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**INNOVATION AND SOCIAL CAPITAL IN THE SMALL-MEDIUM ENTERPRISES:
A CASE OF BAMBOO HANDICRAFT IN INDONESIA ^{*)}**

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ABSTRACT

This paper aims to seek what type of innovation and to estimate the impact of social capital on the innovation in the small-medium enterprises (SMEs) in Indonesia. The data used in this paper was collected from May to June 2008 in several clusters of bamboo handicraft producers in the district of Sleman, Yogyakarta Special Province. The research found that more than half of respondents are innovative producers. Innovation of product and organizational are the important types of innovation in the bamboo handicraft. Social capital, measured by an index of trust significantly influences the innovation index. Other important variables that influence the index of innovation are location, sex, and education. However, in the logistic regression, only education that significantly explain the probability of innovation.

Key words: innovation, social capital, trust, bamboo handicraft, Indonesia

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INTRODUCTION

In the recent discussion on the innovation, there is a great attention on the role of social capital on innovation. A recent research by the Credit Bureau of Bank of Indonesia or CB-BI (2006) based on a field survey in six clusters of small-medium enterprises (SMEs) in Central Java have also mentioned the social capital issues. The report says that main struggle in the cluster development in Indonesia is development of social capital or collectiveness and conflict resolution among the cluster agents. There were several indicators related to this conclusion such as unhealthy competition among the agents, exploitation in the backward-forward linkages and low trust among the agents. Producers with low social capital will experience limited innovation since social capital plays as one of the channels of new information that influence innovativeness of a company (van Geenhuizen & Indarti 2005).

This paper aims to seek what types of innovation and to estimate the impact of social capital on the innovation in the bamboo handicraft industry in the district of Sleman, Yogyakarta Special Province. This district is one of important locations of bamboo handicraft producers in Yogyakarta Special Province. Most of the handicraft producers in this district are small enterprises that located at several clusters of producers. They have also exported the handicraft products. However, recently the clusters have experienced a development problem that closely related to the limitation of innovations. Since, innovation determines the performance of companies, such as their competitiveness; therefore, it is important to asses innovation issues of the bamboo handicraft producers.

Innovation in this study is classified into 15 types and used to construct an index of innovation. Meanwhile, the social capital of producers is measured by a trust index that consists of two items. The primary data used in this paper is collected from May to June 2008 to 40 SMEs in several clusters of bamboo handicraft in the district of Sleman. The research found that more than half of respondents were innovative producers. Types of innovation of product and organizational were the important innovation in the bamboo handicraft. Trust, as a measure of social capital, have a significantly influence the innovation index in the linear regression model. Other important variables influences the index of innovation are location, sex, and education. However, the significant variable in the logistic regression model is only education.

KNOWLEDGE BASED INNOVATION

There are many types of innovation among the SMEs. Product and process innovation have been already known in the previous studies on innovation (i.e. Sandee 1995, Sandee *et al* 1991). In a recent paper by van Geenhuizen & Indarti (2005), beside product and process innovation, there are also four general types of innovation among the SMEs. These four types of innovation are service innovation, market innovation, logistics innovation and organizational innovation.

It is important to be considered that different types of innovation may occur simultaneously since they are related with each other. For example, product innovation may simultaneously need new technique in production or innovation process. The new product because of product innovation perhaps needs new market. In this example, there is a connection among the three types of innovations. In the case of furniture industry in Indonesia, van Geenhuizen & Indarti (2005) found that product innovation is the most important innovation, such as new product designs and new types of product. Other important innovation types are the market and logistic innovation.

This paper adopts van Geenhuizen & Indarti (2005) in identifying types of innovation in the case of bamboo handicraft. As detailed in Table 1, there are 15 types of innovation from new product to human resource development.

Table 1. Types of Innovation

No	Type of Innovation	Detail
1	Product	New product, Changes in product components, Changes in product design
2	Services	Changes in ways to service customers, New services
3	Process	Improvement of existing production process, Adoption new tools/technologies
4	Market	New market destination/location, New market segments
5	Logistics	New raw material, New sources of raw material
6	Organizational	New managerial system in production, Adoption of quality control, Simplification in decision making procedures, New ways in human resource development

Recent studies on innovation consider innovation as the result of process that depends on the interactions and knowledge exchange among the actors. In this theory, social capital is an important factor that explains innovation (Landry *et al* 2000). They also mention two

consequences emerged from this theory. First, innovation is understood as a process that also involving social interaction. Second, innovation not only explained by tangible assets (such as physical or financial capital), but also by combination of intangible forms of capital, especially social capital.

