HO CHI MINH NATIONAL ACADEMY OF POLITICS

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THE FACTORS AFFECTING THE APPLICATION OF HIGH TECHNOLOGY IN PANGASIUS FARMING IN CAN THO CITY

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LIST OF PUBLISHED WORKS
OF THE AUTHOR RELATED TO THE THESIS

1. Nguyen Thi Nghia (2021), "Application of high technology in commercial catfish farming in Can Tho city: The Current Situation and Solutions", *Economy and Forecast Review*, No. 24 August (778), pp.111-114.
2. Nguyen Thi Nghia (2021), "Some problems for digital transformation" in agriculture in the Mekong Delta", *Journal of Scientific Information*, Issue 03 (24), pp.69-73.
3. Dinh Thi Nga, Nguyen Thi Nghia (2021), "Solutions to promote research, transfer, application and development of science-technology, innovation; develop national innovation system and innovative startup ecosystem", Proceedings The Fourth International Conference: "Sustainable economic development and business management in the context of globalisation" (SEDBM 4) which is jointly organized by Academy of Finance (Vietnam), *Institute of Economics - Ho Chi Minh National Academy of Politics and University of Greenwich* (United Kingdom), ISBN: 978-604-79-2912-2.
4. Nguyen Thi Nghia (2022), "Reality and factors affecting farmers' behavior of high-tech application in farming shutchi catfsh in Can Tho city", *Review of Finance*, Vol. 5, Issue 2, tr60-62.
5. Nguyen Thi Nghia, Nguyen The Kien (2022), "Factors Affecting the Adoption of high-tech Innovations in Farming Shutchi Catfish: The Case Study of Can Tho City, Vietnam", *Journal of Environmental Management and Tourism*, Vol 13 No 5 (2022): JEMT, Volume XIII, Issue 5(61).

INTRODUCTION

1. The necessity of the thesis

The achievements of science - technology have played an essential role in the development of the global economy in general and agriculture in particular. Around the world, many decades ago, countries promoted the application of high technology in agriculture, namely high technology agricultural zones in countries such as the US, UK, Japan, the Netherlands, Israel, and China,... was formed and created a record breakthrough in the productivity and quality of agricultural products: In Israel, tomato yields reached 300 tons/ha, compared with the worldwide average of 50 tons/ha; citrus fruit per hectare advanced 262 tons, compared with 243 tons in North America and 211 tons in Europe; highest cow milk yield in the world with 13,000 liters/head compared to 10,000 liters in North America and 6,000 liters in Europe; or in China, agricultural production when applying high technology achieves 40-50 times more output value than previous production models. The application of high technology has been bringing great benefits in agricultural production activities such as cost reduction, increase productivity, and output, protect the environment, and moving towards green and sustainable agriculture. Therefore, agricultural production in the direction of high technology application has become a model for knowledge agriculture of the 21st century. This is considered the primary trend, the key to the success of countries with developed agriculture, and also an inevitable trend for Vietnam's agriculture in the integration period.

In Vietnam, the application of high technology in agricultural production is an urgent requirement for production practice and is considered one of the essential solutions to successfully implementing the industrialization process, farming, and rural modernization as well as the process of in-depth economic growth model innovation and agricultural restructuring. Determining that importance, over the past time, our Party and State have paid attention to directing and promoting the application of high technology in agriculture nationwide. Through a series of policies to encourage the development of high technology agriculture in key economic regions, localities have many advantages in terms of natural and social conditions. The most clearly marked determination and interest in this content are the Prime Minister's Decision No. 176/QD-TTg dated January 29, 2010, on the approval of the Project to develop high technology agriculture in the country. 2020 to build a comprehensively developed agriculture in the direction of modernity, producing significant commodities with high productivity, quality, efficiency, and competitiveness, achieving a growth rate of 3.5%/year...; and many other documents to supplement and concretize solutions to promote the application of high technology in agricultural production. However, so far, the application of high technology in agriculture in the whole country in general and each locality, in particular, is still not as expected, especially the main agricultural products of many localities, encouraging farmers to apply high technology is still facing many difficulties.

The Mekong Delta has favorable natural conditions for aquaculture to develop rapidly, especially in the period from 1980 to the present. The proportion

of aquaculture area of the Mekong Delta in the period 2015-2021 accounts for about 71% of the total area of the country and is much higher than many other regions: including brackish water shrimp farming area of 742,500 ha in 2020 (Directorate of Fisheries, 2021) and a pangasius farming area of 6,600 ha in 2020 (VASEP, 2021). The two main groups of aquaculture species in the Mekong Delta are pangasius and brackish shrimp with production accounting for 100% and 70% of the country, respectively. Aquaculture in the Mekong Delta has been developing rapidly and is diverse in terms of scale, farming subjects, technology, and management.

In the field of pangasius, over the past 20 years of development, it shows the pride of a fish species of the Mekong Delta that has become famous in the world for its contributions in terms of proportion and high yield such as some species of salmon, tilapia, etc., ranking 8th among freshwater fish species with large production in the world (FAO, 2022). Through the development process, techniques such as seed production (artificial reproduction, rearing fry on fry, fry on fingerlings), commercial farming, development of industrial pellets, disease management, etc. have been continuously improved and applied effectively in localities in the region.

Can Tho city is the locality with the pangasius farming area ranked third, after Dong Thap and An Giang in the Mekong Delta, accounting for 15.2% of the pangasius farming area of the whole region. Pangasius is considered a key commodity in the city's aquaculture, according to calculations from data reported by Can Tho city, the cumulative area of pangasius farming by the beginning of 2022 is 607 hectares, accounting for more than 19% of the area and contributing over 90% to the city's aquaculture production. In the past time, Can Tho city has focused on reorganizing pangasius production in the direction of forming joint production organizations; deploying the construction of aquaculture areas applying standards: Global GAP, ASC, SQF, BMP, Metro GAP...; promoting the application of new science and technology in the field of pangasius farming; building a nursery and concentrated pangasius farming area by the farming planning to provide a source of high-quality products and goods to serve consumption and export needs, contributing to improving income for people participating in this industry; at the same time, gradually increase the added value for the province's pangasius, moving towards bringing the strength of this product produced in a more sustainable direction.

However, the development of farming methods using high technology in Can Tho city of households is still slow (since Can Tho city was planned as a locality with agricultural areas applying high technology) as high as according to the Prime Minister's decision in 2013, the agricultural areas applying high technology in the city are still developing slowly, some areas have not been put into operation; the percentage of households applying high technology is still low, accounting for over 30% and basically, very few farmers apply high technology in the entire production cycle in general and in pangasius farming in particular; Although the technical aspect of pangasius farming has many successful studies contributing to

the development of the pangasius industry, however, the "choke points" as high FCR coefficient (1.55-1.57) and suboptimal survival rate (71.4-76.1%), lead to the high cost of raising pangasius from 24,400-24,800 VND/kg (According to Hien and collaborators, 2020) so depending on the area, economic conditions,... of households, the farming households only apply a certain technical process to serve the fish farming process. In other words, high technology is studied, and available in the market, but not all technologies are easily adopted by farmers.

