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Factors affecting farmers' intention to convert to organic agricultural production – a case study in hanoi, vietnam

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Abstract: In this study, the author has given different basis to build hypothesis and research models to find out the factors affecting the farmer's intention to follow organic agriculture. Firstly, this paper focuses on studying the relationship between attitudes, subjective norms and the ability to control over the intention of converting to organic farming. Secondly, the author studies the effects of comparative behavioral advantages, risk perception, and support policies from government on organic agricultural production. The main research subjects are factors affecting farmers' intention to produce organic agriculture. Hence, this research was conducted based on survey results among farmers. For the intention of adopting organic agriculture, the factor of comparative behavior advantage is considered as the strongest effect ($\beta = 0.189$) and the impact of other factors such as attitudes, subjective norms, the ability to control, personal standards, and the government' support policies is negligible. In particular, the study results show that there is no statistical evidences regarding risk perception has a direct and positive relationship with farmers' intention to produce organic agriculture among these farmers ($\beta = 0.021$, P-value> 0.05).
JEL: M21, G30

Keywords: organic culture, production, Vietnam

INTRODUCTION

The advent and development of intensive farming production has created a huge amount of food that meetings the growing needs of more than six billion people on the planet. However, this conventional agriculture has shown its strong reliance on synthetic chemical fertilizers and pesticides, which have brought serious impacts on public health and the environment (Pimentel et al., 2005). Moreover, many studies in the past have revealed that overusing of chemicals also has impaired soil health and has deteriorated environmental conditions (Taylor et al., 2003; Arias-Estévez et al. , 2008; Fenner et al., 2013).

Therefore, organic farming has appeared and is considered as an environmentally-friendly agricultural system where synthetic chemicals and fertilizers are avoided (Venkataraman and Shanmugasundaram, 1992; RoitnerSchobesberger et al, 2008; Mahdi et al, 2010; Suthar, 2010).

In recent years, health, environmental and climate change in agricultural production has attracted lots of social concerns. Consumers gradually move towards safe food, leading to an increase in demand for organic food products (Murphy, 2006; Schifferstein and Oude Ophuis, 1998). Global organic food production has also shown significant growth, which makes global market for organic products has grown steadily not only in Europe and North America but also in Asian countries (Baker, 2004, Gifford and Bernard, 2005; Setboonsarng et al., 2006). Vietnam also owns a long history of agricultural production and organic farming practices. Observing the increasing demands on organic agricultural production and consumption, Vietnamese Communist Party and Vietnamese government have released policies to develop organic agriculture. They defined organic farming as a trend with rapid development in the near future by providing products having better impacts on human health and society. However, the reality shows there are many factors affecting farmer's decision to conduct organic agricultural production that have not been thoroughly explored, which will be necessarily clarified in this paper.

THEORETICAL BASIS

Organic agriculture

Mr. Nguyen The Dang et al (2012) gives a definition: "Organic agriculture is a method of agricultural production based on the use of natural biological cycles. In other words, the mode of organic agriculture is a mode of production in which the production processes follow the inherent natural biological laws ".

Theory of planned behaviour – TPB

Theory of Planned Behavior (TPB) was developed by Ajzen (1985) based on Theory of Reasoned Action (TRA). The TRA has limitation in predicting behavior in situations where individuals cannot control their acts and attitudes towards these actions, together with subjective norms that cannot explain for their behaviors (Hansen et al., 2004).

Therefore, the planned behavioral theory (TPB) was developed by Ajzen by adding "perceived behavioral control" to the TRA model.

