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Contents

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Components of Financial Literacy of Young People

Andrea HORNYÁK
King Sigismund University Budapest, Hungary,
e-mail: andrea.hornyak@t-online.hu

Abstract. The financial crisis has drawn attention to the importance of the population's financial literacy. I am investigating assessment methodologies to evaluate financial literacy both from the point of view of macroeconomics and microeconomics in my study. I am of the opinion that the elaboration of the financial competency model based on international database is the solution that can lead to the determination of conditions of financial awareness by collectively investigating financial education, core competencies, and the psychological role of money. I surveyed the financial knowledgeability of Hungarian high school students with the help of field research after assessing the OECD and PISA findings. I received very different results of knowledge, behaviour, and attitudes by school type, gender, age-group, and family background, which might support the assessment of financial literacy indicators, the evaluation of results, and international comparisons.

Keywords and phrases: young generation, financial competency model
JEL Classification: M31

1. Introduction

The economic crisis has demonstrated that the financial literacy of retail investors is closely linked to the economic decisions they make. Increasing the financial insight serves not only individual but social welfare as well, i.e. the economic growth of the country is also favourably affected (Béres 2013). These days, the general public uses a growing number of financial products; however, they are not aware of the related interest income or risks. If the previously acquired knowledge is not developed, there will be a gap between the financial knowledge of people and the required level of knowledge necessary for safely using the offered financial products (Botos et al., 2012).

OECD research called attention to the fact that in order for people to make considered financial decisions, the coordinated improvement of financial literacy on a social level is essential (Zsótér et al., 2017).

In the first part of my study, I intend to summarize the factors affecting financial literacy, and then I will examine the role of financial education as well as the key competencies and attitudes toward money within the financial awareness of young people. Then, in the following two chapters, I will present the results of research aimed at financial literacy, emphasizing the data on the secondary school age-group. The last chapter will discuss the primary research I carried out, which was conducted among secondary school students attending different types of schools.

2. Indicators of Financial Literacy

The international literature divides the indicators of financial literacy into four main groups: disposable income, size and components of savings, external sources, and level of demand for cash in the economy (Béres & Huzdik, 2012). These variables provide a sound basis but do not provide a complete description of the phenomenon examined. A criticism levelled at them is that the indicators applied by researchers are closely connected to each other, and therefore research results can be rightfully questioned. Ignoring characteristics of current life situations is another negative momentum. Youth assessment has been omitted completely from the scope of recent research. The financial literacy of students, however, is not always worse than an individual's financial behaviour whose willingness to save and self-care lags far behind the average performance of those who have similar standards of living. Creating the proper measurement methodology necessary for youth assessment is missing though!

The literature has not paid enough attention to financial literacy assessment until now. It is not surprising at all since there are three obstacles in the way of the above-mentioned: defining financial literacy, specification of tools, and content of interpretation in terms of findings. A solution would be that the elements of financial literacy are elaborated uniformly. The lack of a precise and consistent theoretical concept places obstacles in the way of comparative analysis, the survey of financial literacy level, and the examination of their impact on the financial well-being of individuals and society (Samy, 2008).

A demand for the elaboration of financial competency has been formulated in the international financial literacy surveys. Financial competency mainly depends on three factors: general financial education, core competencies, and the psychological role of money in the lives of individuals and households.

3. Creating the Financial Competency Model

3.1. The Role of Financial Education (General Financial Education)

In the beginning, financial literacy research laid special emphasis on the role of general financial education to improve youth literacy. Surveys reveal youth financial illiteracy in Australia, the United Kingdom, and Germany, which is mainly due to the lack of financial knowledge (Weberpals, 2006). A strong correlation can be observed between financial education and financial literacy among students because students demonstrate a much more thorough financial knowledge in the countries where a financial subject forms a compulsory part of the curriculum (Huston, 2010). However, in the long term, the interpretation of general financial education must be broadened, and the financial competencies essential for effective decision making by individuals and households must be specified. Although students from different family backgrounds are forced to solve different economic problems, there are clearly definable skills and abilities where mastering might create a suitable and effective financial management framework for solutions (Mantseris, 2008). All the above-mentioned is included in the definition of financial education developed by the OECD as follows: "the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (Clarke, 2005).

3.2. Core Competencies

The notion of competence has undergone significant changes over the past few years, in which the PISA project launched in the framework of OECD indicator programme in 1998 (Programme for International Student Assessment) plays a significant role. The PISA project deals with the assessment of student achievement (Balázsi, 2010).

This programme aims at assessing the extent to which students between 15 and 17 have acquired the wider knowledge and skills essential to start seamless functioning and participating in the society (http://www.oecd.org/pisa/). PISA covers three main subject areas: reading literacy, mathematical literacy, and scientific literacy. The survey is repeated every three years.

The programme does not only measure student knowledge and skills but also their motivations and attitudes towards learning, which can be regarded as a positive factor (Csapó, 2010).

PISA laid the content frameworks of measurement on new fundamental principles and thereafter elaborated a new concept of knowledge. Assessments of skill-based sets of knowledge are carried out by internationally recognized scientists in the most modern assessment centres. The philosophy of PISA lies in that the data directly supporting decisions at the system level must be collected. A new sampling methodology procedure is used in the PISA assessments. Not the students in the same school year but the students born in the same year are examined. Thus, efficiency of time spent in different schools and the influences of early and later school start can also be compared. Repetition on a 3-year basis is favourable as this way trends can be detected as well, and the impact of the measures also become visible.

In terms of Hungarian student performance, reading improvement can be observed in 2009 as compared to 2006. Examining both genders, there is a significant difference in favour of girls. However, the achievement data have not changed in the other two subject areas surveyed. We lag a little behind the OECD average in mathematics, while our performance in science is also close to the average. Mathematical competence also plays a significant role in the development of financial skills and practices. On the basis of international research (Mantseris, 2008), we can state that a strong correlation can be observed between financial literacy and poor performance results in core competencies. It is especially worth paying attention to that since 22.3% of the Hungarian students did not achieve even the second level from the six skill levels according to the PISA mathematics assessment in 2009, although other subjects and the development of the skills necessary for life are touched by the negative influences of low-level mathematics skills.

