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CONCEPTUAL AND ADOPTION OF TECHNOLOGY ACCEPTANCE MODEL (TAM) BY FARMERS FOR AGRICULTURAL ENTREPRENEURSHIP IN NIGERIA

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Abstract: This article is on conceptual and adoption of technology acceptance model (tam) by farmers for agricultural entrepreneurship in Nigeria. Entrepreneurship, value chains and market linkages are terms that are being used more and more when talking about agriculture and farming. Many small-scale farmers and extension organizations understand that there is little future for farmers unless they become more entrepreneurial in the way they run their farms Literature from various authors were reviewed to cover the main variables of accessibility, utilization, technology information, information access, entrepreneurship, information need of farmers, Sources of Technology Information, Community libraries, radio television, newspaper, magazine, internet, friends and relatives, and print materials. The adoption of Technology Acceptance Model (TAM) for acceptability, accessibility and utilization in area of technology in agriculture, by farmers is very important. The researchers further reviewed some challenges and ways forward for agricultural entrepreneurship in Nigeria.

Keywords: Adoption, Utilization, Technology, Agriculture Accessibility, Farmers and Entrepreneurship

1.0 Introduction

There is no doubt that agriculture and agribusiness hold tremendous opportunities that could sustain livelihoods at all levels of the Nigerian economy but adoption of technology is a major problems. Entrepreneurship, value chains and market linkages are terms that are being used more and more when talking about agriculture and farming. Many small-scale farmers and extension organizations understand that there is little future for farmers unless they become more entrepreneurial in the way they run their farms. They must increasingly produce for markets and for profits. Becoming more entrepreneurial can be a challenge for small-scale farmers. They will need help from extension workers and other institutions (Kahan, 2012). Small-scale farmers are entrepreneurs (Agribusiness men/women) because all over the world they have shown a remarkable ability to adapt various production and marketing strategies. Such strategies includes: better ways to organize their farms; trying new crops and cultivars; better animals and alternative technologies to increase productivity; diversification of production and marketing; reduce risk and profits maximization.

They have become more market oriented and have learned to take calculated risks to open or create new markets for their products. Many small-scale farmers have many of the qualities of an entrepreneur. For small-scale farmersto become entrepreneurs they need all of these qualities and more. They need to be innovative and forward-looking. They need to manage their businesses as long-term ventures with a view to making them sustainable. They need to be able to identify opportunities and use them through technology(kahan, 2012).

Utilization is the act of making practical and effective use of something.. Utilization is the actual putting into appropriate use of something. It is the process of making use of something that is available. He further states that utilization is governed by principles such as; goal identification and availability. Itoga (2012) categorizes information utilization into three components: the perceptional understanding anchored on user's demand; the narrative understanding anchored on users purpose; and contextual understanding anchored on the satisfaction derived from information. To Emasealu (2014), information utilization means the adequate application of the knowledge gained from the information resources identified and acquired by the user in order to solve a problem.

Ntui and Udah (2015) see information utilization as the practical and maximum use of the needed, identified and required information by the consumers for decision making, solving a problem or achieving a set of goal.

The value and impact of information utilization refers to the new conditions that are re-established after information has been used. The role of information includes: the ability to take appropriate actions, make sensible decisions and it increase the capacity to see things more broadly and become resolute. The utilization of information makes information received operational knowledge (Abdulsalam, Nwachukwu and Salami 2015). Uhegbu cited in Buhari (2016) stresses that demand for information and its use are products of factors such as research, job performance, examination, leisure/ recreation, problem solving, awareness and education. Based on the statement above, the farmer's entrepreneurs are expected to utilize technology information to enhance their agro-business.

Agricultural research and technology are meaningful only when they are accessed and utilized at the farm level. It is therefore, assumed that quality of business and creation of job, reduced food wastage and effective marketing system in agro and allied industries depend on access and use of available post-harvest technology information sources. Information utilization could be referred to as a situation where the user utilizes the information available to him/ her. Therefore, farmers need to utilize the information available to them in order to make tangible progress in their day-to-day trading business. The way and manner farmers utilize information available to them goes a long way in determining how successful they would be in their businesses. (Umeh & Chukwu ,2015),

