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Agriculture as a Business: An analysis of arable crop farming practices in Edo State, Nigeria

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Abstract

Open eco-innovation (OE) studies is an emerging research domain of potential contributions to sustainable industrial development. Openness benefits environmentally friendly firms by strengthening their relationships with environmentally responsible external partners thereby ingraining them in the social fabric of environmental innovation systems. Exploratory, bibliometric and network visualization mapping techniques were applied with the aim of synthesizing and characterizing the available knowledge in the field of open eco-innovation research. The systematic review is based on a sample of 102 articles published over the period of 1990 and 2019, which have been retrieved through a bibliometric search in Scopus. Results show that the literature on OE has increased significantly in the last eight years and this trend is likely to continue. It was noted that OE research landscape is at the acceleration phase. The results also indicate that both analytic and synthetic modes of external knowledge sourcing are complementary. The study unraveled clusters of fields of studies that could represent theoretical perspectives with which theory of open eco-innovation could be built. This paper contributes to the literature on open innovation by tracing the growth trajectory and mapping the theoretical base of the OE research field while pointing to new OE themes.

Keywords: Open Eco-innovation; External Knowledge Sourcing; Bibliometric Technique; Systematic Literature Review; Open Innovation; Co-citation Analysis

1.0. Introduction

Farming activities in developing countries are usually characterized by high level of risk and the skills, technologies, and financial know-how to produce marketable arable products in large quantity and to supply the identified market with the right quality, and quantity are always a challenge to the average farmer (Reardon, Barrett, Berdegué & Swinnen, 2009). In spite of this, a large body of empirical research argues that smallholders are still keys to global food security and provide nutritional needs of people globally (Paloma, Louhichi & Riesgo, 2020). This set of farmers represent the majority of the workforce in large portions of developing economies (FAO, 2015). However, Makuvaro, Walker, Munodawafa, Chagonda, Masere, Murewi and Mubaya (2017) argued that arable farmers in African countries are generally challenged by two factors, namely; macro-level constraints such as land degradation, usually stimulated by heavy dependence on natural resources by the majority of the population as well as micro-level problems in form of limited access to credit facilities and access to the right source of information, unavailability or poor access to input resources among others. Ordinarily, the cost of every input resource associated with the cost of producing any farm produce must be ascertained and documented in order to determine the level of profitability if farming activity must be seen and practiced as a business venture.

This line of thinking has been accentuated by Djokoto (2014) who argued that arable crops, just like other goods are produced and traded as economic products. The author further argues that these products are usually exchanged for money to fulfill productive obligations as well as profit. Therefore, the production of these crops should involve a process for which their selling prices must be determined with a laid down structure considering the cost of input resources as well as a marked up for profit. Forker (1982) opined that price determination of a farm product is a practice which involves the continual search for the appropriate price in view of the current known or expected future economic conditions (demand/supply), occasioned by the profit orientation of the farmers. While reviewing the Samuelson's theory of perfection competition, Djokoto (2014) argues that the price of any product in a perfectly competitive environment is usually determined when cost of production of a particular product is equal to all marginal costs.

Nigeria's agricultural sector has a high potential for growth and this has been pursued over the years without much significant impact. This is evident in the level of hunger and food insecurity which has attracted many local and international aid. Yet, most farmers see themselves as contributors to the fight against food insecurity. However, this can only happen if farmers view agriculture as a business. This will make agriculture take its rightful position in the Nation's development as farmers would be able to determine their profit margin. In addition, this would encourage more people to take up farming as a profession as Djokoto (2014) reported that for profit to be made, there must be large number of buyers and sellers and free flow of information, resource mobilization, evolution of effective price setting and efficient resource allocation in the environment. Thus, there is need to know what strategies do farmers use to determine their profit.

1.1. Statement of problem

There is no doubt that there is a paradigm shift in the ways agriculture is being practiced all over the world. This involves the use of modern technologies and adoption of best practices that promote efficient use of resources, Thus, practitioners experience high return on investment in farming operations. Many studies have been conducted across the globe on the profitability of agricultural enterprises. For instance, in the Northern part of Nigeria, Awotide, Ikudaisi, Ajala and Kaltungo (2015) submitted that arable crops such as maize, and cowpea were profitable despite the fact that farmers under-utilized all available resources with the exception of land. Also, Ashagidigbi, Yusuf and Agboola (2019) established that positive relationships existed between inputs used and productivity in arable crops production in Nigeria. In Indonesia, Lindawati, Kusnadi, Kuntjoro, and Swastika (2018) emphasized the impact of synergism of inputs and outputs in determining profitability in rice production and concluded that every unit of the input and output must be considered for effective determination of profit. Interestingly, this is applicable to the farmers who see farming as a business and not as an art. For profit determination, there must be adequate

records keeping. The inputs and outputs records must be kept in order to ascertain the profitability of a venture.

