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## **The impact of entrepreneurial orientation on innovation adoption and innovation generation, and ultimately performance of vegetable farmers in West Java, Indonesia**

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### **Abstract**

In emerging high value markets, farmers are challenged by growth options. They can benefit from the growth options depending on their entrepreneurial orientation and how they engage in product quality improvement through adopting and generating innovations. Our study investigates the combined effects of entrepreneurial orientation and innovation adoption and generation on farm performance. Using Structural Equation Modeling we tested the relationships among 282 vegetable farmers in West Java, Indonesia. The findings show that entrepreneurial orientation positively affects innovation inputs, innovation adoption and innovation generation, and innovation adoption has a positive effect on performance. We conclude with recommendations for farmers and policy makers to emphasize innovation adoption to promote farm performance.

**Keywords:** perceived performance, farmer, Indonesia

### **Introduction**

Emerging high-added value markets such as supermarkets and export markets attract farmers to participate in these markets. The demand for agricultural products of these markets increases over time. Participating in these markets offer higher price than only participate in local-traditional markets, but these high-added value markets require the suppliers to provide high-standard products. This situation stimulate farmers to be more entrepreneurial and motivating them to improve the product quality through implementing innovations that can be adopted from external sources or generated internally in the firm. Dynamics in the value chain requires farmers to be able to build skills in strategy, marketing, and entrepreneurship, including entrepreneurial orientation (McElwee et al., 2006).

Our study aims to understand how farm firms in West Java can benefit from the opportunities that emerging value markets provide. We investigate the role of the entrepreneurial orientation of the farmers on developing and adopting innovations and eventual their farm performance. A study by Lumpkin and Dess (1996) proposes possible contingency models for relationship between entrepreneurial orientation and performance. These contingency models consist of moderating effect, mediating effect, independent effect, and interaction model. We continue this line of reasoning and we investigate the mediating role of innovation adoption and generation on the relationship between entrepreneurial orientation and performance (Lumpkin and Dess, 1996). Our study focuses on relationship between entrepreneurial orientation and performance of farm firms by elaborating firm resources that can be determined by innovation inputs as antecedent of innovation adoption and innovation generation. This paper explores two research objectives. First, we aim to investigate the impact of entrepreneurial orientation to innovation inputs, innovation adoption, and innovation generation. Second, our study aims to measure the impact of innovation adoption and innovation generation on farm performance.

Our study contributes to entrepreneurship and innovation research in two respects. First, many studies on entrepreneurial orientation draw their data from large companies or small firms in the context of developed countries. We extend these studies by investigating how the relationships between entrepreneurial orientation, innovation and firm performance are in the context of a developing country as well as for small manager-owned farm firm. Second, unlike many studies that focus on the importance of innovation adoption to farm performance, our study integrates innovation generation as well as innovation adoption that still has little attention in literature.

The article has the following structure. Next section presents theoretical background on entrepreneurial orientation, innovation adoption, innovation generation, and performance. Afterwards, we provide description on research method followed by our empirical findings. Finally, we discuss and conclude the results.

## **Theoretical background**

### **Entrepreneurial orientation**

Entrepreneurship focuses on exploring and exploiting opportunities by constructing current and new resources to create values (Zahra, 2005). Study on entrepreneurship has developed widely in many different levels, from individuals, groups, to firms. Entrepreneurial orientation concept is derived from the concept of corporate entrepreneurship that places firm as the unit of analysis instead of individual (Lumpkin and Dess, 1996, Miller, 1983).

An entrepreneurial orientation is described as a firm who involves in innovation, engages in risky projects, and to be pioneer towards competitors in the market (Miller, 1983). This definition is as the basis for other studies to define dimensions of entrepreneurial orientation, i.e. innovativeness, risk taking, and proactiveness (Covin

and Slevin, 1990). Another study adds the dimensions of entrepreneurial orientation with autonomy and competitive aggressiveness (Lumpkin and Dess, 1996). Our study focuses on dimensions of innovativeness, proactiveness, and risk taking that relevant for farm firms context who show as simple firms.

Our study builds upon the concept of entrepreneurial orientation with three dimensions developed by Miller (1983). The first dimension is innovativeness that refers to involvement in introducing new products, services, or processes. The second dimension is proactiveness that involves opportunity-seizing by anticipating future needs, and being the first toward competitors by introducing new products, services, or processes. The third dimension is risk taking that show willingness to involve in uncertain projects, taking debts for uncertain new activities, and willing to allocate resources for new ventures in uncertain environment (Covin and Slevin, 1990, Lumpkin and Dess, 1996, Miller, 1983).