Information access is the means, ways, routes, or areas through which information could reach to the targeted audience. The audience in this study is farmers for effective agro-based entrepreneurship. Okai and Ujoumunna (2021) state that the emergence of digital information systems in the digital age has increased the manner in which information users search, retrieve and access information materials across the information industry. Inter-library cooperation, a practice many libraries use to sort for information within sister libraries has been replaced with online referrals, linking sites and internet search strategies and lots more. Igbo (2020) opined that Information access has been described as the user satisfaction indicator, she stated further that access to information is regarded as the process by which users acquire adequate information resources. Ugah cited in Obuezie, Okpala and Okoye (2021). Listed obstacles to information access and use in developing countries as lack of awareness, crime, inaccessibility, staff, information explosion, declining budget and rising cost, cost for users, environment and poor infrastructure. According to this researcher, availability of resources is a key factor to information accessibility. However, information explosion hinders access to an extent because farmers cannot definitely access all the overwhelming resources avialabls in their field. Apata and Ogunrewo (2010), information is critical resource in the operation and management of the agricultural enterprise. Information is therefore, considered as one of the most important resources in agricultural and rural development that assist the farmers to take decisions and appropriate actions for further development related to farmeing (Mtega, 2012). Then, agricultural information aids in expanding and energizing agricultural production and their effective communication will help facilitate mutual understanding among farmers, agricultural scientist and extension workers (Ogbonna, 2010).

2.0 Entrepreneurship

Entrepreneurship has to do with the characteristics individuals display to achieve goals. Akpomi, cited in Ezema and Ekenna (2020) in their study define entrepreneurship as globally accepted to be critical to economic and development in an emerging economy such as ours and it is a veritable tool for the improvement of life and quality of citizens in any nation. Igwesi and Orji (2011) stress that entrepreneurship is a programme that inculcates creative, innovative, productive and managerial skills needed in business enterprises for self-reliance and national development. Therefore, it is a vital factor for economic growth and job creation. It also implies the ability to be prepared to risk personnel energy and financial resources to achieve unpredictable results. In other words, it is the result of a disciplined, systematic process of appling creativity and innovation to the needs and opportunities in the market place.

Fundamental to entrepreneurship is innovation, which translates to new methods of production, new market, or the setting up of new organization or the breaking up of an existing one (Ejiogu & Nwajiuba, 2012). In other words, entrepreneurship is not skill acquisition for acquisition's sake, rather it is an acquisition of skills and ideas for the sake of creating employment for one's self and also for others. Entrepreneurship is the vibrant process of increased wealth creation.

It is the process through which innovation drives economic growth. This increase in wealth is generated by persons who take up the major risks in terms of time, equity and career commitment of making available value for some

products or services. Ikeme (2012) ststes that entrepreneurship is the process in which people come to be aware of business ownership as an option for feasible substitutes, development of ideas for the business. Oghenetega and Ughe (2014). .Entrepreneurship is the process of using initiative to transform business concept to new venture, diversity existing venture or enterprise to high growing venture potentials (United nations Industial Development Organisation, 1998) Eke, Igwesi and Orji(2011) Entreprenenurship is a programme that inculcate creative , innovative, productive and managerial skills needed in business enterprises for self-reliance and national development .Shane and Venkataraman(2000)sees entreprenenurship as the process by which opportunities to create future goods and services are discovered , evaluated and exploited while Anyanwu, Amadi and Oparaku (2010) in Simisaye, Salisu and Awodoyin(2018) simply affirmthat entreprenenur takes calculated risk by investing in business oppurtunities and get compensations from the risk by enjoying high profit as the result of risk taking. Nwosu (2014) sees entreprenurship as a process of actions of an enterpreneurwho is a person always in search of something new an exploits such ideas into gainful opportunities by accepting the risk and uncertainty with the enterprise He further stated that entreprenenurship is the articulate and innovative use of oppurtunities of problem solving and/ or weaith creation either in an organization or the larger socirty.

3.0 Agro-Based Entrepreneurship

Production of agricultural products in order to market them to aid in providing more income for the family could be seen as agro-based entreprenurship. Kenya is condisdered a middle income country and is among the top ten economicies in Africa , yet she is experiencing a problem of food security and limited value addition. Therefore, Sullivan (2017) discusses agro-based entrepreneurship as it relates to marketing and producing various agricultural products, as well as agricultural inputs. Most smallholder farmers produce food for their families, but at the same time almost all the smallholders sell small portion of their farm produces into various markets and that level of market sales is growing based on that, small holder's farmers are working towards being agricultural entrepreneurs. All types of entrepreneurship goal are common goals of making money. Urhiewhu, Enweani and Oladaro (2021) state that entrepreneurship is widely understood as the process of starting and owning a business that provides goods or services to people in exchange for money. They further acknowledge that a person who has created and owns a business is known as an entrepreneur but that some people believe that entrepreneurship is more than starting a business but a mindset, a way of thinking and acting.