Intention (IN) represents the individual's motivation to make a conscious decision or plan to attempt implementing a particular behavior (Conner and Armitage, 1998). The attitudes expresse the level of individual judgments on behavior whether it is favorable or not (Ajzen, 1991). Attitudes toward a behavior also depends on an overall assessment of that behavior and the belief in its desired outcome (Tan et al., 2017). Farmers intent to adopt organic farming only if they believe that the practice brings benefits and positive results for them. The empirical research results have demonstrated a direct impacts of PBC on individual intention (Chen, 2017; Tan et al., 2017; Li et al., 2018). When farmers feel they have knowledge, skills and enough resources to produce organic agriculture, their intentions are likely to be created. Individual perception shows the neccessary of consent to person's act, which motivates his/her intention to create performance (Shin and Hancer, 2016). If farmers feel that they are under social pressure when following organic agriculture, they are more likely to use these practices. In general, based on TPB theory, this study has given hypothesis as below:

Hypothesis H1: Attitude has positive impacts on farmers' intention to convert to organic agricultural production.

Hypothesis H2: Subjective norms affect positively on farmers' intention to convert to organic agricultural production.

Hypothesis H3: The feeling of ability to control have positive effects on the farmers' intention to convert to organic agricultural production.

The combination of the Planned behavioral theory (TPB), the Innovation diffusion theory (IDT), the Protection motivation theory (PMT)

The IDT can be considered as one of the common theory explored the factors affecting an individual acceptance of an innovation or a new technology (Al-Jabri and Sohail, 2012). IDT describes the process through new ideas, practices or technologies which are spreaded into a social system (Rogers, 2003).

PMT (Floyd et al., 2000; Maddux and Rogers, 1983; Rogers, 1975) at the beginning was established as a major theory in health risks studies. It has been applied in other studies of behavioral protection in the context of nuclear war (Wolf et al., 1986), water conservation (Kantola et al., 1983) and in marketing communication (Cismaru et al. Lavack, 2006; Tanner et al., 1989). PMT has also been used in research on natural hazards, environmental issues (Grothmann and Reusswig 2006; Mulilis and Lippa, 1990; Zaalberg and Midden, 2010) and climate change (Grothmann and Patt, 2005; Osberghaus et al, 2010; Le Dang et al., 2014).

Comparative Behaviors 'Usefulness (CBU) compares the advantages of farmers' behaviors and it is adjusted based on the Innovation diffusion theory (IDT) (Rogers, 2003). CBU is considered to be applied for behavior of organic production process. Farmers' Perception of Risk (FPR) is the farmer's awareness regarding the risks might happen to crops' behavior. Based on the Protection motivation theory (PMT), Le Dang et al. (2014) show that farmers risk awareness comes from the impacts of climate change on productivity, their health, and financial condition as well as the influence of the farmer's intention to adapt to their behavior. Supports of Government Policies (SGP) is a policy element coming from the private sector and government to support and shape farmers' behavior as an external driving force. Smit et al. (2009) found that external driving forces from economic conditions have motivated farmers to change to organic farming because they believe it will bring sustainable values than conventional cultivation. Therefore, other hypotheses are proposed as follows:

Hypothesis H4: Comparative behavioral advantage positively affects farmers' intention to accept organic agricultural production.

Hypothesis H5: Risk awareness has positive effects on farmers' intention to accept organic agricultural production.

Hypothesis H6: Government support policies have positive impacts on farmers' intention to accept organic agricultural production.

RESEARCH MODELS

The research model is built according two basis: Firstly, according to the Planned behavioral theory (TPB), combining with some theories of behavioral studies such as the Innovation diffusion theory (IDT), the Protection motivation theory (PMT).

Secondly, based on the research models of farmers' intentions and behaviors in the study of Yanakittkul and Aungvaravong (2017) and Rezaei et al (2019). These studies were listed on prestigious journals of the Scopus and ISI, and currently published on ScienceDirect.