There have been many empirical studies showing the factors to explain the adoption of new technology by farmers or not. Fernandez-Cornejo, J. et al (2007); Keelan, C., et al (2010); Mignouna, D., et al. (2011) or Adebiyi, S., & Okunlola, J. (2013) both argue that human capital includes factors such as Education, age and household size all influence farmers' decisions to adopt new technologies in production. Research by Akudugu, M. A., Guo, E., & Dadzie, S. K. (2012) has grouped the determinants of employment technology application in agriculture into three groups of factors: Economic, social, and institutional factors. Given the diversity of species, production methods, intensity and application of technologies depends on the nature of the industry in which they are applied and the economic, social, political, and regulatory environment. Accordingly, considering the specific case of pangasius farming activities of households in Can Tho city, finding the answer to the current situation of applying high technology to the pangasius farming process of households is still slow, with a low rate due to what factors? The degree of influence of factors on the application of high technology in the farming process is very necessary, to have a scientific basis to propose recommendations to local authorities in developing solutions to encourage farmers to apply high technology in pangasius farming, serve the sustainable development of this industry in the area of Can Tho city in the coming time. That's why the PhD candidate chose the topic: "*The factors affecting the application of high technology in pangasius farming in Can Tho City"* doing the doctoral thesis in economics, majoring in Economic Management.

2. Purpose and research tasks

2.1. Research purposes

The study was conducted to determine the factors affecting the intention to apply high technology to pangasius farming households in Can Tho city and measure the impact of factors on the intention to apply high technology to the fish farming process of households. From there, propose solutions to serve the management agencies in promoting farmers to increase the application of high technology in pangasius farming, towards sustainable development of the commodity industry in Can Tho city in the coming time.

2.2. Research tasks

To achieve the above objectives, the thesis has the following tasks:

Research the theoretical basis and relevant practices on the application of high technology in agriculture based on published domestic and foreign research reviews.

Building a model of factors affecting the intention to apply high technology in pangasius farming of farming households in Can Tho city, pilot survey to complete the questionnaire to serve as a basis for testing the built model.

Analysis of the situation and test the research model of factors affecting the intention to apply high technology of pangasius farming households in Can Tho city and the level of impact of factors on the intention to apply high technology of households.

Proposing solutions to increase the percentage of households applying high technology in pangasius farming in Can Tho city to serve the sustainable development of this field until 2030, vision until 2040.

3. Objects and scope of research

3.1. Research subjects

The research object of the thesis is the factors affecting high technology application in pangasius farming in Can Tho city

3.2. Research scope

About the content: The research topic of the thesis has wide content and is an activity with many different stages. This study focuses on studying the influence of factors on the application of high technology in pangasius farming of households and only stop at the stage of fish farming, but not in all stages in the value chain of the pangasius industry (The application of high technology by farmers is considered here through behavioral theory, applied intention.' Intent' is approached according to Ajzen, I. (1991) including motivational factors that can influence the behavior of each individual; these factors indicate the extent to which an individual is willing or able to perform the behavior. Thus, to point out the factors affecting the application of high technology (already existing), first of all, it is necessary to consider whether the household intends to perform that behavior or not, what factors affect the intention to apply, and the level of impact of factors to have solutions to encourage people to apply in practice when pangasius farming technology has been researched and transferred).

About space: The thesis evaluates the current status of the high-technology applications in pangasius farming in Can Tho city; the intention to choose high technology applications in pangasius farming is verified for the case of pangasius farmers in the area of Can Tho city (no research on nurseries and enterprises).

About time: Secondary data used in the thesis were collected in the period from 2011-2020; primary data will be collected in 2021.

4. Theoretical basis and research methods

4.1. Theoretical and practical basis

The theoretical basis of the thesis: The study of the topic is based on the theory of behavior, individual intentions (theory of intended behavior and the theory of technology acceptance and use), framework theory of sustainable livelihoods; theoretical models of agricultural production applying high technology in the country and in the world; opinion, guidelines, guidelines and policies of the Party and State for the development of high technology and application of high technology in agriculture in our country

The practical basis of the thesis: Experimental studies and the current situation of difficulties and limitations in the application of high technology in pangasius farming in Vietnam in general and Can Tho city in particular.

4.2. Research Methods

The research is carried out by combining qualitative research methods and quantitative research methods. (1) For qualitative research, the author interviews experts who are leaders and officials who have been working at the Department of Agriculture and Rural Development, Sub-Department of Agriculture, Forestry, and Fisheries; scientists at the Institutes and Schools of Can Tho University, several business representatives have applied high technology in the process of farming and processing at the enterprise. (2) For quantitative research, interviewees are pangasius farming households in the districts of Can Tho city. The quantitative research method is carried out by collecting, processing, and analyzing data obtained from the information-answered survey questionnaires. Research methods used to analyze data include reliability tests; exploratory factor analysis (EFA). The research process is outlined in the thesis, and details of research methods are presented in chapter 3: Research design

5. Scientific and practical significance of the research topic

5.1. Scientific significance

Firstly, find out the influencing factors of the intention to apply high technology to pangasius farming households.

Secondly, measure the level of impact of the factors affecting the intention to apply high technology to the pangasius farming process farmers.

5.2 Practical significance

The research results have practical significance for the departments, agencies, and sectors, especially the Department of Agriculture and Rural Development; Sub-Departments of Agriculture, Forestry, and Fisheries by contributing to an increased understanding of the measurement model of factors affecting the application of high technology in pangasius farming of households. From there, management units can apply them in practice to affirm the importance of factors to deploy impact solutions to increase the percentage of households applying high technology in fish farming. The results of the study have the following practical significance:

Firstly, this study once again confirms that the application of high technology plays an important role in the farming process but farmers still face many difficulties due to some factors belonging to the resources of the households that have not been met. Therefore, management agencies can confidently improve the percentage of households applying high technology through assessment and the positive effect of positive factors, complementing the negative factors in the policy implementation process.

Secondly, the thesis has identified the components of a high technology application to perceived value and the intention of households, and at the same time indicates the direction of influence and the influence of each component. Therefore, the research results will help the Department of Agriculture and Rural Development; Sub-

departments of Agriculture, Forestry and Fisheries in Can Tho city have the more necessary information to provide management implications to help increase the percentage of households applying high technology to fish farming.

Thirdly, the research results and policy implications of the thesis can also be considered as a reference basis for policymakers and policy advice to better implement policies to promote development, form zones, and agricultural areas applying high technology in the coming time.

6. Structure of the thesis

In addition to the introduction and conclusion, bibliography, and appendices, the thesis consists of 5 chapters and 12 periods.

Chapter 1
OVERVIEW OF RESEARCH WORKS RELATED TO THE THESIS

1.1. WORKS RELATED TO THE THESIS TOPIC

1.1.1. Location research, role, meaning of high technology and application of high technology in agriculture

There have been many studies showing and measuring the contribution of technology in general and high technology in particular for socio-economic development. In agriculture, there have also been many studies focusing on clarifying the position, and the role of the application of high technology in agriculture. The works have focused on clarifying several specific roles such as:

Firstly, agricultural production towards the application of high technology contributes to improving the level of production socialization, accelerating the process of large-scale concentrated commodity production, and adapting to the context of deeper and deeper international economic integration.

Secondly, the application of technology in agriculture plays a role in reducing the vulnerability of the poor and contributes to sustainable poverty reduction.