Inputs required in farming include but not limited to land, labour, seeds/seedlings, agrochemicals, credits, and machineries. All these must be adequately budgeted for accurate profit margins to be determined. Though, the issues of profitability of agricultural enterprises have been long over flogged but the inclusion of inputs like family labour and others is unknown in literature. This serves as the basis for evaluating the practices of arable crop farmers in determining their business orientation with respect to viewing agriculture as a business. This is because for agriculture to be viewed as a business, details of inputs and outputs must be accurately recorded and used for the profitability analysis.

2.0. Methodology

2.1 Description of the study area

Edo state is located within the South-South geo-political zone of Nigeria and lies roughly between longitudes 06° 4' and 06° 43' east and Latitudes 05° 44' and 07° 34' north of the equator. It has boundaries with Kogi State in the North, Delta State in the South, Ondo State in the West and Kogi and Anambra States in the East. The state occupies a total land area of 17,802km² with a population of 3,218,332 (National Population Commission, 2006). Edo State is made up of four (4) major ethnic groups namely; The Binis, Esan, Owan and Etsako. Edo State is an agrarian state with oil palm, cassava, rubber, rice, maize, cocoa, plantain, and pineapple, as major cultivated crops. The vegetation of the State is characterized by swamps along the coast to evergreen forest and savannah in the North. It experiences a tropical climate with the major seasons being wet and dry. Annual rainfall ranges from 2300-2700mm concentrated in two peaks, July and September usually separated by a dry break in August. The agricultural system is predominantly small farm holdings. The people of the State are predominantly farmers, growing various food crops in virtually all the areas of the State. Finished products like palm oil, palm wine, baskets, brooms and chairs are sold in the various markets.

The administrative capital of the State is Benin City and it is comprised of eighteen (18) Local Government Areas (LGAs). The Local Government Areas are delineated by the State Agricultural Development Programme (ADP) into three agro ecological zones. They are: Edo Central, Edo North and Edo South. The Edo central zone has five (5) LGAs as follows: Esan Central, Esan West, Esan North-East, Esan South-East and Igueben Local Government Areas (LGAs). The Edo North zone comprises six (6) LGAs, namely: Owan West, Akoko-Edo, Etsako West, Etsako East, Owan East and Etsako Central LGAs and Edo South consists of seven (7) LGAs namely, Oredo, Ovia south West, Ovia North East, Ikpoba-Okha, Egor, Uhumwode and Orhionwon LGAs.

2.2 Sampling procedure and method of data collection

A two-stage sampling procedure was used for sample selection. The first stage involved the selection of one LGA in each of the ADP agricultural zones in the State based on the intensity of arable crop production. Therefore, Igueben, Owan east and Uhumwode LGAs for Edo Central, North and South, respectively were selected. At the second and final stage, snowball sampling technique was used to selected arable crop farmers who cultivate a minimum of 2 hectares of farmland. Hence, 72, 58 and 66 farmers were respectively selected in Iguebenm, Owan east and Uhumwode LGAs. This makes a total of 196 farmers sampled for this study. However, about 179 copies of research instrument used were found analyzable. This forms a response rate of 91.3%. Validated structured interview schedule was used for data collection. Data collected were analysed with the use of logistic regression and described with frequencies and percentages.

3.0 Results and Discussion

3.1 Demographic Profile

Results in Table 1 shows that the mean age of the sampled respondents was approximately 37 years and this implies that arable crop farmers sampled for this study were still in their prime ages. The implication of this finding is that agriculture might be practiced with the intention of making profit. Another implication

of the finding is that the farmers may have the opportunity to utilize modern (innovations) farming practices (technologies) that will enhance productivity with a view to earning more income. This is because young people are assumed to be innovative, less averse to risk, and ready for change (Adegboye, Oyesola, and Eniolorunda, 2010). Another author (Ijioma and Ibezim, 2010) also reported that younger people are known for their agility, energy, and are determined and adventurous in experimenting different approaches and techniques for getting things done. This implies that farmers in the study area are still within the age bracket that can drive agriculture in the direction of agriculture as a business by adopting practices that suggest their business inclination.

