POLITEKNIK MALAYSIA

SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Exploring the Perceived Ease of Use and Perceived Usefulness of using drone in farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic's, Smart Farm

NAME	MATRIC NUMBER
MUHAMAD ARIF BIN HABIBUR REHMAN	08DPI17F2005
BAVANEE PREYA A/P SUBRAMANIAM	08DPI17F2008
NORSUHADA BINTI KAMARUZZAMAN	08DPI17F1082
FATIN NURAISYA BINTI MAHTIR	08DPI17F2015

This report is submitted in partial fulfilment of the requirements of the Diploma in International Business.

Department of Commerce

DECLARATION

This project entitled Exploring the Perceived Ease of Use and Perceived Usefulness of using drone in farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic's, Smart Farm and submitted to the Department of Commerce, Politeknik Sultan Salahuddin Abdul Aziz Shah to fulfil the requirements of Deploma in International Business.

Name of Students	Signature of Students
MUHAMAD ARIF BIN HABIBUR REHMAN	……
BAVANEE PREYA A/P SUBRAMANIAM	……
NORSUHADA BINTI KAMARUZZAMAN	……
FATIN NURAISYA BINTI MAHTIR	……

Verified by :

…… (Signature of Supervisor)

…… (Name of Supervisor)

…… (Department)

…… (Date)

ACKNOWLEDGEMENT

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout this research work to complete the research successfully.

We would like to express our deep and sincere gratitude to our research supervisor, Muhamad Hashim bin Ahmad, lecturer of Commerce department from Polytechnic Sultan Salahuddin Abdul Aziz Shah, for giving us the opportunity to do research and providing invaluable guidance throughout this research. His creativity, vision, sincerity and motivation have deeply inspired us. He has taught us the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under his guidance. We would also like to thank him for his friendship, empathy, and great sense of humor. We deeply extend our sincere thanks to his wife, family for their acceptance and patience during the discussion we had with him on research work and thesis preparation.

Our sincere thanks also goes to Datin Seri Zainah Binti Othman, commercial Officer and also Senior Lecturer of Commerce department in Polytechnic Sultan Salahuddin Abdul Aziz Shah, for her constant encouragement and her genuine support throughout this research work. We are extremely grateful for what she has taught us. She always support us on the presentation and also paperwork. We are extending our heartfelt thanks to her family for their acceptance and patience during the discussion we had with her on paperwork and thesis presentation.

We would like to thank one of the farmer at Kebun Komuniti Seksyen 8, Shah Alam for providing us with enough information, knowledge and experience. We are also thankful for the time and cooperation given from them. On the other hand, We would like to express our thank to Head of Entrepreneurship Development Unit of Polytechnic Sultan Salahuddin Abdul Aziz Shah, Zaharatul Akmar Ahmad Zainuddin for providing us with full information , cooperation and time to share some knowledge with us, which really help us in order to finish this paperwork.

We would like to say thanks to my friends and research colleagues, Bavanee Preya a/p Subramaniam, Muhamad Arif bin Habibur Rehman, Norsuhada binti Kamaruzzaman and Fatin Nuraisya binti Mahtir for their constant support throughout this research work.

Thank you.

ABSTRACT

This study explores the suitability of growing pineapples by using the fertigation technique in Sultan Salahuddin Abdul Aziz Shah Polytechnic's smart farm. The use of drone application is becoming more popular in the world. Soil conditions were studied by using the drone which was developed to read data from the internet. This was done to solve the problem of depleting human resources, group pesticides control, scheduled pesticides spray. The objective of this research is to explore the perceive usefulness of drone in smart farming and perceived ease to use of drone in smart farnimg at Sultan Salahuddin Abdul Aziz Shah Polytechnic .The research was aimed at establishing the relationship between two thematic at the Smart Farm. A data based was developed with two thematic variables, they are perceive usefulness and perceive ease to use. Then, a dependent variable, smart farming was included in the process of identifying the suitability of the crop growth. Smart farming using drone can minimising the chances of pesticides poisioning. The application of drone can help to increase productivity, permitting for improved agricultural adaption to the effects of climate change. Drone can assist in the reducing. An internal reliability test was also carried out to the reliability of all constructs. In this research, there are two independent variable which are perceived ease of use and perceived usefulness. The result of analysis shows that the perceived usefulness in smart farming in a first place followed by perceived ease of use. The findings concluded that in future, with the development of more advanced farm management techniques, such as precision agriculture, industry professionals now have more tools than ever to improve the accuracy and efficiency of processes.

TABLE OF CONTENTS

CHAPTER **PAGE**

TABLE OF TABLE AND FIGURE

CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Drones commonly referred, as UAVs are mostly associated with military, industry and other specialized operations but with recent developments in area of sensors and Information Technology in last two decades the scope of drones has been widened to other areas like Agriculture. The drones manufactured these days are becoming smarter by integrating open source technology, smart sensors, better integration, more flight time, tracking down criminals, detecting forest and other disaster areas.

An agricultural drone is an unmanned aerial vehicle used to help optimize agriculture operations, increase crop production, and monitor crop growth. Sensors and digital imaging capabilities can give farmers a richer picture of their fields. ... Agricultural drones let farmers see their fields from the sky. In the present era, there are too many developments in precision agriculture for increasing the crop productivity. Especially, in the developing countries like India, over 70% of the rural people depends upon the agriculture fields (UM Rao Mogili & B.B.V.L Deepak, 2018).The Unmanned aerial vehicle (UAV) aircrafts are used to spray the pesticides to avoid the health problems of humans when they spray manually. UAVs can be used easily, where the equipment and labors difficulty to operate.

One of main source of income in of India is Agriculture. The production rate of crops in agriculture is based on various parameters like temperature, humidity, rain, etc. Which are natural factors and not in farmers control. The field of agriculture is also depends on some of factors like pests, disease, fertilizers, etc which can be control by giving proper treatment to crops. Pesticides may increase the productivity of crops but it also affects on human health (S.R.Kurkute, 2018).

Agriculture can be defined as cultivation of animals, plants, fungi and other life forms for food, fiber, biofuel, medicinal and other products used to sustain and enhance human. It is the most comprehensive word used to show the many ways crop plants and domestic animals contribute in order to sustain the global human population especially in providing food and also other products.

1.2 BACKGROUND OF STUDY

The United Nations (UN) Food and Agriculture Organization predicted that by the year 2050, world population will reach 9.7 billion (Brown, 2018). Engineers and farmers are working together towards precision in food production through smart farming (Brown, 2018). The recent shift in agriculture technology 4.0 has replaced the 19th and 20th technology of which based on handheld tools and gasoline engines (Brown, 2018). Now, the focus is on integration and advanced technologies in order to increase production efficiency and quality products. According to Brown (2018), the pillars of smart farm fall into three agricultural technological categories such as autonomous robots, drones or UAVs, and sensors and the Internet of Things (IoT).

Smart farming has encouraged the development of integrated multi-functions systems. Apparently, the use of pesticides not only increases the productivity of crops but it also increases the adverse effects on human health. The World Health Organization estimates that there are 3 million cases of pesticides poison in each year and up to 220,000 deaths primarily in developing countries (Shivaji, 2017). Nawi et al. (2012) found that the spraying pesticides operation in the rice field cultivation is one of the most tedious operations and the most energy consuming (Mat Su, 2018). Muazu et al. (2015) reported that both fertilizing and spraying operations constituted about 63.42% of the total cost expenditure in North-West Selangor (Mat Su, 2018).

Malaysia's agricultural sector is one of the major drivers for the country's economy however it is still facing difficulties, which have resulted in significant losses. Despite the difficulties, the agriculture sector remains positive, with smart farming providing a potential solution to longstanding challenges. MADA (Muda Agriculture Development Authority) took the initiative to introduce the use of drones in pesticides spraying and monitoring in the paddy field. This was done to solve the problem of depleting human resources, group pesticides control, scheduled pesticides spray (Shuhaimi, 2017). Even if human resources were used, they would not be able to spray 20 hectares of paddy field area in a day (Shuhaimi, 2017). The use of drones also improves crops management and provides better mapping where it is able to describe the crops conditions in each flight. At the same time, it optimizes crop treatment, increasing productivity and reducing costs.

1.3 PROBLEM STATEMENT

According to Mohd. Zamri Ibrahim (personal communication, January 25, 2020), the small land under the electric grid is infertile and farmers develop it using their own method to improve the soil condition according to its sustainability. Crop fertility is disrupted due to planting conducted near the electricity supply area. It can also cause the growth of the tree to deteriorate, the plants wither or die. The growth was stunted which may be due to poor action of hormones responsible for cell division and cell enlargement. The humidity of plants over saturated because of continuous rainfall which also affect the moisture of soil to be imbalance. The nutrient that the plant needs cannot travel through the plant when the soil contains too much water than it needs. The soil temperature affects plant growth indirectly by affecting water and nutrient uptake as well as root growth. Due to these factor, the growing of crops in this area have become a great challenge. An integrated system of monitoring is needed to help and assist the farmers (Mohd. Zamri Ibrahim, personal communication, January 25, 2020).

Head of Entrepreneurship Development Unit of Polytechnic Sultan Salahuddin Abdul Aziz Shah, Zaharatul Akmar Ahmad Zainuddin (personal communication, November 20, 2019) mentioned that by using drone in the pineapple fertigation area, it's more efficient to know the accurate information of the growth of pineapple fertigation as the information of the plant can be collected from the drone. This can simplify the work to be done and controlled from one place. The moisture and humidity of soil, which relates to the temperature and pH value, can be recognized from the the usage of drone in the pineapple fertigation. The sustainability of the pineapple fertigation is under control by using drone in our agriculture as it is advanced than doing manually (Zaharatul Akmar Ahmad Zainuddin, personal communication, November 20, 2019)

1.4 OBJECTIVES

This research was conducted to explore the application of integrated system and antenna designs in Pineapples Fertigation at Sultan Salahuddin Abdul Aziz Shah Polytechnic's, Smart Farm. The objectives are as follows:-

I. To determine the perceived usefulness of drones in smart farming.
II. To determine the perceived ease to use of drones in smart farming.

1.5 HYPOTHESIS

H_1 : There are a significant relationship between the perceived usefulness of drone and smart farming.

H_2 : There are a significant relationship between the perceived ease to use of drone and smart farming.

1.6 SCOPE OF THE STUDY

The scope of this study was conducted to explore the perceived usefulness of drone application in Pineapples Fertigation of Sultan Salahuddin Abdul Aziz Shah Polytechnic smart farm whether the usage of drone would enhance the job performance. By using information technology like satellites, drones, artificial intelligence and weather forecasting tools, we can ensure that the crops and soil receive accurately what is needed for optimum health of the farm, and also preventing wastage and time consumption.

1.7 SIGNIFICANCE OF THE STUDY

This study is important to be carried out as it is significance to the institution, the community and the body of knowledge. An agricultural drone new technology vehicle in smart farming, used to help optimize agriculture operations, increase crop production, and monitor crop growth. The important of this study is that the institution related to agricultural are able to educate and implement the smart farming for the future agricultural specialist to be aware of this mew way of doing agricultural.

Smart farming will be most beneficial to the community, where by the farmers will get the full benefit of using this technology. Sensors and digital imaging capabilities use in agricultural drones will let farmers see their fields from the sky. The farmers will be able to reduce their operational cost by using information technology, we can ensure that the crops and soil receive accurately what is needed for optimum health and productivity, thus preventing wastage in not only supply, but also time. On the other hand, they will also increase their productivity which will be a good benefit to the customer as well. Where they will be able to enjoy the good quality of product that is well maintained.

Agriculture plays a crucial role in our economy, both for exports and local consumption. To compete in an increasingly competitive and volatile market, we need to improvise the way our farming industry operates. Therefore, by doing this study it is important to be highlighted about this smart faming to the Government to make an effort to let the private agricultural businesses to get advised by experts that specialize in latest technology in this agriculture industry.

1.8 OPERATIONAL DEFINITIONS

These are the terms and its operational definitions.

a) Perceived usefulness

According to IGI Global, perceived usefulness is The degree to which a person believes that using a particular system would enhance his or her job performance.

b) Perceived ease to use

According to Wikipedia, perceived ease to use is the degree to which a person believes that using a particular system would be free from effort (Davis 1989).

c) Smart farming

According to Food and Agriculture Organization of the United Nations, Smart Farming is a farming management concept using modern technology to increase the quantity and quality of agricultural products. Farmers in the 21st century have access to GPS, soil scanning, data management, and Internet of Things technologies.

d) IOT

According to Wikipedia, The Internet Of Things is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

e) Drone

According to Oxford online dictionary, drone is an aircraft without a pilot, controlled from the ground, used for taking photographs, dropping bombs, delivering goods, etc.

1.9 Summary

In this fast growing economy, we need to improvise our agriculture technology in order to be able to cope with the demand of the market and also to reduce the cost and wastage in agricultural sector. From this study we understand that by using smart farming technology in this era we could make a lot of change because you will be able to monitor your farm, better control over internal processes, enjoy better cost management and waste reduction, increased business efficiency through process automation from product tracking to distribution tracing and analytics and enhanced product quality and volume. By precisely measuring variations within a field, farmers can boost the effectiveness of pesticides and fertilizers, or use them selectively. Therefore, this smart farming will be very beneficial to the agricultural industry, customer and economy accordingly.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

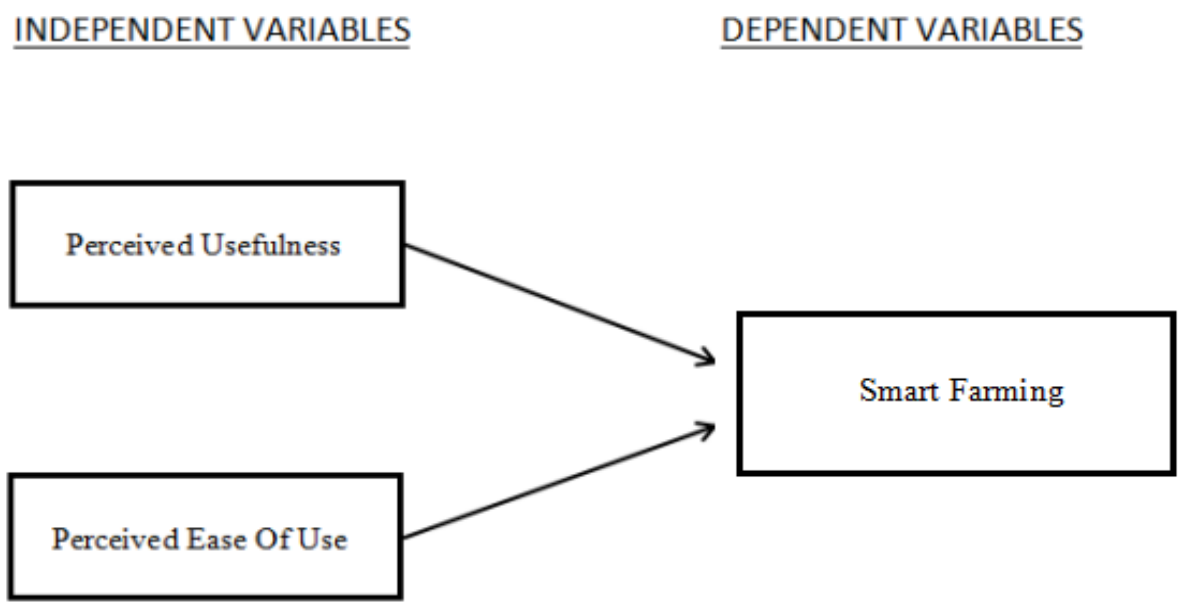
A literature review is a report of information found in the literature related to selected area of study. The review should describe summarize prior research, evaluate, synthesize and clarify this literature. By doing this research, it will help increase our knowledge towards the farmer perception of using drones in smart farming which focus on perceived usefulness of drones in smart farming and the perceived ease to use of drones in smart farming. From this research, we also get to know why farmer prefer to use drones in farming instead of doing it manually as they usually do it before the drone introduced. The technology now has upgraded and introducing new technology for farmers to help them in managing their farming activities in their daily life. Based on what Mackenzie Kelly (2014) has said, the use of drones help commercial farmers better care for their crops and have a higher yield. Drones cannot only be used for crops they can be used to monitor livestock as well. The drones use a wide array of technology including infrared cameras, sensors and GPS to help farmers monitor and better care for their farms. Drones can drastically cut the costs of monitoring crops and they can drastically cut down on water waste. Drones can also reduce the amount of chemicals being released into the environment, preventing negative effects on the environment. As (Mr, I.D. Pharne et al, 2018) said, the Unmanned Aerial Vehicles (UAV) reduces the direct handling of pesticides by human beings and helps to protect them from any injury which will give to them by pesticides. Also the whole area which is get selected by the drone is get sprayed and covered very well. Avoiding the pesticides is also not completely possible as the required outcome has to be met. So, use of robots in such cases gives the best of the solutions for these problems, along with the required productivity and efficiency.

In this paper, the purpose of this study is to explore the farmers perception of using drone in smart farming for agriculture activities which examine the perceived usefulness of using drone in smart farming and the ease of use of using drone in smart farming between farmer will be discussed.

2.2 THEORY/CONCEPT OF THE STUDY

This study is using conceptual framework which comprised the farmers perception of using drone in smart farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic's Smartfarm. The research is using conceptual framework to illustrate the link between independent variable and dependent variable. Based on what McGaghie et al. (2001) has said, this conceptual framework has sets the stage for representation of objective that drive the investigation being reported based on the statement problem.

The conceptual framework model for this study is as in Figure 2.1



Conceptual Framework 2.1

Based on the figure above our independent variable are perceived usefulness of using drone in smart farming and perceived ease of use of drone in smart farming. We also can see the dependent variable is the farmer's perception of using drone in smart farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic's Smartfarm. Handling the pesticides manually will not be safe to the human beings as it effects on the nervous system of human beings. The drones or UAVs will always help to the farmers to spray the pesticides or fertilizers on crops by avoiding direct handling. The agriculture drone sprayer is aims to reduce the ill effects of the pesticides on human beings and also to spray it in short time interval for the large area. The large area is also get covered by the drone to spray the pesticides in short timing. As if we observe that, the time require for spraying fertilizers by drone is very less than the time require to spray that manually with the help of any worker.