Thirdly, the application of high technology in agricultural production allows us to associate economic efficiency with environmental protection.

The research approaches from a general perspective in agriculture or approaches for an area such as Cultivation, animal husbandry, and aquaculture all point out the role and meaning of technology and applying high technology in agriculture to increase productivity, improving the input and output relationship efficiently, reduce the vulnerability of households, ensure food security, protect the environment, etc. This is the basis for management agencies to set out policies and programs to encourage farmers to increase the rate of high technology application in production, at the same time, it is also the driving force for producers to change and increase their application toward sustainable development.

1.1.2. Research on factors affecting the application of high technology in agriculture

There are many studies in and abroad to determine the factors affecting the decision of the producer whether or not the application of high technology in agricultural production. Most projects have in common that the decision to

apply high technology is determined by the characteristics of the technology and a collection of conditions and circumstances of the subject of technology application, such as:

Firstly, studies show that many groups of factors influence the application of new technologies in agricultural production such as economic, social, and institutional factors; household conditions, and external factors such as training, information, field environmental conditions, etc.

Secondly, in-depth studies explain a specific group of factors:

First, the group of human capital factors. In agriculture, the factors of human capital studied include the age, knowledge, and experience of farming households,... The conclusion shows that households with better knowledge levels and more production experience will be the ones who choose to apply for technological advances sooner and more efficiently than other farmers.

Second, is the financial capital factor. Financial capital includes household assets, non-agricultural income, and access to finance for agricultural production.

Third, the social capital factor: Society, which is an enduring network of the community's relationships of acquaintance and mutual recognition, may have its mode fixed.

Fourth, about farming conditions. Experimental studies show that factors of agroecological environment such as productive land, Privilege to use productive land, water resources, and weather conditions (especially today in the context of climate change) have an impact on the actions of households to choose to apply for technological advances.

Fifth, the factor of policy, is the support of the government and local authorities. Government and local government policies can influence farmers' decisions about technology adoption. Then there's the market factor. The application of science and technology in agricultural production can only be successfully implemented when the producer has access to inputs and the output market, thereby reducing the transaction costs of households.

Thirdly, studies on pangasius production and pangasius farming technology

With different approaches, the works have shown the current situation, difficulties and limitations, and the role and significance of applying technical and technological advances in production to increase output, competitiveness, and sustainable development of the pangasius industry in the Mekong Delta in general and in Can Tho city in particular.

Fourthly, studies on the experience of developing high technology agriculture, application of high technology in agriculture

The works have in common is the emphasis on creating favorable factors to promote the development of high technology agriculture such as: determining the role of the subjects of enterprises, cooperative economic units, and farmer households; production planning suitable to each ecological condition; each locality, each stage of assessment, preliminary and directing the next implementation; improving the role of market-oriented enterprises; expand production links associated with consumption markets; promptly propose central ministries and branches on planning orientations and policies to support the development of high technology agriculture in the locality.

1.2. EVALUATE THE RESULTS ACHIEVED AND ISSUES THAT NEED FURTHER RESEARCH

1.2.1. The results obtained from the research works

Through the overview study of the above works, it is shown that the works with the research point of view, different research contexts, research methods, and approaches have created a richness of material related to the research topic. The works have made great contributions to the theoretical basis, current situation, and solutions to develop high technology agriculture, at the same time affirming the position and role of each factor and the need to pay attention to the importance of each influencing factor to the application of high technology in agricultural production in general and pangasius farming in particular.

1.2.2. Issues related to the research topic that the works have not yet been solved

The studies have not clarified the specific criteria for the development of high technology agriculture; what factors affect the application of high technology in production in the specific field of pangasius?

Some empirical studies but approach from a technical perspective, guiding regulations and standards. Besides, some previous quantitative studies also contain information about the relevant variables, however, the proposed evaluation framework is from the perspective of sociologists or on the environment, so it has not been shown how the factors affect and how much impact they have served as a basis for proposing solutions to provide a theoretical basis for state management.

Some studies have a qualitative scale approach to show and measure variables so reliability may not be guaranteed.

1.2.3. Dissertation issues that need further research

Firstly, in theory, the thesis needs to clarify the concept and related issues such as characteristics, criteria and high technologies in agriculture that have been studied and are encouraging application in practice to unify the understanding from managers to farmers, and other units when participating in promoting the application of high technology in local pangasius farming.

Secondly, based on the analysis and selection of the group of factors proposed and used by previous studies, the PhD candidate must systematically determine the factors affecting the intention to apply high technology in pangasius farming in Can Tho city.

Thirdly, propose an approach to studying the factors affecting the application of high technology in pangasius farming in Can Tho city, as a basis for building the research model of the thesis.

Fourthly, study the current status of the agricultural industry and the application of high technology in pangasius farming in Can Tho city to describe and evaluate the characteristics of the industry.

Fifthly, test the research model on the factors affecting the application of high technology in pangasius farming as a basis for proposing solutions to promote farmers to apply high technology in pangasius farming in Can Tho city for the sustainable development of this field in the next period.

Chapter 2
THE THEORETICAL AND PRACTICAL BASIS FOR FACTORS AFFECTING THE APPLICATION OF HIGH TECHNOLOGY IN AGRICULTURE

2.1. CONCEPTS AND FEATURES OF THE APPLICATION OF HIGH TECHNOLOGY IN AGRICULTURAL PRODUCTION

2.1.1. High technology and application of high technology in agriculture

High technology concept: As a term to distinguish it from simple technology, is a technology that is integrated from modern and advanced scientific and technological achievements. But it needs to be considered the characteristics of each industry/product based on the impact of the technology used on the industry and products compared to previous technologies/techniques used in production.

Application of high technology in agricultural production: Understood as the application of advanced (new) techniques by producers focus on changing production methods from traditional to modern such as automation, information technology, new materials, biotechnology, seeds, etc. best implement the coordination between people and other resources in production, through which can optimally exploit input resources to improve efficiency, increase output and quality of agricultural products, towards sustainable agricultural development.

In terms of content, the application of high technology in pangasius farming is understood as the application of advanced (new) techniques by producers (farming households), focusing on changing farming methods from traditional to modern farming techniques The Ministry of Agriculture and Rural Development pointed out in Decision 738/QD-BNN-KHCN to best implement the coordination between people and other resources in production, through which can optimally exploit input resources to improving efficiency, increase output and quality of agricultural products, towards sustainable agricultural development.

2.1.2. Contents and features of high technology applied agriculture

Contents of high technology agriculture:

High technology application activities in agriculture in our country currently include the following main contents: Selection and application of advanced technologies (new technologies) in each field of agricultural production; farming technology in cultivation, animal husbandry, aquaculture, and fishing; Application of harvesting, preservation, and processing technology. Gradually apply information technology to management, brand building, and market promotion.

Features of high technology agriculture: Application of high technology in agriculture using large investment capital; the production process is strictly controlled and highly automated; high technology application in agricultural production creates greater efficiency than traditional production; the application of high technology in agricultural production is characterized by linking economic efficiency with environmental protection, towards sustainable development:

2.1.3. Criteria for high technology applied agriculture

In our country, depending on the characteristics of the subjects applying technology to production, the criteria for units, high technology agricultural organizations, and projects are regulated in various legal documents, derived from the concept of high technology specified

in the law on high technology. It focuses on 4 groups of criteria: Technical criteria; economic criteria; social criteria; environmental criteria.