On gender, it was revealed that most (58.7%) of the respondents were male and 41.3% were female. This suggests that both sexes are involved in the production of arable crops common in the study area. Studies such as Food and Agriculture Organization (FAO, 2011), Aqeela, Muhammad and Asif (2005) and Mohammed and Abdulquadri (2012) earlier documented that gender division existed in farming where men are involved in the activities such as land preparation, while women were responsible for activities like planting, weeding, processing and marketing in Nigeria. However, studies by Fakoya, Apantaku and Adereti (2006) and Onya, Ugochukwu and Ejiba (2018) in Nigeria and Sikod (2007) in Cameroon have established that males and females are equally participating in arable crop production as women now own farmland and are involved in the cultivation of food crops, from land preparation to marketing.

The average years of experience in arable crop production among the respondents was approximately 12 years. About 31.3% of the respondents had no formal education while the remaining 69% had formal education that ranged from primary to tertiary levels. This may indicate that the proportion without education may practice agriculture as an art where adequate records are not kept. However, the large number of respondents with formal education may have a significant influence on the study if they use modern approaches to farming. The findings of Onya *et al.* (2018) and Ololade and Olangunju, (2013) reported that education and farm size among other determinants determined, farmers' yields and income. These variables must have influenced their decisions to adopt best farming practices and approaches that could enhance productivity and ensure that they determined their profit accurately. On average, the household size was 8 persons per house and both family and hired labour were used for farming. The use of family labour may be influenced by the large household size recorded by the farmers.

Table 1: Socio-economic Characteristics of Respondents

Variable	Frequency	Percentage	Mean
Age (Year)			37.2
Sex			
Male	105	58.7	
Female	74	41.3	
Experience (years)			12.6
Education Status			
Non-formal	56	31.3	
Primary	49	27.4	
Secondary	65	36.3	
Tertiary	9	5.0	
Household size			8.4
Source of labour			
Family	88	49.2	
Hired	91	50.8	
Farm size (hectare)			2.6

Source: Field survey, 2021.

3.2 Farming practices used by farmers

Results in Table 2 show that the most conspicuous farming practices commonly practised by the respondents in arable crop production are land preparation (82.1%), stumping (62.0%), planting (90.5%),

weeding (73.7%) and harvesting (57.0%). Though, numerous practices such as harrowing, ploughing, ridging, mulching and thinning among others are required for arable crop production. However, only a few of the farmers were involved in most of these practices. This may be due to their poor knowledge of such practices. This is slightly different from the findings of Adedokun, Ogunyemi and Lawal (2018) that reported that arable crop farmers practiced composting, mulching, crop rotation, inter-cropping, agro-forestry, biological pest control, measures, green manuring, erosion prevention and water harvesting in Lagos State. However, the findings of Osabuomen and Okoedo-Okojie (2011) were similar with the finding of this study. The authors reported that bush clearing/burning, harvesting, weeding, pest invasion, mulching and fertilizer application as practices that were regularly practiced among farmers in Edo State.

Table 2: Participation in Farming Practices

Practices	Frequency	Percentage
Land preparation	147	82.1
Stumping	111	62.0
Harrowing	59	33.0
Ploughing	71	39.7
Ridging	85	47.5
Planting	162	90.5
Weeding	132	73.7
Thinning	39	21.8
Mulching	61	34.1
Fertilizer	33	18.4
Spraying	79	44.1
Harvesting	102	57.0
Marketing at farm gate	41	22.9

Source: Field survey, 2021.

