimal. This is because, in general, administrators of economic institutions in rural areas have low education, are not accustomed to accessing to information except that of from village officials, agricultural extension agents, and marketers.

In terms of infrastructure, the use of information technology has reached rural areas, however knowledge management activities that facilitate innovators have not been optimal. Innovators at the level of economic institutions in rural areas need a knowledge management system that accommodates them in carrying out innovation activities, such as in: choosing effective technologies, innovation-based problem solving, applications for composing innovation proposals, report on the use of funds which is connected with stakeholders (such as : escort agencies, government institutions, financial institutions, insurance institutions). Innovative infrastructure support significantly lowers transaction costs and supports access to innovation activities (Barrett, 2008). Infrastructure is important, especially for farmers, industrial actors and rural institutions, to produce high quality products. That is because a poor infrastructure may cause problems of the decrease in quality and access to input resources and markets (World Bank, 2007). In complex and dynamic environments, integrated knowledge resources become increasingly important. Wallace (2006: 224) explains that internet technology and information have a major impact on serving business units or organizations to develop rapidly through information-driven, customer-centric, e-oriented and co-creation.

Classical economic theory (Smith, 1776) explains that organizations (companies) consist of various resources. Which are used for production activities and creating prosperity. Schumpeter (1934) suggests that entrepreneurship is one of the production resources that affects "economic growth" in addition to other factors i.e. labor, increased capital accumulation, and technology. Verheul (2001) emphasizes that entrepreneurship works on innovation activities which disrupts economic balance and creates opportunities. An innovation is a new product, process, service management approach that is adopted on a significant scale because it is useful. It may solve a problem, increase efficiency, meet consumer demands, or open up whole new ways of doing things. Rural innovation has a number of dimensions - social, technical, organizational and institutional and can take different shapes and forms. Rural innovation system A network of individuals, organizations and enterprises focused on bringing new products, processes and forms of organization into social and economic use, to achieving food and nutrition security, economic development and sustainable natural resource management. FAO working definition (Rajalahti, 2012). Entrepreneurship through an innovation process introduces new products, production methods, markets, supply sources, or industrial combinations that influence the economy going out of the previous equilibrium (Figure 1).

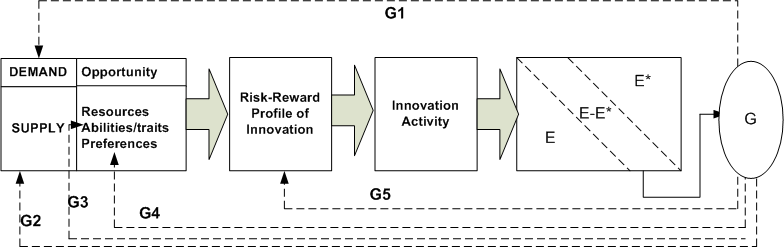


Figure 1. Framework of Innovation Activity

Source: developed from Verheul (2001)

Innovation activity is carried out by entrepreneurs to achieve equilibrium (E) or disequilibrium (EE \*). G is the government's effort to foster regional innovation through: 1) policy and regulation, 2) innovation infrastructure, 3) institution, 4) innovation culture. These are conducted correct disequilibrium (E-E \*) so as to create economic growth.

1) Policy and Regulation. G1 is a government policy that encourages the growth of innovation activities in certain areas, seen from the demand of innovation such as tax incentives and export convenience. G5 is a government policy to develop regional innovation activity through macro policies such as: fiscal incentive policy, subsidy, protection policy for Intellectual Property Rights, and rules for guaranteeing healthy business competition.

2) Innovation Infrastructure. G3 is a government policy to develop existing regional innovation activity through the provision of information technology infrastructure, communication, knowledge management, guidance and counseling, and capital incentives to innovators, especially for small-scale businesses.

3) Institution. G2 is a government policy that stimulates the growth of innovation activity in certain areas in terms of the supply through Research and Development activities carried out by government agencies, agricultural counseling activities, education and training and institutional formation. Based on the New Institutional Economic Theory (NIE) (Coase, 1937; North, 1991; Williamson, 2000) micro and small-scale businesses can cooperate such as by forming an institution (which is based on contracts, vertical and horizontal organizations and partnerships) for governance in accessing resources (raw materials, information and markets, finance, technology, innovation and design,), and increasing economic scale to make them more competitive in the free market era.