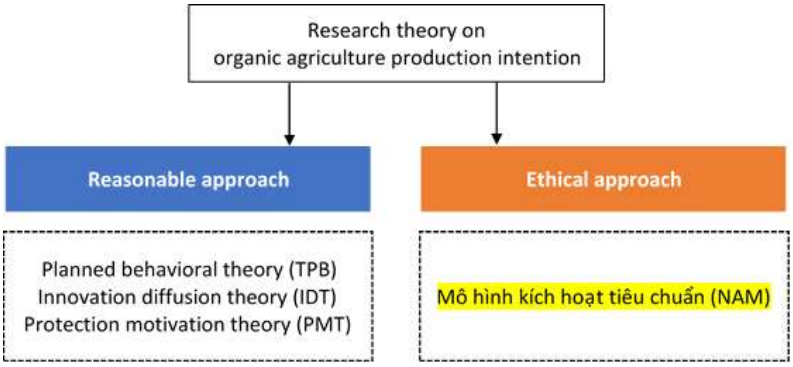

Fig.1: Framework of research theory, research and modeling

On the basis of the research overview, the author has found research gaps and built research hypotheses (H1-> H6) to create research models.

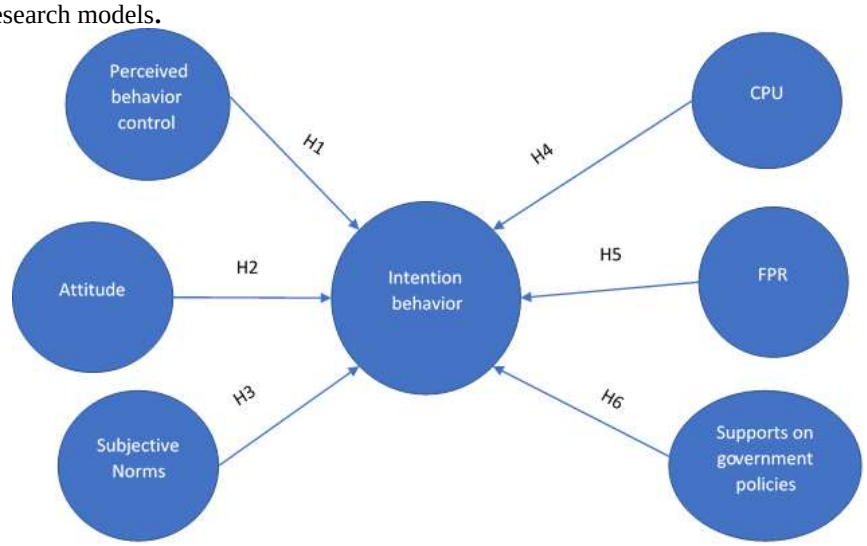

Fig.2: Research model of factors affecting intention on organic agricultural production

RESEARCH METHODOLOGY

The research process is conducted by the following steps: understanding the theoretical basis and research overview to build models and scales; approaching qualitative research to examine the independent and dependent variables, determining the relationship between the factors; applying preliminary quantitative studies to test the reliability of the scales (Cronbach's Alpha); official quantitative research to test the scale by Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), model verification by Structural Equation Modeling (SEM), and veryifying research hypothesis, the impact of control variables. From that, solutions will be given accordingly.

Data collection and processing methods

This method is applied to verify harmony between the factors and the observation methods are intended to be used for the study. The factors and observation methods used in this article are mostly collected from previous researches, mostly conducted at foreign organizations. Therefore, it is necessary to interview experts and farmers to find out the group of factors which are suitable for Vietnamese conditions in general and Hanoi in particular.

Quantitative method is used after analytical and synthetic methods and it measures the effects of different factors on the intention to convert to organic agricultural production. This method requires building questionnaires to carry out the survey. Survey results need to be analyzed using techniques of SPSS and AMOS 22.0 software. These tools will help the author analyze Cronbach's Alpha's reliability coefficients, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), Structural Equation Modeling (SEM).

RESEARCH RESULTS

Statistical samples

318 observations in quantitative research showed that male farmers accounts for 55.03% of research sample and female farmers (accounting for 44.97%). In which, farmers in age group from 31 to 40 accounts for 38.99%, followed by the age group from 20 to 30 (accounting for 35.85%). There is 33.2% of participants graduated from high school. The number of participants with 11 to 15 years' experience in farming occupies the largest proportion

of the total observations (29.25%), followed by 6 to 10 years which accounts for more than a quarter of the samples (26.73%). Besides, the annual income from agriculture ranges from 300 million to 500 million, accounting for the largest rate of 30.19%.