The Hungarian situation: Hungary established a national assessment system expanding to a couple of age-groups, by applying data recording, measurement theory, and data analysis technologies accumulated during the PISA assessment processes. In the framework of the National Competence Assessment in Public Education (Herman & Molnár, 2009), a standardized test measurement of student knowledge has been continuously surveyed since 2001. The assessment characteristically surveys reading and mathematical knowledge of students in grades 6, 8, and 10 and is completed by a student questionnaire about family background and an institutional questionnaire about educational conditions. The assessment strives to achieve several goals at the same time, partly measuring the total public educational system performance and partly interpreting this achievement in terms of each school surveyed.

This competence measurement does not assess how students master learning materials but measures students' skills, i.e. how students can make use of their acquired knowledge in everyday life. In addition, the research provides a sound basis for the development of school assessment on a professional basis.

Competence assessments provide one of the main data sources for empirical research into public education, and they can also be applied to labour market analyses very well. In terms of barriers to assessment, the oldest students measured by the National Competence Assessment in Public Education are in the 10th grade, although their core competencies might improve after that, and the distribution of students among regions and school types only partially corresponds to the later distribution of employee population.

3.3. The Psychological Concept of Money

The psychological significance of money plays an increasing role in the development of financial competence since it is now proved that it is of high significance what function money in the life of individuals and households has besides general financial education and core competencies (Mantseris, 2008). Our attitude towards money depends on our character, which can particularly come under the influence of social requirements, demographic characteristics, and economic circumstances. Different international studies segmented consumers by attitude towards money in many ways. The elaboration of special financial programmes corresponding to the characteristics of the individual groups is of high importance. In particular, financial institutions should keep an eye on the segment categories "anxious spenders", "disinterested followers", and "anxious savers" identified by Füngeld and Wang (2009) since financial problems arise with these types of clients more often than with prudent clients.

4. The OECD Financial Literacy Measurement

The economic crisis has drawn attention to the significance of financial literacy, and therefore measurements in the subject have become widespread all over the world.

Unfortunately, however, the focus of attention on youth at the international level is still missing because transborder research of international organizations has aimed at the development of the adult population's financial literacy.

Student assessments take place at the national level, which, however, lack the possibility of taking over comparisons, assessments, and good methodologies at the international level.

Our country also joined the international assessment coordinated by the International Network on Financial Education – INFE – of OECD examining to what extent the population has a clear knowledge of the information necessary for their financial decisions (www.mnb.hu). Another objective of the research is to establish an international database in order to make the knowledgeability levels

of the population measurable and comparable. Furthermore, the assessment findings might provide a sound basis for improving the population's financial literacy and stimulating change in financial approach.

The questionnaire-based assessment was used for data recording among minimum 18-year-old citizens in 14 countries, among them Hungary, across four continents. The questionnaire consisted of three different parts: analysis of financial knowledge, financial behaviour, and financial attitudes. The survey of knowledge consisted of eight questions, including different financial topics at different difficulty levels. In terms of financial behaviour, the assessment was aimed at how many conscious and how many impulse buyers were among the respondents, whether the families create a budget, and in what form they keep their savings. In terms of financial attitude, respondents' attitude towards money and future planning was measured by three attitude statements from which attitude indicators were created. The collective analysis of the three indicators reveals a lot about the citizens of each country surveyed by assessing each element of the research one by one (Atkinson & Messy, 2012).

I will only concentrate on the findings of our country due to size limits. Barely two-thirds of the population in Hungary have a clear knowledge of the basics of calculating interest rates, and only a few are of the opinion that investment risks can be diminished by diversification, with the help of several investment forms. The above-mentioned can provide an explanation for the fact that although the population knows increasingly more financial products, they hardly trust them.

A good example of the above-mentioned is that although 89% of the Hungarian population has a bank account only 40% uses it actively. In terms of financial behaviour, our country performance was partly very poor, which indicates that the level of financial knowledge above the average is not reflected in the financial behaviour of the population. This is proved by the fact that 52% of the respondents do not have any savings, and those who have some reserves keep them at home or in current bank accounts. When it comes to choosing between financial products, more than one-third of the population does not make any comparisons between different service providers before they make their choice. It is regarded as extremely low, even in an international context, that only one-third of the Hungarian families create a budget. Concerning financial attitude questions, our country ranks in the middle, i.e. almost half of the respondents consider long-term thinking in finances important.

The collective indicator of financial literacy has been developed from high scores, and we can draw important conclusions from its average value (13.7). The following countries achieved above-average cumulative results: the Czech Republic, Hungary, Germany, Ireland, Norway, Malaysia, Peru, the United Kingdom, and the British Virgin Islands (Atkinson & Messy, 2012).

5. Examining the Financial Culture of Young People

The above-described research into adult financial literacy provides a sound basis for drawing conclusions in connection with youth, as financial practices in the family determine students' attitude towards money (Clarke et al., 2005). The young have, however, individual characteristics due to which it is essential to measure and improve their financial knowledgeability.

Two national assessments of youth financial literacy were conducted over the past few years in our country – by the Hungarian National Bank in 2006 and by the University of Szeged in 2011. Both research findings show that the financial literacy of the age-group between 14 and 19 has serious shortcomings in financial information, and in terms of right answers the average performance of high school students was 54%, which cannot be regarded as good at all. In terms of knowledge tests, those who were interested in financial products reached a better result, and the performance of boys exceeded that of the girls (MNB, 2006).

Students between 14 and 16 achieved the lowest performance. The three main sources of money are pocket money, receiving money as a gift, and income earned from work. 64% of the respondents keep their money in cash, 27% in bank accounts, and the rate of different forms of savings is low. Students would rather finance their later studies with the parents' support (44%), and only 2.5% would choose a student loan. When it comes to savings, high school students would rather ask for advice from banking officials (38%) (Ecoventio Round Table Public Benefit Association).

Surveys conducted among young people have shown that there is not one homogeneous group of all young people regarding their financial attitude and behaviour. In their research, Zsótér et al. (2015) identified three significantly different consumer groups on the basis of objectives, source of income, financial insight, experience of banking, and information source as follows: conservative, rebel, and experienced groups. The identification of these market segments is important because they differ in respect of their financial awareness, and therefore different tools are needed to impress them.

