

Human Capital and Best Practice Management Adoption of among Small Scale Maize Farmer in Bantaeng District, Indonesia

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Abstract

In Indonesia, maize is the second most important crop after rice and most of the maize production came from small scale farmer. Integrated Maize Crop Management (IMCM) is one of the approaches that recommended by our government to improve best practise management of maize production at the small scale farmer. This research's aim addressed to examine relationship between human capital i.e. the specific human capital and entrepreneurial behavior and their effect on IMCM does at the small scale farmers in Bantaeng District, one of the centre's maize production development areas in South Sulawesi, Indonesia, provence. Respondent sample as much 183 small scale farmers were ramdomly selected. For testing hypotesis, the data was analyzed using path analysis of This research result showed that human capital specific has significantly and positive effect on IMCM does at the small scale farmers, either directly or indirectly. The contribution of indirect effect (through entrepreneurial behavior) is greater than its direct effect. This study provides new evidence on the relationship between human capital specific and entrepeneurial behavior that play a critical role in influencing the small scale farmer's decision to adopt any component of a technology package completely. For practically, this research provide a source of important information for the effort to improve maize crop production and wealth of the small scale maize farmers.

Keywords: Human capital specific, entrepreneurial behavior, integrated maize crop management, adoption, small scale farmer

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Introduction

In Indonesia, maize is the second most important crop after rice (Kuti,2002) Total maize production in Indonesia has grown at 4.07% per annum and most of the production comes from small-scale farmers (Pakpahan, 2011). To increase the productivity and efficiency of maize cropping in Indonesia, the government through the Ministry of Agriculture has recommended the application of the Integrated Maize Crop Management (ICM). ICM is one of the approaches to improve the management practise of maize production at small scale farmers via implementing the 5 crop component technologies that provide synergistic effects, are: (1) Sukmaraga varieties, (2) ATB1-4R Balitsereal Cropping Tool, Manure usage (3), (4) Dosage of fertilization: 300 Urea + 200 + 100 SP36 and KCI (5) Fertilization frequency 3 times. This application of the IMCM at the level of farmers has been shown to increase the productivity and efficiency of farming the corn which further gives effect to increase farmers ' income and welfare (Saenong et al., 2002; Wahid et al., 2001). Hence, the Approach the IMCM has been recommended and deploying their applications on corn farmers since several years ago especially in areas central to the development of the maize production. Unfortunately, the results of the application evaluation of the fifth component of the IMCM at the farmers, apparently the only component (1) and (2) that they have already applied, component (3) are being still in try, and component (4) and (5) are still not yet known by the farmers. Further, farmers who have implemented components (1) and (2), as much 40,75% been used, 29% use newly, and 30.25% interest/have not try (Margaretha and Syuryawati, 2010). Therefore, questions may be asked about why any compenen of the IMCM incompletely adopted by among farmers?

Much empirical research has been carried out on maize farmer's technology does and several technologies have been investigated, and also various factors affecting the technology does have also been analysed (Kafler, 2010). In the Indonesian context, study to identify factors influenced of technology does at among small scale maize farmers, such as socioeconomic (Gultom, 2009), extention workers performance, access to financial capital and information (Pou et al, 2006), the availability of facilities and infrastructure, access to market (Falo et al., 2011), and social capital (Mink et al., 2009) and many other factors.

However, the previous studies cannot explain the impact of entrepreneurial capital aspect related to incomplete does of any components of a technology package.

Moreover, Bergevoet (2005) and Pichardo et al. (2012) pointed out that entrepreneurship has been the topic of research in a variety of other academic fields, but the role of entrepreneurship competence in agricultural economics, mainly in technology does by farmers have received a lot of attention from researche