Basically this device is the combination of the quad copter and the spraying mechanism. The UAV helps to fly over the device on crops and the spraying mechanism will help to spray the pesticides on the crops (Mr, I.D. Pharne et al, 2018).

As Prof. S. Meivel M.E. et al has said in a paper that given detail about implementation of Agriculture wonder drone. They gave detail about Quadcopter UAV and sprayer module and also discuss pesticide content to the areas that can't easily accessible for human beings. They discussed used of multispectral cameras which is used to capture remote sensing images to identify the green field as well as the edges of crop area.

Agricultural drone have the potential to improve the yield crops. Agricultural drone can help the farmers to transform the agriculture industry. The agricultural sector can benefit significantly from implementation of unmanned aerial vehicles with the potential to improve the soil and plant knowledge, efficiency of input, and economical and environmental sustainability. However, their effective implementation depends upon some mandatory critical aspects that must be considered, including the configuration, mass, payload, flight range and costs (Chavan Priyanka Shivaji et al., 2017)

FERTIGATION

Fertigation can be defined as the application of fertilisers through irrigation systems (Komosa et al.,1999b; Conradie&Myburgh, 2000; Treder, 2005; Sharma et al., 2008). Smart fertigation involves the managing of the crops through integrated software systems and antenna by using drone. The crops growth and handling can be done effectively through the internet. According to Suhaizi et al (2017) the uses of drone in agriculture are extended to;

1. Soil and spatial analysis
2. Plantation
3. Weed control
4. Pest control
5. Irrigation system
6. Plant Growth

Perez-Harvey, (2008) stressed that many factors, notably climate, soil, water and vineyard can influence the growth of grapes. Van Rooyen et al. (1980) also mentioned that the growth, yield and fruit quality of grapes depend on the grapevine water status.The fertigation

of grapes needs supervision on its soil fertility and mineral content although it is planted in a small scale basis (Aditya et at, 2016). They further stated that the advancement of technology is needed to support the intensive production and mechanization in the field spatial variability. By using an automated fertigation system, it can help growers make informed decisions that can significantly impact water and nutrient usage (Cyril et al ,2017). It enables the regulation of nutrient amounts and application frequency according to the plants requirement (Treder, 2005).

Research proves that the use of pesticides may increase the productivity of crops but it also affects human health. The World Health Organization estimates that there are 3 million cases of pesticides poison in each year and up to 220,000 deaths primarily in developing countries (Shivaji, 2017). One of the famous paper, revealed that in the Midwest of the United States, death rates among the farmers are twice that of the general population during 1997-2005 (Balaji et al ,2018). Usage of pesticides should be in a more advanced way in order to have an average margin to the current farmers in Malaysia (Yahya et al ,2018).

In the internet world and ubiquitous computer, the control, monitoring, remote supervision became accessible both in terms of technology and price (Vasilescu and Popescu, 2015). They also indicated that the new technologies developed M2M and IoT have found their place rapidly in all activities, from industry and agriculture to transport and health. This has induced variability in the design of software and antenna for the better use of drone to improvise the method of crop management. Currently, this includes additional EBG structure which ensures the accurate application of daily water and nutrient requirement for the plant by monitoring the crop condition with the reading of the data that will be sent to the software system. Han Nien Lin and Chun Chi Tang (2010) stated that EBG material is the band-stop and slow-wave response from the periodic arrangement of structure or component. Thus, EBG structure gained the most attention in the microwave community.

2.3 LITERATURE OF RECENT STUDIES

History Of Agriculture

The history of agriculture records the domestication of plants and animals and the development and dissemination of techniques for raising them productively. Agriculture began independently in different parts of the globe and included a diverse range of taxa. At least eleven separate regions of the Old and New World were involved as independent centers of origin

Wild grains were collected and eaten from at least 20,000 BC. From around 9500 BC, the eight Neolithic founder crops - emmer wheat, einkorn wheat, hulled barley, peas, lentils, bitter vetch, chicken peas and fla - were cultivated in the Levant. Rye may have been cultivated earlier but remains controversial. Rice was domesticated in China by 6200 BC with earliest know cultivation from 5700 BC, followed by mung, soy and azuki beans.

In the Middle Ages, both in the Islamic world and in Europe, agriculture was transformed with improved techniques and the diffusion of crop plants, including the introduction of sugar, rice, cotton and fruit trees such as the orange to Europe by way of Al-Andulus. After the voyages of Christoper Columbus in 1492, the Columbian exchange brought New World crops such as maize, potatoes, sweet potatoes, and manioc to Europe, and Old World crops such as wheat, barley, rice and turnips, and livestock including horses, cattle, sheep and goats to the Americas.

Irrigation, crop rotation and fertilizers were introduced soon after the Neolithic Revolution and developed much further in the past 200 years, starting with the Agricultural Revolution. Since 1900, agriculture in developed nations, and to a lesser extent in the developed nations, and to a lesser extent in the developing world, has seen large rises in productivity as human labour has been replaced by mechanization, and selective breeding. The Haber-Bosch process allowed the synthesis of ammonium nitrate fertilizer on an industrial scale, greatly increasing crop yields. Modern agriculture has raised social, political, biofuels, genetically modified organisms, tariffs and farm subsidies. In response, organic farming developed in the twentieth century as an alternative to the use of synthetic pesticides.

History Of Agriculture in Malaysia

Agriculture in Malaysia makes up twelve percent of the nation's GDP. Sixteen percent of the population of Malaysia is employed through some sort of agriculture. Large-scale plantations were established by the British. These plantations opened opportunity for new crops such as rubber (1876), palm oil (1917), and cocoa (1950). A number of crops are grown for domestic purpose such as bananas, coconuts, durian, pineapples, rice and rambutan.

Climate

The climate of Malaysia produces the proper conditions for production of exotic produce. It is located on a peninsula in southeast Asia. This area is very rarely affected by hurricanes and drought. Malaysia maintains a humidity level around ninety percent because of its location close to the equator. The weather stays hot and humid all year round.

Ministry Of Agriculture And Agro-Based Industry, Malaysia (MOA)

This ministry is also known as Kementerian Pertanian & Industri Asas Tani Malaysia. The MOA has its name changed to the current title on 27 March 2004. The ministry serves as an agency for private agricultural businesses to get advised by experts that specialise in agriculture, fishing and livestock. The ministry plans the policies, strategies, and different development programs. It monitors, surveys, directs and puts into action the projects given by the Integrated Agricultural Development Project (IADP). the ministry has services such as collecting, analysing and restoring information and agricultural data through science and provide the report to farmers. It provides references and agricultural management systems for plantation owners to access all collected agriculture information.

History Of Drones (Unmanned Aerial Vehicles)

An unmanned aerial vehicle (UAV) (or uncrewed aerial vehicle, commonly known as a drone) is an aircraft without a human pilot on board and a type of unmanned vehicle. UAVs are a component of an unmanned aircraft system (UAS) which include a UAV , a ground-based controller, and a system of communications between the two. The flight of UAVs may operate with various degrees of autonomy: either under remote control by a human operator or autonomously by onboard computers. Compared to crewed aircraft, UAVs were originally used for missions too "dull, dirty or dangerous" for humans. While they originated mostly in military applications, their use is rapidly expanding to commercial, scientific, recreational, agricultural,

and other applications, such as policing and surveillance, product deliveries, aerial photography, infrastructure inspections, smuggling,[6] and drone racing. Civilian UAVs now vastly outnumber military UAVs, with estimates of over a million sold by 2015.

Terminology

Multiple terms are used for unmanned aerial vehicles, which generally refer to the same concept. The term drone, more widely used by the public, was coined in reference to the early remotely-flown target aircraft used for practice firing of a battleship's guns, and the term was first used with the 1920s Fairey Queen and 1930's de Havilland Queen Bee target aircraft. These two were followed in service by the similarly-named Airspeed Queen Wasp and Miles Queen Martinet, before ultimate replacement by the GAF Jindivik.

The term unmanned aircraft system (UAS) was adopted by the United States Department of Defense (DoD) and the United States Federal Aviation Administration in 2005 according to their Unmanned Aircraft System Roadmap 2005–2030. The International Civil Aviation Organization (ICAO) and the British Civil Aviation Authority adopted this term, also used in the European Union's Single-European-Sky (SES) Air-TrafficManagement (ATM) Research (SESAR Joint Undertaking) roadmap for 2020.This term emphasizes the importance of elements other than the aircraft. It includes elements such as ground control stations, data links and other support equipment. A similar term is an unmanned-aircraft vehicle system (UAVS), remotely piloted aerial vehicle (RPAV), remotely piloted aircraft system (RPAS). Many similar terms are in use.

A UAV is defined as a "powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload".[11] Therefore, missiles are not considered UAVs because the vehicle itself is a weapon that is not reused, though it is also uncrewed and in some cases remotely guided.

History Of Drones In Agriculture

As global demand for food production grows exponentially, resources are depleted, farmland is reduced, and agricultural labor is increasingly in short supply, there is an urgent need for more convenient and smarter agricultural solutions than traditional methods, and the

agricultural drone and robotics industry is expected to make progress. Agricultural drones have been used in areas such as Africa to help build sustainable agriculture.

An agricultural drone is an unmanned aerial vehicle used to help optimize agriculture operations, increase crop production, and monitor crop growth. Sensors and digital imaging capabilities can give farmers a richer picture of their fields. Using an agriculture drone and gathering information from it may prove useful in improving crop yields and farm efficiency.

Agricultural drones let farmers see their fields from the sky. This bird's-eye view can reveal many issues such as irrigation problems, soil variation, and pest and fungal infestations. Multispectral images show a near-infrared view as well as a visual spectrum view. The combination shows the farmer the differences between healthy and unhealthy plants, a difference not always clearly visible to the naked eye. Thus, these views can assist in assessing crop growth and production.

Additionally, the drone can survey the crops for the farmer periodically to their liking. Weekly, daily, or even hourly, pictures can show the changes in the crops over time, thus showing possible “trouble spots”. Having identified these trouble spots, the farmer can attempt to improve crop management and production.

Fertigation In Smart Farming

The practice of supplying crops in the field with fertilizers via the irrigation water is called fertigation. In fertigation, timing, amounts and concentration of fertilizers applied are easily controlled. Fertigation ensures saving in fertilizer (40-60%), due to “better fertilizer use efficiency”and “reduction in leaching” (Kumar and Singh, 2002). Drip irrigation is often preferred over other irrigation methods because of the high water application efficiency on account of reduced losses, surface evaporation and deep percolation. Because of high frequency water application, concentrations of salts remain manageable in the rooting zone. The regulated supplies of water through drippers not only affect the plant root and shoot growth but also the fertilizer use efficiency. Fertigation through drip irrigation reduces the wastage of water and chemical fertilizers, optimizes the nutrient use by applying them at critical stages and at proper place and time, which finally increase water and nutrient use efficiency. Moreover, it is well recognized as the most effective and convenient means of maintaining optimal nutrient level and water supply according to crop development stage, specific needs of each crop and type of soil.

It is practiced extensively in commercial agriculture and horticulture. Fertigation is also increasingly being used for landscaping as dispenser units become more reliable and easier to use. Fertigation is used to add additional nutrients or to correct nutrient deficiencies detected in plant tissue analysis. It is usually practiced on the high-value crops such as vegetables, turf, fruit trees, and ornamentals.

Intelligent agriculture is involving the factors such as low cost, variable input use, maximum income targeting and environmental protection principles in the framework of integrating developing technologies with agricultural production. In this approach, agricultural inputs such as labour, water, fertilizers, chemicals, seeds, machinery and energy are used less and this contributes to sustainable agricultural production with the result of increase in profitability (Zarco-Tejada, 2014). This study summarized the literature on smart irrigation and fertilization and attempted to shed light on achieving higher yields with less water and fertilizer uses in agriculture.

Fertigation can be defined as the application of fertilizers through irrigation systems (Komosa et al., 1999; Conradie & Myburgh, 2000; Treder, 2005; Sharma et al., 2008). Smart fertigation involves the managing of the crops through integrated software systems and antennas by using drones. The crops growth and handling can be done effectively through the internet.

According to Natu and Kulkarni (2016), the advancement of technology is needed to support the intensive production and mechanization in the field spatial variability. By using an automated fertigation system, it can help growers make informed decisions that can significantly impact water and nutrient usage (Cyril et al., 2017). It enables the regulation of nutrient amounts and application frequency according to the plants requirement (Treder, 2005).

Research proves that the use of pesticides increases the productivity of crops but it also affects human health. The World Health Organization estimates that there are 3 million cases of pesticides poison in each year and up to 220,000 deaths primarily in developing countries (Shivaji, 2017). One of the famous papers, revealed that in the Midwest of the United States, death rates among the farmers are twice that of the general population during 1997-2005 (Balaji et al., 2018). Usage of pesticides should be in a more advanced way in order to have an average margin to the current farmers in Malaysia (Mat Su et al., 2018).

In the internet world and ubiquitous computers, the control, monitoring, and remote supervision became accessible in terms of both technology and price (Vasilescu & Popescu, 2015). They also indicated that the new technologies developed M2M and IoT have found their place rapidly in all activities, from industry and agriculture to transport and health. This has induced variability in the design of software and antenna to improvise the method of crop management.

2.4 SUMMARY

From this chapter, the conceptual framework construct of each element has been discussed. Agricultural drones can be hugely beneficial to farmers all over the country. As the population grows, so does the need for food. Drones can increase the crop yields by finding problems with plants faster and determining which plant specifically needs attention. By narrowing down which plants are infested with weeds or insects, need water, or not growing as they should, it cuts down on the resources used by the farmer, reducing the waste of water, chemicals and time. By reducing the amount of chemicals sprayed on the plants, the amount of unnecessary chemicals released into the environment is reduced. The drones will be popular during the current social trend of going green and saving the environment. They are not run on gasoline like regular airplanes thus reducing carbon emissions into the environment.

Although with this innovative technology comes some concerns. The primary concern of agricultural drones is security. People using the drones cannot be monitored at all times therefore causing an increased chance that they may be misused and used for illegal activities such as spying on neighbors and recording or taking photographs of groups of children. Also, drones have a stereotype among the general population for being used for military action. While that is true, not all drones are used for malicious purposes. Currently drones are available on a very limited market and the FAA has very strict regulations for their use. They cannot currently be used for commercial purposes but they can be used privately for entertainment, as long as they fly under 400 feet and are flown nowhere near an airport.

In conclusion, these drones would greatly benefit the business of commercial farming and benefit the general population. Farming will become more efficient and farming operations will be less expensive to run. Crops and livestock will be healthier. Although there are questions about the security of agricultural drones, the benefits greatly outweigh the risks.

CHAPTER 3

RESEARCH AND METHODOLOGY

3.1 INTRODUCTION

The previous chapter has discussed the conceptual framework, concept and the literature review. This chapter content the research methodology which involved in research design, how the sample were selected, what kind of instrument used in research, what technique used in sampling data and analysis as how the questionnaire was developed.

3.2 RESEARCH DESIGN

Research design refer to the overall strategy that we choose to integrate the different components of the study in a coherent and logical way (RV Labaree, 2009). Research design is making research as efficient as possible hence yielding maximum information with minimal expenditure of effort, time and money (Kothari, 2004). It is also aprocedul plan that is adopted by the researchers to answer the questions validly, objectively, accurately and economically (Ranjit Kumar, 2011)

In this study, the method used is quantitative research. It is an involvement of using the structural question in which the respondents option have been predetermined and a large number of respondents are involved (Burns & Bush, 2006). Therefore, though quantitative research, independent variables and dependent variables. The information will be analyzed so that it will achieve the objective of our research. Other than that, we also distribute questionnaire and analyzed the result. For this research, we are doing collecting data through pilot test and questionnaire that have been distributed. (Sekaran & Bougie, 2010) said the questionnaire are the most popular and effective method to collect data used by the researchers, because the researcher know exactly what is necessary and how to evaluate the interested variables.

3.3 DATA COLLECTION METHOD

Data collection method means gathering information to address those critical evaluation questions that the author has identified earlier in the evaluation process. It is an important aspects of any type of research study (NA Athukorala, 2011). There are two types of data collection method. Quantitative method was used in this study as the data collection method. The main instrument for the survey is questionnaire. The questionnaire are a well-established tool within social science research for acquiring information on participant social characteristics, present and past behaviour, standards of behaviour or attitudes and their beliefs and reasons for action with respect to the topic under investigation (Bulmer, 2004).

Questionnaire are useful option to consider when conducting a postal survey (N Mathers, 2009). In all cases the role of the questionnaire is to provide a standardized interview across all subjects (Ian Brace, 2018). The aim of this data collection method to collect all the data analysis and to ensure it will have affected the reliability and validity of the test conducted. Furthermore, it will ensure our study meet its objective. To test the variable of the research, a questionnaire was prepared which present the exploring the perceived usefulness of drone in smart farming.

One of the data we used in this study is primary data. Primary data is the data collected by a researcher from first-hand sources, using methods like surveys and interviews. In this study, the method used is questionnaires. The examples of the questions are very simple, direct and clearly.

The other data we used is secondary data. Secondary data refers to data which is collected by someone who is someone other than user. While secondary data analysis is a flexible approach and can be utilized in several ways, it is also an empirical exercise with procedural and evaluate steps, just as there are in collecting and evaluating primary data (Doolan & Froelicher, 2009). Secondary data can be found on articles, journal, publication and any related.

3.4 RESEARCH INSTRUMENT

In order to obtain data, we have used self-administered questionnaire. A self-administered questionnaire was a data collection in which the respondent read the survey question and recorded his or her answer without the present of a trained interviewer (Hair, Black, Babin, Anderson, & Talham, 2006). In this research, there are four section in the questionnaire which is Section A, Section B, Section C and Section D.

Section A is a section of the respondent background which is the researcher give question about the respondent's gender, race, age and education. Section B are about the answer perceived ease of use, Section C are about perceived usefulness and Section D were asked about dependent variables which are smart farming. The respondent must give their feedback and true opinion by answering the question stated based on the scale given.

The Nominal Scale and Likert Scale has been chosen in this study. In Section A, we used Nominal Scale consists of assigning items of groups or categories. Under the-Non-comparative Scale. The Likert Scale has been used in Section B, Section C and Section D.