The survey aimed at the financial knowledge of young Hungarians in Transylvania (aged 18–25) also demonstrated the diversity of young people. Research has shown that the level of financial culture of young people in higher education is affected by gender, specialization, and participation in financial-economic training in secondary school (Eszter Barabás, 2017).

Several authors have confirmed that personal experience in finance is also of great importance. However, increasing financial knowledge may be limited by negative financial attitude and if they are strongly distanced from this topic.

As a solution proposal, the studies regarded education of financial knowledge as necessary, which, besides providing theoretical knowledge, should be practice-oriented.

6. Conclusions

While the best practices of financial literacy development and the establishment of a financial debt prevention network are among the discussion topics at international conferences, the theoretical basics of the field still have serious shortcomings. The most important challenge is to create the scientifically reliable concept of financial competence, which can provide a framework for enabling individuals and households to acquire the necessary financial knowledge (Mantseris, 2008). The range of core competencies must be extended by financial abilities as without them one cannot get on in life. It is necessary to identify what knowledge and skills are needed for the management of personal finances, savings, loans, and family budget. It is by all means necessary to act in time in order to develop a financial literacy and to prevent over-indebtedness, wherefore youth must be involved in these programmes. However, it can only be carried out on the basis of a uniform and widely-applied assessment concept extended to youth financial knowledge and behaviour.

The PISA and the National Competence Assessment in Public Education programmes could provide a sound basis for surveying youth financial knowledge if economic skills would be involved besides current literacy areas. The different professional education programmes would become comparable, which would support adopting and applying effective methodologies across different educational institutions and countries. Acquisition of basic financial knowledge in high schools is essential for the effectiveness of subsequent special educational programmes. According to the dynamic model of life-long learning, ongoing adaptation to a changing world becomes possible through acquisition of new knowledge and skills which are mastered not only during the school years but also continuously throughout the entire life.

7. Field Research

7.1. Research and Methodology

The objective of my research was to assess high school students' general financial knowledge, financial practices, and attitudes towards banks. I carried out field research in various high schools from spring 2011 to autumn 2012. I was planning to compare high school students in different regions of the country; therefore, I recorded data in Budapest, Eastern Hungary (Miskolc, Debrecen, Nyíradony), and Western Hungary (Sopron). In all the three regions, secondary grammar school, economic high school, and other high school students were included in the

selected sample because I strived to conduct an investigation into the influence of professional education on the age-group.

Assessment questionnaires were used as a methodology of polling.

I handed out paper-based questionnaires to the students and asked them to answer each question if possible. I received 573 questionnaires back out of the 600, but 21 could not be evaluated, and therefore I managed to process 552 questionnaires. According to school types, 35.3% of the respondents were secondary grammar school students, 33.3% other high school students, and 31.3% economic high school students.

The structure of my questionnaire was the same as that of the OECD, i.e. it consisted of three parts: financial knowledge, financial behaviour, and financial attitude questions.

7.2. Financial Knowledge

My questionnaire – similar to the OECD research – included eight knowledge questions, i.e. general financial knowledge questions. They were difficult in many ways and reflected various styles and contents. While a couple of questions enabled a completely free choice, other questions forced the respondent to pick an answer from a given number of options.

In terms of knowledge questions, the differences between students with different high school backgrounds are also prominent. A higher rate of secondary grammar school students gave the right answer than students from other school types. These were general interest-rate-related exercises, which are by all means solved during mathematics classes. The highest number of right answers was given in connection with division and interest rates on bank loans. However, students from professional high schools gave the highest number of right answers to questions about risk and yield, inflation and diversification. The question about diversification brought the worst result since only 55% of secondary grammar school students, 63% of economic high school students, and 32% of technical high school students evaluated it well. On examining the differences between both sexes, I stated that boys gave more right answers to almost every question than girls.

There was just one exception, the question about inflation and diversification, where girls performed better due to the fact that two-thirds of the interviewees from economic high schools were girls.

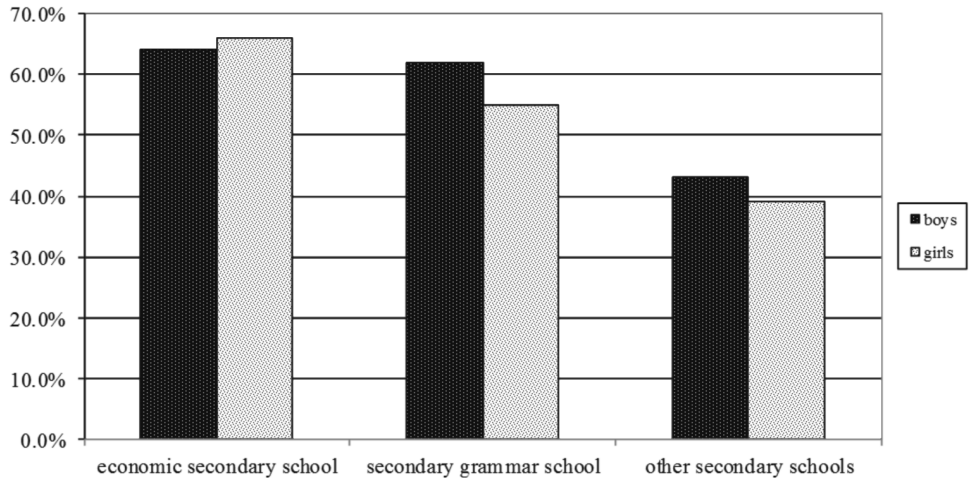

Figure 1. *High knowledge points based on types of school and gender*

7.3. Financial Attitudes

I measured the respondents' attitudes towards money and future planning with the help of three attitudinal statements in the questionnaire. These questions were focused on whether the respondents agreed with the statements, whereby I gained an overview of their attitudes and preferences. I created a collective attitude indicator from the answers given to the three statements, i.e. the high score was interpreted as an average attitude indicator over 3 (1 = absolutely agreed, 5 = did not agree at all). Those respondents indicated the long-term preferences who favoured savings over short-term needs. As the diagram shows, students' attitudes towards money were different by high school type as the highest number of respondents who reported feeling satisfied if they saved money were from economic schools. They recognized that self-caring and creating a financial budget are the basis of their long-term future. However, students from other high schools rather live for today, and they do not care about their future finances. It is rather risky because they give their short-term needs a priority over their long-term safety. Such an order of preferences shows lack of financial budgeting, which places obstacles in the way of preparation for unexpected situations.