Theoretical Framework

Agricultural Technology Adoption

The literature on agricultural technology does mentioned that innovation does states that farmers go through five stages: awareness; interest; evaluation; trial; does (Rogers, 2003). The most often cited factors that have been used to explain the variability seen in agricultural technology does and its patterns of diffusion, are those described by Rogers (2003) that does Rate of determinant factors of innovation (CA) are attributes of innovation: relative advantage, compatibility, complexity, trial ability, observability innovation decision: optional, collective, authority communication channels: mass media or interpersonal, social system: norms, the degree of network connection and extents of change agents promotion efforts. Pannell et al. (2006) was viewed through a broad cross-disciplinary lens, there is agreement that the does of agricultural technology depends on a range of personal, social, cultural and economic factors, as well as on the characteristics of the innovation itself. Abdullah and Shamah (2013) are studied to explains the factors affecting technology usage in Malaysian farmers, concluded that farmers ' perceptions and levels of education, as well as extension-workers ' knowledge, the management of the extension of the program, and the physical conditions of the area, are all factors that affect technology does among farmers. Comprehensive review of empirical research on the predictors of does of agricultural best management practices, Prokopy et al (2008) concluded that educational level, capital, income, farm size, access to information, positive environmental attitude, environmental awareness, and utilization of social network are associated positively with the does.

The Role of Human Capital to Inovation

The concept of human capital refers to the knowledge, abilities and skills of the individuals that can be used in the activities that stimulate the innovation process (Schuller, 2001) and it is a factor that complements innovation and is needed for both the does of existing innovations and the production of new ones (Tugores, 2006). Accordingly, human capital theory that there are two types of human capital: general human and specific human capital.

General human capital relates to factors expected to increase the productivity and individual's they which applicable to a specific domains years of schooling and years of work experience; and specific human capital as industry specific experience, self employment experience, and leadership experience (Wallace, 2010; and Dae-Bong., 2009).

Sriyani (2010) human capital categorized into three aspects: (1) Firm-specific human capital; (2) industry-specific human capital; and (3) individual-specific human capital refers to knowledge that is applicable to a broad range of firms and industries; it includes general production management and entrepreneurial experiences, the level of academic education and vocational training and the individuals age. Popescu and Diaconu (2008) described three types of human capital. The first type-specific human capital refers to skills and knowledge that are valuable only within a certain firm. They are directly correlated with tradition, culture and its practice and they can be applied only within that company. Although they can represent a competitive advantage for the firm that have them, due to the fact that they cannot be transferred to other companies, the limited interaction and communication capacity attached to those abilities makes this type of human capital only have a limited impact on the innovative activity from a region or society.

The second type-industry-specific human capital regards the knowledge resulted from experience specific to an industry. Further researches demonstrated that this type of human capital may play an important role in the generation of innovative activities only if it takes place with the knowledge, personnel exchange and technology within that industry. So, creating innovations can take place when new products or ideas result from the combination of communication among the industry's partners, on the one hand, and of the knowledge present in existing technologies, on the other hand.

The third type of individual-specific human capital – refers to knowledge that can be used for a large range of firms and industries. This can include production management and entrepreneurial experience, a certain level of education and vocational training and the total households. Nelson (2005) has emphasized these into two schools of thought: accumulation and assimilation theories theories. The first envisage a direct effect of human capital on labour productivity as an explicit factor of production embodied in effective labor. This approach leads to the prediction that it is new investment in human capital that matters for economic growth.

The study of the effects of human capital specific on does of innovation and technology in agriculture. D'Souza et al. (1993) examined individual factors influence the does of sustainable agricultural practices, found that human capital characteristics such as a producer's age and experiences were found to be significant determinants of the decision does. Zepeda (1994) investigate the relationship between agricultural investment and productivity in developing countries, and that human capital specific conclude has directly effect on agricultural productivity by affecting the way in which inputs are used and combined by farmers. Specific Human capital has also affects on the farmer's ability to adapt technology to a particular situation or to changing needs.

The Role of Entrepreneurship to Innovation

The role of entrepreneurship to innovation has long been accepted by experts. For Joseph Schumpeter, who formed the concept of entrepreneurship and analyzed its impact on economic development Entrepreneurship does not only lead to an increased national income by creating new jobs, but it also acts as a positive force in economic growth by serving as a bridge between innovation and the marketplace. Therefore, the entrepreneur thus serves as the major link in the process of innovation development, economic growth and revitalization (Hatak,2011). According drucker (1985), innovation is the specific instrument of entrepreneurship. It is the act that endows resources with a new capacity to create wealth. Whatever changes the wealth-producing potential of already existing resources constitutes innovation, Innovation does not have to be technical, it is also an economic or social term, Innovation can be defined as changing the yield of resources, or defined in demand terms rather than in supply terms, that is as changing the value and satisfaction obtained from resources by the consumer.