The psychometric scale commonly use in questionnaire is Likert Scale. The Likert Scale is one of the most popular non-comparative rating scaling techniques in management research. In this scale, the respondent indicated a degree of agreement or disagreement with each of the series of statements about the stimulu subjects (Mukesh, Salim, T. Ramayah (2013), Business Research Method).

The five-point scale can be label as:

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.5 SAMPLING

Sample design refers to the plans and methods to be followed in selecting sample from the target population and the estimation technique formula for computing the sample statistics (Sajjad Kabir, 2018).

In order to collect data for exploring the perceive usefulness of drone in smart farming, the sampling consist the farmer that using drone and the people nearby that have the information and know how drone been working for the farmer. We choose convenience sample is that, we have to look for the farmers that using drone and people who know about drone.

To cover the survey and questionnaire, we use qualitative method in this study. Furthermore, this study has identified the simple random sampling survey questionnaire consisting exploring the perceived usefulness of drone in smart farming.

3.6 DATA ANALYSIS METHOD

Data analysis is the process of systematically applying statistical or logical technique to describe and illustrate, condense and recap and evaluate data. Various analytic procedure provides a way of drawing inductive inference from data and distinguish the signal (Shamoo & Resnik, 2003).

3.6.1 Descriptive analysis

Descriptive data is used to analyze the respondent data about exploring the perceived usefulness of drone in smart farming. Frequencies, percentage, mean and total data will be used to analyze the data obtained through the questionnaire.

Besides, descriptive statistics have been measure on the independent variables, which is perceived ease of use and perceived usefulness. The highest mean would determine that respondent are more likely discuss about particular variable towards exploring the perceived usefulness of drone in smart farming.

3.7 RELIABILITY TEST

Table 3.1: Alpha Coefficient Range Strength of Association

Less than 0.60	Poor
0.60 to less than 0.70	Moderate
0.70 to less than 0.80	Good
0.80 to less than 0.90	Very good
0.90 and above	Excellent

Source: Hair,J.F., Babin, B. Jr., Money, A.H., & Samouel, P. (2003)

A total number of 61 questionnaire were distributed for the purpose of this test. After collected the questionnaire, reliability test was conducted by using Statistical Package for the Social Science (SPSS). Table 3.2 shows the result of the reliability test conducted.

Table 3.2: Results of Reliability Test

No. Constructs	Cronbach's alpha standardized item	Alpha on no of item
1. Perceived ease of use	0.757	10
2. Perceived Usefulness	0.831	10

Source: Developed for research

3.8 SUMMARY

In this chapter, we have been find out and planned the methods and procedures of this research. This is to exploring the perceived usefulness of drone in smart farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic.

Other than that, the methods we are used in this research methodology are including collecting, analysing and interpreting data. In addition, this chapter has provided the method of this research in term of the research design, data collection method, sampling, research instrument and data analysis. All information was collected by using questionnaire that was distributed to the farmer that using drone and people that have knowledge of using drone or how the drone works. In order to help us to conduct a study, SPSS software was used to collect all the information obtained. Lastly, the research methodology used to fulfil the answer in the research question that has been made in Chapter 1.

CHAPTER 4

RESULTS AND FINDINGS

4.1 INTRODUCTION

In this chapter, the results of the questionnaire surveyed respondent's data will be analyzed. Data collection from 61 respondents were analyzed using Statistical Package for Social Science (SPSS). Also, the elements that will be covered in this chapter are included demographic profile and descriptive analysis. The results obtained will be presented in bar charts and table form. Lastly, this chapter concludes with a summary of the research findings.

4.2 RESPONSE RATE

A total of 61 questionnaire were distributed to farmers that are using drone and people that have knowledge about the drone. From the amount distributed, all the questionnaire have been answered perfectly.

4.3 DEMOGRPHIC PROFILE

The demographic data had been analyzed through descriptive statistics provided in the Statistical Package for Social Science (SPPS). In this study, there are questions were asked under the respondent's demographic profile section such as gender, race, age and education.

Table 4.1 Demographic Profile (N=61)

Response		Frequency	% of Total Sample
Gender	Male	48	78.7
	Female	31	21.3
Race	Malay	61	100
Age	21 - 30	20	32.8
	31 - 40	18	29.5
	41 - 50	10	16.4
	51 – 60	9	14.8
	61 – 70	4	6.6
Education	Ijazah	4	6.6
	Diploma	8	13.1
	Sijil	9	14.8
	STPM	4	6.6
	SPM	26	42.6
	SPR/PMR/PT3	3	4.9
	UPSR	5	8.2
	Tiada Pendidikan Formal	2	3.3

Source: Developed for the research

Based on Table 4.1, the respondent are the farmers that using drone and people that have knowledge about function of drone in agriculture which consist of 100% or 61 respondents. From the table, we can see that the majority of the respondents are male which consists of 78.7% or 48 respondents, while the minority respondents are females which consist 21.3% or 31 respondents.

There are four race categories provided in the questionnaire. The race are Malay, Chinese, Indian and Others. But all of our respondent are Malay with 100% or 61 respondents. There are five age categories provided, the majority of our respondents are range between 21 – 30 years old with 32.8% or 20 respondent. Next, the respondents who aged between 31 – 40 years old consists of 29.5% or 18 respondents. The third majority of our respondents who aged between 41 – 50 years old consists of 16.4% or 10 respondents. This followed by the second least respondents aged between 51 – 60 years old with approximately 14.8% or 9 respondents. The least respondents is from the age 61 – 70 years old which consists 6.6% or 4 respondents.

Last but not least, the result above shows that their education level with Ijazah 6.6% or 4 respondents, followed by respondent who have Diploma with 13.1% or 8 respondents Meanwhile, 14.8% or 9 respondents have Sijil, 6.6% or 4 respondents have STPM. The majority of our respondents have SPM with 42.6% or 26 respondents. Lastly, our respondent who their level education is SPR/PMR/PT3 are 4.9% or 3 respondents, UPSR consists of 8.2% or 5 respondents and ‘Tiada Pendidikan Formal are 3.3% or 2 respondents.

4.4 DESCRIPTIVE ANALYSIS

Descriptive analysis or also known as descriptive statistics are conducted based on dependent and independent variables that can be related to each other. Descriptive analysis is a help to simplify that will make them easy to understand and interpret from raw data into a form (Kassim, 2001). The data can be summarized with a chart, graphic or table. In this chapter, there are 2 factor that exploring the perceived usefulness of drone in smart farming. To analyze the factors, the descriptive statistics has been used to show the score mean value to find the whole sum as add the data together. The score mean value was interpreted by using the Score Mean Level introduces by Malhotra. Below are the table of Score Mean Level.

MEAN VALUE	LEVEL
1.00 – 2.33	Lower
2.34 – 3.67	Medium
3.68 – 5.00	High

Table 4.2 Score Mean Level

4.4.1 Section B: Independent Variable - Perceived Ease of Use in Smart Farming.

Table 4.3 shows the respondents result based on perceived ease of use in smart farming.

Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean Score	Level
I have fun using drone to help me do the farming tasks.	0 0%	0 0%	0 0%	30 49.2%	31 50.8%	4.50	High
Using drone is convenient.	0 0%	0 0%	0 0%	38 62.3%	23 37.7%	4.37	High
Using drone has become part of the daily routine in my life.	0 0%	2 3.3%	12 19.7%	21 34.4%	26 42.6%	4.16	High
I use drone in more ways that people do other than agriculture	0 0%	2 3.3%	10 16.4%	29 47.5%	20 32.8%	4.09	High
My drone expresses my personal style of agriculture.	0 0%	1 1.6%	2 3.3%	40 65.6%	18 29.5%	4.22	High
I found the drone is easy to use rather than using human labour.	0 0%	0 0%	4 6.6%	24 39.3%	33 54.1%	4.47	High
It is safer to use drone to handling pesticide.	0 0%	0 0%	2 3.3%	23 37.7%	36 59.0%	4.55	High
Using drone it's easy to get to do what I want it to do.	0 0%	0 0%	1 1.6%	33 54.1%	27 44.3%	4.42	High
My interaction with the drone system would be more clear and understandable.	0 0%	0 0%	5 8.2%	37 60.7%	19 31.1%	4.22	High
It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system.	0 0%	0 0%	1 1.6%	30 49.2%	30 49.2%	4.47	High
Average Mean Score							4.347

Source: Developed for the research

Table 4.3 shows the respondent distribution based on perceived ease of use on smart farming. The results of the analysis item “I have fun using drone to help me do the farming tasks” shows the mean is 4.50 with 30 (49.2%) respondent agree and 31 (50.8%) respondent strongly agree. Mean for item “Using drone is convenient” is 4.37. There are 38 (62.3%) respondents are agree with this item while 23 (37.7%) respondent strongly agree with this item.

Furthermore, mean item “Using drone has become part of the daily routine in my life” is 4.16. There are 2 (3.3%) respondent disagree, 12 (19.7%) respondent are neutral, 21 (34.4%) respondent agree and 26 (42.6%) respondent strongly agree with the item. Other than that, mean for item “I use drone in more ways that people do other than agriculture” is 4.09 and it show that 2 (3.3%) respondent disagree while 10 (16.4%) respondent neutral. The next is 29 (47.5%) respondent are agree with the item and 20 (32.8%) respondent strongly agree.

Other than that, the mean for item “My drone expresses my personal style of agriculture” is 4.22 and its show that 1 (1.6%) respondent disagree with this item while 2 (3.3%) respondents neutral, 40 (65.6%) respondents agree and 18 (29.5%) respondents strongly agree with the statement given. Next item is “I found the drone is easy to use rather than using human labor” with mean 4.47, 4 (6.6%) respondents neutral with the item, 24 (39.3%) respondent agree and 33 (54.1%) strongly agree with the item.

Besides that, the result for the mean item “It is safer to use drone to handling pesticide” is 4.55 and it shows that 2 (3.3%) respondents neutral, 23 (37.7%) respondents agree with the item and 36 (59.0%) respondents strongly agree with the statement. Meanwhile, mean for item “Using drone it's easy to get to do what I want it to do” is 4.42 and only 1 (1.6%) respondent neutral, followed by 33 (54.1%) respondents agree and 27 (44.3%) respondents strongly agree with the statement.

Next, mean for item “My interaction with the drone system would be more clear and understandable” is 4.22 and it shows that 5 (8.2%) respondents neutral, 37 (60.7%) respondents agree and 19 (31.1%) respondent strongly agree with the item. Last but not least, the mean for item “It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system” is 4.47 and its shows that 1 (1.6%) respondents neutral for this statement, 30 (49.2%) respondents agree and also 30 (49.2%) respondents strongly agree with the item.

4.4.2 Section C: Independent Variable - Perceived Usefulness in Smart Farming.

Table 4.4 shows the respondents result based on perceived usefulness in smart farming.

Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean Score	Level
My job would be easy to perform with drone.	0 0%	0 0%	1 1.6%	26 42.6%	34 55.7%	4.54	High
Using drone makes me to manage job more effectively.	0 0%	0 0%	2 3.3%	34 55.7%	25 41.0%	4.37	High
Using drone saves my time and effort in performing farming act	0 0%	0 0%	0 0%	29 47.5%	32 52.5%	4.52	High
Using drone enhance my task effectiveness.	0 0%	0 0%	2 3.3%	29 47.5%	30 49.2%	4.45	High
Using drone gives me a greater control.	0 0%	0 0%	2 3.3%	29 47.5%	30 49.2%	4.45	High
Using drone offers me alternative ways to solve farming problems.	0 0%	0 0%	1 1.6%	27 44.3%	33 54.1%	4.52	High
Facilities of smart agricultural are essential in farm records management.	0 0%	0 0%	5 8.2%	34 55.7%	22 36.1%	4.27	High
Using drone is alternative to monitor the crop in large scale of my farming area.	0 0%	0 0%	0 0%	33 54.1%	28 45.9%	4.45	High
Drones really helpful to enter the area that human labor can't access to spray pesticides and fertilizers.	0 0%	0 0%	1 1.6%	27 44.3%	33 54.1%	4.52	High
The use of drone can save labor costs over the long term.	0 0%	0 0%	4 6.6%	33 54.1%	24 39.3%	4.32	High
Average Mean Score							

Source: Developed for the research

Table 4.4 show the respondent's results based on perceived usefulness in smart farming. The result analysis on item "My job would be easy to perform with drone" shows that the mean is 4.54 with 1 (1.6%) respondents neutral, 26 (42.6%) respondents agree with the statement and 34 (55.7%) respondents strongly agree with the item. Meanwhile, mean for item "Using drone makes me to manage job more effectively" is 4.37 and it shows that 2 (3.3%) respondents neutral, 34 (55.7%) respondents agree and 25 (41.0%) respondents strongly agree with the item.

Next, the item "Using drone saves my time and effort in performing farming act". Shows that the mean is 4.52 which is tie between 29 (47.5%) respondents agree and 32 (52.5%) respondents strongly agree. Other than that, the mean for item "Using drone enhance my task effectiveness" is 4.45, it state that 2 (3.3%) respondents neutral, 29 (47.5%) respondents agree and 30 (49.2%) respondents strongly agree with the item.

Mean for item "Using drone gives me a greater control" is 4.45. The results of the analysis item shows that 2 (3.3%) respondents neutral, 29 (47.5%) respondents agree with the statement and 30 (49.2%) respondents strongly agree. Other than that, mean for item "Using drone offers me alternative ways to solve farming problems" is 4.52 and it show that 1 (1.6%) respondent neutral, 27 (44.3%) respondents agree and 33 (54.1%) respondents strongly agree with the item.

Furthermore, the item "Facilities of smart agricultural are essential in farm records management" mean is 4.27. The highest respondents that is 34 (55.7%) agree with the item while 22 (36.1%) respondents strongly agree and 5 (8.2%) respondents neutral. The table shows that the mean for item "Using drone is alternative to monitor the crop in large scale of my farming area" is 4.45, 33 (54.1%) respondents agree and 28 (45.9%) respondents strongly agree with the statement.

More than that, mean for item "Drones really helpful to enter the area that human labour cant't access to spray pesticides and fertilizers" is 4.52 with only 1 (1.6%) respondents neutral, 27 (44.3%) respondents agree with the item and 33 (54.1%) respondents strongly agree. Last but not least, the mean for item "The use of drone can save labour costs over the long term" is 4.32. It shows that 4 (6.6%) respondents neutral, 33 (54.1%) respondents agree and 24 (39.3%) respondents strongly agree with the statements.

4.5 SCALE MEASUREMENT

4.5.1 Internal Reliability Test

Table 4.5 Summary of Reliability Test

Construct	Cronbach's Alpha (coefficient alpha)	No. of Item
Perceived Ease of Use	0.757	10
Perceived Usefulness	0.831	10

Source: Developed for the research

The composite reliability varies from 0 and 1, with higher values including higher levels of reliability and it is generally interpreted in the same way as Cronbach's alpha. Specifically, the composite reliability values of 0.60 to 0.70 are acceptable to exploratory research. In more advanced stages of research, values between 0.70 and 0.90 can be regarded as satisfactory (Nunnally & Bernstein, 1994). Values of 0.90 (and > 0.95) are not desirable because that indicates all the indicator variables are measuring the same phenomenon and are therefore unlikely to be a valid measure of the construct. Not only that, according to (Hair et al, 2017), composite reliability values below 0.60 shows a lack of internal consistency reliability.

Based on table 4.6, it shows the results that all the independent variables construct exceeded 0.6. Referred to the table above, perceived ease of use produced the lowest coefficient alpha among the two factors which is 0.757 which was measured by 10 items. Next, perceived usefulness shows the highest coefficient alpha which was 0.831 and measured also by 10 items.

4.6 INTERVIEW QUESTION

Name: Encik Mohd Zamri bin Ibrahim

Position: R & D Manager

Organization Name: Kebun Komuniti Seskyen 8 Shah Alam

No.	Question	Answer
1.	Berapa lama anda telah melibatkan diri dalam bidang pertanian?	Dalam lingkungan 14 tahun
2.	Apakah jenis tanaman yang ditanam di kebun?	Pelbagai sayur-sayuran seperti sawi, bayam, kangkung, cili, terung, bendi, timun, tomato, peria, labu kayu, kacang botol, jagung, ubi keledek, ubi kayu, lengkuas, kunyit, lemon dan pelbagai tanaman herba lain.
3.	Berapa keluasan kawasan pertanian secara kesuluruhan?	Kawasan ini mempunyai keluasan sebanyak 2.4 ekar daripada kawasan tasik sehingga kawasan tanaman atas bukit.
4.	Apakah cara yang digunakan untuk berkebun?	Berkebun mempunyai 31 teknik pertanian yang kena buat sampel seperti fertigasi tergantung untuk mereka yang malas memotong rumput, fertigasi double layer dan fertigasi dalam tanah pun ada. Aquaculture dan Aeroponik pun ada. Menggunakan tahi arnab untuk dijadikan baja kerana kandungan nitrogen yg tinggi. Tugas untuk menyiram tanaman adalah harus menyiram sendiri dan menggunakan sprinkler yang diletakkan di setiap batas.
5.	Berapa lama tempoh masa yang digunakan untuk membaja?	Membaja dilakukan oleh komuniti sendiri pada batas masing-masing.
6.	Berapa lama tempoh masa yang digunakan untuk meracun?	Meracun dilakukan oleh komuniti sendiri pada batas masing-masing.
7.	Bagaimanakah cara anda memantau tanaman di kebun?	Pemantauan ada banyak pandangan dan perspek iaitu pandang tepi, pandang bawah,pandang kiri, pandang kanan. Ada yang memerhati daun, serangga, hujan, dan lain2. Komuniti memantau sndiri setiap tanaman mereka dengan cara mereka sendiri dan motif tersendiri bergantung pada kajian yang mereka jalankan.
8.	Bagaimanakah anda mengenalpasti kesesuaian tanah yang digunakan untuk setiap tanaman?	Tanah subur memang tidak ada sebab semuanya infertile. Jadi, kena develop sendiri seperti tukar PH tanah atau tanah yang keras dilembutkan ikut teknik sendiri. Katakan ada 13 jenis tanah, masing-masing ada teknik untuk tukar infertile melalui research.
9.	Adakah anda berpuas hati dengan kualiti tanaman?	Kepuasan hati bergantung kepada penggunaannya. Hasil tanaman mereka adalah terbaik dan berkualiti kerana mereka menggunakan baja atau racun yang diolah sendiri dgn menggunakan bahan organik.