By examining the differences between both sexes, it becomes visible that girls achieved higher scores, i.e. their attitudes towards long-term financial questions were more favourable. It is they who think in the longer term, i.e. give priority to savings over immediate consumption.

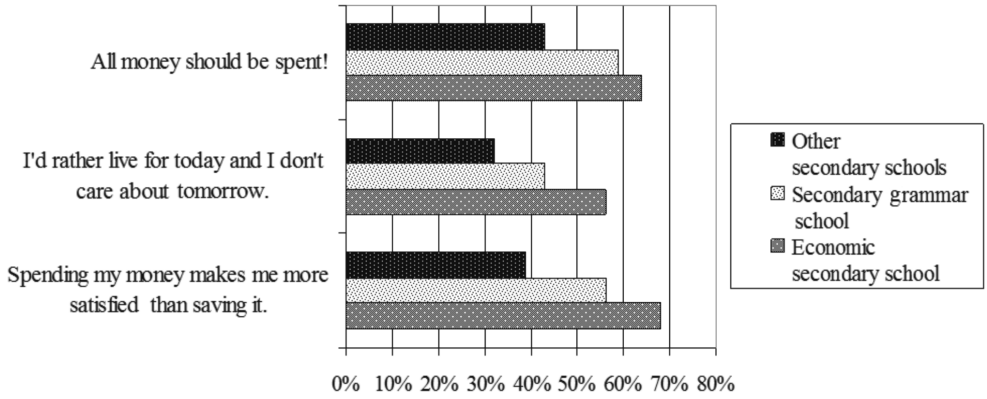

Figure 2. *Attitude about thinking in the long term*

7.4. Financial Behaviour

The measurement of financial behaviour forms is a very important part of financial literacy assessment as it is not enough to possess knowledge and information about different economic issues – there is also a need for their proper use. The questionnaire strived to examine a wide range of behavioural forms, emphasizing the factors either increasing or decreasing financial well-being. The answers given to the different styles of questions provided conclusions such as students' willingness to save, taking out a loan, attitudes towards budgeting, long-term planning, or what they do in order to achieve financial goals.

I experienced significant differences by school type in terms of students' financial behaviour. The diagram shows that only a few of the students from other high schools (39%) set long-term objectives, and likewise only a few (32%) consider things before buying. In terms of the above-mentioned data, 76% of them consider taking out a loan necessary for the everyday life.

Secondary grammar school students strive to behave more consciously as 56% have long-term objectives and 60% consider material possibilities before buying. However, 59% of the respondents can imagine taking out a loan, which I regard as an extremely high rate for it would be by all means avoidable by creating a family budget. A more thorough financial knowledge of students from economic high schools is reflected in their behaviour, as they are the highest number who indicated long-term planning (68%), and it is they who could be best characterized by a conscious consideration before buying (63%). I regard it as promising that 65% reject taking out a loan necessary for the everyday life.

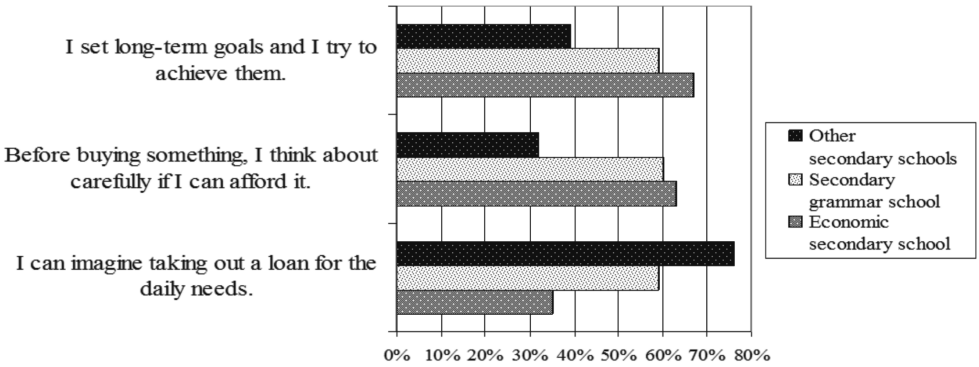

Figure 3. *Features of financial attitude*

7.5. Collective Indicators of Financial Literacy

After examining each element of financial literacy surveyed one by one, I focused my research on what characterizes the students from the three school types collectively and commonly.

Table 1. *Summary*

Type of school	High knowledge – points	High behaviour – points	High attitude – points
Economic secondary school	69%	55%	65%
Secondary grammar school	62%	46%	55%
Other secondary schools	37%	29%	38%

The findings show that there is a positive relationship between depth of knowledge and behaviour in every school type. Respondents with a level of higher financial knowledge also proved to possess a more conscious economic behaviour. Similarly, a significant relationship can be observed between the scores of behaviour and attitudes as the students who consider long-term thinking important show a more positive behaviour than those with short-term preferences. Surprisingly, I recognized that behaviour reached the lowest score, independently from school type. It might be worth considering that students possess basic financial knowledge for nothing if it cannot become an integral part of conscious behaviour. A significant relationship can be shown between school education and financial literacy since in all three main subject areas students from economic schools reached the highest values. The lowest scores were reached by students from other high schools. In terms of conscious financial behaviour

and positive preferences, students of secondary grammar schools lagged behind students attending professional education. All in all, it is visible that the role of economic education takes shape not only in terms of knowledge transfer but also in terms of the development of financial attitude.

8. Summary

In my study, I have strived to prove the necessity of creating a financial competence model that must be tried out in practice after laying the theoretical foundations. I tried to identify the determining elements of financial knowledge, behaviours, and attitudes in my research conducted among high school students. I recognized significant differences in all three main subject areas by sex, school type, and family background.

I am of the opinion that the elaboration of a uniform assessment methodology is necessary at the international level. It would make youths' literacy measurable and comparable with the help of the statistical data collected in several countries and would show further possible directions of the development of national financial education.