4) Innovation Culture. G4 is a government policy to develop regional innovation activity by raising awareness through education and mass media. This policy is employed to improve the low culture of innovation and entrepreneurship in an area. Generally, rural areas are rich in local wisdom as a basis for sustainable development, but tend to be resistance of change. Whereas the environment changes dynamically, while natural resources in rural areas are increasingly limited.

Regional innovation system consists of a combination of 3 actors: university, industry and government known as the Triple Helix model of innovation (Figure 2). The underlying principle of the Triple Helix model of innovation (Figure 2) is based on the Seminary's contribution to the analysis of the role of innovation in the process of economic change (Saad and Zawdie, 2005: 96). In the model, the university, industry and government features as the principal institutional actors. The triple helix arises from the numerous institutional combinations are produced by networks of relations, communication and mutual exchange. These dynamics and complexities provide multitude of cooperation and competitive networks which generate operational climate where the institutions function (Marques et al., 2006L 541). Triple helix relations between the three primary parties (university, industry, government) far have been developed mainly as an institutional model for studying the knowledge infrastructure in networks of relations (for example Etzkowitz et al., 2000). From evolutionary perspective, the triple helices can be viewed dynamically as connections to the three sub-dynamics of a system (Leydesdorff, 2007; Leydesdorff and Etzkowitz, 1998; Leydesdorff et al., 2006: 183).

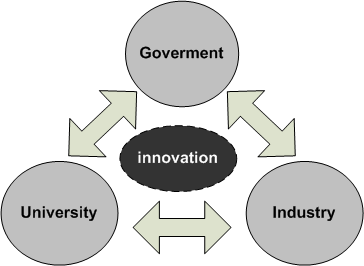


Figure 2. Triple Helix model of innovation

Source: Saad and Zawdie (2005: 95)

Regarding industrial actors in rural areas, economic and industrial actors in rural areas generally have limited economic scale. Institution increases the economic scale of small businesses in villages to be more competitive at the market. The idea of economic institution is not opposed to the neoclassical school, or the free-market economy; instead, it complements the later one. According to Bardhan (1989), the NIE places itself as a builder of non-market institution with the foundation of neoclassical economic theory.

According to Royer et al. (2016), institutional constraint encourages collective action to coordinate and cooperate on problem solving. Kydd and Dorward (2004) argue that action is needed not only through market mechanisms; instead, it should also be done especially in rural areas, through institutional arrangements. Royer et al. (2016) describe several institutional strategies such as through contracts, producer organizations and partnerships. They have been used in the practice of strengthening farmer / rural institution. Each of these arrangements can reduce institutional constraints by forming a market network (e.g. connecting buyers and producers, assisting in negotiations, providing information on quality requirements and access to innovation), preparing training and technical assistance, supporting institutional development, and certification.

In terms of infrastructure, the development of information technology and internet encourages integrated knowledge. Based on institutional economic theory (Coase, 1937), knowledge management infrastructure lowers transaction costs and increases the economy of small-scale businesses towards access to resources. Knowledge Management is developed from Knowledge Based View (KBV) (Grant, 1996). It focuses on aspects of intellectual resources as a basic strategy for the long-term-organizational-competitive-advantage source and the short-term performance. On the basis of KBV, organizations use Management and Knowledge Management as a strategy to improve performance in the short and long term.

Furthermore, it can be explained that the environment of most organizations is more complex and dynamic. Competition becomes higher, stakeholder expectations increase, whereas there is little time to develop and market new products and services before they get outmoded. All organizations learn many things, but some do it much better than others. The concept of integration refers to ''procedures between organizations and cross-functional'', which concentrates on two aspects: interaction and collaboration. Interaction focuses on the exchange and use of communication between functional units, while collaboration emphasizes collective work on various departments (Grant, 1996b: 376-382). Grant (1996a, 1996b) states that the ability to integrate knowledge of corporation can be determined by two important mechanisms: referrals and organization routines (Grant, 1996b: 377). Aldakhil (2015: 3) conceptualizes the integration of knowledge as an activity of gathering, processing variety of knowledge to do specific activities and solving problems. Furthermore, he (2015: 3) also explains that knowledge integration is a process to gain knowledge across organizational boundaries, then share, assimilate, and apply it to improve operational performance. According to Hakanson (2005: 4), knowledge integration is part of knowledge management. Governance itself is broader than management because it involves the stakeholders and organizational management objectives.