There are many definitions of social capital. From various definitions of that concept, Durlauf & Fafchamps (2004: 5) distinguish three main underlying ideas. First, social capital generates positive externalities for members of a group. Second, these externalities are achieved through shared trust, norms, and values and their consequent effects on expectation and behaviour. Third, shared trust, norms, and values arise from informal forms of organization based on social networks and associations. They also mention that study of social capital is that of network-based processes that generate beneficial outcomes through norms and trust.

Since innovation need new knowledge and information, then social capital may provide a better chance of producers to access them. The producers who have ability to learn can combine their own knowledge base with external knowledge in their innovation activities (Ruuskanen 2004). Therefore, innovation related to social capital of the producers, as well as their own knowledge or their education.

In developing countries informal social capital play an important role in distributing (or as a source of) information and knowledge needed in innovation, such as family, friends and customers, or customer relation and social networks (Premaratne 2002, van Geenhuizen & Indarti 2005; Kristiansen *et al* 2005). In their study on furniture industry in Jepara, Indonesia, van Geenhuizen & Indarti found that the main sources of innovation process are traditional sources, such as learning by doing, buyer and customers, and business partners. The nature of these partnerships was informal. Trust developed through social exchange is an important base of social networks. This finding also indicates that social network is an important explanation about innovation among the SMEs. In the case of Tanzanian cottage industries, Kristiansen *et al* (2004) also found that family and friends, colleagues and business partners, and religious affiliations are important source of business information that used such as in developing fashion and design. In the case of Finnish SMEs, Ruuskanen (2004) found that social capital, measured as wide and active participation in network cooperation, have significant correlation with the overall innovation of a firm.

Based on the above discussion, this paper rely on a prediction that social capital, such as measured by trust of the bamboo handicraft producers, give positive influence on the innovation among the producers. To test this prediction, the paper employs linear regression and logistic regression. Operationalizations of concept of social capital and innovation are described in the following section.

DATA AND DESCRIPTIVE STATISTICS

An enumerator has collected the data used in this study. The bamboo handicraft producers were interviewed using a questionnaire that is developed based on previous studies, especially van Geenhuizen & Indarti (2005) and Kristiansen *et al* (2005). There were 40 producers in three sub districts interviewed for this study from May to June 2008. Most of them are cottage and small enterprises.

Table 2. Distribution of Respondents Based on types of Innovation

No	Type of Innovation	Number of Respondents	Percentage (%)
1	Product		
	New product	27	67.5
	Changes in product components	23	57.5
	Changes in product design	27	67.5
2	Services		
	Changes in ways to service customers	11	27.5
	New services	9	22.5
3	Process		
	Improvement of existing production process	16	40.0
	Adoption new tools/technologies	13	32.5
4	Market		
	New market destination/location	11	27.5
	New market segments	12	30.0
5	Logistic		
	New raw material	10	25.0
	New sources of rawa material	8	20.0
6	Organizational		
	New managerial system in production	13	32.5
	Adoption of quality control	23	57.5
	Simplification in decision making procedures	11	27.5
	New ways in human resource development	15	37.5

To measure innovation, the survey asked the producers if they had made innovation. This is a binary measurement. There are six group of innovation in the questionnaire that each type has two to four types of innovation. Totally, there are 15 types of innovation. Table 2

shows distribution of respondents based on their types of innovation. There are 27 innovative producers or 67.5 percent of total respondents. New product, change in product design, change in product components and adoption of quality control are the important types of innovation among the producers.

A summary index of innovation is constructed based on the 15 types on innovation. The innovation index of a producer who answered “yes” for all the sub-types of innovation is 15, meanwhile, the index for producer who answered “no” is zero. To check the reliability of components of the innovation index, this study used Cronbach’s Alpha. The coefficient of Cronbach’s Alpha is .926 and the mean value of this index is 5.73 (Table 3).