Test results of realibility by Cronbach's Alpha

To evaluate the reliability of the scale, the author uses Cronbach's Alpha's test. According to Hoang Trong and Chu Nguyen Mong Ngoc (2008), Cronbach's Alpha coefficient between 0.8 and 1 showing good scale; from 0.7 to 0.8 is usable; from 0,6 and above can also be considered in case the measurement concept is new or unfamiliar with the respondents in the context of the new study. Additionally, the corrected item-total correlation must be 0.3 or higher when evaluating the scales to meet the requirements (Hair et al., 2010).

Table 1: Statistical results of the scale standardization

No	Scale of measurement	No of observed variables	Confidence Intervals (Cronbach Alpha)	Coefficient of correlation of total variables	Conclusion
1	Intention (IN)	3	0,782	All higher than 0.4	All scales are reliable
2	Attitude (AT)	4	0,804		
3	Subjective Norms (SN)	6	0,870		
4	Perceived behavior Control (PBC)	5	0.861		
5	Comparative Behaviors' Usefulness (CBU)	5	0,847		
6	Farmers' Perception of Risk – FPR	4	0,814		
7	Supports of government policies (SGP)	7	0,880		

The results of hypotheses test on the research model

Table 2: The results of hypotheses test

Hypothesis				Estimation	S.E	C.R	P-value	Conclusion
H1	AT	→	IN	0.147	0.054	2.714	0.007	Supported
H2	SN	→	IN	0.135	0.053	2.537	0.011	Supported
H3	PBC	→	IN	0.153	0.059	2.581	0.010	Supported
H4	CPU	→	IN	0.189	0.062	3.033	0.002	Supported
H5	FPR	→	IN	0.021	0.059	0.350	0.726	Declined
H6	SGP	→	IN	0.140	0.058	2.437	0.015	Supported

Note: Statistically significant (P); *** <0.001; S.E: Standard deviation; C.R: Critical value

Source: Data analysis results using AMOS 22.0 software

The estimated result for parameter presented in the table above and unstandardized coefficients show statistically significant relationship at P-value <0.05. According to the results of that estimate, there is 1 hypothesis that is not sufficient to prove a correlation relationship.

Table 3: Standardized coefficients

Hypothesis				Estimate
H1	Attitude	→	Intention	0.175**
H2	Subjective Norms	→	Intention	0.153*
H3	Perceived Behavior Control	→	Intention	0.178*
H4	Comparative Behaviors' Usefulness	→	Intention	0.212**
H5	Farmers' Perception of Risk	→	Intention	0.026
H6	Supports of government policies	→	Intention	0.174*

Note: Statistically significant (P); *** <0.001; ** < 0.01; * < 0.05

Source: Data analysis results using AMOS 22.0 software

After verifying 6 hypotheses from H1 to H6 by Structural Equation Modeling (SEM), the research result shows:

- Attitude shows directly and positively relation to farmers' intention to accept organic agriculture (β = 0.147, P-value <0.01), hypothesis H1 is supported.
- Subjective norms have a direct and positive relationship with farmers' intention to accept organic agricultural production (β = 0.135, P-value <0.05), hypothesis H2 is supported.
- Perceived control ability has a direct and positive relationship with farmers' intention to accept organic agricultural production (nông = 0.153, P-value <0.05), hypothesis H3 is supported.
- Perceived Behavior Control related directly and positively to farmers' intention to accept organic agricultural production (β = 0.189, P-value <0.01), hypothesis H4 is supported.

- There is no statistical evidence showing risk perception has direct and positive relationship to farmers' intention to accept organic agricultural production (β = 0.026, P-value> 0.05), thus, hypothesis H5 has been rejected.
- Supports of government policies have a direct and positive relationship with farmers' intention to accept organic agricultural production (β = 0.140, P-value <0.05), hypothesis H6 is supported.