Entrepreneurs may work alone and keep the profit of their ventures for themselves, or they may choose to become part of a farmer group where they invest in their production system as an individual but sell collectively. He observed that farmers are increasingly entering into regular business relationship with other value chain partner. Over the time, farmers tend to shift from working as individuals towards some form of cooperative or contractual marketing approach and if successful, they go on to create medium to large –sized business. Agrientrepreneurship is a means of identifying value-added activities that increases efficiency and employment opportunities in agricultural sector.

4.0 Technology Information Needs of Farmers

Information need could be said to be the kind or type of information that farmers need for effective agro-based entrepreneurship. Ehikhamenoe in Nwokocha and Okorie (2021) opines that information need refers to the extent to which information is required to solve problems as well as the degree of expressed satisfaction or dissatisfaction with the information. Igwe (2012) categorizes the information needs of individuals as follows: education/academic information needs, political needs, job opportunities and business information needs, social and entertainment information needs, medical and health information needs, legal and human rights information needs and agricultural information needs. Furthermore, to satisfy all these needs, citizens depend on reliable sources such as libraries or information centres to access, retrieve and use needed resources to satisfy the information needs of farmers. The progress of any individual community, society or country depends to a great extent upon the provision of dependable and right kind of information, in the right form or format and at the right time which also helps the receiver to take the right decision and reduce uncertainty. Information need stands as a valuable resource for societal growth and survival. Information needs of farmers defer from person to person, sometimes depending on their social, or academic backgrounds. Fapojuwo, O.E, Ajayi, M.T and Owolabi,E..K*2011). The study accesses the level of entrepreneurial interst of agricultural students. The researcher used a proprationate random sampling technichique, a total of 106 students was sampled. Findings showed that 65.1% of the students were males and 888.7% were within the age range of 20-29 years. Respondents indicated having a higher level of competence in rearing livesto, - 34.56) and poultry (mean -4.25) but their major area of entrepreneurial interest

was in poultry business) mean-2.68)

5.0 Technology Sources

Sources of technology information are those areas, things and places where post-harvest technology information can be found or located or derived from. These are the places, things or areas where a farmer could be able to lay hand on or gather information that would aid him in post-harvest technology information that he would use in order to improve preservation, storage or even protecting his harvest from loses. These information sources could be the library, newspapers, radio, television, internet, research agents.

Technology sources of information which are the focus of this study are information officers, agricultural extension agent, social media, community libraries, radio, television, relation officers, information officers etc. Tandi et al in Ukpabi (2019) add that interpersonal sources such as colleagues, family members, friends and neighbours have all the time become the major sources of information on agriculture because of their nearness, reliability, credibility and most importantly, they are trusted by the local community. Furthermore, Matthewson (2007) supports this assertion that farmer- to- farmer contact enable farmers to exchange news and adopt new technology especially from experienced fellow farmers. The identified farmers' sources of information by Adetimehin et al (2018) are: television, radio, projectors, mobile phones, telephones, Geographical Information System (GIS), media van, print media and the newly existing internet connectivity. Therefore, the most important thing is the usefulness of these information sources to the postharvest technology information not even their existence which is most important to this study for now.

5.1. Community libraries

Community libraries are those libraries established in our various communities. Most times, these libraries are established as an extension of a public library with the headquarters at the state capital. These libraries are established and are being monitored and supervised by their main branch popularly known and addressed as state library board. They are local centers of information for community dealers. Sometimes, this library is established by philanthropists, as a community developmental project taken up by one age grade or the youth or non-governmental organizations. Odini (2014) posits that majority of farmers do not access external assistance or official information system and centers such as libraries. This could be ascribed to the inaccessibility of formal channels. Some respondents might not seek information from the library because they do not see the library and information channels as potential provider of useful information. In fact most rural dwellers are illiterates and do not know what the library is all about let alone visiting the library to seek for information related to their farm work. It is expected that community library should be made available to each and every member of the community to access at all times and also have access to all the information resources available thereby, preventing people from travelling to the cities to seek for information that will aid them in solving their problems more especially in the aspect of post-harvest technology information.