Suryana (2003) argue that entrepreneurship begins with the process of imitation and duplication, and then evolved into the development process, and ends at the process of creating something new and different (innovation). Baldacchino (2009) states that entrepreneurship is the ability to be creative and innovative base, tips, and resources to explore the opportunities for success.

The essence of entrepreneurship is the ability to create something new and different through creative thinking and innovative acts to create opportunitie, and creativity is the ability to develop new ideas and new ways in problem solving and finding opportunities.

The point of creativity is thinking of something new and different, while innovation is the ability to apply creativity and problem solving in order to find opportunities. The essence of innovation is the ability to do something new and different. Larsen and Lewis (2007) argued that one of the pivotal characters of the entrepreneur is the ability to innovate. In the absence of innovation the company won't be able to last a long time. This is due to the needs, desires, and customer demand changes-Fox. Customers will not always consume the same products. Customers will be looking for other products from other companies that can satisfy their needs perceived. For that is the necessary innovations continuously if the company will take further and continued to stand by his efforts. Innovation is something that pertains to the goods, services or ideas perceived as new by an individual. Although the idea has long existed but this can be said to be an innovation for people who are new to see or feel it

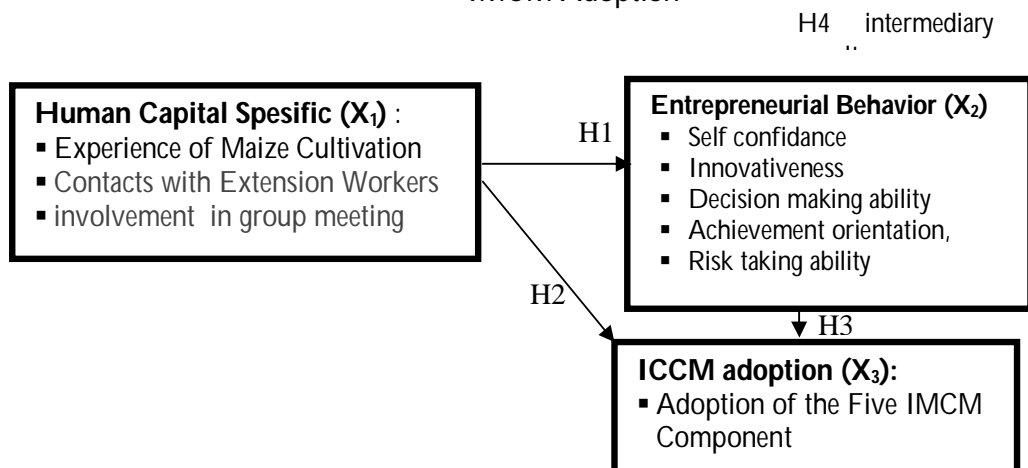
The study the effects of entrepreneurship on adoption of innovation and technology in agriculture, Kumar and Narayanaswamy (2000) studied to know the socio-economic characteristics and entrepreneurial behavior of farmers who adopted sustainable agriculture in India, and they reported that farmers who adopted sustainable agriculture had high extension participation with high entrepreneurial behavior index was differed significantly from medium and low extension participation groups. Balasaravanan and Vijayadurai (2012) studied to determines the level of entrepreneurial behavior among the farmers in India, and found that the level of entrepreneurial behavior of the small farmers are lower than big farmers

Figure 1 provide the conceptual framework used in this study. The conceptual framework based on literature review which proposes that the specific human capital will have an effect on components of the IMCM does, both directly and also indirectly through entrepreneurial behavior.

Human capital is conceptualized as the specific skills and knowledge at t are valuable only within a maize farming. such experience of maize cultivation, contacts with extension workers, involvement in group meeting. Entrepreneurial behavior is conceptualized as self confidence, innovativeness, decision making ability, achievement orientation.

Does of the IMCM is conceptualized does of the five u.s. IMCM components From the Figure 1, we propose four hypotesis as follow:

Figure 1. Conceptual Model linking Human Capital, Entrepreneurial Behavior, and IMCM Adoption



Hypothesis 1 : Human capital specific has a significant positive effect on entrepreneurial behavior.