10.	Berapakah hasil pendapatan anda daripada tanaman?	Pekebun yang berkebun kebanyakannya adalah pesara dan bekerja di bahagian professional. Jadi, motif mereka berbeza-beza. Kebanyakan mereka apabila mendapat hasil tanaman, ia bukan untuk pendapatan mereka tetapi mereka berkebun untuk kepuasan individu dengan melakukan aktiviti pertanian sekaligus untuk terapi mental dan fizikal mereka.
11.	Ke manakah hasil tanaman itu dihantar untuk jualan?	Bukan untuk dijual tetapi untuk kepuasan individu dan juga bertujuan kesihatan mental dan fizikal.Berbeza setiap individu jadi hasil pertanian diberi pada kenalan atau lain-lain atas hasil usaha sendiri.
12.	Adakah anda mengetahui tentang penggunaan teknologi drone dalam pertanian? Bagaimana?	Ya. Memang ada perancangan dan brainstorming dalam mesyuarat untuk menggunakan drone untuk konservasi. Sebab ada masalah untuk cover specific area. Konservasi ada 6 masalah. Tak dapat nak tangkap gambar burung yang datang, ular yang ada dalam kebun, biawak, ular (untuk kegunaan keselamatan),
13.	Adakah anda mengetahui kebaikan penggunaan drone dalam pertanian? Bagaimana?	Ya. Drone boleh mengatasi 6 masalah konservasi trsebut dan mudah untuk pemantauan pencerobohan pada waktu malam
14.	Mengapa anda tidak beralih kepada penggunaan drone dalam pertanian?	Drone mempunyai beberapa masalah. Frequency, power supply, angin lintang, burung langgar drone, range (tempat bukit bukau), cuaca tak menentu (hujan atau terlalu panas) dan drone black and white dan tidak boleh zoom in.
15.	Adakah anda terfikir untuk mengubah kepada penggunaan drone dalam sistem pertanian anda?	Ya. Dalam listing dan sedang merancang untuk menggunakan drone dalam pertanian.

Source: Developed for the research

4.7 CHAPTER SUMMARY

This chapter summarizes the respondent's general and demographic profiles that have been analyzed by using descriptive analysis. Furthermore, an internal reliability test was also carried out to the reliability of all constructs. In this research, there are two independent variable which are perceived ease of use and perceived usefulness. The result of analysis shows that the perceived usefulness in smart farming in a first place followed by perceived ease of use.

SOAL SELIDIK MENEROKA PENGGUNAAN DRONE DALAM PERTANIAN PINTAR DI POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH.

Saudara/Saudari,

Kerjasama anda amat diperlukan untuk menjayakan kajian ini dan kami adalah kumpulan pengkaj ibernama seperti dibawah dari JabatanPerdagangan, Politeknik Sultan Salahuddin Abdul Aziz Shah, Shah Alam, Selangor.

NAMA PELAJAR :

Bavanee Preya a/p Subramaniam	08DPI17F2008
Muhamad Arif bin HabiburRehman	08DPI17F2005
Fatin Nuraisya binti Mahthir	08DPI17F2015
Norsuhada binti Kamaruzzaman	08DPI17F1082

NAMA PENYELIA :

Muhamad Hashim Bin Ahmad	0176761491
Ts. Ir. Dr. Ahmad Azlan Bin Ab Aziz	0124822714
Datin Seri Dr. ZainahBt Othman	0192219540
Zaharatul Akmar Binti Ahmad Zainuddin	01110022145

Pihak kami sedang menjalankan kajian bertajuk**"Menerokapenggunaan drone dalam pertanian pintar di Politeknik Sultan Salahuddin Abdul Aziz Shah".**Kajian in idijalankan oleh pelajar program Diploma Perniagaan Antarabangsa semester 5 untuk mengetahui penggunaan drone dalam pertanian.

Kami amat menghargai sekiranya anda dapat meluangkan masa untuk menjawab soalan-soalan yang disediakan dengan jujur dan berhemah. Segala maklum balas yang diberi adalah sulit dan hanya digunakan untuk kegunaan akademik sahaja. Kerjasama dan penglibatan anda dalam kajian ini amat kami hargai dan didahului dengan jutaan terima kasih.

Sebarang pertanyaan berkenaan kajian ini boleh dikemukan kepada pengkaji di atas melalui nombor telefon.

Terima kasih atas masa dan kerjasama yang diberi.

Sekian.

EXPLORING THE PERCEIVED USEFULNESS OF DRONE IN SMART FARMING AT SULTAN SALAHUDDIN ABDUL AZIZ SHAH POLYTECHNIC

Ladies and gentlemen,

Your cooperation is essential to the success of this study and we are a research group named below from the Department of Commerce, Polytechnic Sultan Salahuddin Abdul Aziz Shah, Shah Alam, Selangor.

STUDENT'S NAME :

Bavanee Preya a / p Subramaniam	08DPI17F2008
Muhamad Arif bin HabiburRehman	08DPI17F2005
Fatin Nuraisya binti Mahthir	08DPI17F2015
Norsuhada binti Kamaruzzaman	08DPI17F1082

SUPERVISOR'S NAME :

Muhamad Hashim Bin Ahmad	0176761491
Ts. Ir. Dr. Ahmad Azlan Bin Ab Aziz	0124822714
Datin Seri Dr. ZainahBt Othman	0192219540
Zaharatul Akmar Binti Ahmad Zainuddin	01110022145

We are conducting a study titled "**Exploring the perceived usefulness of drone in smart farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic".** This study is conducted by students of the 5th semester of Diploma in International Business program to learn the use of drones in agriculture.

We would appreciate it if you could take the time to answer the questions provided honestly and prudently. All feedback provided is confidential and is for academic use only. Your cooperation and participation in this study is greatly appreciated and is gratefully acknowledged.

Any questions regarding this study can be directed to the above researcher by telephone number.

Thank you for your time and cooperation.

PART A

BAHAGIAN A

(RESPONDENT BACKGROUND)

(LATAR BELAKANG RESPONDEN)

Tick (/) in the space provided as the answer to the next question.

Tandakan (/) dalam ruang yang disediakan sebagai jawapan bagi soalan seterusnya.

Gender */ **Jantina***

1.	Male / ***Lelaki***	
2.	Female / ***Perempuan***	

Race / ***Kaum***

1.	Malay / ***Melayu***	
2.	Chinese / ***Cina***	
3.	Indian ***/ India***	
4.	Others / ***Lain-lain***	

Age / ***Umur***

1.	21-30	
2.	31-40	
3.	41-50	
4.	51-60	
5.	61-70	
6.	71-80	

Level of education / ***Tahap pendidikan***

1.	PhD	
2.	Master	
3.	Ijazah	
4.	Diploma	
5.	Sijil	
6.	STPM	
7.	SPM	
8.	SRP/PMR/PT3	
9.	UPSR	
10.	TIADA PENDIDIKAN FORMAL	

PART B

BAHAGIAN B

INDEPENDENT VARIABLE: PERCEIVED EASE OF USE IN SMART FARMING

PEMBOLEHBAH TIDAK BERSANDAR: KEBERKESANAN MEMUDAHKAN KEPENGGUNAAN DALAM PERTANIAN PINTAR

Instruction/ ***Arahan***:

Tick (/) in the space provided as the answer for all the question.

Tandakan (/) dalam ruang yang disediakan sebagai jawapan pada setiap soalan.

1	2	3	4	5
STRONGLY DISAGREE/ ***SANGAT TIDAK BERSETUJU***	DISAGREE/ ***TIDAK BERSETUJU***	NEUTRAL/ ***TIDAK PASTI***	AGREE/ ***SETUJU***	STRONGLY AGREE/ ***SANGAT BERSETUJU***

	Perceived Ease of Use	1	2	3	4	5
1.	I have fun using drone to help me do the farming tasks. ***Saya berasa seronok menggunakan* drone *dalam membantu saya melakukan tugas berkebun.***					
2.	Using drone is convenient. ***Menggunakan* drone *ialah sesuatu yang mudah.***					
3.	Using drone has become part of the daily routine in my life. **Menggunakan drone sudah menjadi sebahagian rutin harian saya.**					
4.	I use drone in more ways that people do other than agriculture. **Saya menggunakan drone dengan pelbagai cara selain daripada pertanian seperti yang dilakukan oleh orang lain.**					
5.	My drone expresses my personal style of agriculture. **Drone saya mengungkapkan gaya peribadi saya dalam pertanian.**					
6.	I found the drone is easy to use rather than using human labour.					

	Saya mendapati drone adalah mudah digunakan daripada menggunakan buruh manusia.					
7.	It is safer to use drone to handling pesticide. **Lebih selamat menggunakan drone untuk mengendalikan racun perosak.**					
8.	Using drone it's easy to get to do what I want it to do. **Menggunakan drone mudah untuk melakukan apa yang saya mahu lakukan.**					
9.	My interaction with the drone system would be more clear and understandable. **Interaksi saya dengan sistem drone akan lebih jelas dan difahami.**					
10.	It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system. **Penggunaan drone memudahkan untuk mengetahui masa dan kuantiti yang tepat untuk menyembur racun, air dan baja setelah maklumat disampaikan oleh sistem.**					

PART C

BAHAGIAN C

INDEPENDENT VARIABLE: PERCEIVED USEFULNESS IN SMART FARMING

PEMBOLEHBAH TIDAK BERSANDAR: KEBERKESANAN PENGGUNAAN DALAM PERTANIAN PINTAR

Instruction/ ***Arahan*** :

Tick (/) in the space provided as the answer for all the question.

Tandakan (/) dalam ruang yang disediakan sebagai jawapan pada setiap soalan.

1	2	3	4	5
STRONGLY DISAGREE/ ***SANGAT TIDAK BERSETUJU***	DISAGREE/ ***TIDAK BERSETUJU***	NEUTRAL/ ***TIDAK PASTI***	AGREE/ ***SETUJU***	STRONGLY AGREE/ ***SANGAT BERSETUJU***

	PERCEIVE USEFULNESS	1	2	3	4	5
1.	My job would be easy to perform with drone. ***Kerja saya akan jadi lebih mudah dengan menggunakan* drone.**					
2.	Using drone makes me to manage job more effectively. ***Penggunaan* drone *membantu saya menguruskan kerja dengan lebih berkesan.***					
3.	Using drone saves my time and effort in performing farming activity. ***Penggunaan* drone *menjimatkan masa dan usaha saya dalam melakukan aktiviti pertanian.***					
4.	Using drone enhance my task effectiveness. ***Penggunaan* drone *meningkatkan keberkesanan tugas saya.***					
5.	Using drone gives me a greater control. ***Penggunaan* drone *memberikan saya kawalan yang lebih besar.***					
6.	Using drone offers me alternative ways to solve farming problems.					

	Penggunaan drone menawarkan saya cara alternatif untuk menyelesaikan masalah pertanian.					
7.	Facilities of smart agricultural are essential in farm records management. **Kemudahan penggunaan pertanian pintar adalah penting dalam pengurusan rekod ladang.**					
8.	Using drone is alternative to monitor the crop in large scale of my farming area. **Penggunaan drone adalah alternatif yang baik untuk memantau tanaman dalam kawasan yang luas / kesemua kawasan pertanian saya.**					
9.	Drones really helpful to enter the area that human labor can't access to spray pesticides and fertilizers. **Drone sangat membantu memasuki kawasan yang tidak dapat diakses oleh pekerja manusia untuk menyemburkan racun perosak dan baja.**					
10.	The use of drone can save labor costs over the long term. **Penggunaan drone dapat menjimatkan kos buruh bagi tempoh jangka panjang.**					

PART D

BAHAGIAN D

DEPENDENT VARIABLE: SMART FARMING

PEMBOLEHBAH BERSANDAR: PERTANIAN PINTAR

Instruction/ ***Arahan*** :

Tick (/) in the space provided as the answer for all the questions.

Tandakan (/) dalamruang yang disediakan sebagai jawapan pada setiap soalan.

1	2	3	4	5
STRONGLY DISAGREE/ ***SANGAT TIDAK BERSETUJU***	DISAGREE/ ***TIDAK BERSETUJU***	NEUTRAL/ ***TIDAK PASTI***	AGREE/ ***SETUJU***	STRONGLY AGREE/ ***SANGAT BERSETUJU***

	SMART FARMING	1	2	3	4	5
1.	Smart farming help me to manage the crop more quickly. ***Pertanian pintar membantu saya menguruskan tanaman dengan cepat.***					
2.	Smart farming isan important contributor to my farm's current financial profitability. **Pertanian pintar adalah penyumbang penting kepada keuntungan kewangan semasa lading saya.**					
3.	Smart farming has made my job as a farm manager easier. **Pertanian pintar telah menjadikan pekerjaan saya sebagai pengurus lading lebih mudah.**					
4.	Smart farming help me to better understand the soil characteristics (PH, EC, Battery, Temperature, Humidityand Moisture). **Pertanian bijak membantu saya untuk lebih memahami ciri-ciri tanah.**					
5.	Smart farming is beneficial for the farming industry. **Pertanian pintar amat bermanfaat untuk industri pertanian.**					

6.	The use of smart farming is less stressful for me to handle than manually. **Penggunaan pertanian pintar kurang tertekan bagi saya untuk mengendalikannya daripada menggunakan cara manual.**					
7.	Smart farming is a 'future proof' with the current technology of data recording. **Pertanian pintar adalah 'buktimasadepan' dengan teknologi rakaman data semasa.**					
8.	Smart farming is completely compatible with all aspects in my farming activities. **Pertanian pintar sangat serasi dengan segala aspek dalam aktiviti pertanian.**					
9.	Smart farming improves the plant health and productivity. **Pertanian pintar memperbaiki pengeluaran dan kesuburan tanaman.**					
10.	Smart farming supports the development of agricultural sector. **Pertanian pintar menyokong kemajuan sector pertanian.**					

SPSS – RELIABILITY RESULT

```
RELIABILITY
  /VARIABLES=B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
  /SCALE('IV_1') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: IV_1

Case Processing Summary

		N	%
Cases	Valid	61	100.0
	Excluded[a]	0	.0
	Total	61	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.740	.757	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B1 - I have fun using drone to help me do the farming tasks.	39.0328	10.032	.365	.375	.725
B2 - Using drone is convenient.	39.1639	9.606	.531	.538	.705
B3 - Using drone has become part of the daily routine in my life.	39.3770	8.305	.486	.377	.707
B4 - I use drone in more ways that people do other than agriculture	39.4426	9.717	.226	.291	.755
B5 - My drone expresses my personal style of agriculture.	39.3115	9.151	.549	.412	.698
B6 - I found the drone is easy to use rather than using human labour.	39.0656	9.362	.447	.506	.712
B7 - It is safer to use drone to handling pesticide.	38.9836	9.983	.324	.520	.730
B8 - Using drone it's easy to get to do what I want it to do.	39.1148	10.137	.306	.360	.732
B9 - My interaction with the drone system would be more clear and understandable.	39.3115	9.951	.311	.311	.732
B10 - It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system.	39.0656	9.196	.606	.531	.693

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.354	4.098	4.557	.459	1.112	.026	10

```
RELIABILITY
  /VARIABLES=C1 C2 C3 C4 C5 C6 C7 C8 C9 C10
  /SCALE('IV_2') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: IV_2

Case Processing Summary

		N	%
Cases	Valid	61	100.0
	Excluded[a]	0	.0
	Total	61	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.829	.831	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C1 - My job would be easy to perform with drone.	39.9344	9.796	.559	.564	.809
C2 - Using drone makes me to manage job more effectively.	40.0984	9.657	.580	.612	.807
C3 - Using drone saves my time and effort in performing farming activity.	39.9508	9.481	.716	.730	.795
C4 - Using drone enhance my task effectiveness.	40.0164	9.483	.618	.615	.802
C5 - Using drone gives me a greater control.	40.0164	9.683	.555	.413	.809
C6 - Using drone offers me alternative ways to solve farming problems.	39.9508	9.881	.530	.474	.812
C7 - Facilities of smart agricultural are essential in farm records management.	40.1967	10.361	.312	.216	.835
C8 - Using drone is alternative to monitor the crop in large scale of my farming area.	40.0164	10.383	.407	.275	.823
C9 - Drones really helpful to enter the area that human labor cant't access to spray pesticides and fertilizers.	39.9508	10.314	.393	.326	.825
C10 - The use of drone can save labor costs over the long term.	40.1475	9.628	.531	.482	.812

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.448	4.279	4.541	.262	1.061	.008	10

```
RELIABILITY
  /VARIABLES=D1 D2 D3 D4 D5 D6 D7 D8 D9 D10
  /SCALE('DV_1') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: DV_1

Case Processing Summary

		N	%
Cases	Valid	61	100.0
	Excluded[a]	0	.0
	Total	61	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.801	.802	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
D1 - Smart farming help me to manage the crop more quickly.	39.3115	10.285	.705	.589	.754
D2 - Smart farming is an important contibutor to my farm's current financial profitability.	39.3770	11.372	.478	.367	.784
D3 - Smart farming has made my job as a farm manager easier.	39.1803	11.850	.452	.400	.787
D4 - Smart farming help me to better understand the soil characteristics (PH, EC, Battery, Temperature, Humidity and Moisture).	39.4918	11.487	.382	.374	.797
D5 - Smart farming is beneficial for the farming industry.	39.0492	12.381	.282	.317	.804
D6 - The use of smart farming is less stressful for me to handle than manually.	39.3443	11.230	.532	.396	.777
D7 - Smart farming is a 'future proof' with the current technology of data recording.	39.2787	11.404	.495	.354	.782
D8 - Smart farming is completely compatible with all aspects in my farming activities.	39.3443	11.496	.527	.361	.779
D9 - Smart farming improves the plant health and productivity.	39.3607	10.801	.489	.404	.784
D10 - Smart farming supports the development of agricultural sector.	39.0164	11.950	.438	.409	.788

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.364	4.148	4.623	.475	1.115	.023	10

SPSS – FREQUENCIES RESULT