# RESEARCH METHOD

This research was conducted on economic institutions in rural areas in Semarang Regency, Central Java, Indonesia. Semarang Regency is one of the regions in Central Java Province of Indonesia, with economic growth supported by leading agricultural sectors, processing industries and services. Most of the population (73%) lives from agricultural sector and industrial SMEs in rural areas. Economic institution in rural areas includes *Bumdes*, *Gapoktan PUAP* and Agricultural Cooperatives. Primary data were collected through direct interviews with respondents based on a list of prepared questions. Meanwhile, secondary data were obtained from the literature, institutions, and agencies related to this research. Structured and in-depth interviews were also conducted with the respondents i.e. institutional managers of *Bumdes, PUAP Gapoktan* and Agricultural Cooperatives.

*Table 1: Variable and Operational Definition*

|  |  |  |
| --- | --- | --- |
| **Variables** | **Indicators** | **Scale** |
| **Institutional Performance (Y)** | Asset accumulation (%) | Continum  (%) |
| **Innovation Capacity (INOV)** | 1. Product and service innovation | (1 = not available, 2 = available, 3 = high available) |
| 1. Process innovations |
| **Policy and Regulation (REG)** | 1. Fiscal incentives | (1 = not support, 2 = support, 3 = high support) |
| 1. Property Right Protection policy |
| 1. Warranty of healthy business competition |
| **Innovation Infrastructure (INF)** | 1. Access to Financial Support | (1 = not support, 2 = support, 3 = high support) |
| 1. The level of use of ICT in rural areas |
| 1. Condition of ICT infrastructure in rural areas |
| 1. HR training |
| **Institutional Capacity (MAN)** | 1. Capacity of Innovation adoption | (1 = not good, 2 = good, 3 = very good) |
| 1. Capacity of Cooperation with Suppliers |
| 1. Capacity of Cooperation with Buyer |
| 1. Capacity of Cooperation with Competitors |
| **Innovation Culture (CUL)** | 1. Innovation Culture | (1 = not good, 2 = good, 3 = very good) |
| 1. Entrepreneurial culture |
| 1. Concern for traditional knowledge |
| **Capacity of Knowledge Management (KM)** | 1. Access to Innovation | (1 = not good, 2 = good, 3 = very good) |
| 1. Access to Information on Innovation Funding |
| 1. Access to Information Reporting |
| 1. Connected with stakeholders |

The analysis method in this study used a multilevel regression analysis model, that is, the least squares regression with the following equation:

INOV= β0 +β1REG +β2INF+β3MAN+β4CUL+β6KM+ε1 (1)

Y= *δ*0 +*δ*1INOV +ε2 (2)

Where: *α*, β:intercept and slope, ε:Error. To evaluate the accuracy of regression function toward observation value can be seen from the value of *goodness fit*. The statistic of *goodness of fit* is measured from F statistic value and determination coefficient. The determination coefficient (R²) is used to decide percentage deviation of dependent variable that is caused by independent variable. The test of F is the formula significance test that is used to determine how independent variable affects the dependent variable (Y). *P-value*is the probability to refute zero hypotheses if the test is presumably correct. The significant level is 1% (very significant), 5% (significant) and 10% (moderate significant). If p value is less than significant level, the researcher will conclude that the observed influence depicts the population characteristic not only the error sampling.

# RESULTS AND DISCUSSION

**3.1 Results**

The average accumulation of assets in Economic Institutions in rural areas in Semarang Regency was 37% compared to the initial capital. The initial capital itself came from the government and self-help capital. Innovation Capacity of rural economic institutions in general was low (mean = 2.21). In general, economic institutions in rural areas in Semarang Regency have low capacity in product/service innovation (average = 1.23) and process innovations (average = 1.19). Innovation capacity consisted of product and service innovation and process innovation. Product innovation included management of coffee commodities, agro tourism, and waste management for economic value. Process innovation, then, encompassed some aspects such as price control, product quality control, packaging, post-harvest technology adoption, and marketing innovation.