Hypothesis 2 : Human capital specific has a significant positive effect on IMCM adoption.

Hypothesis 3: Entrepreneurial behavior has a significant positive effect on IMCM adoption

Hypothesis 4: Human capital specific have a significant positive effect on IMCM adoption through entrepreneurial behavior

Purpose and Objectives

The purpose of this study is to give significant contributions to the current body of knowledge regarding the best practice management does in farmers, particularly of the human capital development at small scale farmers. Practically, it may also support policy makers and researchers in developing sound policies and technologies respectively for increasing maize production and wealth of small scale maize farmers in Indonesia.

While the objective of this study is to examine relationship between human capital i.e. the specific human capital and entrepreneurial behavior and their effect on IMCM does at the small scale maize farmers in Bantaeng District, Indonesia

Methods

This research was conducted in May-December 2013 in Bantaeng District, which is one of the centers of the development of maize production in South Sulawesi, Indonesia. According to context the formulation of problems and research purposes, then the research method used is quantitative method through field survey. Sample of randomly selected farmers as much as 183 small scale farmers in term of land has an area of 0.5 hectares less corn crop and is a participant of the program activities of the SL-IMCM. Data were collected through interviews are structured with respondent farmers use research instrument in the form of a questionnaire. Before use, the instruments of the research carried out test validity and reliability first. Test results to the overall question of items on the human capital variables (4 items) were declared valid with cronbach alpha value-0,786, overall items questions on entrepreneurial behavior variables (five items) declared valid with alpha-cronbach 0.842, overall variable does questions on items (1 items) were declared valid with a value of alpha – 0,715 cronbach. In this research, human capital specific is conceptualized as described by Popescu and Diaconu (2008), namely the skills and knowledge that are directly correlated with practice and application for maize cultivation. This specific human capital is measured by long years of experience in the maize cultivation, the frequency of contact with extension officers, and active involvement in group meeting. Entrepreneurial behavior is measured as a combination of components viz., self confidence, innovativeness, decision making ability, achievement orientation, risk taking ability using a 5-point Likert type scale with the anchors 1 = ' not agree ' and 5 = ' highly agree '.

IMCM does is measured by the number of components IMCM has been adopted by farmer during they were participant of SL-IMCM. Data analysis was done with path analysis with SPSS program 6. Before the data is analyzed, the data are ordinal measurement scale was transformed into a scale interval of the data through the method of the successive interval (Al Rashid, 1993). In this study also used two testing the assumption that the classical assumptions of test and goodness of fit model test

Findings/Results

Path analysis was the development of multiple regression. Hence, the classical test of model assumption should be self-employed. Based on a classic assumption test using SPSS program version 18.0, obtained results that all normal distributed data with data that is spread around the diagonal lines on the "P-Normal Plot of Component Regression Residual"; the human capital variables and entrepreneurial behavior showed no symptoms of the relevant value of the VIF is less than 10 and greater tolerance of 0.10, homoskedastis does not occur or is not the absence of a specific pattern on a scatter plot of the bound variable; and there is no autocorrelation in regression models with a value of 2,159 DW located between the upper limit of (du) and $(4-du)$, $du = 1,688$. The precision of the sample regression functions in estimating the actual value can be measured from its goodness of fit. Measurement results of goodness of fit with R-squared (R^2). R^2 of the regression equation in the path model is 0,708. which means that the ability of the specific human capital and entrepreneurial behavior variables to explain variations in the IMCM does variables is 70,8% while the rest is 29.2% is explained by the unspecific variable. Next, the goodness of fit is tested via the F statistics as provided on table 1.

Tabel 1. ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	414,288	1	414,288	147,649	,000 ^a
Residual	227,278	81	2,806		
Total	641,566	82			

a. Predictors: (Constant), X1, X2

b. Dependent Variable: X3

Table 1 shows that the F-ratio of 147.649 is significant, even at the 0.005 margin of error, implying that independent variables (X_1 and X_2) are a good fit of dependent variable (X_3) in path model. The path's coefficients in the path model were estimated as shown on Figure 2.