Table 3. Descriptive Statistics

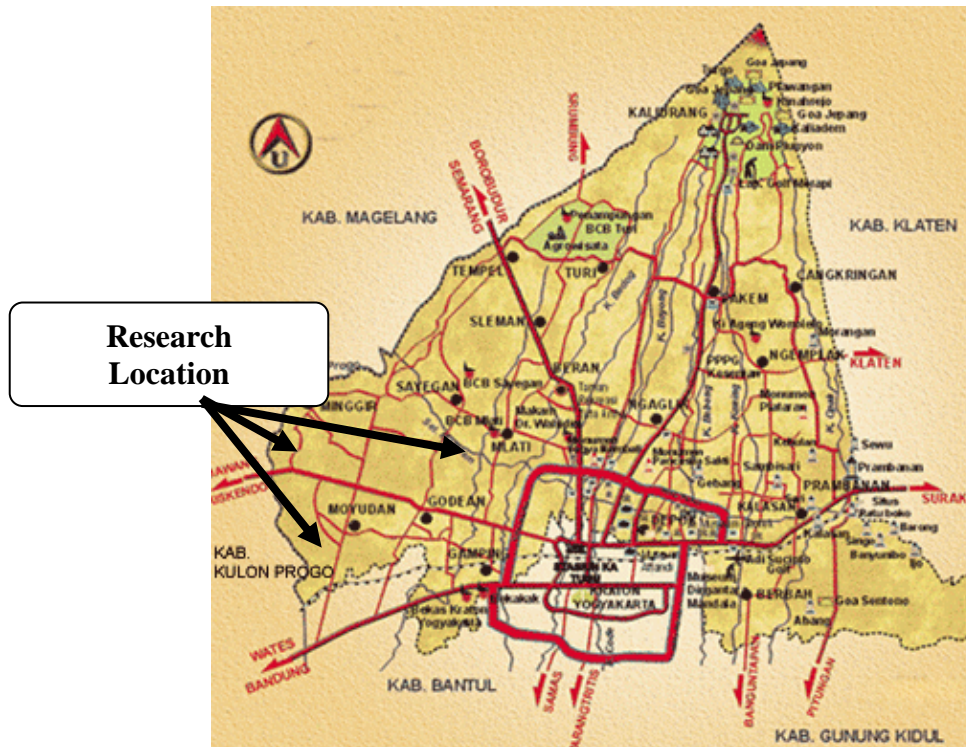
Variable	Description	N	%	Mean	SD
INNOVATION	Number of types of innovation			5.73	4.89
INNOVATIVE	Dummy of innovative producers				
	-innovative producers (=1)	27	67.5		
	-non innovative producers (=0)	13	32.5		
TRUST	Index of trust			4.95	.88
LOCATION	Dummy of location				
	-urban (=1)	14	35.0		
	-rural (=0)	26	65.0		
SEX	Dummy of sex				
	-male (=1)	21	52.5		
	-female (=0)	19	47.5		
EDUCATION	Dummy of education				
	-completed secondary school or higher (=1)	22	55.0		
	-completed primary school or lower (=0)	18	45.0		

Social capital in this paper is measured by an index of trust that constructed as a sum of two items of trust. The first item is related to the family and colleague, and the second one is related to business partner.¹ Producers were asked their trust with their family and colleague (item 1) and with their business partner (item 2). All of the items are rated on a three point

¹ Basically, questionnaire used in this study also provides questions on trust of producers to local association of bamboo handicraft producers and other types of innovation such as rotating saving associations (ROSCAs). However, data collected for these questions are insufficient and incomplete that related to producers’ skeptical on the existence of the associations, especially producers association. Therefore, most of producers are unwilling to join that association. In the case of furniture industries in Jepara, van Geenhuizen & Indarti (2005: 381) also found that only a small part of manufacturers have joined the industry association, since this association is not able to meet the expectations of its members.

scale (1=low, 2=medium, 3=high). The coefficient of Cronbach's Alpha of trust index is .652 (mean value of index = 4.95). This index is used in the estimation as independent variable.

Fig. 1. Research Location



There are other independent variables introduced in the empirical analysis. These variable are dummy variable of sex (male=1; female=0); urban location (urban=1, rural=0), education (secondary school or more=1, otherwise=0). The survey found that more than a half of respondents in this study are male (52.5%). Male producers are expected have better performance in innovation than women producers. Meanwhile, based on their location, there are 14 producers in urban areas and the rests are in rural areas. Respondents from Minggir subdistrict are categorized in rural group, and respondents from Mlati and Moyudan subdistricts are categorized in urban group. Mlati and Moyudan are near the capital city of Sleman district and the City of Yogyakarta then classification as urban areas (Fig.1). Producers located near the centres are expected have better access to information or knowledge that important in innovation activities. There are 22 respondents completed secondary school or higher. Educated producers are expected have better ability to learn and

to seek information for innovation. Descriptive statistics of variables used in the model are presented in Table 3.

INNOVATION AND SOCIAL CAPITAL: EMPIRICAL ANALYSIS

There are two regression models used to analyze the relation between social capital and innovation in empirical analysis. The models are linear regression model and logistic regression model. In each group, there are two alternative models. The first model only estimated the impact of social capital, while in the second one are also included other variables. To ensure that independent variables in the estimations do not have multicollinearity problem, correlation analysis is used. As shown in Table 4, there is no multicollinearity problem in the estimations since the coefficients of correlation among the independent variables are less than 0.8. Multicollinearity is exists when correlation coefficient between independent variable is greater than 0.8 (Gujarati & Porter 2009: 338). Table 5 provides the results of the linear model. Logistic regression results are presented in the Table 6.

