Project Investocks: Online Investment System For Poultry And Swine Raisers With Decision Support System

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Abstract— Online-based technology in relation to the investment system for poultry and swine in the Philippines is not well known. Thus, study aimed to develop a Web-based Investment System that would help investors look for the best poultry and/or swine farm which could generate better investment returns. An Investor – Farmer matching system with decision process was developed using a user-friendly online interface for Pork Producers Federation of the Philippines Incorporated (formerly National Federation of Hog Raisers Inc. or NFHFI). This will contain a dashboard on the system administrator side that would reflect the overall performance and financial standing of participating livestock farms as well as comprehensive dashboard for investors which would display the historical and current investment data of every investor account. Main functions of the system include account management, enhanced decision making, maximizing the profit through Return on Investment analysis based on farmers' production data and profile. One-on-one interviews, focused groups and direct observations will be employed to collect primary data required for the system development. The effectiveness of the system and client satisfaction were discussed and presented after months of deployment in PPFPI website.

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Index Terms— Decision Support System; Online Investment System; Report Generation; Livestock Investment; Livestock Farming; Project Investocks; Decision Tree Algorithm

1 INTRODUCTION

In a recent [1] cited that the country is not self-sufficient in many agricultural commodities, particularly in livestock. She supported this claim by providing further information about the country's increasing import trends and figures of livestock products from 2010-2015. In a nutshell, her statement suggests that the country is increasingly being dependent on imported livestock products to suffice the demand of our people while neighboring countries exporting these products reap the benefits [2]. In addition, local livestock businesses are not able to compete with the low prices of the imported livestock products due to a number of factors: low productivity due to use of outdated methods and technology, lack of support from the government sector in relation to development, as well as limited budget support or government subsidy in the livestock sector [3].The only reason that the livestock industry is thriving throughout the years is due to the aggressive investments of large private corporations to the hog and chicken industry as per the senator's statement [4].

It is observed by [5] that there is intervention and budgetary support from the private commercial sector is needed for the country's livestock sector to continue growing, producing their products, supplement the demands of consumer, and compete with the imported livestock commodities in the market. However, the support that these large corporations provide are only allocated to the well-known players of livestock industry, sometimes to large corporation's own livestock subsidiary, leaving behind other less known but well-established livestock businesses, to financially thrive in every production cycle, by their own means, sometimes through word-of-mouth, financial investment requests or through bank loans. One organization which uses such methods of financial resource procurement is our client, the Pork Producers Federation of the Philippines Inc. Philstar.com states that Filipinos are the world's heaviest internet users in 2018 averaging at 10 hours and 2 minutes per person. In addition, 70 percent of these internet users spent money on eCommerce platforms. This is also evident on the report of Rappler.com as more Filipinos, particularly middle-class and Millennials are investing in the stock market.The increase in the stock market trading can be accounted to the increase in the total number of online accounts which boosted the online stock trading by 60.9%. The Philippine Stock Exchange president said, "Technology has played a big role in the growth of the investor base over the years as more and more Filipinos have continued to adopt online trading to invest in the stock market." On the other hand [6] emphasized that advancement of technology specifically the existence of numerous online investment platforms nowadays gave Filipinos further exposure to not just online stock market investment but to different schemes of investment. According to [7] one of which is known to the public as an online crowd funding platform. These platforms gave way for middle-class Filipinos to experience and reap the rewards of investing to this said program. As of today, numerous industries are currently utilizing such platform to advertise or market their project funding or financial assistance to potential online investor, but unfortunately there are only a few such investment programs for agriculture and livestock industry. Another mode of investment which is commonly known by any Filipino investor is called Time Deposit. Moreover, [8] discussed that a type of savings account that earns a fixed interest rate upon reaching maturity. Funds in a time deposit cannot be withdrawn during the term of the maturity but can be pre-terminated subject to penalty fees. Though this mode of investment provides you a fixed amount of investment return, Filipinos often find it lacking in relation to waiting time and the amount of investment return. Hence, investors often find other alternative investment schemes which would offer better returns despite of waiting time. By harnessing the opportunity of rising number of

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investors and advancement of internet technology, developing an online investment system dedicated for the livestock industry, specifically hog and poultry industry would cross the borders between livestock businesses and potential online investors [9]. It would also provide opportunities for investors to reap the rewards of investing in livestock businesses that usually generate better investment returns since as aforementioned above, commodities produced by the livestock business are increasingly in demand as the country's population increases. At the same time, livestock businesses would be given the opportunity to reach out to potential investors for additional financial resources to be used either for procurement of better equipment to increase productivity or to simply increase the headcount of their livestock farms to anticipate the demand of their products to the public. Upon deployment of the system to the web, the system proponents are hoping it would serve as an instrument for sustainability of local livestock commodities in the market, as well as diminish the dependence from importation of livestock products from neighboring countries. [10] Due to inflation rate increase in the past few years, the client has reported higher incidents of fund shortage amongst some of their members, leaving no choice but to decrease their production rate. The proponents believe the time to procure funds from alternate sources and harnessing the internet technology to reach out to online investors would be a good solution. Collating all the applicable aspects of some investment concepts, the proponents believe that an investment system which utilizes a time deposit maturity timeframe, in line with the different production cycle timeframes of livestock farms, as well as utilizing the collective power of small to medium investors, and possibly seasoned investors to fulfill the fund petitions, the client's problem of monetary fund procurement for its livestock farmers can be solved by implementing the Project Investocks.