2.2. THEORIES USED IN THE STUDY TO DETERMINE THE FACTORS AFFECTING THE APPLICATION OF HIGH TECHNOLOGY IN FARM HOUSEHOLDS

During the second half of the 20th century, many theories were formed and tested to study user acceptance of technology, related to the thesis topic, PhD candidate approached several related theories: The theory of Reasoned Action (TRA); theory of Planned Behavior (TPB); Technology Acceptance Model (TAM); Unified Theory of Acceptance and Use of Technology (UTAUT); Sustainable Livelihoods Framework Theory (DFID):

2.3. INTERNATIONAL EXPERIENCE IN THE COUNTRY ABOUT THE APPLICATION OF HIGH TECHNOLOGY IN AGRICULTURE AND LESSONS FROM CAN THO CITY

2.3.1. International experience in the country on the application of high technology in agriculture.

2.3.1.1. Foreign experience

** Israel's experience*

** Japanese experience*

** Indian experience*

2.3.1.2. Domestic experience

** Experience in Lam Dong province*

** Experience of An Giang*

2.3.2. Some lessons learned for Can Tho city

From the practice of encouraging the application of high technology to develop high technology in agriculture of some countries the application of high technology in agricultural production in Can Tho city needs to focus on the following basic contents:

Firstly, strengthening the promulgation and effective implementation of policies on agricultural development with high technology application

Secondly, creating favorable environments and conditions for the development of high technology agriculture.

Thirdly, there is a mechanism to connect scientists at institutes and universities; consulting companies with farmers to transfer technology solutions, and techniques and provide knowledge, skills, and information on new and modern technologies in pangasius farming to innovate the way, the efficiency of farming activities for households.

Fourthly, orient and promote communication, select appropriate technology, and at the same time replicate the models of effective high technology applications of agricultural production organizations.

2.4 MODEL BUILDING AND RESEARCH HYPOTHESES

Based on theory, at the same time, inheriting and adjusting some studies in and abroad made about the application of high technology in agricultural production, the author builds the research hypotheses of the dependent variable and the independent variable as follows: The dependent variable is the intention to apply high technology in pangasius farming of households the study identified 8 independent variables (explaining the factors affecting the intention to apply high technology in pangasius farming of households):

Hypothesis 1: Human capital has a positive effect on the intention to apply high technology in pangasius farming.

Hypothesis 2: Income instability and unfavorable access to finance hurt the application of technology and technical advances to pangasius farming of households.

Hypothesis 3: Conditions of the environment of farming (land, water resources,...) hurt the application of high technology in fish farming of households.

Hypothesis 4: Social capital positively affects the intention to apply high technology to households.

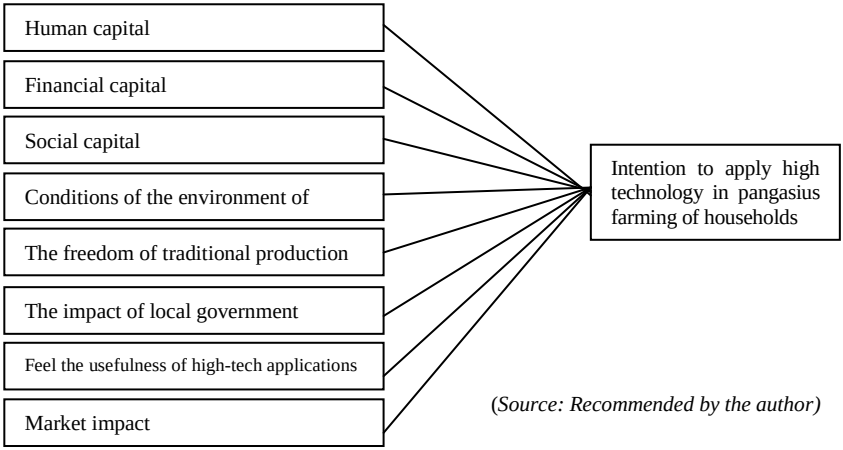
Hypothesis 5: Ineffective and ineffective policies negatively affect the intention to apply high technology to farmers.

Hypothesis 6: The usefulness of high technology positively affects the intention to apply high technology of pangasius farmers.

Hypothesis 7: The market has a positive impact on the intention to apply high technology of households.

Hypothesis 8: The freedom of traditional production negatively affects the intention to adopt high technology in pangasius farming of households

After summarizing the theoretical basis and building research hypotheses, the proposed research model is as follows:



(*Source: Recommended by the author)*

Figure 2.3: The proposed research model

Chapter 3
RESEARCH DESIGN

3.1. QUALITATIVE RESEARCH

3.1.1. Design of qualitative research

The overview of the current situation of pangasius farming in Can Tho city is done through secondary data collected from (1) Government documents, (2) the Ministry of Agriculture and Rural Development, (3) In the libraries: books, dissertations, research works of the National Library, Library of National Economics

University, Library of Ho Chi Minh National Academy of Politics (4) General Statistics Office; (5) Department of Agriculture and Rural Development of Can Tho city; (6) Departments of Agriculture and Rural Development of districts with pangasius farming in the city and (7) on the Internet: google scholar academic database and prestigious domestic and foreign magazine sites.

In addition, to achieve the goal of discovering the factors affecting the application of high technology in pangasius farming of households, the thesis uses the method of interviewing experts who are leaders and officials who have been working at the Department of Agriculture and Rural Development, Department of Agriculture and Rural Development, Officer of Sub-Department of Fisheries; lecturer of Fisheries Faculty of Can Tho University; Representatives of businesses purchasing commercial pangasius in Can Tho city to seek opinions for determining influencing factors, building research hypotheses, set up the scales and calibrate the scales to complete the questionnaire.

3.1.2. Qualitative research results

In general, the interviewees agreed with the groups of factors affecting the intention to apply high technology in fish farming of households. However, there are some comments from experts on the questionnaire and the PhD candidate revised it according to these comments, specifically presented in the thesis. After interviewing experts, business representatives, and farmer representatives, the official scale includes 48 observed variables with 9 components (dependent variable includes 3 observed variables, independent variable includes 45 observed variables) is presented in detail in the variables and the functional scale of the thesis.

3.2. QUANTITATIVE RESEARCH

3.2.1. Sequence of steps in quantitative research

Step 1: Design the questionnaire

Step 2: Select a sample for quantitative research

3.2.2. Methods of data analysis

The study uses qualitative analysis through analytical methods, to synthesize, compare, and analyze secondary data to describe, and assessment of the current state of the research problem. In addition, the study also used quantitative analysis

Quantitative analysis is performed through the following basic steps:

Step 1: Descriptive statistics.

Step 2: Check the reliability of the scale.

Step 3: Analyze exploratory factors.