5.2. Radio

Radio is one of the fastest means of spreading information in the world today. Adebumiti, Folorunso and Olorunyomi (2021) in their study view that of all the mass media used in achieving effective communication, the radio appears to be the oldest. Radio has been in existence since the 19th century and despite various advancements in mass communication media, they have stood the test of the time. It was the first mass media deployed by the British in controlling Nigerians using the Radio Distribution Service (RDS). The British controlling recruited solders from the country and also used the radio to propagate her slant or agenda during the World Wars. It was also a bridge between the Nigerian culture and the British lifestyle. Hence, radio has become a foremost medium in achieving mass education and orientation. It is known as the blind man's medium, also potable and affordable for everyone. It is a medium without social segregation - both the poor and the rich man can afford to buy it. With the advent of technology, Radio became more acceptable by everyone. There is hardly any mobile phone invented today that would not have radio application in it.

The evolution of modern Information Communication Technologies (ICT) has made communication much easier, and farmers have a lot of benefitss from these technologies. Real-time information can reach farmers across the globe, without geographical restrictions (Okwu & Irokaa, 2011). Information and communication technologies are also cost effective considering the expense involved in maintaining one-on-one contact of extension agents with farmers. Radio is therefore, one of the tools of communication. Radio is one of the most powerful but effective communication channel. It has wide coverage and the flexibility in terms of farmers (Familusi &

Owoeye, 2014). The ease of access to radio stations with the evolution of transistor radio and mobile devices that can receive radio signals is also an advantage over other communication channels (Ariyo *et al*, 2013). Familusi and Owoeye (2014) assert that radio is still the main channel in development communication. Usually, radio is used by the officer or expert for the dissemination of pertinent development messages, especially for rural dwellers. They believe that radio can be multifaceted as with other things, it is used to pass massages, enhance the capability of calling upon and organizing groups and organizations, enlarge the forum for social dialogue, provide effective capacity building of the community issues, being the peoples' voice to the higher level of their structure and mobilize communities to tackle issues. Oyeyinka *et al* (2014) observe that radio programmes are usually timely and capable of extending messages to the audience no matter where they might be provided; they have a receiver with adequate supply of power.

5.3. Television

Television known as TV or Tele, marinate both visual and audio sounds to achieve aesthetic finesse. However, TVs are elitist. Unlike radio, Television appeals mostly to urban lifestyle. Television is not potable unlike radio. Advancement in technology has bridged the gap as mobile phones have inbuilt television on them but they are not popular as that of radio. One of the features of modern television is the colour appeal. This ensures that farmers see real time event for themselves without much detailed explanations unlike radio, notwithstanding, just like the radio, the internet has impacted the use of television services (Adebumiti et al, 2021). These days you can watch live events on television, for instance, agricultural extension agents can now present talks on any aspect of Agriculture and it will be televised on the TV, videos of farm produce, post-harvest technology information techniques, products resulting out of post-harvest technology. The issue of accessibility and utilization of post-harvest technology information could also be televised for people to see and learn from.

5.4. Magazine

Magazine is another source of information for post–harvest technology for agro-based entrepreneurship. It has aided communication of information for a long time, but it is limited in reach because it is usually produced for a purpose or during a special event. It is purely for periodic events as it is not produced regularly but periodically. It is usually glossy and very colourful in nature unlike Newspapers, they are not published daily but quarterly or annually.

5.5. Newspaper

Newspaper as a source of information for post-harvest technology information has always aided effective communication among the farmers. Similar to television, newspaper also appeals to the elitist strata of the society although we cannot outrightly restrain newspaper to the wealthy class of the society as the lower class of the poor still find succor in it. Newspaper is a medium for information. The first newspaper in Nigeria, "Iwe Irohin fun awon ara Egba ati Yoruba" was established in Abeokuta by Reverend Henry Townsend in 1859 mainly to propagate religion education (Adebumiti *et al*, 2021). Since the establishment of newspaper, it has been a source of information, most times issues on farming are published in it and also through newspaper, vital information are being passed across to the masses in order to inform, entertain and also educate them.

5.6. Internet

Internet has become the world largest source of information; it is an emerging medium. For quite some time, the internet has changed the narrative of communication of information the world over. It was Canadian media theorist, Marshal McLuhan who predicted the idea of the global village which describes the phenomenon of the world becoming more interconnected as the result of the propagation of media technologies throughout the world. The term was popularized in his books "The Gutenberg Galaxy, The making of Typographic Man" (1962) and understanding Media (1964). Since then, the internet has emerged as a force for mass dissemination of information and communication.