2 Background of the Study

Investocks, a combination of the words "invests" and "livestocks", is a web-based investment system which comes with a data-driven decision support system feature, which would aid potential investors in searching, as per their preference, for a livestock farm to invest. At the same time, the system would serve as an online platform for livestock businesses under the Pork Producers Federation of the Philippines Incorporated to post their opportunities for investing in their businesses as well as possibly market their products to potential buyers [11]. Since establishment, the Pork Producers Federation of the Philippines Inc. has been committed in realizing their mission and vision as an organization, which is to be the backbone of the hog industry as it enhances the opportunities for business growth and viability towards the assurance of the country's food security and livelihood program, as well as to be a formidable catalyst in promoting the competitiveness, sustained growth, and protection of its members. However as mentioned by [3] due to the recent inflation rate, interest rates are at its highest peak in the Philippine Economy therefore limiting the options of livestock businesses and consider unconventional ways to keep their production funding enough on the next production cycle either to decrease their production rate which would result to diminished supply of livestock products or consider cutting other production expenses which then would reduce the quality of livestock products. The system will be managed by Pork Producers Federation of the Philippines Inc. (PPFPI), a non-government organization for hog farmers' association that monitors national legislations which may affect the interests of the numerous, different aspects and sides of people in the industry. It also serves as a way where vital statistics on market trends, disease incidence, growth performances, price and volume movements of swine farm necessities, and government directions in protecting the agricultural sectors are.

3 The Developed System

The team also conducted a survey which measures the degree which the developed system attained its objectives. The table below shows the respondents' extent of agreement/ disagreement with the statements given.

TABLE 1
5 –Point Likert Scale

Rating	Mean Range	Interpretation
5	4.50-5.00	Strongly Agree
4	3.50-4.49	Agree
3	2.50-3.49	Moderately Agree
2	1.50 -2.49	Disagree
1	1.00-1.49	Strongly Disagree

Investocks is an online investment system with decision support system which can only operate in Google Chrome and Mozilla Firefox web browsers. Further enhancements can be done to fully function in a mobile browser after the deployment of the system. Below are the screenshots of the web application.

4 Project Design

The system was developed in a codeIgniter web application framework, uses PHP 7.0. The system also has the integrated Payment system by PayPal REST for the payment feature is integrated in the CodeIgniter platform. The system's features can be used properly with Google chrome or Mozilla Firefox. Investocks web application has several modules and functionalities. Figure 1 shows the home page of the systems.

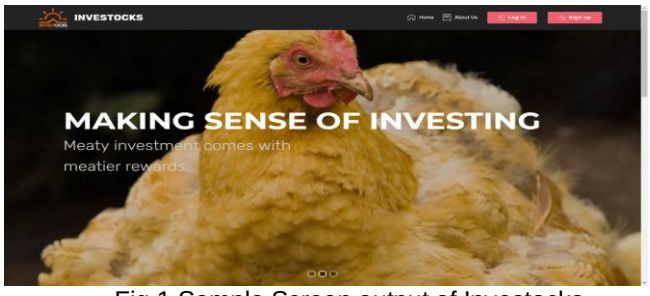

Fig 1 Sample Screen output of Investocks

The system showcased the branding of the federation itself, incorporated with the login, signup, and about us button will lead the user several functionalities as follows:

1. An about module was also included in the system which educate the users about the history of the federation.
2. The system has a registration module for those who want to be a part of the federation and crowd funding goal of the system.
3. The login module for both the farmer and investor provided that they have already been accepted by the admin has already confirmed their accounts by the email that was sent to them upon registration.
4. Access module allows the creation of the admin access and tracking process are taken into execution.
5. Reports module will automatically appear in Microsoft excel whenever the user wanted a separate copy of the reports regarding their investment. In addition, this section allows the investors to view their investment on different farms. Table will also produce by the system to forecasted return on investment, the amount which they invested, location of farm, date when they invested and the production rate of the farm. Also, the tracking of investment on the farmer side allows the farmer to view different investment approved on their farms. With the use of this they will be able to see the forecasted revenue of the investment and since the system promotes crowd funding they will also see the total amount of money they have acquired from the different investments they gathered.
6. The integrated Decision Support System aids investors to choose what farm is best to invest with. After answering a series of questions, the system will provide the top farms which matches the criteria of with which the investor has set. In this module the investor has already chosen a certain farm to invest on but to complete the said process they have to input the exact amount they want to invest to that certain farm at the moment.
7. And the last module is the payment, which the system is integrated with PayPal to have a more secured process of payment for the investor.