Table2. Descriptive statistics

|  |  |  |
| --- | --- | --- |
| **Variables** | **MEAN** | **SD** |
| **Institutional Performance(Y)** |  |  |
| Asset accumulation (%) | 0.37 | 0.34 |
| **Innovation Capacity(INOV)** | **1.21** | **0.49** |
| Product and service innovation | 1.23 | 0.54 |
| Process innovations | 1.19 | 0.48 |
| **Policy and Regulation(REG)** | **1.92** | **0.44** |
| Fiscal incentives | 2.27 | 0.49 |
| Property Right Protection policy | 1.25 | 0.44 |
| Warranty of healthy business competition | 2.23 | 0.49 |
| **Innovation Infrastructure(INOV)** | **2.01** | **0.54** |
| Access to Financial Support | 2.05 | 0.59 |
| The level of use of ICT in rural areas | 2.05 | 0.61 |
| Condition of ICT infrastructure in rural areas | 2.06 | 0.61 |
| Facilitator Capacity | 1.91 | 0.63 |
| HR training | 1.96 | 0.60 |
| **Institutional Capacity(MAN)** | **1.85** | **0.69** |
| Capacity of Administration | 1.87 | 0.71 |
| Capacity of Management | 1.90 | 0.74 |
| Capacity of Governance | 1.77 | 0.72 |
| **Innovation Culture(MAR)** | **1.99** | **0.52** |
| Innovation Culture | 1.66 | 0.60 |
| Entrepreneurial culture | 1.72 | 0.63 |
| Concern for traditional knowledge | 2.59 | 0.49 |
| **Capacity of Knowledge Management (KM)** | **1.57** | **0.47** |
| Access to Innovation | 1.59 | 0.49 |
| Access to Information on Innovation Funding | 1.59 | 0.49 |
| Access to Information and Market | 1.53 | 0.50 |

Source: Analysed from interviewing managers of rural economic institutions (2017)

As for the policy and regulation, the average respondent's perception of policies and regulations is supportive (on average = 1.92). In terms of indicator, the average of respondent's perception of the fiscal incentivesfor innovation activities and warranty of healthy business competition is sufficiently supportive (average = 2.27 and 2.23), however the respondent's perception of the protection policy of Intellectual Property Rights (IPR) is still low supportive (average = 1.25). The average respondent's perception of the availability of fiscal incentives is low, this can be caused there were already fiscal incentives for innovation activity, yet the absorption capacity of innovation grants was low. Fiscal incentives: Operational Funds for the Rural Knowledge and Innovation Program Activities, Operational Funds for Strengthening Technical Service Providers. Respondents' perception of the Intellectual Property Rights (HKI) protection policy was still low. Innovations made by individuals, companies, institutions were easily adopted without considering Intellectual Property Rights. The regulation concerning Intellectual Property Rights is actually available, but the implementation of law enforcement against violations of Intellectual Property Rights has not been supportive.

In terms of innovation infrastructure (INOV), in general the respondent's perception of the innovation infrastructure has supported (on average = 2.01) both in the aspect of Access to Financial support, level of use of ICT in rural areas, condition of ICT infrastructure in rural areas, Facilitator Capacity and HR training. The rural Innovation Program (PID) is a program designed to encourage and facilitate the strengthening of village capacity oriented to meet the target of the RPJM Kemendesa PDTT-the priority program of the Village Official of PDTT, through raising rural productivity based on the development of entrepreneurship, improving the quality of human resources (HR) and fulfilling and increasing rural infrastructure. In connection with the capacity of innovation infrastructure, generally there have been guidelines for rural innovation, innovation grant funds, assistance, innovation / appropriate technology exchanges facilitating innovators (at the level of economic institutions) to conduct rural innovation activity. Recently, information technology infrastructure has reached remote villages in Semarang Regency, but the development of information and communication technology in rural areas has not been used optimally. Training has also been conducted to improve the entrepreneurial capacity of institutional administrators in rural areas. In coaching and controlling the PID, government is assisted by professional assistants. In accordance with Government Regulation No. 47 of 2015 concerning Amendments to Government Regulation No. 43 of 2014 about Regulation of the Implementation of Law Number 6 of 2014 concerning Villages and the Regulation of the Village Officials, Development of Disadvantaged Regions and Transmigration No. 3 of 2014 concerning Village Facilitators who also explains the position of Experts at the District level as Professional Assistants in helping facilitate village development and empowerment. The Directorate General of Development and Empowerment of Rural Community, the Village Officials, Development of Disadvantaged Areas and Transmigration stipulates and issues Administrative-Operational Standards and Procedures (OSP) and PID Assistance Reporting. Such an OSP contains the main issues related to the implementation of the Rural Innovation Program Assistance through efforts made by the Government, Provincial Government, District / City Government, Third Party or Rural community participation. It is also used as a means to help ensure transparency and accountability in the implementation of the Rural Innovation Program so that it can reflect the governance of rural development and empowerment that is intertwined to the Self Governing Community. Despite the availability of regulations, Operational Standards and Procedures, however the results of the study found that the facilitators capacity was inadequate (average = 1.91). This is because it is not easy to find a companion capacity for village institutions with agricultural environmental characteristics, complex markets. The challenge of facilitators village institutions is more complex than the role in empowering farmers as individuals or farmer groups (only production focus). The companion must have marketing and networking capacity, quality management and farm risk management, but on the other hand the background that has never been an entrepreneur or manager in an agricultural business is an obstacle in that role.