Figure 2. The Structural Diagram in Path Model

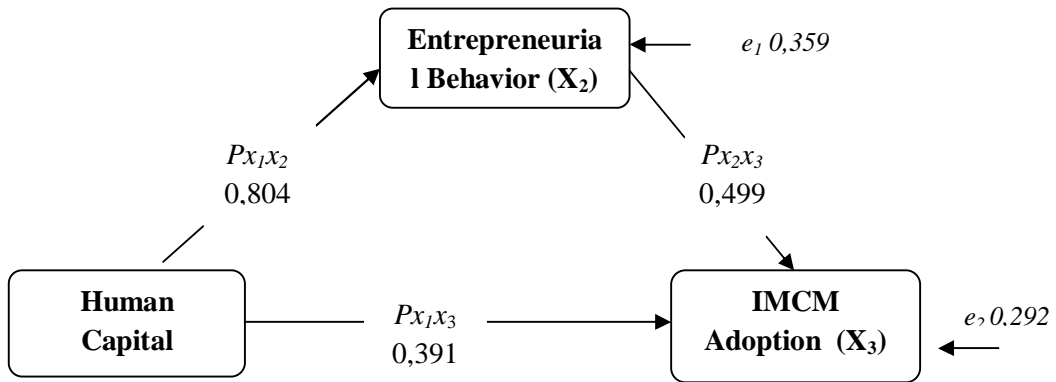


Figure 2 shows the all of the path coefficients (the component regression coefficient) in path models are a positive sign with arrow direction of human capital specific to IMCM does, both directly and indirectly trough entrepreneurial behavior

Hypothesis Testing to examine the independent effect of human capital specific variables (X 1) and entrepreneurial behavior (X 2) on the dependent variable of IMCM does partially used the t-test (Table 2). Table 2 shows the path coefficients indicating the significance of variables relating to specific human capital, entrepreneurial behavior, and IMCM does that can be described as follows:

Table 2. t Scores For Testing Hypotesis in Path Model

Structure Relation	Path coefficient	Direct Effect	t Scores	t Table
X ₁ to X ₂	0,804	0,646	12,151*	2,00
X ₁ to X ₃	0,391	0,153	3,894*	2,00
X ₂ to X ₃	0,499	0,249	4,974*	2,00

Effect Human Capital Specific on Entrepreneurial Behavior

. The effect human capital specific (X 1) on entrepreneurial behavior (X 2) (Hypotheses 1), show that the t score value is greater than t-table value (12,151 > 2.00) and its probability or p value is less than 0.05 (p < 0.05). These findings make it clear that the specific human capital has significant and positive effect on entrepreneurial behavior with the contribution of its direct effect is 80,4%.

This suggest that increase human capital is associated with the specific increase entrepreneurial behavior of the small scale farmer. This result supported by opinion of Williams (2004) that individuals with higher stocks of human capital and various skills are better able to make use of their resources in entrepreneurship than in a salaried job. Venkataraman (1997) and Teece (2011) also agrees that there are strong links between entrepreneurship and human capital specific because the entrepreneurial ability to connect knowledge and opportunities requires a very specific set of skills and insight

Individuals with high actual human capital are more likely to pursue entrepreneurial activities. This result also support previous studies which indicates individuals with high human capital are more likely to pursue entrepreneurial activities compared to individuals with low human capital (Bayan, 2010) Therefore, hypothesis **H1** is accepted.

Effect Human Capital Specific on IMCM Adoption

The effect human capital specific (X_1) on IMCM adoption (X_3) (Hypotheses 2), show that t-score value is greater than t-table value ($3,894 > 2,00$) and its probability or p value is less than 0,05 ($p < 0,05$). This result suggest that human capital specific has significant and positive effect on adoption of IMCM, with contribution of its direct effect is 15,3%. This suggest that increase human capital specific of the small scale farmers is associated with increase many components of IMCM that they were adopted. This founding supported by Parvan (2012) in his reviewed literature agricultural adoption technology which he concluded that human capital specific variables are comprised of experience, and contact with the technology or with extension worker positively correlated with innovators or early adopters farmer. Therefore, hypothesis **H2** is accepted

Effect of Entrepreneurial Behavior on IMCM Adoption

The effect of entrepreneurial behavior (X_2) on IMCM adoption (X_3) (Hypotheses 3), show that t -score value is greater than t-table value ($4,974 > 2,00$) and its probability or p value is less than 0,05 ($p < 0,05$). These findings make it clear that the behavior of entrepreneurial behavior has significant and positive effect on the IMCM adoption with contribution of its direct effect is 24.90%.