Step 4: Regression Analysis

Chapter 4
STATUS OF INFLUENCING FACTORS TO THE APPLICATION OF HIGH TECHNOLOGY IN PANGASIUS FARMING IN CAN THO CITY

4.1. OVERVIEW OF CAN THO CITY AND THE SITUATION OF HIGH TECHNOLOGY APPLICATIONS IN PANGASIUS FARMING IN CAN THO CITY

4.1.1. Brief introduction about the natural and socio-economic conditions of Can Tho city

Natural condition

Social and economic conditions

With the natural and socio-economic conditions being promoted for development, Can Tho is forecasted to become the regional center for high technology agricultural and aquaculture production, food processing, and export, thereby becoming a key factor in ensuring food security in the Mekong Delta region.

4.1.2. High technology application situation in pangasius farming in Can Tho city

4.1.2.1. Characteristics of pangasius farming and the situation of pangasius farming in Can Tho city recently

** Characteristics of catfish farming*

This part of the thesis presents the contents related to the Characteristics of catfish ponds; Regarding the stocking density of fish; About fish food, the environmental management of ponds, etc.

4.1.2.2. Overview of pangasius farming in Can Tho city over the past time

In recent years, implementing the City's policy on agricultural development in general and aquaculture in particular towards sustainability, ensuring food safety and hygiene, and environmental sanitation. Therefore, all levels and sectors of agriculture focus on all measures to accomplish the goal of restructuring and promoting the construction of aquaculture areas. Applying standards to provide a source of high-quality goods.

4.1.2.3. Overview of the situation of high technology applications in pangasius farming in Can Tho city

Until 2020, Can Tho city has applied new science and technology in the field of catfish farming; to build a concentrated pangasius rearing and rearing area by farming planning; ... thereby contributing to rational use, effective in natural resources, increasing the proportion of fishery industry, and at the same time improve income for people participating in this industry.

The application of high technology farming methods in Can Tho city of households is still limited in number and, very few farmers apply high technology in the entire production cycle, depending on the area, and economic conditions, etc households apply a certain technical process to the production process, through a survey of secondary data (from industry reports and studies) shows that some technologies that have been successfully researched and are encouraging pangasius farming households to apply in the city recently are: Seed production technology; Recirculating fish farming technology; Biofloc Technology; Aquaponic Technology; Automatic feeding technology on demand; Monitoring, and automatic tracking of fish growth: using IoT (Internet of Things) technology:

In addition, recently, the Department of Agriculture and Rural Development of Can Tho city has also implemented, propagating, and supported Blockchain technology to farmers to trace the origin from the breeding stage of finished products to meet increasingly stringent output standards in demanding markets to improving the value chain of pangasius.

These achievements

With the support and direction of the city government, the application of new science and technology in the field of pangasius farming is increasingly

interesting for farmers to learn and apply in the production process. The city has built a concentrated pangasius rearing and rearing area by the Master Plan for Pangasius farming and processing in the Mekong Delta to 2020 according to Decision 3885/QD-BNN-TCTS dated September 11, 2014. Accordingly, in the recent period, with the support of modern science and technology, it has contributed to promoting the increase of export pangasius output although the farming area decreased compared to previous years; at the same time, the application of modern technology to the production process also helps in the rational and effective use of natural resources, in the face of increasingly heavy impacts of climate change affects water resources as well as efficient use of inputs, limiting emissions to the environment.

The application of high technology has actively contributed to and promoted the process of forming a concentrated pangasius breeding industry as well as commercial fish farming areas, contributing to stabilizing supply.

Farming households are increasingly interested in the application of modern technology to meet the prescribed technical standards to ensure the supply of pangasius seed in sufficient quantity, safe from diseases, and traceable to the origin. Currently, there are over 150 farming households with an area of about 600 hectares of pangasius farming that have applied and obtained the Certificate of Good Aquaculture Practices (VietGAP) compared to only about 400 hectares in the first phase.

Existences, limitations, and causes

The investment cost to build high technology pangasius farming models is large, so the number of households raising pangasius in the direction of high-technology applications is still small. Many farming households do not have enough economic conditions to apply high technology in improving the farming process and product quality.

The scale of agricultural land of households is still small, and the concentration of large production land is mainly through the forms of association and cooperation.

Funding to support the development of high technology application models has not met the city's high technology agricultural development goals. It can be said that the application of high technology in pangasius farming brings many benefits to farmers;

However, high technology application activities have not been widely deployed in pangasius farming households in Can Tho city.

4.2. ANALYZE THE CURRENT SITUATION OF INFLUENCING FACTORS TO THE APPLICATION OF HIGH TECHNOLOGY IN PANGASIUS FARMING IN CAN THO CITY

4.2.1. Influence of factors on the application of high technology in fish farming in Can Tho city through secondary data analysis

The human capital factor: Identifying human capital factors through qualitative research shows the characteristics of human capital In the farming activities of pangasius households in Can Tho city, there are some limitations such as: (1) Laborers engaged in pangasius farming have a high level of education, and the percentage of trained professionals and technicians is still low,

so the acquisition of technology and application of science and technology in farming is still low. the farming process is limited, especially high technology; (2) Farmers involved in pangasius farming in the city still have little investment in researching and understanding the regulations, and criteria related to the output of the product; (3) A part of households know how to apply and use techniques and high technology, for the most part, is to participate in short-term training and refresher courses organized by training institutions or enterprises themselves.

Social capital factor: Recently, Can Tho city has focused on building a chain of high technology pangasius production. In addition, the City has encouraged and supported the formation of a system of businesses investing in technology in pangasius farming, playing the role of a nucleus (input supply, processing, trade) linking with farmers, leading value chains, and developing markets; Although the link between farmers and processing factories and enterprises has been established, the legal obligations are still not very tight; Trading still passively takes place, not following the forecast information about the rise and fall of market prices. If the price is high, the fisherman automatically sells the fish to another place, or vice versa, if the price is low, the processing plant will not buy or buy a certain amount to maintain operations.

Financial capital factor: Over the past time, the city's high technology application activities have been carried out in aquaculture. Specifically, the application of high technology in pangasius farming shows that the investment costs in building high technology agricultural models are very large. However, many production facilities and farming households do not have the economic conditions to apply high technology in improving production processes and product quality. In addition, according to research by Truong Hoang Minh and Tran Hoang Tuan (2014), Most pangasius farmers have to borrow bank loans with high-interest rates and increase production costs and unsecured banking, while funding to support the development of high technology application models is limited, cannot meet the needs of households.

City's policy towards the development of high technology pangasius farming:

(i) Regarding the planning and reorganization of production: Party committee, the government of Can Tho city actively promulgated many programs and plans for the development of high technology aquaculture, specifically: Action plan to implement the Fisheries Development Strategy from 2021 to 2030, with a vision to 2045; Decision No. 102/QD-UBND approving the master plan for fisheries development of Can Tho city up to 2020, with orientation to 2030; Planning on high technology aquaculture production areas in Can Tho city in 2020 and orientations to 2030; The city has implemented Decree No. 36/2014/ND-CP dated April 29, 2014, of the Government on raising, processing, and exporting pangasius products and Circular 23/2014/TT-BNNPTNT dated July 29, 2014, of the Ministry of Agriculture and Rural Development, guiding the implementation of Decree 36/2014/ND-CP, production reorganization is concerned. command and implementation, especially building linkage models, cooperatives and production cooperative groups to create favorable conditions to support increasingly stable production and sustainable development.