5 Result and Discussions

The proponents used purposive sampling. It is also known as a judgment, selective or subjective sampling and a sampling technique where in the researchers choose their respondents based on their own judgment. The respondents had to answer 16 different questions which correspond to the FURPS methodology. The ages and the occupation of the respondents varies from a wide range of people which allow the researchers to better analyze the different results generated from these different people. The statistical treatment used on determining the results is weighted mean average. The formula used for calculating the weighted mean is:

M = (R5 * 5) + (R4 * 4) + (R3 * 3) + (R2 * 2) + (R1 * 1) / N

Where:

M = Mean
Rx = number of respondents in their chosen rating
N = number of total respondents

TABLE 2
SYSTEM EVALUATION TABLE

Question	Weighted Mean
1. Investocks has necessary features needed to process and monitor monetary investments and returns.	4.29
2. Monitoring investments and returns using livestocks' dashboard can be done and easily understood.	4.10
3. Results from livestock and poultry farm search fits investor preference.	4.14
4. Registration and log-in process of Investocks is simple.	4.33
5. Navigation within the Investocks system is simple.	4.38
6. Investocks is easy to learn and use.	4.34
7. Investocks is an innovative investment system compared to other existing online investment systems.	4.15
8. Investocks has potential to help our fellow small and backyard livestock and poultry farmers.	4.15
9. Investocks provides accurate information about monetary investments and returns.	4.09
10. Investocks' webpage is neatly designed.	4.23
11. Loading issues or errors at the Investocks system are at minimal or non-existent.	4.08
12. Investocks is accessible and presentable on any device platform.	3.85
13. Investocks is accessible on any browser programs.	3.39
14. Investocks transactions are secured.	4.06
15. Investocks accounts are completely protected.	3.94
16. Funding petitions at Investocks are legitimate and well-regulated.	4.08
Total	**4.10**

Based on the gathered data, most of the respondents reacted positively towards the system especially the students. The proponents found out that the students and professionals liked the features of the system in terms of Functionality, Usability, Reliability, Portability and Security categories. Through the survey, the proponents were able to determine the strong points and weak points of the developed system. First, Calculated results for survey statement number 1 which garnered a weighted mean score of 4.29, it shows that out of the total number of response for this survey statement, 38 respondents which consists of 47.5% of the total number of respondents strongly agree, 32 respondents or 40% of the total respondents agree, as well as 7 respondents or 8.8% of the total respondents moderately agree. In short, Investocks has met the acceptable standards for investment processing and monitoring. Second, Calculated results for survey statement number 2 which garnered a weighted mean score of 4.10, It shows that out of the total number of response for this survey statement, 30 respondents which consists of 37.5% of the total number of respondents strongly agree, 32 respondents or 40% of the total respondents agree, as well as 15 respondents or 18.8% of the total respondents moderately agree. In short, Investocks has an acceptable and comprehensive dashboard, investors can use. Third, survey statement number 3 shows that 45% of the respondents (36) strongly agree, 31.3% of the respondents (25), agree, and 18.8% of the respondents (15) moderately agree in the said statement. In totality,Investocks' decision support system is effective in providing the preferred search results to the users which made the statement gain a weighted mean score of

4.14. Fourth, survey statement number 5 shows that 55% of respondents (44) strongly agree, 35% of the respondents (28) agree, and 3 respondents moderately agree to the said survey statements. The results depicted majority of the respondents find the layout of the whole system to be comprehensive but in statement number 13 it shows about the investocks is fairly accessible on any browser programs, It is being said because the system was developed entirely for the latest browsers in the web today. Lastly, based on the survey conducted, the system garnered a weighted mean score average of 4.10 in terms of Functionality, Usability, Reliability, Portability and Security categories. This would mean the system is eligible for deployment with further recommendations of system feature updates mostly focusing in the Portability and Security aspects of the system.

5 Conclusion and Future Works

Subject to the results of the survey conducted with the use of FURPS (Functionality, Usability, Reliability, Performance, and Security) as a method of measuring the capabilities of the created system. As observed on the results the proponents were able to meet the requirements and the main goal of the system. The system's specific objectives are as follows:

1. To develop the system's decision support feature which would be based on different factors such as return on investment (ROI), investment amount, production rate, maturity rate, and location
2. To develop comprehensive dashboard for the investors' and farmers' account, which will serve as an immediate reporting tool for investors' investment records and history
3. To integrate a secured payment system which would facilitate the monetary transactions of the investors and farmers
4. To create an account management system for facilitation of investor's profile and transactions, as well as showcasing the livestock farmers' farm performance metrics
5. To create an audit trail which would serve as a reporting tool for monetary investments and returns of investors and farmers

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