In terms of institutional capacity, the rural institutions tended to have low management and governance capacity (mean= 1,87). Management of rural institutions capacity was low in aspects of: administration capacity (mean= 1,80), management capacity (mean = 1,77) andgovernance capacity (rata-rata= 1,77).Rural institutions such as *Gapoktan* and *Bumdes* were born in the era of free trade and changes in the agricultural environment and dynamic markets, while the rural environment in general is still traditional. Rural institution, like any other socio-economic organizations in rural areas are usually still managed traditionally such as, lack of administrative records because they are not accustomed to developing organizational accountability reports, are not familiar with work plans, are based on centralized decisions on the role of local leaders and are lack of member participation. Furthermore, agriculture is production-oriented in nature or is performed as what exactly done from one generation to another. It is not market-oriented and has not been integrated between upstream and downstream businesses; the actors are used to being dependant (on Government funding assistance, the information, knowledge and experience of the elder or agricultural counselor). These cause the image that rural institutions are just similar to other organizations such as farmer groups, *arisan* groups, that is, the organizations which focus on providing assistance and have not created an entrepreneurial culture, *Gapoktan* and *Bumdes*, as farmer institutions is a more complex organization than other ones in rural communities (such as: farmer groups, *arisan* groups, arts groups and other social and religious organizations). *Gapoktan* includes various business units, not only agricultural production, but also is expected to be developed to have (Ministry of Agriculture, 2007): marketing business units, capital business units, management of production inputs, agricultural product processing.

In terms of culture of innovation, innovation culture in the rural economic institutions in Semarang Regency in general are low (mean = 1.99). The rural economic institutions in Semarang Regency generally have a high level of awareness of traditional knowledge (average = 2.59). Rural areas in Semarang Regency had many sources of local wisdom, such as: culture of helping each other, mutual cooperation, prioritizing public interests rather than those of personal and community *(talk less do moresepi ing pamrih, rame ing gawe)*, and resource management which was environmentally friendly. However, they tended to be resistance of change. Entrepreneurial culture in rural communities in Semarang district was commonly low. On the other hand, farmers / groups were likely to be dependant (relying on government funding assistance, the information, and the knowledge and experience of the elder or agricultural counselor). Regarding the level of concern for traditional knowledge, knowledge of local wisdom was a unique knowledge resource, and valuable for it was not easily replicable and irreplaceable; not only it was a source of competitive advantage but also often provided wisdom in balanced and sustainable management of the environment (physically, socially, and spiritually).

In terms of knowledge managementcapacity, in general the respondents' perception of knowledge management capacity is still low (average = 1.57) both in the aspects of knowledge management (acquisition, sharing and analysis) of the market, access to funding and adoption of appropriate technology. In terms of infrastructure, the use of information technology has reached rural areas, however knowledge management activities have not been optimal. Innovators at the level of economic institutions in rural areas need a knowledge management system that facilitates them in carrying out innovation activity, such as in: choosing effective technologies, problem solving-based innovation exchange, applications for developing innovation proposals, reporting on the use of funds which is connected with stakeholders (like institution facilitators, government institutions, financial institutions, and insurance institutions).