```
FREQUENCIES VARIABLES=Gender Race Age Education B1 B2 B3 B4 B5 B6 B7 B8 B9
B10 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10
  /STATISTICS=MEAN SUM
  /BARCHART PERCENT
  /ORDER=ANALYSIS.
```

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	48	78.7	78.7	78.7
	Female	13	21.3	21.3	100.0
	Total	61	100.0	100.0	

Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	61	100.0	100.0	100.0

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30	20	32.8	32.8	32.8
	31-40	18	29.5	29.5	62.3
	41-50	10	16.4	16.4	78.7
	51-60	9	14.8	14.8	93.4
	61-70	4	6.6	6.6	100.0
	Total	61	100.0	100.0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ijazah	4	6.6	6.6	6.6
	Diploma	8	13.1	13.1	19.7
	Sijil	9	14.8	14.8	34.4
	STPM	4	6.6	6.6	41.0
	SPM	26	42.6	42.6	83.6
	SPR/PMR/PT3	3	4.9	4.9	88.5
	UPSR	5	8.2	8.2	96.7
	TIADA PENDIDIKAN FORMAL	2	3.3	3.3	100.0
	Total	61	100.0	100.0	

B1 - I have fun using drone to help me do the farming tasks.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	30	49.2	49.2	49.2
	Strongly Agree	31	50.8	50.8	100.0
	Total	61	100.0	100.0	

B2 - Using drone is convenient.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	38	62.3	62.3	62.3
	Strongly Agree	23	37.7	37.7	100.0
	Total	61	100.0	100.0	

B3 - Using drone has become part of the daily routine in my life.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	12	19.7	19.7	23.0
	Agree	21	34.4	34.4	57.4
	Strongly Agree	26	42.6	42.6	100.0
	Total	61	100.0	100.0	

B4 - I use drone in more ways that people do other than agriculture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	10	16.4	16.4	19.7
	Agree	29	47.5	47.5	67.2
	Strongly Agree	20	32.8	32.8	100.0
	Total	61	100.0	100.0	

B5 - My drone expresses my personal style of agriculture.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1.6	1.6	1.6
	Neutral	2	3.3	3.3	4.9
	Agree	40	65.6	65.6	70.5
	Strongly Agree	18	29.5	29.5	100.0
	Total	61	100.0	100.0	

B6 - I found the drone is easy to use rather than using human labour.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	4	6.6	6.6	6.6
	Agree	24	39.3	39.3	45.9
	Strongly Agree	33	54.1	54.1	100.0
	Total	61	100.0	100.0	

B7 - It is safer to use drone to handling pesticide.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	23	37.7	37.7	41.0
	Strongly Agree	36	59.0	59.0	100.0
	Total	61	100.0	100.0	

B8 - Using drone it's easy to get to do what I want it to do.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	33	54.1	54.1	55.7
	Strongly Agree	27	44.3	44.3	100.0
	Total	61	100.0	100.0	

B9 - My interaction with the drone system would be more clear and understandable.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	8.2	8.2	8.2
	Agree	37	60.7	60.7	68.9
	Strongly Agree	19	31.1	31.1	100.0
	Total	61	100.0	100.0	

B10 - It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	30	49.2	49.2	50.8
	Strongly Agree	30	49.2	49.2	100.0
	Total	61	100.0	100.0	

C1 - My job would be easy to perform with drone.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	26	42.6	42.6	44.3
	Strongly Agree	34	55.7	55.7	100.0
	Total	61	100.0	100.0	

C2 - Using drone makes me to manage job more effectively.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	34	55.7	55.7	59.0
	Strongly Agree	25	41.0	41.0	100.0
	Total	61	100.0	100.0	

C3 - Using drone saves my time and effort in performing farming activity.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	29	47.5	47.5	47.5
	Strongly Agree	32	52.5	52.5	100.0
	Total	61	100.0	100.0	

C4 - Using drone enhance my task effectiveness.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	29	47.5	47.5	50.8
	Strongly Agree	30	49.2	49.2	100.0
	Total	61	100.0	100.0	

C5 - Using drone gives me a greater control.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	29	47.5	47.5	50.8
	Strongly Agree	30	49.2	49.2	100.0
	Total	61	100.0	100.0	

C6 - Using drone offers me alternative ways to solve farming problems.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	27	44.3	44.3	45.9
	Strongly Agree	33	54.1	54.1	100.0
	Total	61	100.0	100.0	

C7 - Facilities of smart agricultural are essential in farm records management.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	8.2	8.2	8.2
	Agree	34	55.7	55.7	63.9
	Strongly Agree	22	36.1	36.1	100.0
	Total	61	100.0	100.0	

C8 - Using drone is alternative to monitor the crop in large scale of my farming area.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	33	54.1	54.1	54.1
	Strongly Agree	28	45.9	45.9	100.0
	Total	61	100.0	100.0	

C9 - Drones really helpful to enter the area that human labor cant't access to spray pesticides and fertilizers.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	27	44.3	44.3	45.9
	Strongly Agree	33	54.1	54.1	100.0
	Total	61	100.0	100.0	

C10 - The use of drone can save labor costs over the long term.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	4	6.6	6.6	6.6
	Agree	33	54.1	54.1	60.7
	Strongly Agree	24	39.3	39.3	100.0
	Total	61	100.0	100.0	

D1 - Smart farming help me to manage the crop more quickly.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	7	11.5	11.5	11.5
	Agree	27	44.3	44.3	55.7
	Strongly Agree	27	44.3	44.3	100.0
	Total	61	100.0	100.0	

D2 - Smart farming is an important contibutor to my farm's current financial profitability.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	6	9.8	9.8	9.8
	Agree	33	54.1	54.1	63.9
	Strongly Agree	22	36.1	36.1	100.0
	Total	61	100.0	100.0	

D3 - Smart farming has made my job as a farm manager easier.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	31	50.8	50.8	52.5
	Strongly Agree	29	47.5	47.5	100.0
	Total	61	100.0	100.0	

D4 - Smart farming help me to better understand the soil characteristics (PH, EC, Battery, Temperature, Humidity and Moisture).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	11	18.0	18.0	18.0
	Agree	30	49.2	49.2	67.2
	Strongly Agree	20	32.8	32.8	100.0
	Total	61	100.0	100.0	

D5 - Smart farming is beneficial for the farming industry.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	2	3.3	3.3	3.3
	Agree	21	34.4	34.4	37.7
	Strongly Agree	38	62.3	62.3	100.0
	Total	61	100.0	100.0	

D6 - The use of smart farming is less stressful for me to handle than manually.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	5	8.2	8.2	8.2
	Agree	33	54.1	54.1	62.3
	Strongly Agree	23	37.7	37.7	100.0
	Total	61	100.0	100.0	

D7 - Smart farming is a 'future proof' with the current technology of data recording.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	4	6.6	6.6	6.6
	Agree	31	50.8	50.8	57.4
	Strongly Agree	26	42.6	42.6	100.0
	Total	61	100.0	100.0	