This suggest that increase enrepreneurial behavior of the farmers is associated with increasing amout of the IMCM components that they were adopted. These findings support previous research results by Narayanaswamy and Kumar (2000) who found that there was close association between entrepreneurial behavior and adoption of sustainable agriculture practices by farmers. Therefore, hypothesis **H3** is accepted

Effect of Human Capital on IMCM Adoption Trough Entrepreneurial Behavior

The effect of human capital specific (X_1) on IMCM adoption (X_3), showed that human capital specific affect directly and also indirectly via behavior does IMCM against entrepreneurship (Hypotheses 4). Calculation results of the magnitude of the contribution effect directly and indirectly of the human capital specific on the IMCM does can be seen in Table 3

Table 3. Directly and Undirectly Contribution Effect of Human Capital Specific on IMCM Adoption

Structure Relation	Contribution Effect (%)		
	Direct	Undirect	Total
X_1 to X_3 trough X_2	15,3	41, 0	56,3
X_1 to X_3	24,9	-	-

Table 3 shows that indirect effects of human capital specific (X_1) to the IMCM does (X_3) trough entrepreneurial behavior (x_2) is greater than its direct effect (56,3% > 24.9%). These results give an indication that the specific human capital and entrepreneurial behavior factors together are to increase the number of the IMCM components were adopted by small scale farmers.

This finding is supported by the results of previous research by Kumar and Naravanaswamy (2000) the who reported that The entrepreneurial behavior of farmers who adopted the sustainable agriculture differ significantly in different age groups, but farmers with longer experiences in sustainable agriculture had high entrepreneurial behavior compare to index shorter experience groups and big farmers had high entrepreneurial behavior compare to small farmers.

Further, farmers who had high organisational participation partnerships were also high in their entrepreneurial behavior compared to medium and low groups and farmers with high extension, and farmers who adopted the sustainable agriculture had high participation partnerships extension with high entrepreneurial behavior index was significantly differed from the medium and low participation partnerships extension groups. Therefore, hypothesis H4 is accepted

Conclusion

The key findings from this study are: firstly, the specific human capital has significantly and positive effect on entrepreneurial behavior with its contribution of direct effect is 64.6%. Second, the human capital specific has significantly and positive effect on the IMCM does with the contribution of its direct effect is 15.3%. Three, entrepreneurial behavior has significantly and positive effect on the IMCM does with the contribution of its direct effect is 24.9%. Fourth, human capital specific has indirect effect to the IMCM does through entrepreneurial with a total contribution of indirect effect (56,3%) is greater than its contribution of direct effect (24.9%).

Recommendations/Implications

Limitation of this research is that our generalization ability is limited by the sample size and location. However, we believe that the findings reported here should be replicated to other province in Indonesia (and might be to other developing countries), because of the underlying level of specific human capital and entrepreneurship behavior of the small scale maize farmer should be similar across province in indonesia and across developing countries. Another limitation, this our research cannot detail to identify effects each dimension of human capital specific and entrepreneurial behavior on the IMCM does.

Therefore, the future researchers should also use this model to empirically find out the strength of the interrelationships among the dimensions of each of the variables in the proposed conceptual model. For small scale maize farmers, so they suggested we should obtain specific human capital and increase entrepreneurial behavior that are associated with their maize farming activity, and have a willingness to learn more IMCM. Furthermore, extension workers should update their knowledge on entrepreneurship that will be trained to the farmers.

They should also arrange suitable specific human capital and entrepreneurial behavior of the farmers, and practice technology does together.