For the intention of accepting organic agriculture, the direct effect of comparative behavior advantage is strongest (β = 0.189) and the difference in the influence of other factors such as attitude, perceived behavior control, personal standards, supports of government policies are negligible.

Results of CFA analysis

The suitability of the model is reflected by Chi-square (CMIN) criteria; Chi-square is adjusted by the degree of freedom (CMIN / df); Comparative Fit Index (CFI); Tucker and Lewis Index (TLI); Root Mean Square Error Approximation (RMSEA). The model is considered to be appropriate when testing values of GFI, TLI, CFI are greater than or equal to 0.9 (Bentler and Bonnet, 1980); CMIN / df is less than or equal to 2; RMSEA is less than or equal to 0.08 (Steiger, 1990). Nguyen Dinh Tho and Nguyen Thi Mai Trang (2009) believe that if the model receives TLI, CFI values ≥ 0.9, CMIN / df ≤ 2, RMSEA ≤ 0.08, the model is considered to be suitable with the data. According to Awang (2012), Forza and Filipini (1998), the model is acceptable if 0.8 <TLI, CFI <0.9, CMIN / df <5, RMSEA ≤ 0.08.

CFA analysis results from the survey samples have TLI = 0.991> 0.9; CFI = 0.992> 0.9; CMIN / df = 1,052 ≤ 2 and RMSEA = 0.024 ≤ 0.08. Therefore, the calculation results show that the model's indicators are satisfied and this model is acceptable with research data.

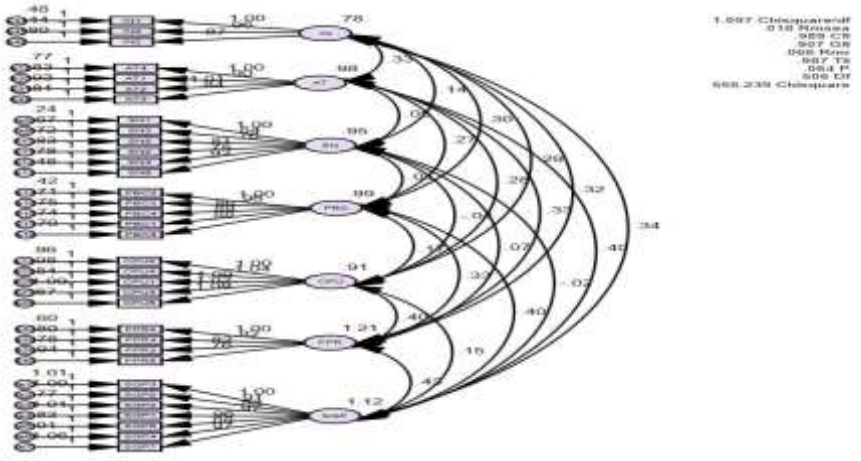

Fig.3:

4.2.3 Results of Structural Equation Modeling (SEM) analysis

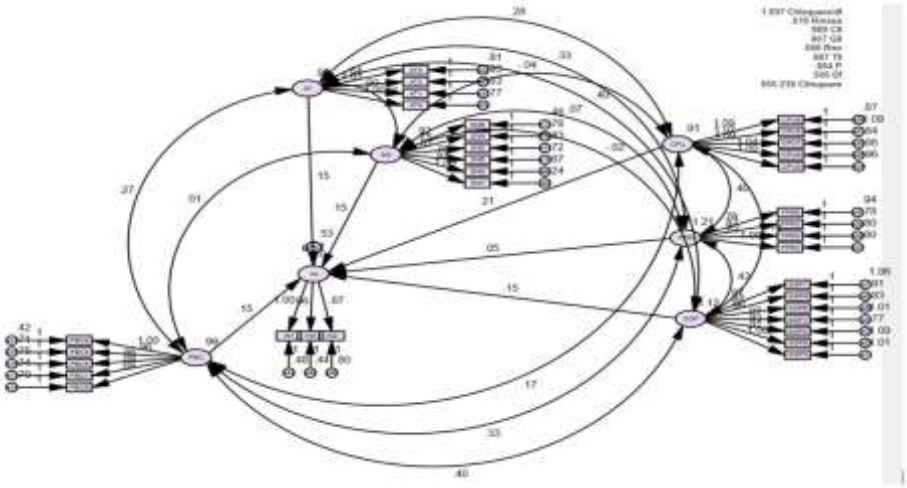

Fig.4: The result of the research model test

DISCUSSION

In this study, the author has contributed in building and testing models regarding organic production in Vietnam. The author has proven that the factors of attitude, subjective norms, Perceived control ability , personal standards,

comparative behavior advantage, supports of government policies have a positive impacts on Farmers' intention to convert to organic agricultural production.

The author proposes based on research results to promote the intention to accept organic agriculture as follows:

First: Changing perceptions of farmers regarding organic agriculture which represents essential role in sustainable agricultural development. Farmers must be aware that the conversion to organic agricultural production not only has a positive impacts on the environment, but also increases the tolerance of market changes. Research showed that the more positive attitudes, perceptions, and knowledge the farmers have, the higher intention they have leading to their performances. It is necessary to increase promoting, training, transferring good model and strongly focus on the community aspect of this production method.

Second: It is vital to have specific policies: (i) Research and training on organic agricultural production; (ii) Increase the ability of organic agricultural production associations; (iii) International cooperation, experience exchanges, human resource training, market development support. Each agency such as: Cooperatives, pioneer farmers in community, NGOs, IFOAM, Department of Planning and Investment, Department of Agriculture and Rural Development, etc. need to have specific actions and strategic policies to provide farmers more knowledge, awareness, feelings of social pressure when following organic agriculture. Farmers should have innovate thinking and awareness in all production stages to create a strong position for organic agricultural products.

Third: Apply information technology in industry 4.0 to raise the product values. Policies to encourage organic agricultural production such as developing organic farming methods to protect the ecological environment must go hand in hand with economic benefits. The income from this method must be seen by the producers and it should be stable or higher than conventional farming.

Fourth: The Government needs to invest in infrastructure, creating favorable conditions for land lease and expansion for cultivation. The government should give their supports on costs and procedures related to providing certification of organic agricultural products which meet standards. Besides, communicating with consumers and producers about the completion of production process is also important. There should be policies to encourage initial investment, interest rates, scientific solutions for farming techniques, training for farmers participating in organic agricultural production. Specific actions can be mentioned as: Negotiating and signing export contracts, helping producers for marketing activities, updating information, promoting credit for agricultural value chain loans, managing hygiene and safety, attach QR codes to seek for the origin of organic products.

RESEARCH LIMITATION AND DIRECTION FOR FURTHER RESEARCHES

Research limitation

This study on farmers' intention to accept organic agricultural production, particularly in Hanoi still has some limitations:

Firstly, the research scope is farmers living in Hanoi. However, the sample size is considered to be small (318 people).

Second, apart from the factors indicated in the research model which affect intention to accept organic agriculture, there are many factors coming from the farmers themselve and from the environment which are not mentioned in this study.

Third, this research found out the factors affecting the farmers' intention to accept organic agricultural production. However, the author did not study deeply from the intentions to the agricultural practices of farmers living in Hanoi.

Fourth, the effects of control variables (gender, age, education level, experiences in agriculture and annual income from agriculture) were not mentioned and analyzed in details.

Direction for further researches

Firstly, related factors should be expanded to learn deeply about farmers' intentions to accept organic farming production.

Second, building a research model to explore the relationship between intentions and practices in organic agricultural production.

Third, qualitative and quantitative research has been used to test the research model. However, a case study of the intentions of consent of organic agricultural production and organic farming practices should be conducted in the next study to clarify the relationship between these factors as well as finding solutions that promote organic farming intentions and behavior.

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