Table 4. Correlation Coefficient among Independent Variables (Pearson Correlation)

Variable	TRUST	LOCATION	SEX	EDUCATION
TRUST	1			
LOCATION	.224	1		
SEX	.177	.278	1	
EDUCATION	.122	.453**	.548**	1

** . Correlation is significant at the 0.01 level (2-tailed).

As shown in column A, in Table 4, coefficient of trust is statistically significant with a positive sign. It means that number of types of innovation (or innovation index) increase as the trust index increase. However, the ability of this basic model to explain the amount of variance of innovation index is very low, less than 1 percent. It indicates that there are other variable explain the variance of innovation index. Column B in the table shows the estimation result with three additional variables (location, sex, and education). Introducing these additional variables in the basic model increases the adjusted R^2 . The model can explain 53.4 percent of variance of innovation index.

All of coefficients in this regression result also statistically significant, at least at 10 percent. In other word, innovation index is positively related to trust index, location, sex and education. The positive sign of trust variable means the number of types of innovation will

increase because of an increase in the trust index. The impact of trust on innovation in this model is also consistent with the basic model. It could be interpreted that an increase in a unit of trust index will increase innovation index between 1.106 units (Model B) to 1.955 units (Model A).

Table 5. Linear Regression Results (Dependent variable: INNOVATION)

Variable	A	B
Constant	-3.952 (-.926)	-3.913 (-1.259)
TRUST	1.955** (2.301)	1.106* (1.750)
LOCATION		2.425* (1.917)
SEX		3.590*** (2.814)
EDUCATION		2.600* (1.898)
F-test	5.297	12.192
Adjusted R ²	.099	.534

Note: Figures in the parentheses are t-statistics; *, **, and *** indicate that the coefficients are significant at 10%, 5%, and 1% respectively.

The estimation results also confirms that there is a difference in innovation index between male and female, urban and rural, and educated and less educated producers. Coefficient of sex variable indicate that mean of innovation index of producers in urban areas is higher than producers in rural areas. The mean of innovation index of male producers is also larger than female ones. The mean of innovation index of producers those who completed at least at secondary school are higher than producers are those who only completed primary school or lower. These findings show that producers with better trust, located at urban areas, male and more educated have better performance in innovation in their business activities than others.

The logistic regression results (Table 6) shows determinant variables of the producers are classified as an innovative or not innovative producer. The value of Nagelkerke R² in the column A is very low that is trust variable only explain 2.9 percent of variance of dependent variable. It is also supported by insignificant of Chi-square test. The predictive power of

model A is 67.5 and indicates that the model correctly classified 67.5 percent of the producers into those who are innovative producers and those who are not innovative producers.

Incorporating additional variables in the basic model improve its statistical performance. As shown in column B, the value of Nagelkerke R^2 increase to .467 that is all independent variables in the model explain 46.7 percent of variance of dependent variable. Chi-square test of model B is also significant at 1 percent level. The predictive power of the model also increases when other variables are introduced in the basic model. As shown in column B, the model correctly classified 77.5% of respondents into two classifications of producers, innovative or not innovative. However, based on the Wald statistics, only education variable significantly determines the probability of producers classified as innovative producers. It indicates that the probability of producers classified as innovative producers increases if they have better education. In contrary to linear model in the previous table, variable of trust in the logistic model has no significance impact on the innovative variable.

Table 6. Logistic Regression Results (Dependent variable: INNOVATIVE)

Variable	A	B
Constant	-1.040 (.282)	-2.158 (.716)
TRUST	.361 (.829)	.264 (.273)
LOCATION		1.681 (1.818)
SEX		.969 (1.059)
EDUCATION		1.935* (3.851)
Nagelkerke R^2	.029	.467
Chi-square (df)	.844 (1)	16.296 (4)***
Overall percentage correct	67.5	77.5

Note: Figures in the parentheses are Wald-statistics; *, **, and *** indicate that the coefficients are significant at 10%, 5%, and 1% respectively.

CONCLUSION

The research found that more than half of respondents are innovative producers. The important types of innovation for producers are new product, change in product design, change in product components and adoption of quality control. In this research, innovation

index is a sum value of 15 types of innovation. Social capital is measured by trust index that constructed based on two items. Estimation of linear model found the positive impact of trust on the innovation. Other additional variables, which are dummy of location, sex, and education introduced in the model also, have significance impact on the innovation index. These findings support the positive role of social capital on the innovation of producers of bamboo handicraft. However, using same independent variables in the logistic regression, this study found that only education that significantly explain the probability of producers classified as innovative or not innovative producers.

There are limitations of this study. First, the limited numbers of sample of this study that only from a district. Expanding the research location in the province perhaps will give a sufficient data for empirical analysis. Second, as indicated by the determination coefficients obtained in this study; other interesting variables that probably affect the innovation do not included in the analysis, both in linear and logistic model. Third, social capital have many facet, however this study only used trust as a single indicator of social capital. Perhaps, further research may concern with these limitations.***

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