As a matter of course, the assessment methodology only identifies the abilities determining future financial situation and those needed for an economically appropriate behaviour but cannot guarantee that it will take place that way. The characteristics of youths' behaviour, impulsiveness, unusual preferences, family background, and friend relationships all have an impact on actual decision making.

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The Influence of Entrepreneurship Education on the Entrepreneurial Intentions of University Students in Katsina State, Nigeria

Aliyu MAMMAN,[1] Ismail Kayode OLAOYE,[2]
Abdulrazaq M. ABDULRAHAMAN,[3]
Jibrin Nuhu SHAGARI,[4] Olusegun Kazeem LEKAN[5]
Department of Business Management, Faculty of Management Sciences, Federal University, Dutsin-Ma, Katsina State, Nigeria,
e-mail: [1] amamman@fudutsinma.edu.ng, [2] iolaoye@fudutsinma.edu.ng,
[3] aabdulrahaman@fudutsinma.edu.ng, [4] njibrin@fudutsinma.edu.ng,
[5] kolusegun@fudutsinma.edu.ng

Abstract. This study attempts to determine the influence of Entrepreneurship Education (EEd) on the entrepreneurial intentions of university students in Katsina State, Nigeria. The study is guided by the following specific objectives: to examine the nature of entrepreneurial education being acquired by the students to determine the extent of influence of the acquired education on the students' entrepreneurial self-efficacy and to determine the extent of influence of the acquired education on student's entrepreneurial mindset. Secondary and primary sources were used in generating data for the study. Using stratified and random sampling techniques, data was generated by means of a structured questionnaire administered to 400 students across the three universities in the State. Descriptive statistics as well as simple regression was used in analysing the data collected from the respondents. Findings revealed that students fairly agreed that they have acquired education in major areas of entrepreneurship encompassing creativity, innovation, and venture creation and that EEd has a significantly positive influence on their entrepreneurial self-efficacy and entrepreneurial mindset. The study recommends that university managements should devise means of an adequate follow-up of their graduates to ensure the translation of their entrepreneurial intentions into venture creation, while entrepreneurship education lecturers should pay special attention to the area of venture creation as the students do not seem to be very optimistic in their ability to translate business opportunities into business projects/ventures.

Keywords: influence, enterprise creation, entrepreneurial mindset
JEL Classifications: L26, M13, O10

1. Background of the Study

In the 60s and 70s, unemployment was not pronounced among university graduates (Odidi, 2013) as at that time, mainly due to desperate need for human resources, public and private organizations would visit universities and grant employment to graduating students in advance. In that period, it was even reported that organizations with vacant positions would jingle the bell around the host community requesting qualified candidates to apply for the said positions. Candidates who failed secondary school examinations were usually secured front-desk jobs in banks and were handsomely paid.

The rosy situation for university graduates began to change in the 80s. The Commission on the Review of Higher Education, popularly called "Longe Commission" (1992), reported that by 1984 the phenomenon of graduate unemployment had begun to emerge in Nigeria. The situation kept on worsening from that time to date. According to publications by the National Manpower Board (NMB) and Federal Bureau of Statistics (FBS), only about 10% of university graduates released annually to the labour market are employed.

There has not been a consensus on the causes of graduate unemployment in Nigeria. Some stakeholders attributed the unfortunate phenomenon to negligence on the part the Agricultural Sector that used to generate about 70% of the nation's employment opportunities and accounted for about 8% of the Gross Domestic Product (Maina, 2014). Graduate unemployment was also attributed to the inability of successive government regimes to effectively manage the oil boom of the 70s and the oil windfall of the 90s to create infrastructural and industrial development that will generate employment for the teaming youth in general and university graduates in particular (Ojeifo, 2013). Some stakeholders even attributed the high rate of unemployment among university graduates to the lopsided production of high-level manpower from the universities.

Among all the causes advanced, there is none that is more appealing than the one that traced the problem of graduate unemployment to the disequilibrium between labour market requirement and lack of essential employable skills by the graduates themselves. Oviawe in Olorundare and Kayode (2014) reported the findings of a three-week large-scale, rapid national survey in 2004, jointly sponsored by the Nigerian University Commission (NUC) and the then Education Trust Fund, now TetFund, to determine the needs of the labour market which Nigerian university graduates are failing to meet. Of the 20 organizations covered and 100 individuals surveyed, 60% considered the graduates to be very poor in the required skills, such as literacy, oral communication, information communication technology (ICT), and entrepreneurial and critical thinking ability, as well as to have great deficiency in problem solving and decision making. Olorundare and Kayode (2014) also noted that the major defect in the

Nigerian educational system, including universities, is its theoretical inclination. The duo rightly observed that most Nigerian universities produce graduates who are at best only suited for white collar jobs and have little or no basic skills of any other vocational relevance, and all these greatly contribute to the high rate of unemployment among university graduates.

As part of the measures to provide graduates the essential employable skills and even to be job creators rather than job seekers, the Federal Government in 2006 directed all tertiary institutions (including universities) to include Entrepreneurship Education (EEd) as a compulsory course for all students with effect from the 2007/2008 academic session (Aliu, 2008). This directive led to the inclusion of EEd in the curriculum of all universities and to the establishment of the centres for entrepreneurship education/development (Olorundere & Kayode, 2014).

The introduction of EEd in the curriculum of universities was premised on two major assumptions which academic researchers have proved to be factual (Sanchez, 2013). First, entrepreneurs are not necessarily "born" but "made". It is possible to learn how to be an entrepreneur through different specific educational policies and programmes (Erikson, 2003). Second, policymakers and economists firmly believe that the higher the level of entrepreneurship in a country, the greater its levels of creativity, innovation, economic growth, and development.

Based on the above premises, many researchers consider EEd as a typical example of planned intentional behaviour (Bird, 1988; Katz & Garner, 1988; Krueger & Brazeal, 1994). Having an entrepreneurial intention means that one is committed to starting a new business (Krueger, 1993). Despite the recognition that education generally and prior entrepreneurial experiences may influence people's attitudes towards starting their own business, the influence of EEd – as distinct from general education – on students' intentions to start their own business after graduation has largely remained unexplored even in developed economies (Graeventiz, Harhoff, and Weber, 2010). From the time EEd was introduced in the curriculum of universities in 2006 to date, there has been few research on its influence on students' intentions to practice entrepreneurship during or after their university education (Bette, 2012). Research of this nature may bring out deficiencies and make useful recommendations on areas of improvement in the curriculum, method of teaching, and learning outcomes of EEd in universities.