(ii) Regarding the activities of fostering, propagating, and disseminating modern pangasius farming techniques, ensure compliance with food safety standards. In the past time, the city's functional sector has focused on disseminating the processes of nursing technology and specialized farming of pangasius to the people through training courses and extension materials.

(iii) Regarding policies to encourage investment in high technology fish farming. Effectively implement policies to encourage enterprises to invest in agriculture and rural areas. Up to now, the city has approved 32 projects, with total investment capital of 1,261 billion VND to call for investment in the 2016-2020 period; Develop projects and plans to implement policies to support the development of high technology agricultural models in the city.

(*iv) Regarding the certification of registration of pangasius farming.* Over the past time, Can Tho city has accelerated the implementation of Decree 36/2014/ND-CP: Issuing 115 certificates of commercial pangasius farming area; 04 certificates of identification number of pangasius ponds, and 22 certificates of re-identification of catfish pond identification numbers; Implementation of Decree 55/2017/ND-CP: Has issued 14 certificates of identification number of pangasius ponds and 42 certificates of re-certification of identification number of pangasius ponds.

About the market and market trends for importing pangasius. The markets have strict regulations on quality, food hygiene, and safety for pangasius, especially the regulations on food hygiene and safety criteria of different markets are also different,... if farmers do not strengthen linkages with enterprises when participating in exporting to expand consumption scale, ensure output stability and value increase.

4.2.2. Quantitative research results

4.2.2.1. Descriptive statistics of survey subjects

From the results of the data collected through the questionnaire, the survey subjects showed that the average age of survey participants was 42.3 years old; in which, with under 40 years old accounting for 36.4%, from 40-45 years old accounting for 29.6% and over 45 years old accounted for 34.0%. In general, the distribution of age groups in the survey sample does not have a big difference.

Regarding education, the average number of years of schooling is 9.86 years, in which 63.9% of survey respondents have an education level below high school and 18.5% have an education level at high school and 17.6% have an intermediate level or higher. In general, the education level of survey respondents in grade 9 accounts for a relatively large proportion (accounting for 35.5%).

Regarding the number of years of raising pangasius, the average duration of fish farming of the survey respondents was 9.67 years; of which less than 5 years accounted for 12.9%, 5-10 years accounted for 45.8% and 10 years or more accounted for 41.4%. In general, the majority of survey respondents have been raising pangasius for more than 5 years.

Regarding the area of farming ponds, the survey results show that the average area of the pangasius farming household is 15,054 m^2, in which the lowest pond area is 1200 m^2 and the highest is 53,000 m^2.

Regarding the number of main employees, the average number of main

employees in households is 2.68 people, in which the household has at most 5 main employees and at least 2 people.

Regarding the characteristics of owning water surface in ponds, 65.9% of respondents answered that they raise on their family's land the remaining 34.1% of respondents answered that they raise cages in rivers and rent water surface areas to raise fish.

4.2.2.2. People's awareness about factors affecting the application of high technology in pangasius farming

People's awareness about factors affecting high technology application in pangasius farming is considered the independent variable. The survey results show that people's perception of influencing factors is shown as follows:

Awareness of the human capital factor. The survey results show that the standard deviations of the indicators are all below 1 and this shows that the data has little significant difference; the level of agreement of the indicators is only less than 3.4 and this shows respondents about human capital impact are at a neutral level. Assessing that this factor affects the intention to apply high technology to pangasius farming, only 40.5% of respondents agree and more than 2/3 of the total respondents are neutral and disagree.

Understanding the element of financial capital. Financial capital in this study is manipulated by the indicators shown in Table 2 there are ¾ indicators answered by farmers at a neutral level about the impact of financial capital on the application of high technology in pangasius farming; only the statement "Application of high technology pangasius farming is very expensive" with an average score of 3.86/5 points and this shows that people agree with this statement, 64.7% of survey respondents believe that there is a lack of investment capital. So, the application of high technology to pangasius farming requires the support of the state's financial factors so that they can boldly invest in modern equipment for high technology applications in pangasius farming.

Understanding the element of social capital. An assessment of the perception of social capital affecting the intention to apply high technology to pangasius farming showed that 44.3% of respondents agreed on this; while 23.0% still disagree. Thus, it can be said that the social capital factor has an impact but has not been clearly shown in the perception, and to evaluate the influence more specifically, the thesis will present the results of the regression analysis.

Awareness of pond conditions. Awareness of farming conditions including area, water source, weather, and infrastructure through survey results showed that the level of agreement of the respondents on the impact of pond conditions on the application of high technology in pangasius farming ranged from 3.3-3.47/5 points. In, the statement that "high technology application requires a large enough pond area" has the highest average score (3.47 points). This shows that the area of the pond is one of the important factors for people to decide on whether or not to apply high technology to pangasius farming.

Awareness of policy factors. The survey results show that 5/6 statements are at 3.44 or higher and this shows that the respondents agree with these statements. Except for the statement "Local authorities often orient, promoting businesses to link with farmers to create favorable conditions for the application of high technology in fish

farming" less than 3.4 out of 5 points, which means neutral.

Awareness of the usefulness of high technology applications. The survey results show that most of the comments about the usefulness of high technology applications have an average score of 3.39 or higher which means that the respondents agree with these statements, in which the statement "Application of technology helps to increase production", "saving on labor time" and "helping to reduce disease during farming" were agreed with the highest and lowest average scores being "Reducing dependence on nature". 75.8% of respondents are agreeing on the impact of the usefulness of high technology on the intention to apply high technology in pangasius farming, so it can be said, awareness of the usefulness of high technology applications creates more motivation for farmers who intend to apply high technology in pangasius farming.

Awareness of market factors. The market factor is one of the important factors for high technology application decision behavior. The survey results show that 63.7% of respondents agree that market factors have an impact on the intention to apply high technology to pangasius farming. This shows that the majority of respondents are highly aware of the significant role of the market in high technology application behavior in pangasius farming. For example, "The output market (customers) today is very fond of products with high technology applications" and "better responsive to commercial fish, including demanding markets".

Awareness of traditional production methods. The survey results show that the majority (4/5) of the comments show that fish farmers agree on traditional production methods that affect the intention to apply high technology to fish farming. This shows that fish farmers are aware of traditional production methods that affect the intention to apply pangasius farming.

People's perception of the intention to apply high technology in pangasius farming survey results showed that 52.8% of survey respondents said that they agree and strongly agree with high technology applications. This shows that the specific level of consent focuses on the agreeing and neutral groups. Even so, the respondents still expressed their intention in applying high technology to pangasius farming.

4.2.2.3. Scale testing and exploratory factor analysis (EFA)

Reliability analysis. The reliability of the scale is assessed through Crobach's Alpha tool and factor analysis. Results of coefficients α greater than 0.7 and all correlation coefficients - the sum of the variables are greater than 0.3. This proves that the variables are suitable and ensure reliability. Analysis of Crobach's Alpha coefficient also shows that there are 41 independent indicators observed and qualified to analyze EFA factors.