D8 - Smart farming is completely compatible with all aspects in my farming activities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	3	4.9	4.9	4.9
	Agree	37	60.7	60.7	65.6
	Strongly Agree	21	34.4	34.4	100.0
	Total	61	100.0	100.0	

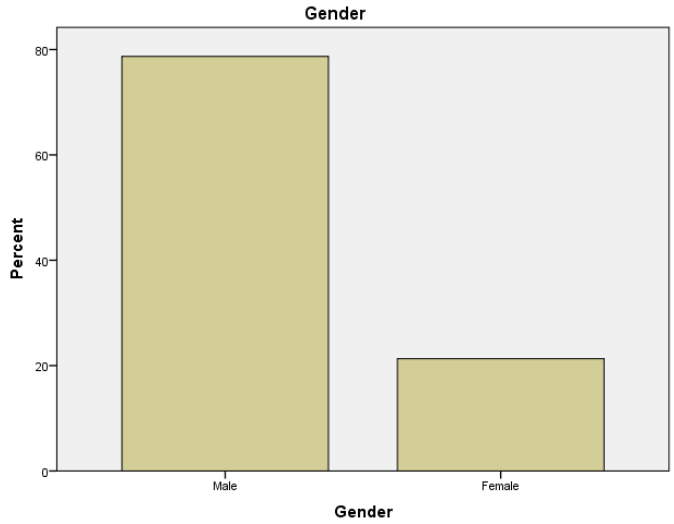
D9 - Smart farming improves the plant health and productivity.

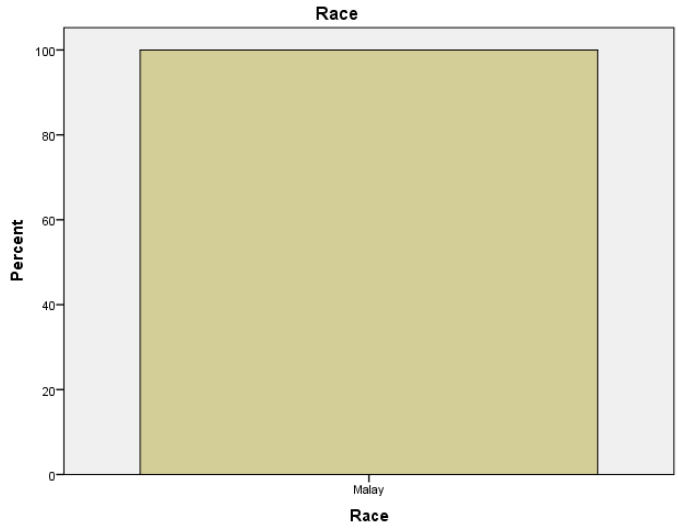
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	2	3.3	3.3	3.3
	Neutral	5	8.2	8.2	11.5
	Agree	28	45.9	45.9	57.4
	Strongly Agree	26	42.6	42.6	100.0
	Total	61	100.0	100.0	

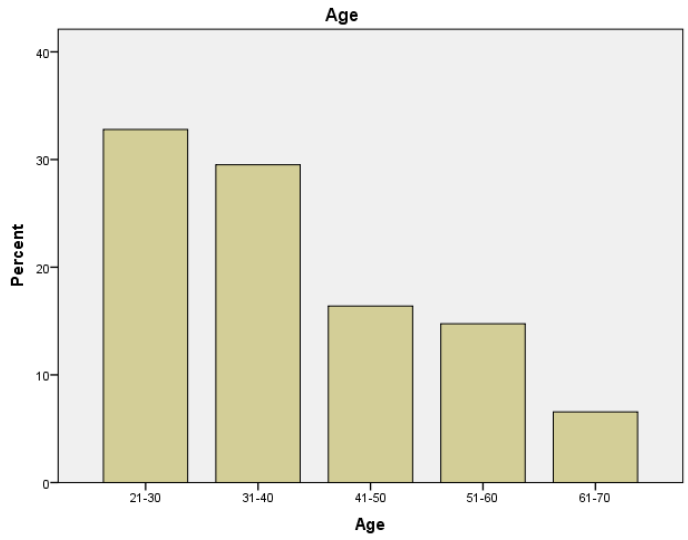
D10 - Smart farming supports the development of agricultural sector.

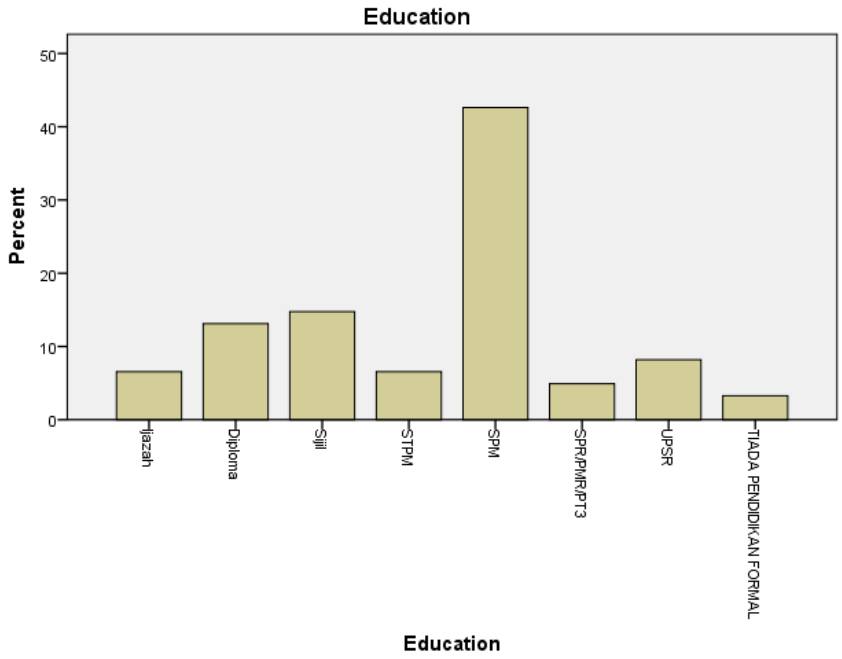
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutral	1	1.6	1.6	1.6
	Agree	21	34.4	34.4	36.1
	Strongly Agree	39	63.9	63.9	100.0
	Total	61	100.0	100.0	

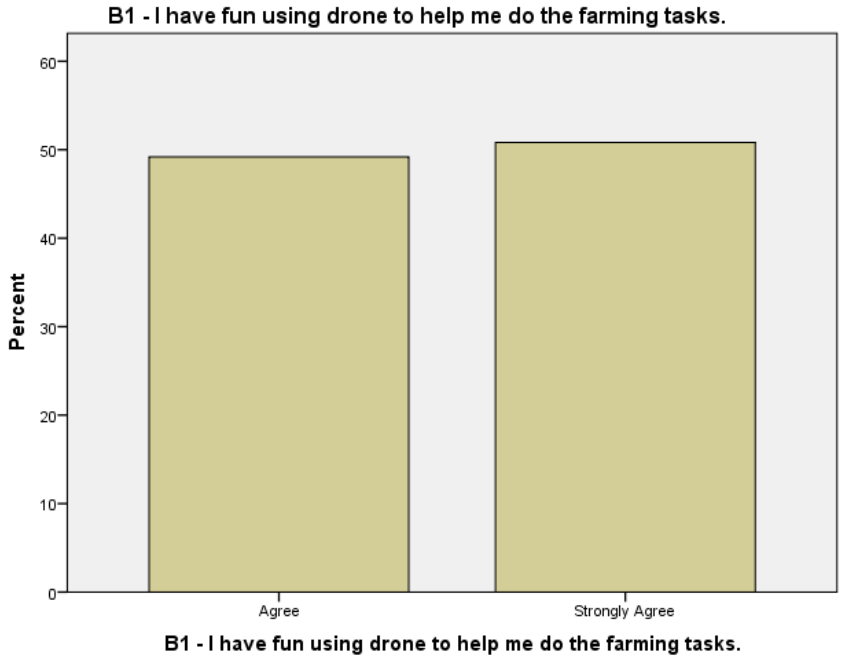
Bar Chart

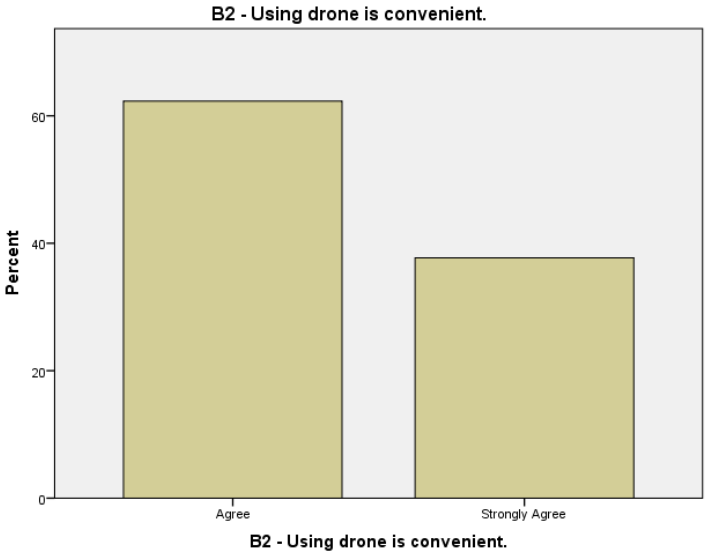

Gender
Percent
80
60
40
20
0
Male
Female
Gender

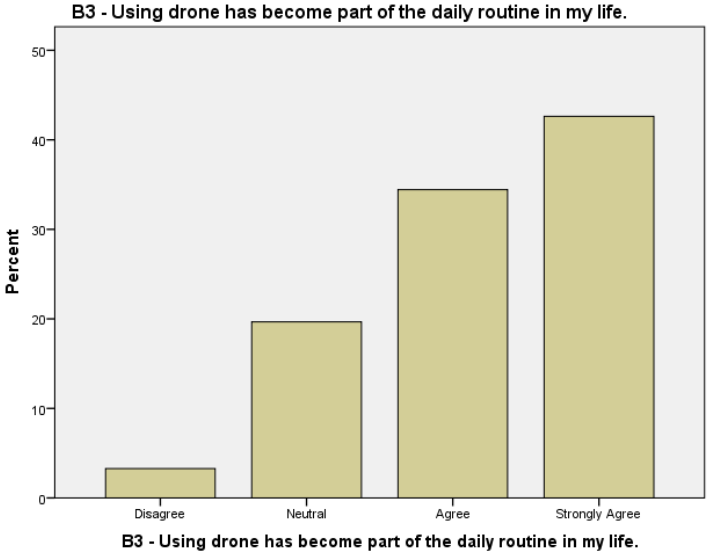

Race
Percent
100
80
60
40
20
0
Malay
Race

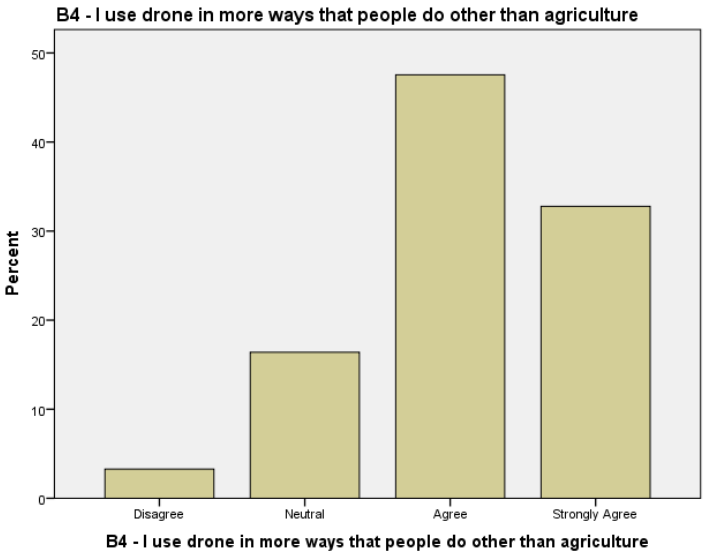

Age
Percent
40
30
20
10
0
21-30
31-40
41-50
51-60
61-70
Age

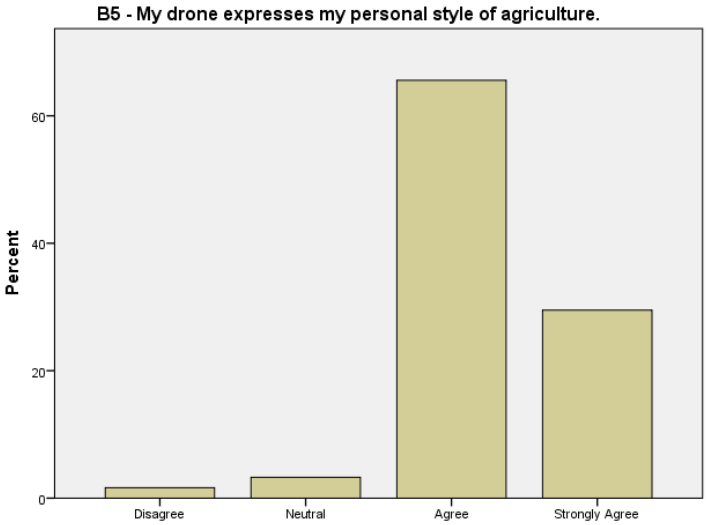

Education
Percent
50
40
30
20
10
0
Ijazah
Diploma
Sijil
STPM
SPM
SPR/PMR/PT3
UPSR
TIADA PENDIDIKAN FORMAL
Education


B1 - I have fun using drone to help me do the farming tasks.
Percent
60
50
40
30
20
10
0
Agree
Strongly Agree
B1 - I have fun using drone to help me do the farming tasks.

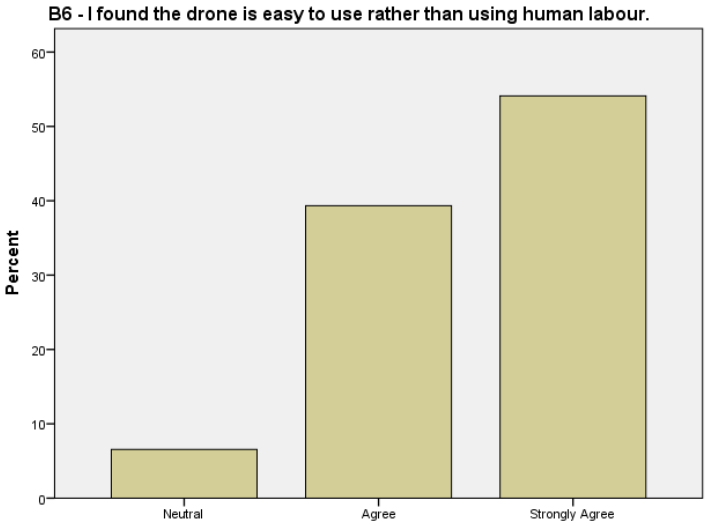

B2 - Using drone is convenient.
Percent
60
40
20
0
Agree
Strongly Agree
B2 - Using drone is convenient.


B3 - Using drone has become part of the daily routine in my life.
Percent
50
40
30
20
10
0
Disagree
Neutral
Agree
Strongly Agree
B3 - Using drone has become part of the daily routine in my life.

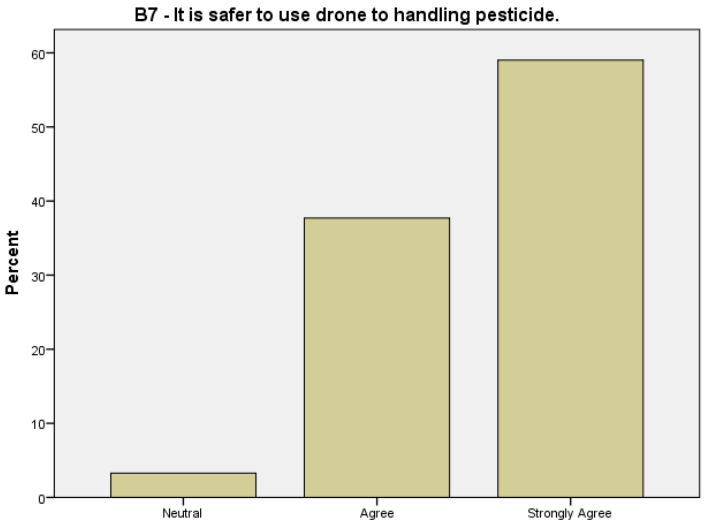

B4 - I use drone in more ways that people do other than agriculture
Percent
50
40
30
20
10
0
Disagree
Neutral
Agree
Strongly Agree
B4 - I use drone in more ways that people do other than agriculture



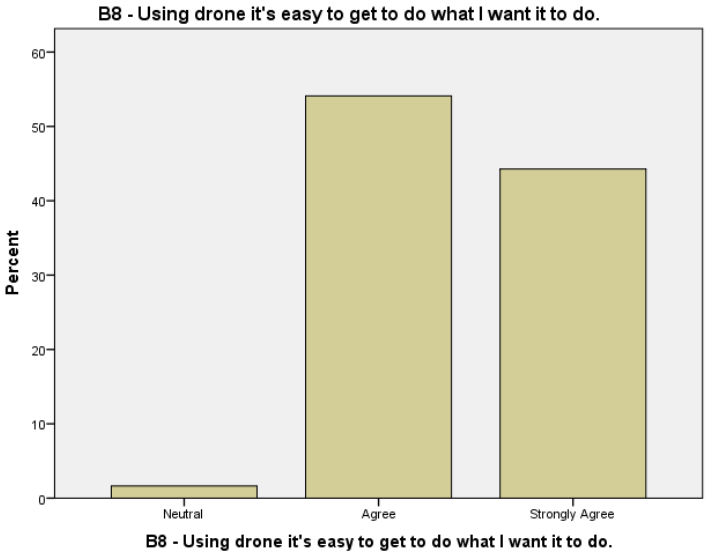
B5 - My drone expresses my personal style of agriculture.

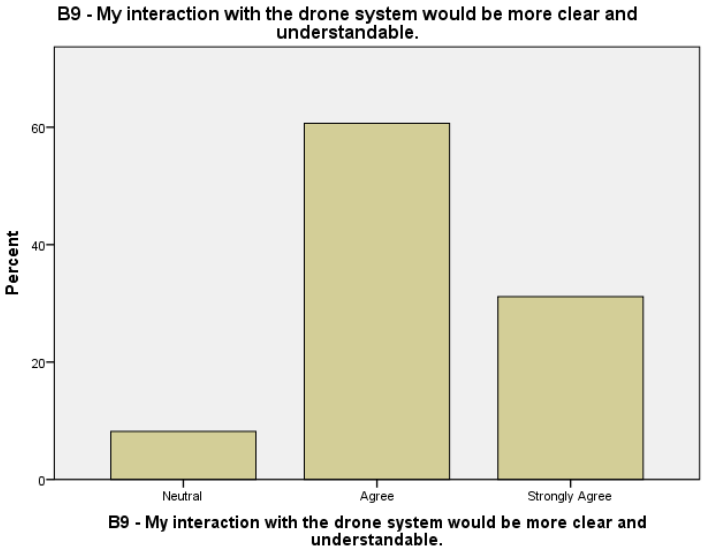


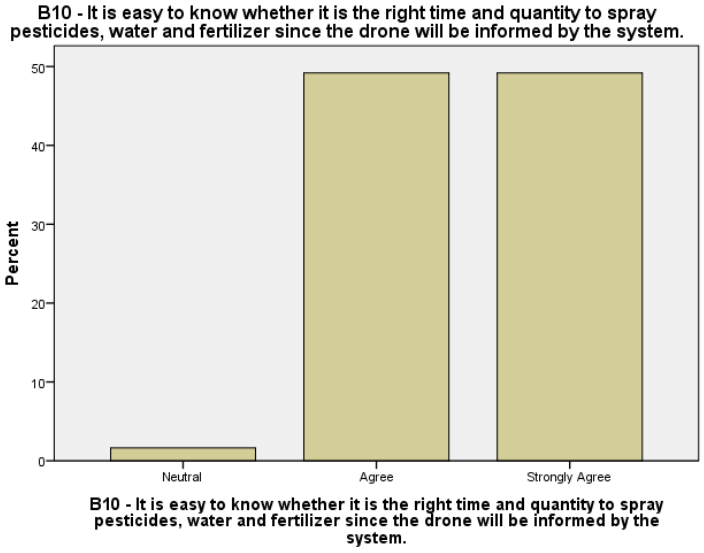
B6 - I found the drone is easy to use rather than using human labour.

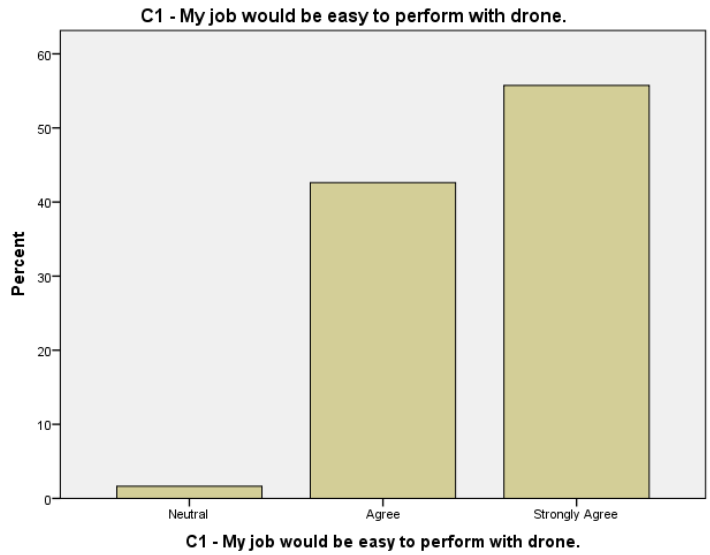


B7 - It is safer to use drone to handling pesticide.

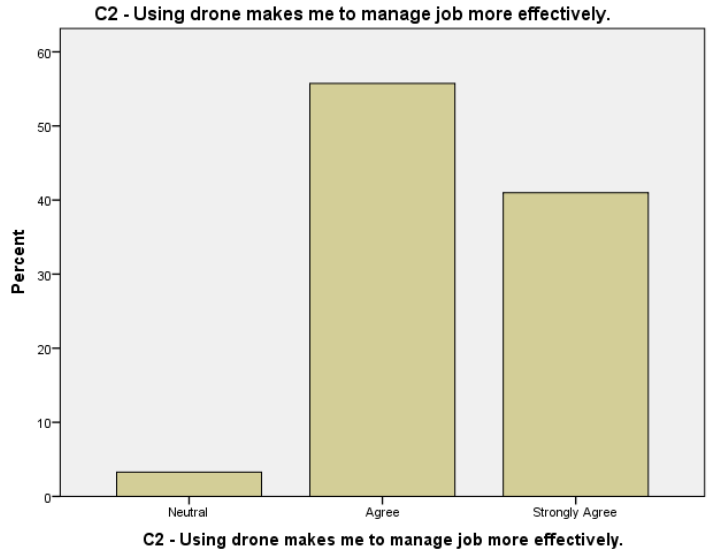

B8 - Using drone it's easy to get to do what I want it to do.
Percent
60
50
40
30
20
10
0
Neutral
Agree
Strongly Agree
B8 - Using drone it's easy to get to do what I want it to do.


B9 - My interaction with the drone system would be more clear and understandable.
Percent
60
40
20
0
Neutral
Agree
Strongly Agree
B9 - My interaction with the drone system would be more clear and understandable.

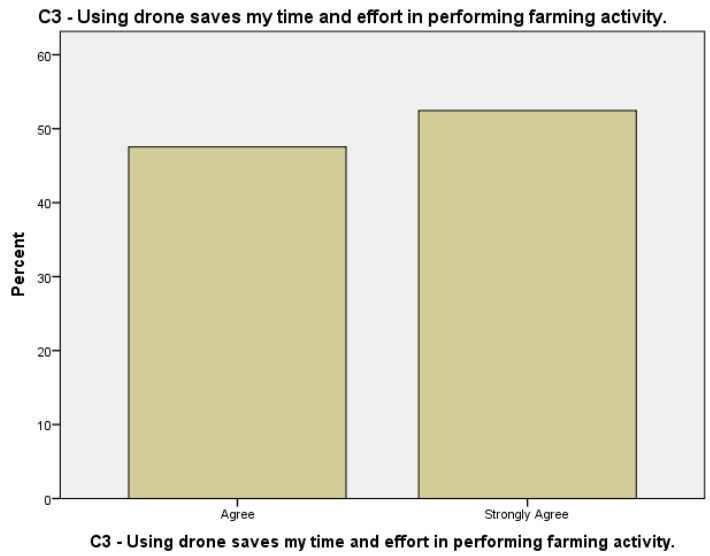

B10 - It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system.
Percent
50
40
30
20
10
0
Neutral
Agree
Strongly Agree
B10 - It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system.



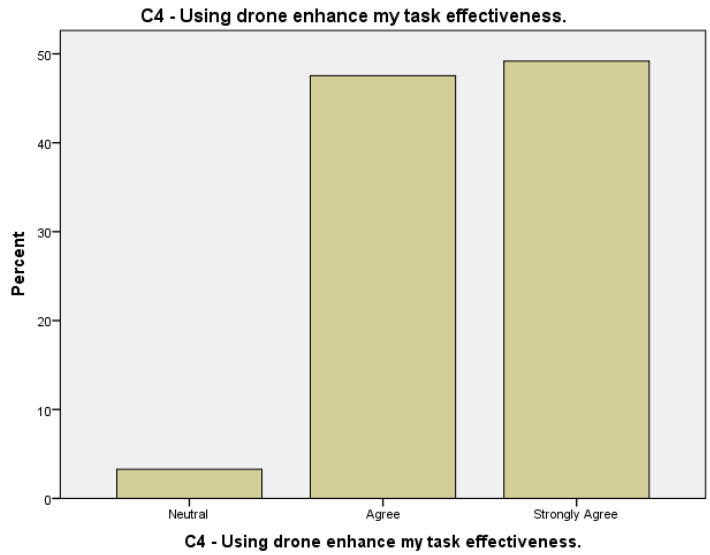
C1 - My job would be easy to perform with drone.

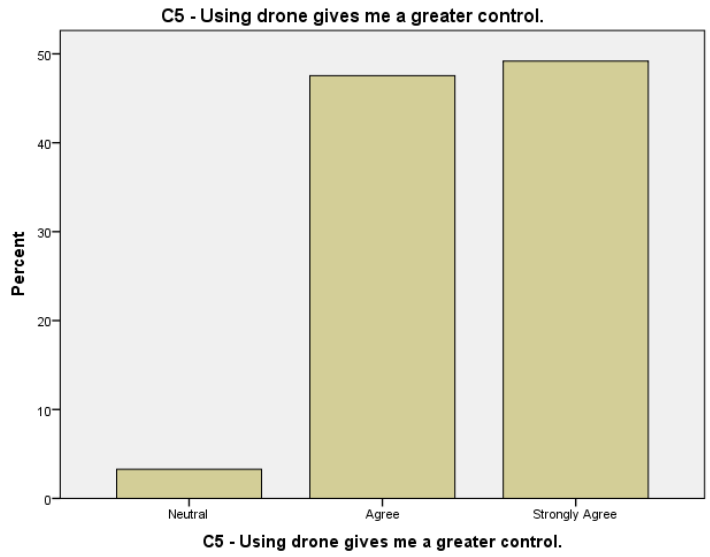


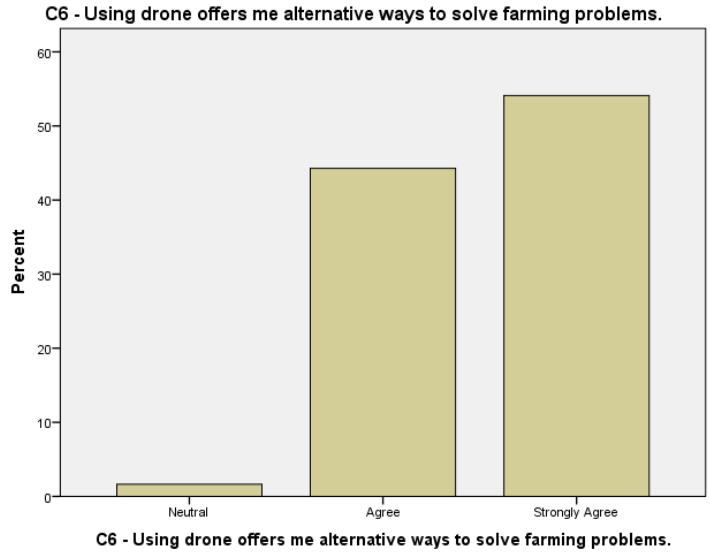
C2 - Using drone makes me to manage job more effectively.



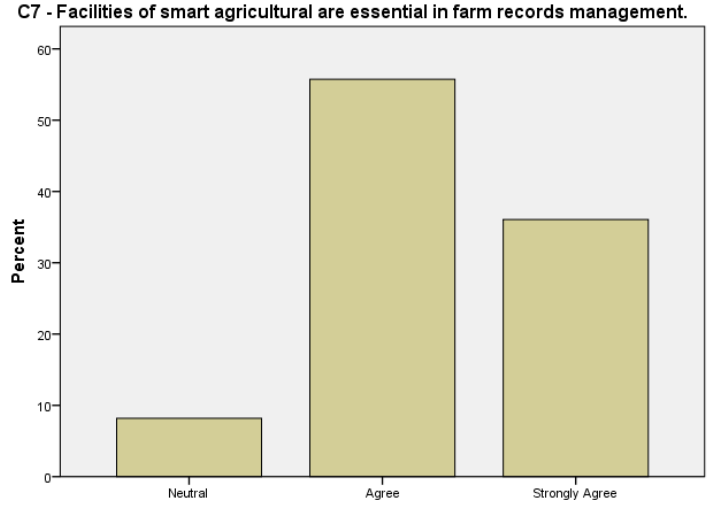
C3 - Using drone saves my time and effort in performing farming activity.


C4 - Using drone enhance my task effectiveness.
Percent
0
10
20
30
40
50
Neutral
Agree
Strongly Agree
C4 - Using drone enhance my task effectiveness.


C5 - Using drone gives me a greater control.
Percent
0
10
20
30
40
50
Neutral
Agree
Strongly Agree
C5 - Using drone gives me a greater control.

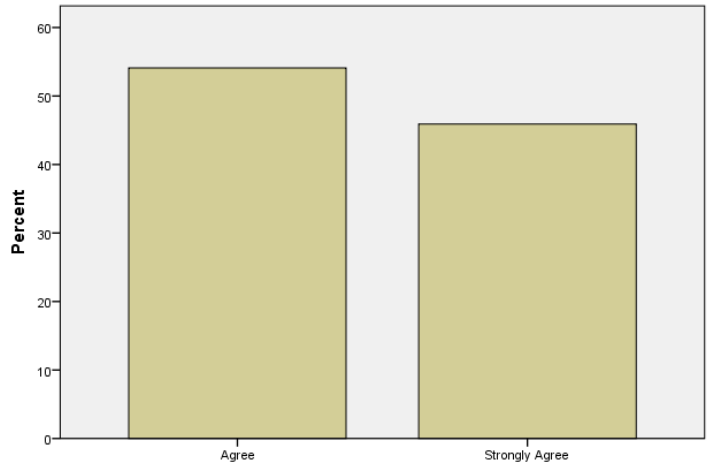

C6 - Using drone offers me alternative ways to solve farming problems.
Percent
0
10
20
30
40
50
60
Neutral
Agree
Strongly Agree
C6 - Using drone offers me alternative ways to solve farming problems.

C7 - Facilities of smart agricultural are essential in farm records management.



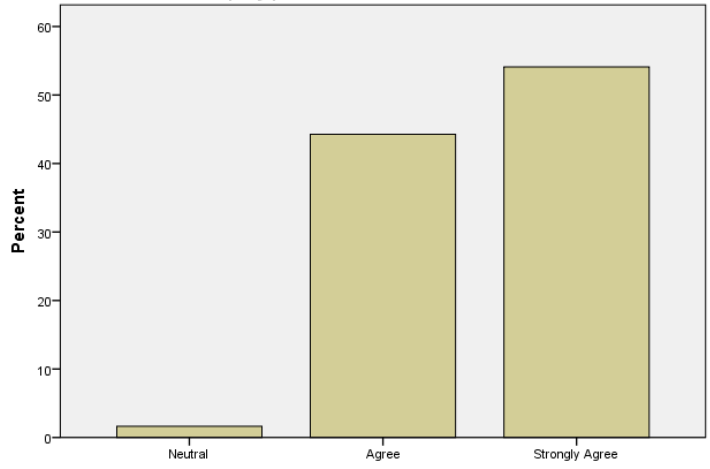
C7 - Facilities of smart agricultural are essential in farm records management.

C8 - Using drone is alternative to monitor the crop in large scale of my farming area.

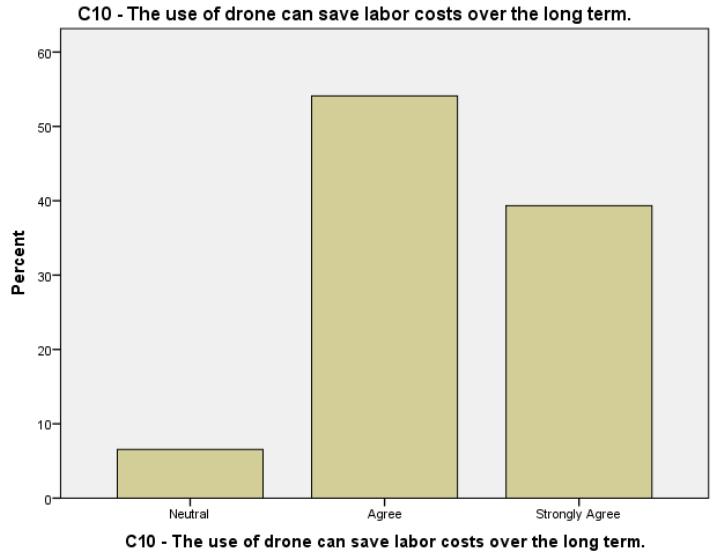


C8 - Using drone is alternative to monitor the crop in large scale of my farming area.

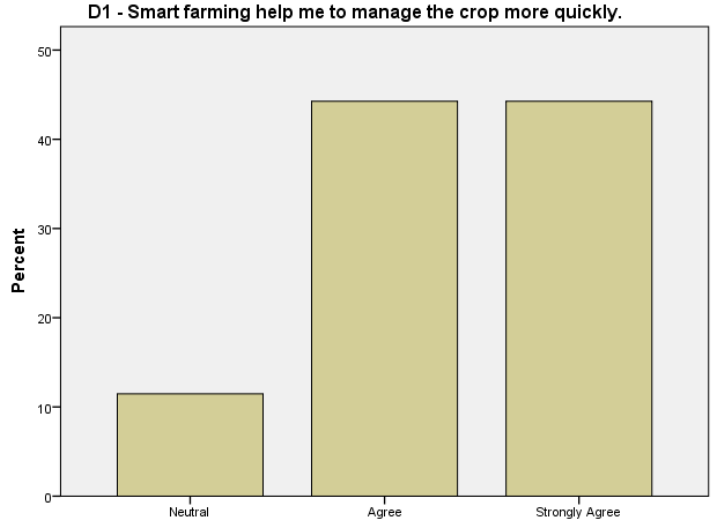
C9 - Drones really helpful to enter the area that human labor cant't access to spray pesticides and fertilizers.



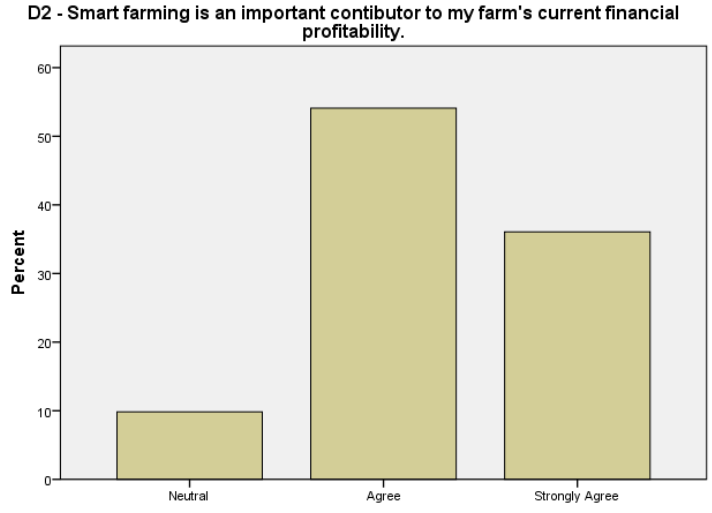
C9 - Drones really helpful to enter the area that human labor cant't access to spray pesticides and fertilizers.



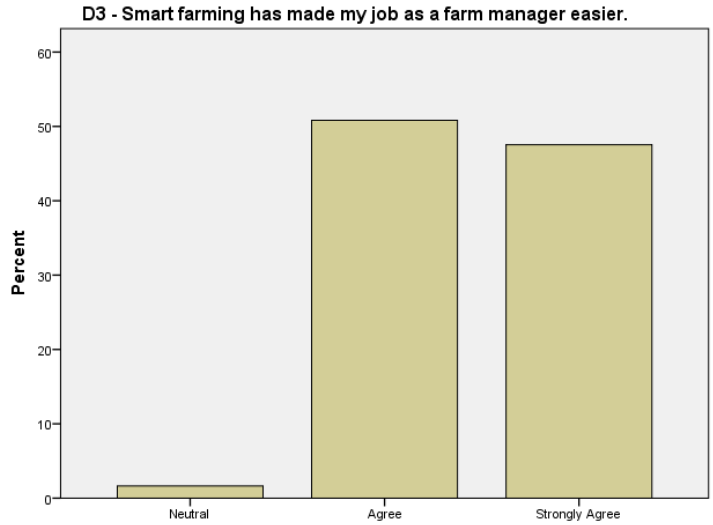
C10 - The use of drone can save labor costs over the long term.



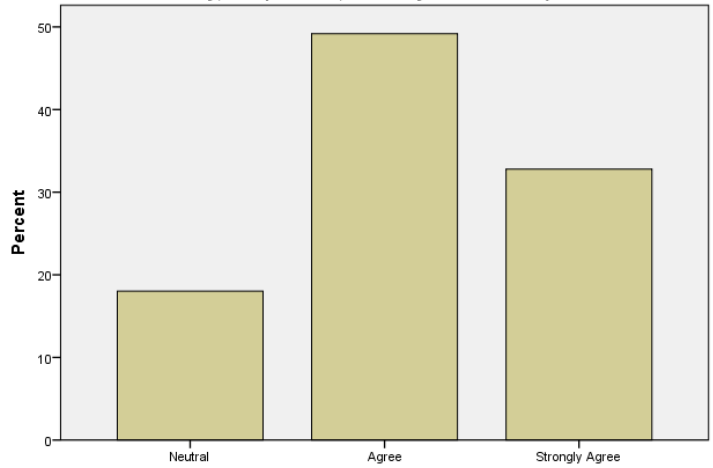
D1 - Smart farming help me to manage the crop more quickly.



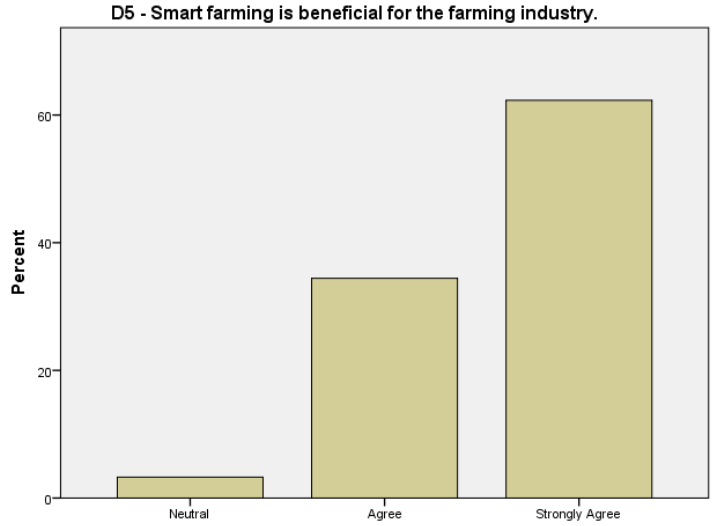
D2 - Smart farming is an important contibutor to my farm's current financial profitability.



D3 - Smart farming has made my job as a farm manager easier.

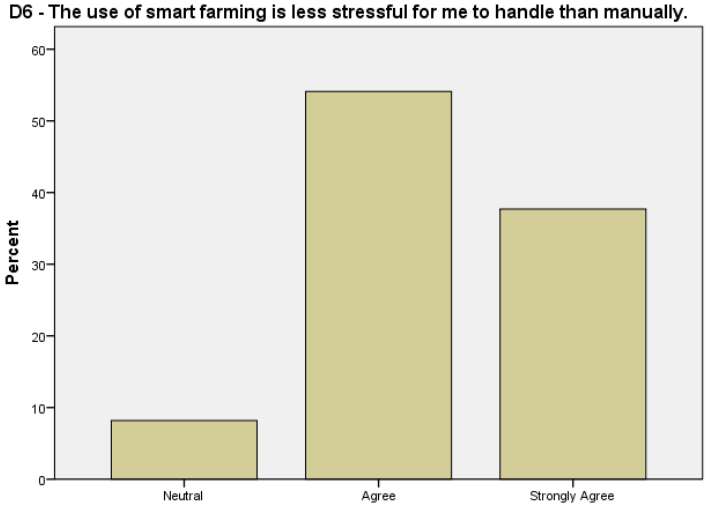


D4 - Smart farming help me to better understand the soil characteristics (PH, EC, Battery, Temperature, Humidity and Moisture).



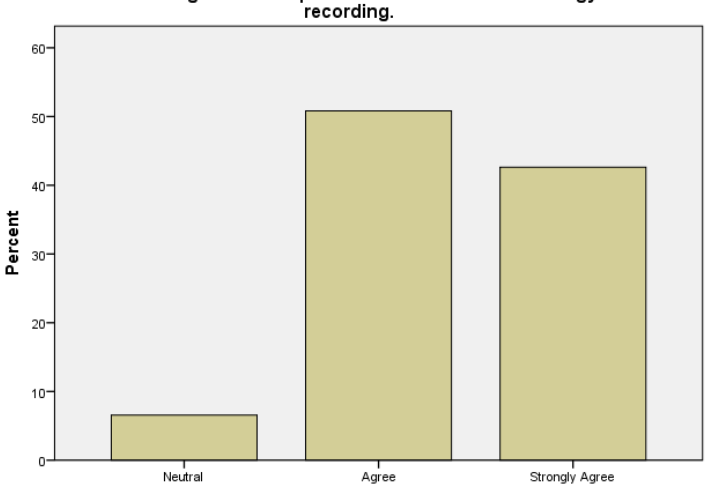
D5 - Smart farming is beneficial for the farming industry.

D6 - The use of smart farming is less stressful for me to handle than manually.



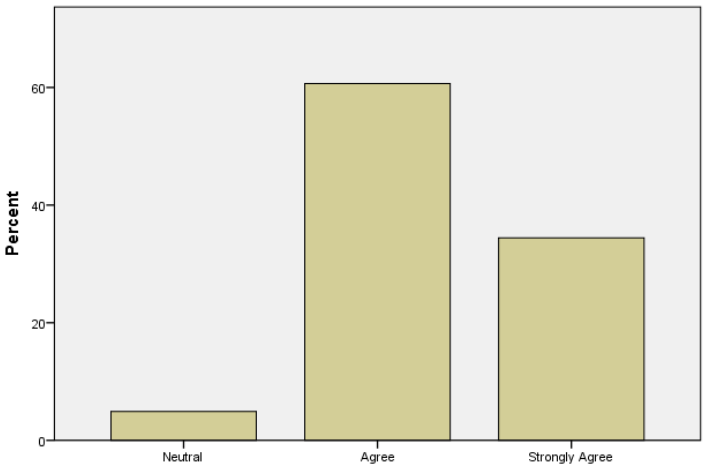
D6 - The use of smart farming is less stressful for me to handle than manually.

D7 - Smart farming is a 'future proof' with the current technology of data recording.

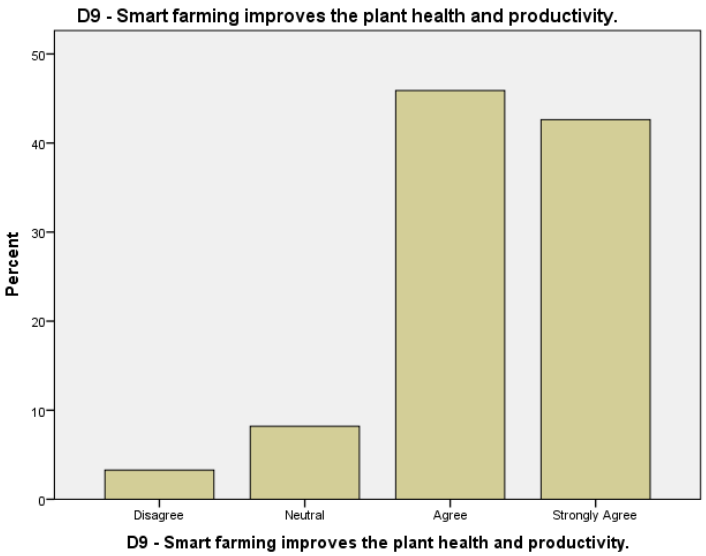


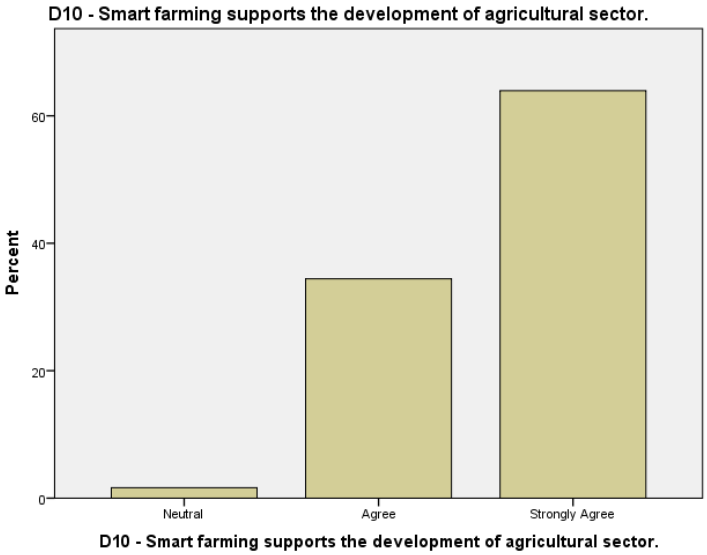
D7 - Smart farming is a 'future proof' with the current technology of data recording.

D8 - Smart farming is completely compatible with all aspects in my farming activities.



D8 - Smart farming is completely compatible with all aspects in my farming activities.


D9 - Smart farming improves the plant health and productivity.
Percent
50
40
30
20
10
0
Disagree
Neutral
Agree
Strongly Agree
D9 - Smart farming improves the plant health and productivity.


D10 - Smart farming supports the development of agricultural sector.
Percent
60
40
20
0
Neutral
Agree
Strongly Agree
D10 - Smart farming supports the development of agricultural sector.

PILOT TEST