In this study, an attempt will be made to determine the level of influence of EEd on the students' entrepreneurial intentions.

1.1. Statement of the Problem

Globally, the role of EEd is to create a mindset of entrepreneurial spirit in students by means of providing them with knowledge, behaviour pattern, and skills that enable them to be entrepreneurial throughout their lives (ASTEE, 2014). In view

of this development, EEd requires a continuous programme evaluation that is different from the traditional classroom examination method. Programme evaluation, unlike the traditional classroom examination, determines the effects of EEd on students' entrepreneurial intention and also reveals areas of strengths and weaknesses in the implementation of its curriculum with a view to coming up with meaningful suggestions on further improvement (Borchers, 2011).

Although there has been a growing interest in EEd, over the years in many countries, there have not been corresponding efforts regarding the evaluation of its influence on students' entrepreneurial intention (Graevenitz, Harhoff, and Weber, 2010). Despite its limitations, institutions rely heavily on the traditional examination and classroom evaluation measure to assess the impact of EEd on students. This unfortunate development is even more pronounced in developing countries such as Nigeria (Bette, 2012).

It is against this background that the study intends to assess the level of influence of EEd on students' intentions. The dependent variable of the study is entrepreneurial intention (entrepreneurial self-efficacy and entrepreneurial mindset), and its independent variable is entrepreneurship education.

1.2. Objectives of the Study

The general objective of the study is to assess the influence of EEd on the entrepreneurial intention of students in universities within Katsina State. The specific objectives of the study are as follows:

i. to examine the nature of entrepreneurial education being acquired by the students,
ii. to determine the extent of influence of the acquired education on students' entrepreneurial self-efficacy, and
iii. to determine the extent of influence of the acquired education on students' entrepreneurial mindset.

1.3. Research Hypotheses

Based on the above research objectives, the study has the following hypotheses:

$H_0$1: Entrepreneurship education does not have significant effect on students' entrepreneurial self-efficacy.

$H_0$2: Entrepreneurship education does not have significant effect on students' entrepreneurial mindset.

1.4. Significance of the Study

The study will determine the extent of influence of EEd on the entrepreneurial intention of students in universities within Katsina State. The study will be beneficial to the following categories of stakeholders in the following ways:

Students of EEd. The main goal of EEd is to teach entrepreneurial knowledge that will positively influence students' entrepreneurial intention and determination for self-employment. The findings of the study will reveal the extent of achievement of this noble objective among students in universities within Katsina State. The recommendations of the study can serve as the basis for further improvement in the achievement of the EEd objective among students, particularly in the universities under study but others as well.

Lecturers of EEd. Lecturers at universities play a vital role in the teaching and learning of EEd as agents of dissemination and knowledge producers. The findings of the study will indicate the extent to which lecturers play this significant role in the teaching and learning of EEd. The recommendations of the study can serve as the basis of further improvement in the teaching of EEd at universities and other tertiary institutions.

University Authorities. The responsibility of universities is to provide a conducive atmosphere to ensure an adequate teaching and learning of EEd. The findings and recommendations of the study can be used as the basis for further improvement regarding this statutory role.

Nigerian Universities Commission (N.U.C.). As a regulatory body, the N.U.C. should be interested in all measures that will improve the teaching and learning of EEd. This study is a step in that direction, and as such its findings and recommendations may be useful to the N.U.C. in performing its statutory regulatory role.

Government. The main objective of the government in introducing entrepreneurship courses at universities is to disseminate the culture of entrepreneurship among students with a view to making them job creators instead of job seekers. The findings of the study will give the government (especially the Federal and Katsina State Government) an insight into the extent of achievement of this objective among students in the study area, while its recommendations can serve as the basis for the formulation of policies that will improve the teaching and learning of EEd.

1.5. Scope and Delimitation of the Study

The expected outcome of EEd is not limited to entrepreneurial knowledge, entrepreneurial mindset, and self-efficacy, but, in view of their close relationship with intention, the study will restrict itself to them. This is a limitation to this study.

Apart from EEd, there are other factors, such as family background, friends, socio-cultural values, etc., that can also have influence on students' entrepreneurial intention. The study will restrict itself to the influence of EEd on students' entrepreneurial intention, adopting entrepreneurial knowledge, entrepreneurial self-efficacy, and mindset as proxies. The study will not cover the effects of other factors on students' entrepreneurial intention, which constitutes another limitation to the study.

To address the objectives of this study, Section 2 of this paper considers the conceptual, empirical, and theoretical issues related to entrepreneurial education and intention. The method adopted by the study is explained in Section 3, while the presentation and analysis of data is done in Section 4. Section 5 presents the conclusions of the findings as well as recommendations.

2. Review of Literature

2.1. Conceptual Issues

2.1.1. Entrepreneurship Education (EEd)

There have been many definitions of EEd by different scholars and institutions. Ebele (2008) defines EEd as the teaching of knowledge and a skill that enables students to plan, start, and run their own business. In the view of Enu (2012), EEd is made up of all kinds of experiences that give students the ability and vision of how to access and transform opportunities of different kinds. The European Commission (2014) defines EEd as contents, methods, and activities supporting the creation and development of knowledge, competences, and experiences that make it desirable and feasible for students to initiate and participate in entrepreneurial value-creating processes. Based on this definition, EEd entails transfer of knowledge, competences, and experiences to students with a view to directing their mindset towards self-employment by means of establishing their own enterprises. This study draws a lot of inspiration from the EU's definition of EEd, as it covers the objectives of the study and its independent variables regarding entrepreneurial knowledge, entrepreneurial self-efficacy, and entrepreneurial mindset.