#### **Innovation adoption and generation**

Based on the source of innovation, we distinguish two types of innovation, i.e. innovation adoption and innovation generation. Innovation adoption refers to new ideas that perceived as new for the adopter in which the innovation is developed outside the firm. The firm who shows high degree of innovation adoption will acquire the innovation earlier than other members in the same group (Rogers, 1995). Innovation generation refers to products, processes, or technologies that are developed internally by the firm (Pérez-Luño et al., 2011).

Innovation can be categorized based on its forms that are product innovation and process innovation. Product innovation refers to new tangible products that give more benefits to users. Process innovation refers to new methods or systems that can enhance the efficiency of production, and help to reduce costs (Smith, 2010). In farm sector, farm firms usually adopt new product innovation such as new cultivars or new nontraditional crops developed by private companies or public research institutes. For some extent, farm firms can generate their own innovations such as new farm techniques to solve their current problems. Our study focuses on product and process innovations adopted or generated by the farmers.

In adopting and generating innovation, firms will allocate resources as innovation inputs including investment in farm equipment (Diederer et al., 2003). Therefore, we place innovation inputs as antecedent of conducting innovation adoption or innovation generation. We expect that higher entrepreneurial orientation will lead farmers to allocate more on innovation inputs.

H1: The higher the entrepreneurial orientation of the farmers, the higher the allocation of innovation inputs.

Literature finds that a firm with high entrepreneurial orientation will highly adopt new product innovation (Avlonitis and Salavou, 2007). Another study shows that entrepreneurial orientation also supports innovation generation (Pérez-Luño et al., 2011). Innovation inputs facilitate the relationship between entrepreneurial orientation and innovation adoption as well as innovation generation. We expect that innovation inputs positively influence both innovation adoption and innovation generation.

H2a: The higher the innovation inputs that farmers allocate, the higher the innovation adoption.

H2b: The higher the innovation inputs that farmers allocate, the higher the innovation generation.

### **Firm performance**

Firm performance can be reflected by perceived performance that refers to firms' performance relatively to their main competitors. Previous study shows that innovation supports indirect influence between entrepreneurial orientation and performance (Baker and Sinkula, 2009). In relation to performance, literature presents that innovation adoption as well as innovation generation provide positive effect to firm performance. The more the firms innovate in product or process innovations, the higher the firm performance relative to their main competitors. Therefore, we expect that within farm firms, innovation adoption and innovation generation give positive influence to perceived performance of the farmers.

H3a: Innovation adoption positively influences farmers' perceived performance.

H3b: Innovation generation positively influences farmers' perceived performance.

### **Method**

#### **Sample and unit of analysis**

To learn entrepreneurial orientation, innovation adoption, and innovation generation, we chose vegetable farmers in West Java because the farmers have integrated to high value markets and have applied certain innovations who are relatively faster than other-crops farmers. We conducted a survey over the period of January –August 2012 in five regions in West Java. The regions are Pangalengan, Cisarua, Warung Kondang, Cipanas, and Bogor, as the centers of vegetable production in West Java. A total of 282 vegetable farm firms were interviewed by using a semi-structured questionnaire with face to face interviews.

The concept of entrepreneurial orientation addresses at the firm level that is consistent with classical economics regarded an individual entrepreneur as a firm. Small firm is an extension of the individual entrepreneur who leads the firm (Lumpkin and Dess, 1996). Most farm firms depict as simple firms or entrepreneurial firms who own and control the firm by the farmer (Douma and Schreuder, 2008). Therefore, our study places

farmers as farm firms as our unit of analysis, and it is visible to analyze entrepreneurial orientation in farm firm context.

Most farmers run their business by themselves or together with their family members. This firm type is relevant with entrepreneurial firms that owned and controlled by the firm owners (Douma and Schreuder, 2008). In this study we use the term of farmers as the farm firms who mainly produce vegetables as their main business. Some of the farmers also do upstream activities, like producing seeds, or do downstream activities, such as producing processed vegetables. Our study only focus on farmers' main activities as vegetable producers.

### **Measures**

We carried out descriptive analysis and structural equation modeling, to analyze the data in detail. The descriptive analysis provides description of entrepreneurial orientation, innovation inputs, innovation adoption, innovation generation, and performance. To measure the combined relationship between dimensions of entrepreneurial orientation, innovation, and performance, we tested by using a Structural Equation Modeling.

We measured dimensions of entrepreneurial orientation in terms of innovativeness, proactiveness, and risk taking with a nine-item, 7-point Likert-type scale (Covin and Slevin, 1990). We measure innovativeness with questions related to R&D, new products, and radical changes; proactiveness with questions related to initiative, pioneer, and competitiveness; risk taking with questions related to high-risk project, obtaining objectives, and exploring new opportunity. Innovation adoption and innovation generation are measured by a seven-item, 7-point Likert-type scale; and innovation inputs with two-item, farm size for trials or experiment and trial or experiment costs,. We derived the variables of the innovation from in depth-study during the period of May-December 2011. We measured performance of farmers by using perceived performance with self-assessment of farmers compared to their main competitors in terms of sales volume, sales growth, new market entry, in the last three years, with a four-item, 7-point Likert-type scale.