```
GET
  FILE='C:\Users\MMnP40\Desktop\Data Questionnaire.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
RELIABILITY
  /VARIABLES=B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
  /SCALE('IV 1') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: IV 1

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.750	.770	10

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.363	3.833	4.600	.767	1.200	.063	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B1	39.0667	12.202	.272	.520	.746
B2	39.1667	11.592	.452	.610	.727
B3	39.4667	9.844	.447	.458	.730
B4	39.8000	11.269	.235	.396	.766
B5	39.3667	10.240	.609	.499	.698
B6	39.0667	10.892	.515	.565	.715
B7	39.0333	11.620	.384	.545	.733
B8	39.2000	11.821	.325	.541	.741
B9	39.4667	11.361	.426	.429	.728
B10	39.0667	10.823	.606	.651	.705

```
RELIABILITY
  /VARIABLES=C1 C2 C3 C4 C5 C6 C7 C8 C9 C10
  /SCALE('IV 2') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: IV 2

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.838	.842	10

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.430	4.233	4.533	.300	1.071	.009	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C1	39.8000	11.062	.507	.514	.825
C2	39.9000	10.438	.705	.781	.806
C3	39.8000	10.648	.727	.834	.806
C4	39.8333	10.006	.734	.804	.801
C5	39.9000	10.645	.642	.844	.812
C6	39.8000	11.200	.468	.651	.829
C7	40.0667	12.271	.150	.541	.861
C8	39.8333	11.385	.490	.357	.827
C9	39.7667	11.289	.444	.504	.831
C10	40.0000	10.897	.526	.800	.824