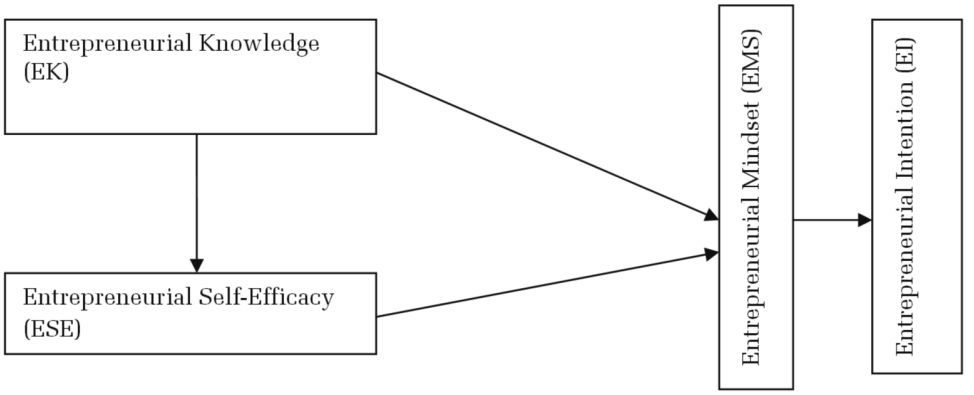
2.1.2. Entrepreneurial Intention (EI)

Entrepreneurial Intention (EI) may be viewed as the intent of an individual to pursue an entrepreneurial career, which may be encouraged by the environment or by certain personal factors (Lee, 2011). Intentionality can be defined as a state of mind directing a person's attention, experience, and action towards a

specific path to achieve something (Bird, 1988 as qtd by AbdulKadir, Salim, and Kamarudin, 2008); in this light, it could be attributed to be a predictor of planned entrepreneurial behaviour (Kruger & Carsud, 1993).

EI is the mindset that directs, guides, coordinates, and controls the basic concept (action) of new business development, implementation, and evaluation (Bird, 1988). EI is the self-acknowledged conviction of the individual mind to start up a new business with a sincere and dedicated plan to do so at a certain point in time (Thompson, 2009). EI, in the words of Ogundipe, Kosile, and Olatunde (2012), is the willingness to undertake entrepreneurial activities so as to become self-employed.

It is important to understand the factors leading to EI, as intentions are reliable indicators of entrepreneurial action. A clear entrepreneurial intention leads to more possibilities of displaying entrepreneurial behaviour (Ajzen, 1991). Based on this argument, studying the EI provides a clue to understanding the antecedents that predict entrepreneurial action. The underlying EI model guiding the study is depicted as follows:



Source: authors (2017)

Figure 1. *EI – conceptual model*

2.1.3. Entrepreneurship Education and Entrepreneurial Intention

From the mid-80s to date, there has been a growing youth and graduate unemployment in Nigeria. According to the National Bureau of Statistics, as at 2012, 54% of the Nigerian youth were unemployed (Innocent, 2014). As part of measures to address the danger of youth unemployment, especially graduates, in 1987, the Federal Government of Nigeria introduced EEd in the curricula of tertiary institutions, comprising universities, polytechnics, and colleges of education. The objectives of teaching EEd in the tertiary institutions include:

– the presentation of functional education for the youth so as to engender in them the need for self-employment and self-reliance;

– providing graduates with ample and appropriate skills for creative and innovative thinking that would enable them to identify unique business opportunities;

– serving as a channel towards economic growth and development;

– creating employment and reducing the high rate of poverty;

– reducing rural–urban migration;

– providing young graduates with the right skills and support, financial and otherwise, that will make it easier for them to set up careers in the establishment of small and medium-sized businesses;

– instilling in young graduates and adults an entrepreneurial spirit that would create in them perseverance in any business venture they embark upon;

– creating an environment for a smooth transition from a local and traditional economy to a modern industrial economy.

To achieve the above stated objectives correctly, teachers need to teach the EEd (e.g. creativity, business idea generation, role of entrepreneur in business/society, etc.) that will trigger desired entrepreneurial behaviours such as entrepreneurial self-efficacy (e.g. financial literacy, managing ambiguity, marshalling resources, planning, etc.) and entrepreneurial mindset (e.g. self-confidence in tackling problems, self-evaluation, entrepreneurial attitude, etc.). The study will attempt to examine the nature of entrepreneurial knowledge being taught at universities within Katsina State and also determine the influence of the said knowledge on student's entrepreneurial self-efficacy, entrepreneurial mindset, and consequently their EI. The attempt was based on the fact that EI is regarded as a reliable indicator of entrepreneurial action leading to self-employment resulting from learning EEd (Ogundipe et al., 2012).

2.2. Review of Empirical Studies

Studies on the effect of entrepreneurial education on entrepreneurial intention (EI) follow various perspectives. A lot of these studies indicated a positive or mixed result (Lorz, Müller, and Volery, 2011), while a few others found a negative impact of entrepreneurship education (Oosterbeek, Praag, and Ijsselstein, 2010; Graevenitz, Harhoff, and Weber, 2010). Other studies found insignificant or mixed results between entrepreneurial education and entrepreneurial intention (Olomi & Sinyamule, 2009; Souitaris, Zerbinati, and Al-Laham, 2007). To actually test the depth of the relationship between the factors, Linan and Chen (2009) developed and tested a new questionnaire aiming at measuring entrepreneurial intention through the theory of planned behaviour. Studies conducted in different countries across the globe at different times have revealed positive and negative impacts of EEd courses or programmes at universities on entrepreneurial intention. Peterman and Kennedy (2003) discovered that EEd positively affected the entrepreneurial

intentions of high school students in Australia. The study involved 220 students from 17 high schools chosen from across Australia. Souitaris et al. (2007) found that sensitization through a long (January–May) entrepreneurship programme led to stronger EI. The study covered 250 students from science and engineering faculties randomly selected from two major European universities. Graevenitz, Harhoff, and Weber (2010) in their study on the effects of EEd involving students of the Department of Business Administration, Munich School of Management (one of Germany's largest universities), discovered that students' EI had become more pronounced as a result of the EEd course they had been taking. Sanchez (2013), using correlation and regression analyses, conducted a study on *the impact of Entrepreneurship Education Programme on Entrepreneurial Competences and Intention* in Spain and discovered that there is a positive relationship between EEd and EI. Furthermore, Karlsson and Moberg (2013) in their study on students who offered EEd courses in a marketing master's programme at Southern Denmark University found that the said courses were effective in enhancing the students' EI and start-up behaviour, which, however, was not observed in the control group. Remeikene, Startiene, and Dumciuviene (2013) conducted a study on *Explaining Entrepreneurial Intention of University Students: The Role of Entrepreneurial Education*, involving students of economics and mechanical engineering from across universities in Lithuania. The result of the study reveals that EEd has a positive impact on the EI of students of economics and mechanical engineering. The study has also established that students of economics have a more favourable attitude towards the benefits of EEd with respect to business start-up in comparison with students of mechanical engineering.