References

- Abdullah, F.A. and Samah,B.A., 2013. Factors Impinging Farmers' Use of Agriculture Technology,
URL : <http://www.ccsenet.org/journal/index.php/ass/article/viewFile/25282/15722>
- Al Rashid, H., 1993. The Technique of the Sampling and the Preparation of the Scale. Post Graduate Program, University of Padjadjaran Bandung.
- Bergevoet, R.H.M. 2005. Entrepreneurship of Dutch dairy farmers. PhD thesis, Wageningen University, Dept. of Farm Management, Wageningen, The Netherland. . URL : edepot.wur.nl/19289
- Baldacchino. 2008. Entrepreneurial Creativity and Innovation, The First International Conference on Strategic Innovation and Future Creation, University of Malta, Malta.
- Balasaravanan,K and Vijayadurai,J.,2012. Entrepreneurial behavior among farmers – An empirical study, *International Journal of Social and Economic Research*, 2 (1) : 312-321.
- Bayan, M.C., 2010. Human capital and entrepreneurial activities: Examining the role of perceived human capital in entrepreneurial decision making, Doctor Thesis,Universitat Autònoma Barcelona, Spain September, 2010.
- Bulu,Y.G, Hariadi, S.S, Herianto, A.S dan Mudiyono, 2009. Influence of social capital and exposure of innovation information toward rate of adoption of maize innovation in East Lombok Regency West Nusa Tenggara Province, *Jurnal Agro Ekonomi*, 27 (1) : 1 – 21.
- Cohen, J., 1977. *Statistical power analysis for the behavioral sciences*. New York: Academic Press.
- Dae-Bong, K., 2009. Human Capital and Its Measurement, The 3rd OECD World Forum on Statistics, Knowledge and Policy, Charting Progress, Building Visions, Improving Life Busan, Korea 27-30 Oct. 2009, URL : www.oecd.org/.
- Dharmaputra, O.S., 2002. Review on Aflatoxin in Indonesian Food and Feedstuffs and Their Products, *Biotropia*, No. 19 : 26 - 46
- Drucker, P. F. 1986. *Innovation and entrepreneurship*. New York: Harper Collins.
- D'Souza G, Cyphers D, Phipps T. 1993. Factors affecting the adoption of Sustainable agriculture practices. *Journal of Agriculture and Resource Economics Review*, 22(2): 159-165.
- Falo, M., Amiruddin, S., and Lumintang, R.E.W., 2011. Hybrid corn technology adoption by farmers in dry land of North Central Timor Regency Of East Nusa Tenggara Province, Bogor Agricultural University,
URL : <http://repository.ipb.ac.id/handle/123456789/57522>
- Gultom,L., 2009. The Farmer adoption of maize cultivation technology and The factors that affected It In The district of Langkat (Case Study: North Namu Ukur Village, Sei Binge, Langkat Regency), Thesis, North Sumatra University.