```
RELIABILITY
  /VARIABLES=D1 D2 D3 D4 D5 D6 D7 D8 D9 D10
  /SCALE('DV 1') ALL
  /MODEL=ALPHA
  /SUMMARY=TOTAL MEANS.
```

Reliability

Scale: DV 1

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.832	.834	10

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.297	3.967	4.633	.667	1.168	.034	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
D1	38.7333	13.651	.758	.712	.789
D2	38.7667	15.289	.499	.413	.819
D3	38.5333	16.120	.469	.516	.822
D4	39.0000	15.241	.504	.598	.818
D5	38.5000	16.534	.324	.438	.834
D6	38.7333	15.030	.536	.485	.815
D7	38.6333	15.895	.480	.359	.821
D8	38.6667	15.126	.669	.538	.804
D9	38.8000	14.441	.509	.530	.821
D10	38.3333	16.023	.506	.509	.819

CHAPTER 5

DISCUSSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter represent the discussion, implication, and summary with the conclusion of the study. Besides that, we give a suggestion for the future researcher to encourage people using drone in farming. Hence, this research has conclude perceived usefulness of using drone in smart farming and perceived ease of use of using drone in smart farming at Polytechnic's Sultan Salahuddin Abdul Aziz Shah Smart Farm whether the using of drone in Polytechnic's Smart Farm affect farming activities. This research has been conducted among farmers in Selangor.

5.2 SUMMARY OF STATISTICAL ANALYSIS

5.2.1 DESCRIPTIVE ANALYSIS

Descriptive analysis or also known as descriptive statistics are conducted based on dependent and independent variables that can be related to each other. Descriptive analysis is a help to simplify that will make them easy to understand and interpret from raw data into a form (Kassim, 2001). The data can be summarized with a chart, graphic or table. In this chapter, there are 2 factor that exploring the perceived usefulness of drone in smart farming. To analyze the factors, the descriptive statistics has been used to show the score mean value to find the whole sum as add the data together. The score mean value was interpreted by using the Score Mean Level introduces by Malhotra.

The results of the analysis item "I have fun using drone to help me do the farming tasks" shows the mean is 4.50 with 30 (49.2%) respondent agree and 31 (50.8%) respondent strongly agree. Mean for item "Using drone is convenient" is 4.37. There are 38 (62.3%) respondents are agree with this item while 23 (37.7%) respondent strongly agree with this item.

Furthermore, mean item “Using drone has become part of the daily routine in my life” is 4.16. There are 2 (3.3%) respondent disagree, 12 (19.7%) respondent are neutral, 21 (34.4%) respondent agree and 26 (42.6%) respondent strongly agree with the item. Other than that, mean for item “I use drone in more ways that people do other than agriculture” is 4.09 and it show that 2 (3.3%) respondent disagree while 10 (16.4%) respondent neutral. The next is 29 (47.5%) respondent are agree with the item and 20 (32.8%) respondent strongly agree.

Other than that, the mean for item “My drone expresses my personal style of agriculture” is 4.22 and its show that 1 (1.6%) respondent disagree with this item while 2 (3.3%) respondents neutral, 40 (65.6%) respondents agree and 18 (29.5%) respondents strongly agree with the statement given. Next item is “I found the drone is easy to use rather than using human labour” with mean 4.47, 4 (6.6%) respondents neutral with the item, 24 (39.3%) respondent agree and 33 (54.1%) strongly agree with the item. Besides that, the result for the mean item “It is safer to use drone to handling pesticide” is 4.55 and it shows that 2 (3.3%) respondents neutral, 23 (37.7%) respondents agree with the item and 36 (59.0%) respondents strongly agree with the statement. Meanwhile, mean for item “Using drone it's easy to get to do what I want it to do” is 4.42 and only 1 (1.6%) respondent neutral, followed by 33 (54.1%) respondents agree and 27 (44.3%) respondents strongly agree with the statement.

Next, mean for item “My interaction with the drone system would be more clear and understandable” is 4.22 and it shows that 5 (8.2%) respondents neutral, 37 (60.7%) respondents agree and 19 (31.1%) respondent strongly agree with the item. Last but not least, the mean for item “It is easy to know whether it is the right time and quantity to spray pesticides, water and fertilizer since the drone will be informed by the system” is 4.47 and its shows that 1 (1.6%) respondents neutral for this statement, 30 (49.2%) respondents agree and also 30 (49.2%) respondents strongly agree with the item.

The result analysis on item “My job would be easy to perform with drone” shows that the mean is 4.54 with 1 (1.6%) respondents neutral, 26 (42.6%) respondents agree with the statement and 34 (55.7%) respondents strongly agree with the item. Meanwhile, mean for item “Using drone makes me to manage job more effectively” is 4.37 and it shows that 2 (3.3%) respondents neutral, 34 (55.7%) respondents agree and 25 (41.0%) respondents strongly agree with the item.

Next, the item “Using drone saves my time and effort in performing farming act”. Shows that the mean is 4.52 which is tie between 29 (47.5%) respondents agree and 32 (52.5%) respondents strongly agree. Other than that, the mean for item “Using drone enhance my task effectiveness” is 4.45, it state that 2 (3.3%) respondents neutral, 29 (47.5%) respondents agree and 30 (49.2%) respondents strongly agree with the item.

Mean for item “Using drone gives me a greater control” is 4.45. The results of the analysis item shows that 2 (3.3%) respondents neutral, 29 (47.5%) respondents agree with the statement and 30 (49.2%) respondents strongly agree. Other than that, mean for item “Using drone offers me alternative ways to solve farming problems” is 4.52 and it show that 1 (1.6%) respondent neutral, 27 (44.3%) respondents agree and 33 (54.1%) respondents strongly agree with the item.

Furthermore, the item “Facilities of smart agricultural are essential in farm records management” mean is 4.27. The highest respondents that is 34 (55.7%) agree with the item while 22 (36.1%) respondents strongly agree and 5 (8.2%) respondents neutral. The table shows that the mean for item “Using drone is alternative to monitor the crop in large scale of my farming area” is 4.45, 33 (54.1%) respondents agree and 28 (45.9%) respondents strongly agree with the statement.

More than that, mean for item “Drones really helpful to enter the area that human labour cant't access to spray pesticides and fertilizers” is 4.52 with only 1 (1.6%) respondents neutral, 27 (44.3%) respondents agree with the item and 33 (54.1%) respondents strongly agree. Last but not least, the mean for item “The use of drone can save labour costs over the long term” is 4.32. It shows that 4 (6.6%) respondents neutral, 33 (54.1%) respondents agree and 24 (39.3%) respondents strongly agree with the statements.

5.2.2 SCALE MANAGEMENT

Internal Reliability Test

Table 5.1 Summary of Reliability Test

Construct	Cronbach's Alpha (coefficient alpha)	No. of Item
Perceived Ease of Use	0.757	10
Perceived Usefulness	0.831	10

Source: Developed for the research

The composite reliability varies from 0 and 1, with higher values including higher levels of reliability and it is generally interpreted in the same way as Cronbach's alpha. Specifically, the composite reliability values of 0.60 to 0.70 are acceptable to exploratory research. In more advanced stages of research, values between 0.70 and 0.90 can be regarded as satisfactory (Nunnally & Bernstein, 1994). Values of 0.90 (and > 0.95) are not desirable because that indicates all the indicator variables are measuring the same phenomenon and are therefore unlikely to be a valid measure of the construct. Not only that, according to (Hair et al, 2017), composite reliability values below 0.60 shows a lack of internal consistency reliability.

Based on table 5.1, it shows the results that all the independent variables construct exceeded 0.6. Referred to the table above, perceived ease of use produced the lowest coefficient alpha among the two factors which is 0.757 which was measured by 10 items. Next, perceived usefulness shows the highest coefficient alpha which was 0.831 and measured also by 10 items.

5.3 RECOMMENDATION FOR FUTURE RESEARCH

After analysing and observing all the data regarding our study, some suggestions were given to the future researcher. A recommendation is a suggestion that something is good or suitable for a particular purpose or job. In other words, this recommendation is varying important as an indication and helps them in continue this research in future.

Our recommendation is an evidently important factor with regards to the adoption of drones for safety purposes was cost savings which was displayed by most interviews. It is one thing to study the potential safety benefits of drones in construction sites and another thing to study the tangible economic result of investing in drones.

There is another economical way is utilizes a drone for one village and uses it for farming the farms available in that village. One drone is sufficient for many farms in one village, as soil and yield are remained constant in one growing season. So, the farmer can use it once before starting of the growing season. Once farmer gets the composition of their soil so they can apply the correct amount of seeds, fertilizers, and irrigation to each section of their field in that growing season without labours. Therefore, it is proposed for developing Drones for Advance farming technologies for sustainability, which able to do multiple tasks of farming such as monitoring spatio-temporal variability, variable rate application, application of irrigation and fertilizers etc. The advantage of a drone is enabling monitoring of large portions of farmland in a simple, quick and cost-effective manner, providing high value insight that speeds up decision-making.

5.4 SUMMARY CHAPTER

Based on the conclusion that we can conclude from this chapter, the findings of the study have answered all the objectives that had been made about perceived ease of use and perceived usefulness of using drone in farming at Sultan Salahuddin Abdul Aziz Shah Polytechnic's Smart Farm.

The modern farming industry is at a turning point. With the development of more advanced farm management techniques, such as precision agriculture, industry professionals now have more tools than ever to improve the accuracy and efficiency of processes. The use of the different type agricultural drones for solving specific tasks of plant growing is studied: creation of electronic maps of fields, operational monitoring of crop conditions, evaluation of germination and predicting crop yields, checking the quality of ploughing, maintaining environmental monitoring of agricultural land, etc. Consequently, drones are very important tools in the modern agriculture and farming systems.

In addition, we can do comparison between the differences in the results of the study that have been conducted as well as the results of the previous study. This chapter also discusses the conclusions for each data and recommendation for the research.

REFERENCE

Ahirwar, R. S., Swarnkar, S., Bhukya, G., Namwade. (2019). Application of Drone in Agriculture. Retrieved on 11 January 2020 from https://www.researchgate.net/

Balaji, B., Chennupati, S. K., Chilakapudi, S. R. K., Katuri, R., Mareedu, K. (2018). Design of UAV (Drone) for Crop, Weather Monitoring and for Spraying Fertilizers and Pesticides. Retrieved on 11 January 2020 from aran E., Warry F. (2008). Simple data analysis for biologists. World Fish Center and The Fisheries Administration. Phnom Penh, Cambodia. Retrieved on 11 January 2020 from https://www.worldfishcenter.org/

Brown, M. (2018). Smart Farming, Automated and Connected Agriculture Retrieved on 11 January 2020 from https://www.engineering.com/

Conradie, W.J. & Myburgh, P.A., 2000. Fertigation of Vitis Vinifera Retrieved on 11 January 2020 from https://www.journals.ac.za/

Cyril. J., Thirunavuakkama., Aadesh, B., Anish, P., (2017). Automated Fertigation Choosing The Right System. Retrieved on 11 January 2020 from https://www.arguscontrols.com/

Gupta, S. K., Kumar, S., Pratibha, Thombare, B. (2019). Drones In Agriculture Retrieved on 11 January 2020 from https://www.researchgate.net/

Joseph, C., Thinakaran, I., Penuruju, A. (2017). Automated fertigation system for efficient utilization of fertilizer and water. Retrieved on 11 January 2020 from https://www.semanticscholar.org/

Kardasz, P., Doskocz, J., Hejduk, M., Zarzyc, P. W. H. (2016). Drones and Possibilities of Their Using. Retrieved on 11 January 2020 from

https://www.researchgate.net

Khan, H. A., Ullah, S., Afridi, M. A., Saleem, S. (2016). Patch antenna using EBG structure for ISM band wearable application. Retrieved on 11 January 2020 from https://www.researchgate.net/

Komosa A., Pacholak E., Stafecka A., and Treder W., 1999 Changes in nutrient distribution in apple orchard soil as the effect of fertigation and irrigation. II. Phosphorus, potassium and magnesium. J. Fruit Ornam.

Konting, M.M. (1990). Kaedah Penyelidikan Pendidikan. Kuala Lumpur: Dewan Bahasa dan Pustaka. Retrieved on 11 January 2020 from https://www.researchgate.net/

Kovacs, P., Urbanec, T. (2012). Electromagnetic Band Gap Structures: Practical Tips and Advice for Antenna Engineer. Retrieved on 11 January 2020 from https://www.semanticscholar.org/

Kurkute, S. R., Deore, B. D., Kasar, P., Bhamare, M., Sahane, M. (2018). Drones for Smart Agriculture: A Technical Report. Retrieved on 11 January 2020 from https://www.researchgate.net/

Lin,H.N., Tang,C.C. .(2010). Analysis and design for high-gain Antenna with periodic structure. Retrieved on 11 January 2020 from https://www.researchgate.net/

Mat Su, A. S., Yahya, A., Mazlan, N., Hamdani, M. S. A. (2018). Evaluation on the Spraying Dispersion and Uniformity using drone in Rice field Application.

Mr, I. D. Pharne, Kanase, S., Patwegar, S., Patil, P., Pore, A., Kadam, Y. (2018). Agriculture Drone Sprayer. Retrieved on 11 January 2020 from https://www.ijrter.com/

Myburgh, P., Howell, C. (2012). Comparison of three different fertigation strategies for drip irrigated table grapes – Part I. Soil water status,root system characteristics and plant water status. Retrieved on 11 January 2020 from https://www.researchgate.net/

Muazu, A., A. Yahya, W. I.W. Ishak, and S. K. Bejo. 2015. Energy Audit for Sustainable Wetland Paddy Cultivation in Malaysia. Retrieved on 11 January 2020 from https://core.ac.uk/

Natu, A. S., Kulkarni, S. C. (2016). Adoption and Utilization of Drones for Advanced Precision Farming. Retrieved on 11 January 2020 from https://www.semanticscholar.org/

Nawi, N.M., Yahya, A., Chen, G., Bockari-Gevao, S.M. and Maraseni, T.N., 2012. Human energy expenditure in lowland rice cultivation in Malaysia. Retrieved on 11 January 2020 from https://www.ncbi.nlm.nih.gov/

Norasma, C., Sari, M. Y. A., Fadzilah, M. A., Ismail, M. R., Omar, M. H., Zulkarami, B., Hassim, Y. M. M. , Tarmidi, Z. (2018). Rice crop monitoring using multirotor UAV and RGB digital camera at early stage of growth. Retrieved on 11 January 2020 from https://iopscience.iop.org/

Pallant, J. (2007). SPSS survival manual- A step-by-step guide to data analysis using SPSS for windows (3rd ed.). Retrieved on 11 January 2020 from https://www.scribd.com/

Patel, B. D., Narang, T., Jain, S. (2013). Microstrip Patch Antenna – A Historical Perspective of the Development. Retrieved on 11 January 2020 from https://www.semanticscholar.org/

Savita, M, S., Vani, R, M., Prashant, R, T., and Hunagund, P, V (2014). Design of Rectangular Microstrip Antenna with EBG for multiband operations. Retrived on 11 January 2020 from http://www.ijaiem.org/

Sharma et.al. (2008). Effect of fertilizer application through irrigation water on Thomson seedless grape yield and fertilizer use efficiency.Retrieved on 11 January 2020 from https://www.researchgate.net

Shivaji, C. P., Tanaji, J. K., Satish, N. A., Mone, P. P. (2017). Agriculture Drone for spraying fertilizer and pesticides. Retrieved on 11 January 2020 from http://www.ijrti.org/

Shuhaimi (2017) Penggunaan Drone dalam Pertanian.Retrieved on 11 January 2020 From https://myagri.com.my/

Saloni. S., Sindhu, Chauhan. K., and Tiwari. S. (2017). Pineapple production and processing in north eastern India. Retrieved on 11 January 2020 from https://pdfs.semanticscholar.org/

Soil, Soil Characteristic and Soil Management.(n.d). Retrieved on 11 January 2020 From https://www.agronomy.k-state.edu/

Treder, W. (2005) Variation in Soil pH, Calcium and Magnesium Status Influenced By Drip Irrigation and Fertigation. Retrieved on 11 January 2020 from http://www.nawadnianie.inhort.pl/

Vasilescu, C., Popescu, I., Alecu, L., Stãnciulea,O., Poesina, D., Tomulescu, V. Robotically Performed Total Mesorectal Excision for Rectal Cancer. Retrieved on 11 January 2020 fromhttps://www.ncbi.nlm.nih.gov/

Mogili, U. R., & Deepak, B. B. V. L. (2018). Review on Application of Drone Systems in Precision Agriculture. Procedia Computer Science, 133, 502–509. Retrieved on 11 January 2020 from https://doi.org/10.1016/j.procs.2018.07.063

Kurkute, S. R. (2018). Drones for Smart Agriculture: A Technical Report. *International Journal for Research in Applied Science and Engineering Technology*, *6*(4), 341–346. Retrieved on 11 January 2020 from https://doi.org/10.22214/ijraset.2018.4061