EFA factor analysis for independent variables. Through the analysis results, the coefficient KMO = 0.863 > 0.5, so the factor analysis is in good agreement with the Sig value. (Bartlett's Test) = 0.000 (sig. < 0.05) shows that the observed variables are correlated with each other in the population. Eigenvalues = 1,508 > 1 at factor 8, thus, the 8 factors extracted from EFA have the best meaning to summarize the information of the observed variables. Total variance extracted: Extraction Sums of Squared Loadings (Cumulative %) = 62.560% > 50%. This proves that 62.56% of the variation of the data is explained by the above 8 factors.

EFA factor test for the variable intention to apply high technology in

pangasius farming. Through the analysis results, there is a factor extracted from the observed variables included in the EFA analysis. The extracted variance is explained as 56.779 % at an eigenvalue of 3.407 > 1. KMO coefficient = 0.874> 0.5, so factor analysis is appropriate as Sig value. (Bartlett's Test) = 0.000 (sig. < 0.05) shows that the observed variables are correlated with each other in the population and at the same time show a good analytical model.

Analysis of the impact of independent variables on the intention of applying high technology to pangasius farming. There are two groups of independent variables affecting the intention to apply high technology to pangasius farming. The group of variables has the opposite effect with the intention of applying high technology to fish farming such as pond conditions, financial capital, traditional production methods, and policies; a group of variables that have a positive effect, including utility, market, human capital, and social capital. The probability for this relationship to occur ranges from 31.5% - 57.7%; in which the strongest correlation occurs in the relationship between the usefulness of high technology applications and financial capital; The lowest is the relationship between traditional production methods, policies, and the application of high technology to pangasius farming. This result shows, the independent variables all have a linear relationship with the variable intention to apply high technology in pangasius farming and allows the study to establish a linear regression model.

The linear regression model was built based on 8 independent variables including (1) Pond conditions, (2) The usefulness of high technology applications, (3) Financial capital, (4) Markets, (5) Human capital, (6) Impact of traditional production methods (7), Policy and (8) Social capital. The results of the model analysis show that Sig test value F = 0.000 < 0.05 and R2 = 0.674, this for the regression model with 8 independent variables in table 4.6 is completely appropriate and explain the variation of the dependent variable due to the impact of 8 independent variables in the model with a probability of 67.4%.

Confirm research hypotheses. From the results of the above quantitative analysis, the research hypotheses of the model are confirmed and summarized in the table below.

Table 4.10: Confirmation of research hypotheses

Research hypotheses		Confirm hypothesis
H1	Child capital has a positive impact on intention to apply high technology in pangasius farming	Agree
H2	Unstable sources of income and unfavorable access to finance have a negative impact on the application of technology and technical advances to pangasius farming of households	Agree
H3	Conditions of the environment of farming (land, water sources, ...) strictness hurts the application of high technology in fish farming by households	Agree
H4	Social capital positively affects the intention to apply high technology of households	Agree
H5	Lack of policy has little effect on farmers' intention to apply high technology	Agree
H6	The usefulness of high technology has a positive effect to the intention to apply high technology of pangasius of households	Agree
H7	Market barriers have the opposite effect changing the intention to apply high technology of households	Agree
H8	The freedom of traditional production has the opposite effect changing the intention to apply high technology in pangasius farming of households	Agree

(Source: Author's analysis results)

Chapter 5
ORIENTATION AND SOLUTIONS TO ENCOURAGE FARMERS HIGH TECHNOLOGY APPLICATION IN PANGASIUS FARMING IN CAN THO CITY

5.1. OPINION AND ORIENTATION TO INCREASE THE APPLICATION OF HIGH TECHNOLOGY IN PANGASIUS FARMING IN CAN THO CITY

5.1.1. High technology application perspective in pangasius farming in Can Tho city shortly

Continue to take advantage of and promote the role of science and technology, considering science and technology an important factor, key to developing the city's aquaculture sustainably; proactively adapting to climate change, saltwater intrusion, and sea level rise, including pangasius farming. Promote the promotion of research and application and transfer of science and technology, contributing to promoting digital transformation in pangasius farming towards smart; improving productivity, output, quality, product value and production efficiency so that the pangasius farming sector continues to make important contributions to the growth of the agricultural sector and socio-economic development of Can Tho city.

5.1.2. Orientation to increase the application of high technology in pangasius farming in Can Tho city shortly

Strengthening research coordination and transfer of new technical advances in pangasius farming, creating a premise to encourage farmers to access and use high technology in the farming process to improve the productivity and quality of commercial fish, and increase competitiveness, thereby increasing value and stabilizing income for farmers.

Accelerate the application of high technology in several important stages of the rearing process, then step by step towards the application of high technology in all fish farming activities, towards farming activities to ensure water saving, save fuel to protect the environment, prevent diseases and adapt to climate change.

Focus on developing high technology applications in pangasius farming in areas with favorable conditions such as O Mon districts, Thot Not to form effective models, spreading to farming households in other areas. Focus on using high-efficiency, energy, resource, and low-emission technology to meet the requirements of environmental protection; encourage the development and transfer of modern technology, high-added value, and competitive ability in international integration.

5.2. GROUPS OF SOLUTIONS TO ENCOURAGE FARMERS TO APPLY HIGH TECHNOLOGY IN PANGASIUS FARMING IN CAN THO CITY UNTIL 2030

5.2.1. Solutions on propaganda and transfer and disseminating technology contribute to increasing the application of high technology in pangasius farming of households

For communication to work really effectively, contribute to changing awareness, and increase the transfer of agricultural technology and techniques, it is necessary to focus on basic contents such as: (i) Deploy appropriate forms of communication, based on the actual situation and natural, economic and social conditions of the locality; (ii) Communication follows divergence, the first time communication needs to focus on inadequacies, limitations of traditional production

methods in the current context and focus on communication on the benefits and roles of science and technology; (iii) Organize educational and information dissemination programs or support businesses in communication and application of technology in agricultural production.

Organizing fairs, technology and equipment markets, and forums with the participation of businesses, organizations, and households to propagate and introduce scientific and technological advances in pangasius farming.

Promoting evaluation and recognition and build demonstration models of high technology applications in fish farming in areas with a large concentration of fish-raising households.

Building an integrated electronic database, updating and timely posting high technologies, effective high technology application models, and new technology research results.

Strengthening close coordination between Research Institutes, Universities, and the agricultural extension system contributes to the rapid dissemination and transfer of modern technologies.

There is a mechanism to encourage enthusiasm and the enthusiasm of the agricultural extension staff in transferring new technology to households.

5.2.2. Solutions to enhance financial support for households

Promoting the implementation of mechanisms and policies specified in the Law on High Technology; Decision No. 1895/QD-TTg of the Prime Minister and decisions of the People's Committee of Can Tho city on the development of high technology agriculture, which includes promoting the application of Can Tho city in pangasius farming, specifically:

Develop a mechanism to create favorable conditions to promote enterprises, Banks and credit institutions provide financial support to farmers.

Mobilize capital sources for cooperation, association, and joint venture to build production and business establishments; integrate capital for implementation from approved programs, projects, and schemes; synchronously implement solutions and policies on agricultural investment to create favorable conditions for farmers, and business organizations' access to capital.

Paying attention to expanding credit activities, and diversifying credit products.

Maintain and have a mechanism to facilitate the implementation of policies to support pangasius farmers to innovate technology, equipment, and application of high technology in the farming process.

Create a mechanism to promoting the connection of businesses to build modern forms of technology equipment rental at some stages in fish farming activities with reasonable costs and low-interest rates.