The result of the regression equation of the factors influencing the Innovation (Table 3) was proved through F-test value of 13.796, with the level of significance at the error rate of 1%. This result also showed simultaneously the factors in the model had a significant effect on the accumulation of assets. Based on the result of the regression equation, R2 value was 0.368 or 36.8% which reflected that all independent variables were able to explain the change variations, i.e. the increase or decrease in the dependent variable (accumulated assets of the institution) of 36.8%, while the remaining, that was 63,2%, was influenced by other variables excluded in this research model.

The regression result of the effect of Innovation capacity on performance (Table 3) was proved through F-test value was 427.692, while the model is significant at an error rate of 1%. These result also showed that simultaneously the factors in the model had a significant effect on the Institutional Innovation Capacity. Meanwhile, the result of the regression equation showed the R2 value of 0,795 or 79,5% which reflected that all independent variables were able to explain the change variations i.e. the increase or decrease in the dependent variable (non-dependence of subsidies) of 79,5%, while the remaining (20,5%) was affected by other variables excluded in this research model.

*Table 3 The Regression Result*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1**  **Innovation** | | **Model 2**  **Asset Accumulation** | |
| *β* | *ρ* | *δ* | *ρ* |
| (Constant) | -1.036 | 0.001 | -0.363 | 0.000 |
| INOV |  |  | 0.605 | \*\*\*) 0.000 |
| REG | 0.231 | \*\*) 0.047 |  |  |
| INF | 0.333 | \*\*\*) 0.000 |  |  |
| MAN | 0.109 | \*\*) 0.048 |  |  |
| CUL | 0.268 | \*\*\*) 0.003 |  |  |
| KNOW | 0.258 | \*\*) 0.014 |  |  |
|  |  |  |  |  |
| R-squared | 0.368 |  | 0.795 |  |
| F-statistic | 13.796 |  | 427.692 |  |
| Prob(F-statistic) | 0.000 |  | 0.000 |  |

Description: \*\*\*) significantly impactful with error tolerance of 1%; \*\*) significantly impactful with error tolerance of 5%

Source: Analysed from interviewing managers of rural economic institutions (2017)

Innovation Capacity (INOV) had a positive and significant impact on institutional performance (*ρ* = 0.000 < 1%).The regression coefficient of the Innovation Capacity on institutional performance was 0,605.Interpretation ofregression coefficient that an increase in Innovation capacity of 1 unit would be accompanied by an increase in institutional performance of 0,605 percent, whereas Innovation Capacity decline as far as 1 unit would be accompanied by a reduction in institutional performance of 0,605 percent, noting that other variables remained constant.

Policy and Regulation (REG)had a positive and significant impact on innovation capacity (*ρ* = 0.047 < 5%). The regression coefficient of the Policy and Regulation on innovation capacity was 0,231.Interpretation of regression coefficient that an increase in Policy and Regulation of 1 unit would be accompanied by an increase in innovation capacity of 0,231 unit, whereas Policy and Regulation decline as far as 1 unit would be accompanied by a reduction in innovation capacity of 0,231 unit, noting that other variables remained constant.

Rural Infrastructure Capacity (INF) had a positive and significant impact on innovation capacity (*ρ*= 0.000 < 1%).The regression coefficient of the Rural Infrastructure Capacity on innovation capacity was 0,333.Interpretation of regression coefficient that an increase in Rural Infrastructure Capacityof 1 unit would be accompanied by an increase in innovation capacity of 0,333unit, whereas Rural Infrastructure Capacitydecline as far as 1 unit would be accompanied by a reduction in innovation capacity of 0,333unit, noting that other variables remained constant.

The capacity of Rural Institutional Management (MAN) had a positive and significant effect on innovation capacity (*ρ*= 0.048 < 5%). The regression coefficient of the Management Capacity on innovation capacity was 0,109.Interpretation of regression coefficient that an increase in Management Capacity of 1 unit would be accompanied by an increase in innovation capacity of 0,231 unit, whereas Management Capacity decline as far as 1 unit would be accompanied by a reduction in innovation capacity of 0,109 unit, noting that other variables remained constant.