The world is now better in terms of information and communication technology which the internet is a subset. Farmers can search for post-harvest technology information via internet connectivity and various ways to improve by the agro-based entrepreneur is treated by various authors via online and video of different activities on post-harvests technology and information are also displayed online too.

5.7. Friends and Relatives

There are other ways through which information could be obtained from these, such information that we obtain

from face-to-face interaction, conversations, neighbours, gossips, propaganda, colleagues, friends. These categories of people are sometimes overlooked but often, ideal information are gotten from them because most of them sometimes are more experienced than the researcher and get more valuable information that when shared goes a long way in providing information on post-harvest technology information to farmers for effective agro-based entrepreneurship.

5.8. Print Materials

It is true that most farmers more especially in the rural areas are not lettered but they still source for information through print media and this information is dependent on the person's information needs.

5.9. Extension Officers

Extension officers as described in Anaeto, Asiabaka, Nnadi, Ajaero, Aja, Ugwoke and Onweagba (2012) state the role of extension officers and extension services in the development of agriculture in Nigeria. The paper dwelt on the basic concepts, underlying scope, understanding and meaning of agricultural extension. Role of extension services and extension officers are resolved that no nation will have real growth in the agricultural sector without effective extension service. Anaeto et al (2012) also believe that the total eradication of agricultural development problem can be achieved through extension approach if the role of extension would be properly conceived and effectively administered.

6.0 Technology Acceptance Model

Technology Acceptance Mode (TAM) was propounded by Fred D. Davis in 1989. It is a model that explains how people come to accept and utilize a given Technology. TAM suggests that when users are presented with a new technology, a number of factors influence their decision about how to use it. According to Davis, user acceptance of any technology is by a person's intention to use the technology, which is determined by two key benefits (or constructs) namely; Perceived Usefulness (PU) and Perceived Ease-to-Use (PEOU).

Perceived Usefulness (PU) is defined as the degree to which a person believes that using a particular system would enhance his or her job performance while Perceived Ease–of-Use (PEOU) refers to the degree to which a person believes that using a particular technology would be free from strenuous effort. Technology Acceptance Model is an empirically-tested theoretical model that helps to predict users' behaviour towards information technology acceptance and use. It also provides the basis with which to trace how external variables influence belief, attitude and intention to use a piece of technology.

This Model is considered to be relevant to this study as Information Technology is technologically-based. As a result, there is need for farmers to be ICT compliant. This implies that the ease-of-use of these information resources determine their acquisition, provision, utilization and acceptance as an individual must have target to achieve, perceived the usefulness of the information resources, need, consider also time, energy and cost of accessing the information source. Technology Acceptance Model is therefore used in this paper to depict the basic variables that predict the implication of utilization of Technology Acceptance Model (TAM) on farmers for entrepreneurship in Nigeria.

7.0 Factors that influences the Utilization of Technology by Farmers

Certain factors could hinder farmers from accessing and utilizing post-harvest technology information. Some factors could come from the farmer's personal characteristics. Some could arise from the characteristics associated with the innovation and others could be related to some other causes. Complexity: How simple or difficult to access a post-harvest technology information may affect its utilization by the farmers. People usually resist technology that requires many technicalities to use.

Visibility: technology that manifest visible result attracts more users than those which result may not be physically noticed. For instances new post-harvest technology information on food preservation could more readily be used by farmers than those meant

8.0 Ways Forward and Conclusion

There are so many ways farmers could improve technology access. Valuing the quality of our lives also means valuing the quality of our food sources tells us that in order to function well daily; we need a variety of vitamins

and minerials from fresh healthy and nutrious food. However, food does not always equate to good food, processed and industrial manufacturing may have taken shortcuts that unfortunately also took a toil on the nutrient that our food can provide, Infact, food quality is a bigger issue than many of us realize.

Improving food quality is critically important as this ensures that we are getting safe and nutritious food items. Focusing on food quality also protects commodities from contaminating and maintains their overall weight, quality and quantity. Food quality pertains not only to taste but also to the amount of nourishment that we get from food having better post-harvest management system, such as better storage and adequate transport solutions, ensure that the food we eat comes to us with nutrient.

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