- Hatak, I., 2011. Innovation in entrepreneurship education in Europe: An Analysis of new initiatives, implementation processes and associated success factors, in: RICC - research report 2011/3, hrsg. v. RöBl Dietmar. Wien: RICC - Research Institute for Co-operation and Co-operatives.
URL : www.wu.ac.at/ricc/en/forschung/researchreports/researchreport2011_
- Kumar, N.N and Narayanaswamy, B.K., 2000. Entrepreneurial behavior and socio-economic characteristics of farmers who adopted sustainable agriculture in India, Karnataka J. Agric. Sc., 13(1):83-90.
- Larsen, P. and Lewis, A., 2007. How Award Winning SMEs Manage The Barriers to Innovation, Journal Creativity and Innovation Management, page: 141-151.
- Margaretha, S.L. and Syuryawati, 2010. Evaluation of application of maize production technology through Integrated Crop Management Approach, Proceedings of the National Cereals Week 2010
URL : balitsereal.litbang.deptan.go.id/ind/images/.../p64.pdf
- Nelson, R., 2005. Technology, institutions and economic growth, Cambridge, Mass.: Harvard University Press.
- Pakpahan, A. 2011. Increasing the scale of small-farm operations III. Indonesia, Paper, Center for Agro-Socioeconomic Research, Agency for Agricultural Research and Development, Bogor, Indonesia
- Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R., 2006. Understanding and promoting adoption of conservation practices by rural landholders. Australian Journal of Experimental Agriculture 46(11): 1407-1424.
- Parvan, A., 2011. Agricultural technology adoption: Issues for consideration when scaling-up, blogs.maizeell.edu/.../agricultural-technology-adoption-issues-for-consider, July 1, 2011.
- Pichardo, R.N., González, C.C., Hernández, P.L. and McElwee, G., 2012. From farmers to entrepreneurs: The importance of associative behavior. The Journal of Entrepreneurship 21(1) : 91–116
- Popescu, C. and Diaconu, L., 2008. Human capital and innovation.
URL : papers.ssrn.com/sol3/papers.cfm?abstract_id=1099025.
- Pou1, E., Gusasi, A and Wahab, A., 2006. Levels of innovation adopt of the farmer to culture technology of sweet maize (*Zea mays saccharata* Sturt) in Borongloe village, district of Bontomarannu, Gowa regency Agrisistem Journal, December 2006, 2 (2) : 85-92.
- Prokopy, L. S., Floress, K., Klotthor-Weinkauf, D. and Baumgart-Getz, A., 2008. Determinants of agricultural best management practice adoption: evidence from the literature, Journal of Soil and Water Conservation 63 (5):300–311.
- Rauch, A., Frese, M. and Utsch, A., 2005. Effects of human capital and long-term human resources development on employment growth of small-scale businesses: A causal analysis. Entrepreneurship Theory and Practice, 29: 681-698
- Rogers, E. M., 1995. Diffusion of innovations (four Editions), The Free Press. New York.
- Saenong S and Subandi., 2002. The concept of the IMCM maize crops. Papers presented at technical and management coaching IMCM Crops at Balitkabi. Malang 21 – 22 Desember 2002.
- Schuller, T., 2001. The Complementary rules of human and social capital. Canadiran Journal of Policy Research, 22(I) (March 2001).

- Schumpeter, J. A., 2003/1928. Entrepreneur. In R. Koppl (Ed.), *Austrian economics and entrepreneurial studies (Advances in Austrian Economics, 6: 235-265, Emerald Group Publishing Limited. (English translation of 1928 handbook entry *Unternehmer*)*
- Shane, S., and Venkataraman, S., 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review*, 26(1): 217-226.
- Sriyani, G.T.W., 2010. Human capital and its impact on small firm success, *Proceedings of the Seventh Academic Sessions, University of Ruhuna, Sri Lanka*
- Sunding, D., and Zilberman, D., 2001. The agricultural innovation process: Research and technology adoption in a changing agricultural sector, *Handbook of agricultural economics, B. L. Gardner and G. C. Rausser, eds., Elsevier, Amsterdam, 207-261.*
- Suryana. 2003. *Kewirausahaan, Pedoman Praktis, Kiat dan Proses Menuju Sukses, Edisi Revisi, Jakarta: Salemba Empat*
- Teece, D.J., 2011. Human capital, capabilities, and the firm: literati, numerati, and entrepreneurs in the twenty-first century enterprise, in Burton-Jones, A. and Spender, J-C (eds) *The Oxford Handbook of Human Capital, OUP, Oxford.*
- Tugores, M., 2006. Human capital and innovation as determinant factors of competitiveness: an application to the Balearic hotel industry
URL : www.uib.es/depart/deaweb/webpersonal/mtugores/.../book-MTugores.pdf
- Wahid. A. S., Zainuddin, and Sania Saenong., 2002. Analisis fertilizing NPK rainbow on farming crops corns in Gowa Regency. South Sulawesi on MK. I. 2002. Case study Pa'bundukang Village Gowa Regency, South Sulawesi. In *corporated BPTP South Sulawesi with PT. Panen Mas Agromandiri and PT. Pupuk Kaltim.*
- Wallace, R., 2010 *Human Capital in the City: Exploring the Relationship Between Skill and Productivity in US Metropolitan Areas, Masters Theses, University of Massachusetts – Amherst, URL : <http://scholarworks.umass.edu/theses/504>*
- Williams, C.C., 2004. *Cash-in-Hand Work: The underground sector and the hidden economy of favours. Basingstoke: Palgrave Macmillan.*
- Zepeda, L., 1994. Simultaneity of technology adoption and productivity, *Journal of Agricultural and Resource Economics*, 19(1): 46-57.