Coordinating the development of cooperation programs, and investment promotion of the city to introduce information about the orientations, plans, and priorities in the high technology applications.

5.2.3. Solutions to increase human capital

In short term: (i) Strengthening coordination with relevant agencies to organize training courses for cadres and civil servants, in socio-political organizations, state management agencies, public non-business units in the field of aquaculture on new technologies, skills and uses of technologies so that cadres, officials, and unions play a pivotal role in introducing, transfer to people about high technologies in a way that is

easy to understand, remember and see the usefulness of the technology; (ii) Focus on training to ensure regularity, easy understanding and specificity for farmers, cooperative members, cooperative group members on skills to use high technologies in production, basic digital, information technology background in the rearing process; (iii) There is a technical support mechanism at each stage and according to the urgency of a group of households who are having difficulty in understanding, operating high technologies in the process of fish farming to help farmers initially access and quickly update knowledge, skills and techniques of high technology applied in fish farming; (iv) Promoting the establishment of a cooperation mechanism and develop a reasonable remuneration policy in inviting experts to support local research, transferring training of households to innovate production methods toward modernity through the increased application of high technology in the farming process.

In the long term: (i) Organize surveys, surveys, and forecasts of highly skilled human resources in the field of, aquaculture and seafood processing in general and the field of pangasius in particular; (ii) Promoting linkages between vocational education institutions and universities, aquaculture Research Institute and Enterprise; (iii) Increase the quantity and quality of Science and Technology Newsletters from basic to advanced, periodically; (iv) Organize and strengthen training institutions and research centers; (v) to encourage the movement of advanced learning, professional skills for staff of agricultural science and technology, enterprises, and farmers; (vi) Strengthening the training of human resources for high technology application activities.

5.2.4. Solutions to enhance the impact of promoting social capital

To promoting social capital, local authorities need to focus on influencing factors that increase social capital, and the following priorities should be implemented:

Implement a regional linkage program and join 04 houses in agricultural production. Actively implementing Decree No. 98/2018/ND-CP dated July 5, 2018, of the Government on policies to encourage the development of cooperation and association in the production and consumption of agricultural products·

Promoting the role of associations and mass organizations, especially Farmers' Unions as the survey results are analyzed in the current situation, most of the surveyed households said that to apply high technology in the farming process, the role of the Farmers' Union. In particular, it is necessary to have orientations and mechanisms for training and retraining to improve the quality of activities of the Farmers' Union and ensure sufficient quantity and better response in terms of quality so that farmers can confidently switch models, sustainable production methods through accepting and proactively applying high technology in production.

Enhancing the role and influence of production households in the city has applied high technology in aquaculture in general and in pangasius farming in particular, by selecting those farmers as a model for propaganda, visiting, learning and exchanging experiences.

Promoting the role of scientists in orienting, and deploying successfully researched technologies to improving the efficiency of fish farming.

Promoting the formation of supply organizations, and providing resources and favorable factors for the application of high technology in fish farming.

Attract businesses to invest and support farmers to apply high technology in agriculture.

Mobilize businesses, cooperatives, farms, cooperative groups, and farmers to participate in programs, and projects in the field of agriculture, complying with regulations on high technology agricultural development. Strengthening close links between the state, scientists, businesses, and people to improving production methods.

5.2.5. Market development solutions

Implement business support policies to develop the market and ensure output for commercial pangasius.

Strengthening market information work and market forecasts; actively disseminating information on the industry's web portal in a systematic way,... to meet the requirements of oriented investment in production and business development of enterprises and farmers; serving the requirements of restructuring production associated with the consumption market.

Strengthening trade promotion, creating favorable conditions for production facilities to access, searching for markets, and expanding domestic and foreign markets.

Strengthening the propaganda to raise awareness and understanding of households about the requirements of the pangasius import markets, technical competition issues of producers in general, and farmers in particular when participating in the common market.

5.2.6. Solutions to improving the efficiency of planning, area control, farming output, limiting spontaneous farming and empirical farming

Firstly, identifying areas with favorable conditions for expansion planning, linking according to a specific roadmap associated with brand building.

Secondly, planning a model of the high technology application in pangasius farming in association with businesses to develop a complete value chain to stabilize supply.

Thirdly, plan and orient the functions of post-harvest centers, and agricultural product transaction centers to increase linkages, market connections and brand positioning and above all, add value to high technology agricultural products.

Fourthly, the planning needs to closely follow the areas with agricultural production land to focus on the new planning to ensure synchronization and increase the level of attracting individuals and businesses to invest in the province's high technology agriculture.

Sixthly, publicize detailed planning for all subjects including farmers, agricultural extension officers, and organizations providing inputs for production to purchasing, consuming, and preliminary processing organizations to call for investment and increase synchronization, reduce information gaps, and increase consensus in implementation.

5.2.7. Some other solutions

Accelerate the restructuring of the agricultural sector in association with new rural construction and economic development and improve the lives of people in rural areas.

Strengthening the management and assessment of the application of high technology in pangasius farming in the city. Advise on the effective implementation of mechanisms and policies to encourage farmers to apply high technology.

CONCLUSION

Faced with the multi-dimensional impact of the requirements of the international economic integration process, scarcity of resources in aquaculture development in general, and the impact of climate change is becoming more and more obvious, the application of high technology in pangasius farming to increase productivity, quality, improve competitiveness, etc has great significance for the sustainable development of pangasius farming activities in Can Tho city.

Throughout the research process from overview of related research works, throughout the research process from overview of related research works, building the research theoretical framework, designing and research institutions, understanding the current situation, analyzing and processing data, proving the research hypotheses, and achieving the set research objectives. Specifically, the thesis has solved the following basic problems:

Firstly, specify the connotation of the concept of high technology application in agriculture, its characteristics, and criteria and high technologies in agriculture have been studied and are encouraging application in practice to unify the understanding from managers to farmers, other units when participating in promoting the application of high technology in local pangasius farming.

Secondly, based on analysis, selection of the proposed group of factors, and use of previous studies, through qualitative and quantitative research methods, the thesis has systematically identified 8 factors affecting the intention to apply high technology in pangasius farming of households in Can Tho city. Which, through the correlation test of the observed variables, the thesis has identified two groups of independent variables to apply high technology to pangasius farming. The group of variables with the effects opposite the intention of applying high technology to fish farming includes pond conditions, financial capital, traditional production methods and policies; a group of variables with positive effects includes usefulness, market, human capital and social capital. The strongest correlation occurs in the relationship between the usefulness of high technology applications and financial capital, and the weakest correlation occurs in the relationship between traditional production methods, and policies with the application of high technology in pangasius farming, which is thereby served as the basis for the practical explanation of the application of high technology by households in practice with the aim of providing an appropriate solutions that encourage farmers to increase the application of high technology in the process of pangasius farming.

Thirdly, propose solutions to increase the percentage of households applying high technology in pangasius farming in Can Tho city to serve the sustainable development of the industry. The proposed solutions in the thesis are explained clearly in the proposed basis and specific content of each solution. Some solutions may have been and are being implemented, but when proposed in the thesis, they were based on specific scientific research results and can help management agencies make adjustments to bring higher efficiency.