Innovation culture (CUL) had a positive and significant effect on the capacity of innovation (*ρ* = 0.003 < 1%).The regression coefficient of the Innovation culture on innovation capacity was 0,268.Interpretation of regression coefficient that an increase in Innovation culture of 1 unit would be accompanied by an increase in innovation capacity of 0,268 unit, whereas Innovation culture decline as far as 1 unit would be accompanied by a reduction in innovation capacity of 0,258 unit, noting that other variables remained constant.

Knowledge Management (KNOW) had a positive and significant effect on innovation capacity (*ρ*= 0.014 < 5%). The regression coefficient of the Knowledge Management on innovation capacity was 0,258.Interpretation of regression coefficient that an increase in Knowledge Management of 1 unit would be accompanied by an increase in innovation capacity of 0,258 unit, whereas Knowledge Management decline as far as 1 unit would be accompanied by a reduction in innovation capacity of 0,258 unit, noting that other variables remained constant.

**3.2 Discussion**

The results of the study showed that: policy and regulation support, innovation infrastructure, management capacity, innovation culture and knowledge management had a positive impact on Innovation Capacity. Innovation Capacity had a positive impact on institutional performance. Innovation Capacity had a positive and significant impact on institutional performance. Rural institutions both Bumdes, Gapoktan or Cooperatives are available for innovation activities such as: management of coffee commodities, agro-tourism management, water resource management, waste management for economic value, price control, product quality control, packaging, post-harvest technology adoption, marketing innovation generally have asset accumulation is higher than village institutions, either Bumdes, Gapoktan or Cooperatives, which are not available for innovation activities.

Policy and Regulation had a positive and significant impact on innovation capacity. Government policies and regulations in the form of fiscal incentives for innovation activities, protection of Intellectual Property Rights and Guarantees fair business competition has proven effective in increasing the innovation capacity of rural institutions, however the results of the study also found that regulation of Intellectual Property Rights still does not yet support, so these results have implications for strengthening law enforcement against violations of Intellectual Property Rights.

Rural Infrastructure Capacity had a positive and significant impact on innovation capacity.Village institutions that have access to adequate infrastructure capacity such as financial infrastructure, availability of information and communication technology, use of information and communication technology availability, adequate companion capacity and available training tend to have better capacity for innovation. Infrastructure support is needed to support access to input and output markets, access to credit information and facilities, and technical innovation assistance. On the input side, the availability of infrastructure supports access to resources, market information, financial services and technology. High quality input is an important prerequisite for achieving high product quality. Demand for inputs by business actors (farmers, fishermen, low traders and industrial entrepreneurs) is uncertain due to lack of liquidity and transactions for small-scale businesses. In addition, high input prices are combined with certainty the absence of output prices is an obstacle and inhibits small-scale business actors in rural areas to increase productivity and improve product quality to meet market needs (Kydd and Dorward, 2001: 473). On the output side, the availability of infrastructure supports market information, quality control and inspection, and relations to the output market.

The lack of market relations is often caused by rural infrastructure and the low production volume of individual farmers. Market networks are also hampered by monopolistic practices, corruption and low market confidence. In addition, the quality of agricultural and industrial products in rural areas is often uneven and uncertain, making private companies reluctant to cooperate with small-scale producers. Supermarkets often support large and medium-sized suppliers and are close to cities, considering the lower costs and risks of doing business with large and medium-scale suppliers in these rural areas (Berdegué et al., 2005). information such as relating to market demands, prices, class specifications, storage and transportation facilities is required, but the market information has not been managed optimally. Other constraints relate to a lack of product quality control. Access to certification, auditing, quality control and laboratory services may be important to verify these requirements. However, audit and certification of services is expensive because farmers have an inadequate economic scale (Raynolds, 2004). When individual businesses in rural areas have economies of scale efficiency and access to resources, the rural economic institutions have a role to improve constraints.

The capacity of Rural Institutional Managementhad a positive and significant effect on innovation capacity. The result of the study found that institutional management capacity had a positive and significant effect on capacity for innovation. The finding of significant influence of management capacity on innovation capacitycan be explained by Neoclassical Production Theory (Cantillon, 1755) and Schumpeter's Theory (1934) which suggest the role of management and entrepreneurship in increasing production and markets. This shows that the higher the capacity of management, the more effective it will be in increasing the ability to manage resources (management capacity and entrepreneurship) aiming to raise the accumulation of institutional assets. Many institutions are built to strengthen the position of farmers in the economy, such as: the Association of Farmers' Groups (*Gapoktan*), and *BUMdes*. Yet, agricultural institutions and farmers themselves have not nailed their role in overcoming these problems. Some problems, such as ability in group organization, improvement or expansion of farms to the upstream and downstream sectors, marketing and cooperation in increasing bargaining position, inability to manage funds, inability to provide market information and to distribute / market / process the products, low management technical capacity, ability to cooperate, and lack of preparedness in the growth of autonomous businesses.