We treated each dimension of entrepreneurial orientation, innovation inputs, innovation adoption, innovation generation, and performance as constructs (latent variables). We tested the combined relationship among constructs by using a Structural Equation Modeling with Lisrel 8.7.

### **Result**

The means and standard deviations are show in Table1. It indicates that in general innovativeness dimension mainly represents the entrepreneurial orientation of vegetable farmers. Overall, the farmers have low entrepreneurial orientation. The means of innovation show that the vegetable farmers are generally more on innovation adoption

than on innovation generation, except adoption of farm equipment that might relatively more expensive than adoption of seeds, farm inputs, or farming techniques. On perceived performance, it shows that the farmers have equal performance to their main competitors on sales volume, sales growth, market shares, and new market entry.

**Table 1.** Description of mean score of variables

<b>Variables</b>	<b>Mean</b>	<b>Std</b>
Innovativeness		
R&D	3.13	1.68
New products	2.10	1.37
Radical changes	3.07	1.63
Proactiveness		
Initiative	2.73	2.19
Pioneer	2.06	1.65
Competitive	2.72	1.36
Risk taking		
High risk projects	2.38	1.74
Obtaining objectives	3.31	2.08
Exploiting new opportunities	2.95	1.75
Innovation adoption		
New seed	4.60	1.66
Farming techniques	3.89	1.57
Farm inputs	4.26	1.43
Farm equipment	1.79	1.57
Innovation generation		
Fertilizer formulation	2.41	1.90
Pesticide formulation	1.88	1.74
Farming techniques	2.39	1.89
Innovation inputs		
Farm size for trials (ha)	.07	.17
Trial costs (000 US \$)	.51	1.43
Perceived performance		
Sales volume	4.24	1.16
Sales growth	4.23	1.10
Market share	4.18	.99
New market entry	4.22	.93

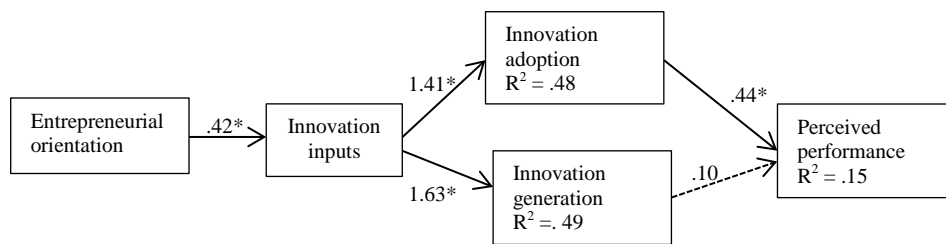
The correlation among constructs are presented in Table 2. It shows that entrepreneurial orientation is positively correlated with innovation adoption, innovation generation, innovation inputs, and perceived performance. Overall, all construct are positively correlated and moderately strong, except innovation generation and innovation inputs that weakly correlated with perceived performance.

**Table 2.** Correlation coefficient of construct

	Entrepreneurial orientation	Innovation adoption	Innovation generation	Innovation inputs
Entrepreneurial orientation				
Innovation adoption	.58**			
Innovation generation	.69	.30**		
Innovation inputs	.68**	.45**	.61**	
Perceived performance	.30**	.25**	.16**	.21**

\*\* p < .01

Figure 1 provides a visual overview of the structural model and the structural coefficients. The significance of the path shown in this structural model. The relative importance of the variables is reflected by magnitude of the coefficients. The overall goodness of fit measures indicate that the model fits the data well.



**Figure 1.** Structural model

\* p < .05;  $\chi^2(202) = 152.97$ ; p-value = .99; RMSEA=.00; AGFI=.94; GFI=.95; RMR=.098; NFI=.95; NNFI=1.03; CFI=1.00

The structural model shows that entrepreneurial orientation positively related to innovation inputs. The higher the entrepreneurial orientation of the farmers the higher the innovation inputs that they allocate in farm size and budget to conduct trials or experiments. In turn, the higher the innovation inputs lead farmers to a higher of

innovation adoption and generation. Thus, the results support the hypothesis 1, 2a, and 2b.

Innovation adoption is positively related to perceived performance. The higher the farmers adopt innovations on seeds, farm inputs, farming techniques, and farm equipment, the higher their performance relatively to their competitors. In contrast, innovation generation does not give significant positive impact to the farmers' performance. The outcome of the innovation generation conducted by the farmers is not captured on their performance. The results only support hypothesis 3a.