3.2 Types of records kept

Based on the report in Table 3, it was observed that just a little above half of the respondents (50.8%) kept records of cost of seeds and agrochemicals used while 56.4% only kept records of hired labour used under variable assets accounts. Moreover, records of self and family labour were not kept. Less than half of the respondents kept records of other important assets on the farm operations. In the same vein, under the fixed assets records, about 76.5% kept accounts of the size of land, 60.9% kept records of cost of rent, all the respondents kept their records of sales while only 20.7% and 8.4% kept records of the cost of produce consumed and given out as gift, respectively. One of the first steps in being a successful farm manager is keeping well-maintained, accurate records and establishing a sound record-keeping system (Simpa, 2019). Keeping accurate records has its benefits, like helping farmers plan and complete realistic forecasting. It will also enable them to accurately determine their profits. However, based on the above findings, respondents did not keep critical records that would enable them to make valid decisions with respect to their profitability. Records of self and family labour, sales, amount consumed and given out as gifts and records of input used must be adequately kept in order to accurately determine the level of profitability of a business enterprise. To accurately determine profit, the use of innovative records keeping practices such as the use of computer and software would help farmers to be abreast of information that would be needed to be kept for profit determination. Accounting and payroll system may be adopted as it is used in developing countries even with small-scale farmers. This will involve management of expense receipts, and the use of clouds to store information on transactions. This means that agricultural extension agents have a lot to do in educating farmers on the use of information telecommunication technology (ICT) in records keeping. This is possible due to the availability and accessibility of android phones by farmers who are not even educated.

Table 3: Types of Records Kept

Assets	Frequency	Percentage
Variable Assets		
Quantity of seeds	73	40.8
Quantity of agrochemicals	58	32.4
Cost of seeds	91	50.8
Cost of agrochemicals	91	50.8
Cost of transporation	56	31.3
Cost of hired labour	101	56.4
Cost of self labour	-	-
Cost of family labour	12	6.7
Fixed Assets		
Size of land	137	76.5
Cost of rent	109	60.9
Cost of equipment	81	45.3
Revenue		
Amount sales	179	100.0
Cost of amount consumed	37	20.7
Cost of amount given out as gift	15	8.4

Source: Field survey, 2021.

3.4 Determinants of Participation

The results in Table 4 show that the binary logistic regression model could be used to explain about 51.2% of the variance in participation in arable production with the Nagelkerke R^2 value of 0.512. The model was able to accurately predict and classified about 69.3% of the cases in the regression. The model specifically shows that education (odds ratio = 1.790), farm size (odds ratio = 1.602), annual income (odds ratio = 1.775), experience (odds ratio = 4.402) and source of (odds ratio = 1.061) significantly determined respondents' participation in arable crop production in the study area at $p < 0.05$. With the odd ratio of 4.402 for experience, it means that more experience in farming increases the likelihood of participating in arable crop production by 4 times. This further show that respondents with more experience are more likely to participate 4 times more than those with lower experience in the production of arable crops. The findings are in tandem with the study of Simpa (2014), which reported experience as a critical variable that influenced the production of yam. Also, Adedokun et al. (2018) findings further supported this study by the assertion that variables such as education, income and farm size significantly influenced farmers' participation in arable crop production. The log likelihood value of 812.117 is large enough and this shows that fit of the binary logistic regression model for this analysis.

Table 4: Determinants of Participation in Arable Crop Production

Variable	B	Wald	Odds ratio
Education	0.582	3.517*	1.790
Farm size	0.471	2.155*	1.602
Income	0.574	4.251**	1.775
Experience	1.482	2.183*	4.402
Household size	0.721	0.482	2.056
Labour source	0.059	2.156*	1.061

Source: Field survey, 2021.

Overall percentage prediction = 69.3%

-2log likelihood = 812.117

Nagelkerke R Square = 0.512

5.0 Conclusion and recommendations

Profit is the goal of any business enterprise and adequate records management is critical to making valid decisions in the determination of profitability of such business enterprises. In this study, records that would enable arable crop farmers to make accurate decisions on the profitability of their enterprise were not kept. Therefore, it was established that arable crop production practices adopted by the respondents and the types of records kept showed that farmers' profitability cannot be accurately determined. Hence, agriculture is still being practiced as an art and not as a business. It is therefore, recommended that stakeholders in the field of agriculture in Nigeria should intensify efforts in training farmers on the appropriate record keeping techniques that must be kept in order to ascertain their profitability status with a view to viewing agriculture as a business. Innovative system of keeping records such as computer and simple accounting software should be introduced by agricultural extension agents to farmers for up-to-date records of their farming enterprise. This will encourage farmers to adopt approaches and innovations that may enable them to increase their productivity and by extension, ensuring food and meal securities in Nigeria.

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