Generally, managers at rural / farmer institutions are selected based on their distinguished roles in society, older people who are respected by the community. They are usually accompanied by the local Program Facilitator and Agricultural Counselor. Those parties are unlikely to have experience in real business activities both in the scope of agricultural production and in marketing agricultural production. This causes limitations in the development of institution strategies (institutional behavior) to deal with market structures, such as the ability to compose partnership proposals, networking, contract-based risk management and business negotiations, financial management to protect people from low harvest and / or increasing prices of high agricultural inputs, market contract-based strategies, production strategies through diversification, geographical distribution, selection of varieties, timeliness, drainage, use of cultivation methods that are most suitable for certain regions, and cooperation with third parties such as insurance agencies.

Innovation culture had a positive and significant effect on the capacity of innovation.In the Knowledge Era, rural institution not only in the scope of production, but also in marketing, price management, processing of harvests, finance (capital), management of production inputs which are all components of business units in rural institution. On the other side, Culture of innovation and entrepreneurship in rural communities in Semarang district is likely to be low. On the other hand, farmers / groups who are accustomed to be dependant (by relying on Government funding assistance, information, knowledge and experience of the elder or agricultural counselors). Various schemes of assistance provided do not make farmers more independent; instead they tend to be more dependent on subsidies. Various assistance schemes have also been implemented ranging from subsidies of Production Facilities, Direct Capital Assistance, Farmer Business Loans, and so forth. Yet, the assistances have not produced the desired results. Indonesian farmers have a low income, still. Various assistance provided also cause farmers to become dependent and feel unable to move alone in carrying out their farming. Small-scale business actors in rural areas often lack knowledge about optimal production, post-harvest processing (agriculture, fisheries), processing and storage techniques, especially those related to high-quality products and access of open innovation. Thus, small-scale businesses in rural areas with access to extension services have more ability to adopt new technologies and invest in new market trends, such as quality certification (Asfaw et al, 2010; Muriithi et al, 2011).

Knowledge Management had a positive and significant effect on innovation capacity. Research in recent years (Aldakhil and Vonderembse, 2015; Basaglia aet al., 2010, Kim et al., 2011; Hassan et al., 2017), asserted that knowledge management has been considered as a source of competitive advantage and important factors that can positively affect organizational performance, while knowledge integration is an important process in the organization to benefit from knowledge and create competitive advantage. Knowledge integration facilitates sharing of experience and problem solving among innovation stakeholders unlimited to space and time. Wallace (2006) explains that internet technology and information have a major impact on work. The development of information and communication technologies in rural areas in Semarang Regency Indonesia currently provides ease regarding the constraints of "space and time" which has been the determining aspect of speed and the success of rural innovation systems. As to the infrastructure, the use of information technology has reached rural areas, however accessible knowledge management activities have not been optimal. Innovators at the level of economic institutions in rural areas need a knowledge management system that facilitates them in carrying out innovation activities, such as in: choosing innovation-based problem solving, effective technologies, applications for developing innovation proposals, reporting on the use of funds connected with stakeholders (such as : institution facilitators, government institutions, financial institutions, and insurance institutions).

# CONCLUSIONS

Generally, the results of the study found that the factors influencing the capacity of institutional innovation in rural areas were policy and regulation, innovation infrastructure, management capacity, facilitator capacity, innovation culture and knowledge management. The implications of this study are intertwined to the importance of the development of rural economic institutions based on knowledge management, making it easier for innovators (at the level of economic institutions) to conduct rural innovation activities, such as in: choosing innovation-based problem solving, effective technologies, applications for developing innovation proposals, reporting on the use of funds connected with stakeholders (such as : institution facilitators, government institutions, financial institutions, and insurance institutions). In addition, innovative infrastructure support can be also significantly lower transaction costs and improve access to innovation activity..

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31. **Appendixes**