### **Discussion**

The analysis shows that entrepreneurial orientation as well as innovation inputs and innovation adoption are important for farmers' performance. This supports earlier findings that entrepreneurial orientation and innovation provide positive impact to firm performance directly or indirectly (Avlonitis and Salavou, 2007). Entrepreneurial orientation as the basis for farmers to allocate resources for innovation and decide to innovate by taking from external sources or developed internally by themselves. Unlike previous study that shows entrepreneurial orientation only affects innovation generation (Pérez-Luño et al., 2011), we find that entrepreneurial orientation supports both innovation adoption and innovation generation through innovation inputs.

Our analysis indicates that innovation adoption is important to promote farmers' performance. Vegetable farmers in West Java easily adopt new innovations because their location is close to sources of innovation such as input suppliers, research institutes, and universities, and also close to their markets such as supermarkets and exporters. The farmers are easy to get access to market information then translate it to what kind of innovation is suitable for the market demand. Afterwards, the farmers decide to adopt innovations on new seeds, new farm inputs, or new farming techniques that are already developed by the other companies or institutes. Not surprisingly that this innovation adoption affects positively to their performance because the "ready-to-use" innovation is the quick solution for farmers to fulfil the market demands. This finding is in line with previous study that shows innovation adoption is positively related to profit and market position (Diederen et al., 2003).

The results reveal that innovation generation does not give positive impact to farmers' performance. This finding is in line with previous study that indicates entrepreneurial activities including innovation efforts cannot be represented in the short-run performance, but later the firms will get their return in the long run (Grande et al., 2011). So, the farmers' effort on generating innovation by themselves cannot be captured in their performance that less than three years. The farmers need longer time to get benefits from their own innovation generation.



## **Conclusion**

The paper provides an empirical evidence on the combined effect of entrepreneurial orientation and innovation to performance of vegetable farmers in West Java. The results show that entrepreneurial orientation is positively related to innovation inputs. In turns, innovation inputs are positively related to innovation adoption and innovation generation. Furthermore, we found that only innovation adoption ultimately give positive impact to farmers' performance. Not surprisingly we found that innovation generation gives no significant effect to farmers' performance because farmers may need longer time to get their return from their innovation generation efforts.

Our study has implication both for policy-makers and for farmers. We show that entrepreneurial orientation is important for innovation and ultimately innovation promotes better performance for farmers. It shows that farmers should pay attention on innovation adoption for better products or processes to fulfill the market demands in stead of only focus on existing products of processes. Furthermore, our findings imply that policy makers can support farmers to access new innovations that fit with market demands by mediating farmers with innovation providers.

## **Acknowledgement**

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### **Appendix: Measurements**

Entrepreneurial orientation (Covin and Slevin, 1990)

#### *Innovativeness*

In the last three years, generally our firm ....

focused on marketing of existing products	1 to 7	focused on innovation for new products or processes
introduced no new products	1 to 7	introduced a lot of new
There has been small changes of the current products or process	1 to 7	There has been big changes of products or processes.

#### *Proactiveness*

Our firm....

normally reacts on our competitors' initiatives or changes.	1 to 7	normally initiates changes then our competitors react.
is seldom being a pioneer in introducing new products or processes	1 to 7	is very often being a pioneer in introducing new products or processes.
normally avoids competition by taking a "live-and let-live" position.	1 to 7	normally is brave toward competitors.

#### *Risk taking*

In the last three years our firm...

has a strong tendency to involve in low	1 to 7	has a strong tendency to involve in
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risk projects with secure results.		high risk projects with uncertain results.
believes that our goal is achieved carefully and gradually.	1 to 7	believes that our goal is achieved bravely and powerfully.
Takes a very careful position to minimize costly effect of making decisions in insecure situation.	1 to 7	takes a brave and aggressive position to maximize opportunities in making decisions in insecure situation.

*Innovation adoption*

To what extent did your firm adopt these kinds of innovations in the last three years

	Not at all		To a great extent
Seeds	1	to	7
Farming techniques	1	to	7
Farm inputs	1	to	7
Farm equipment	1	to	7

*Innovation generation*

To what extent did your firm generate these kinds of innovations in the last three years

	Not at all		To a great extent
New fertilizer formula	1	to	7
New pesticide formula	1	to	7
New farming techniques	1	to	7

*Innovation inputs*

Please specify your R&D resources in the last three years for the following items:

Farm size for trials or experiments (m<sup>2</sup>)

Costs of trials or experiments (*rupiah*)

*Perceived performance*

Please indicate your firm performance compared to your main competitors for the following items in last three years:

	Much worse	Equal	Much better
Sales volume	1 to 3	4	5 to 7
Sales growth	1 to 3	4	5 to 7
Market share	1 to 3	4	5 to 7
New market entry	1 to 3	4	5 to 7