In Nigeria, some related studies on students EI have also been conducted. Muhammad, Aliyu, and Ahmed (2015) conducted a study on *EI among Nigerian University Students*, involving 205 students from Abubakar Tafawa Balewa University, Bauchi. The findings of the study indicated that entrepreneurial attitude, subjective norm, and power of behavioural control are all significant indictors of EI. Using multi-regression analysis technique, Lucky and Ibrahim (2014) conducted a study on the *Environmental Factors and EI among Nigerian Students in University Utara, Malaysia (UUM)* and found that both entrepreneurial orientation (EO) and entrepreneurial skill are essential factors required in the realization of EI by the Nigerian students in UUM. In a study on EI by Ogundipe et al. (2012) among students from Lagos State University, 206 graduating students from the departments of Guidance and Counselling and Business Education were observed, and it was discovered that EEd had a significant impact on students' EI. Students from the Department of Guidance and Counselling showed stronger EI than their Business Education counterparts.

Oosterbeek, Praag, and Ijsseistein (2010) studied the impact of EEd, using a difference-in-differences framework in the Netherlands, covering 252 students, and

the results indicated that the effect on students' self-assessed entrepreneurial skills was insignificant. The study also found that the effect of the EEd course on EI was a significantly negative one. A study conducted by Olumi and Sinyamule (2009) in Tanzania, involving 237 professionals who took EEd courses during vocational training, discovered that participation in an entrepreneurship course has no significant effect on start-up inclinations. Galloway, Anderson, and Wilson (2005) examined the influence of EEd on 307 university students in Scotland and found that only half of them perceived that the course had a positive impact on their EI.

Our view of empirical studies on EI glaringly shows that all the studies were conducted in other countries, and the ones conducted in Nigeria covered students from institutions in the south-western and north-eastern zones only. None of the studies covered students in universities located in Katsina State in particular and the north-western zone in general. This study intends to address this gap by covering students in universities located in Katsina State, north-western Nigeria.

2.3. Theoretical Framework

There are three major theoretical approaches to studying the practice of entrepreneurship. The first approach comprises the trait theories that explain entrepreneurship from the perspective of personal traits of entrepreneurs which distinguish them from other people, such as need for achievement, need for power, need for affiliation, etc. The second approach involves behavioural theories that explain entrepreneurship through the ability of an individual to identify, utilize, and take steps to harness the profitable opportunities not seen by others. The third approach comprises the cognitive theories that explain entrepreneurship from the perspective of influence of environmental factors such as subjective norms, behavioural control, EEd, etc. Cognitive theories attempt to understand how entrepreneurs process information and how they think (Baron, 2004). Most scholars are of the view that cognitive theories/models provide a stronger predictive power than the trait and behavioural ones (Gartner, 1988). Based on this argument, the theoretical underpinning of this study will be *The Theory of Planned Behaviour*, one of the major cognitive theories of entrepreneurship.

According to the theory of planned behaviour, EI is a function of the following factors: Subjective Norms (SN), Attitude (A), and Perceived Behavioural Control (PBC) which involves EEd (Ajzen, 1991). The subjective norms represent the influence of family background, peers, and friends. For instance, if the parents and friends of an individual consider entrepreneurship as too risky, it is unlikely the individual concerned will have EI. Attitudes comprise expectations about the consequences of performing a given action. For example, if an individual expects positive consequences from an entrepreneurial action, such as commencement of business, it is likely he or she will develop an EI. Perceived Behavioural Control

(PBC) entails the individual's perception of the ease or difficulty of becoming an entrepreneur. PBC includes not only the feeling of being able or not being able to become entrepreneur but also the controllability of the behaviour; the greater the perceived control, the stronger the person's EI (Ogundipe et al., 2012). For example, if an individual has perceived that his difficulty in becoming an entrepreneur is due to lack of awareness and education, his or her enrolment in any of the EEd courses may bring about EI. EEd was introduced in the curricula of tertiary institutions based on the assumption that it would have a positive impact on students' EI and eventual establishment of business start-ups. In literature, there is sufficient theoretical basis to justify a belief that educational interventions may increase entrepreneurial behaviour and efficacy (Rideout & Gray, 2013). It is in the light of this belief that this study will attempt to assess the influence of EEd on the EI of university students in Katsina State, which may be positive or negative.

3. Research Methodology

3.1. Research Design

The descriptive survey design was adopted for this study. The method is considered appropriate since there will not be any attempt to control or manipulate the sample subjects from the population.

3.2. The Population of the Study

The population of the study consists of all students offering various entrepreneurship courses for a semester at the three universities in Katsina State, namely, Federal University Dutsin-Ma (FUDMA), Umaru Musa Yaradua University (UMYU), and Al-Kalam University, Katsina (AUK). Based on the information provided by the Entrepreneurship Development Centres of the said universities, the total number is 5,898 (FUDMA – 575, UMYU – 1,933, and AUK – 3,390).

3.3. Sample Size and Sampling Techniques

In estimating the sample size for the study, the formula for determining sample size given by Krejche & Morgan (1970) was used. The formula is as follows:

$$s = X^2 NP (1- P) \div d^2 (N -1) + X^2 P (1- P),$$

where s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.
P = the population proportion (assumed to be .50 since this would provide the maximum sample size).
D = the degree of accuracy expressed as a proportion (.05).

$$S+ = \frac{3{,}841(5.898)(0.50)(0.50)}{0.05^2(5{,}898)+3{,}841(0.50)(0.50)}$$

$$S = \frac{5{,}663.6}{15.7} \qquad S = 377 \quad Students$$

Quota sampling technique was used to determine sample sizes in the three universities covered. The random sampling technique was used in administering the questionnaires among the sample subjects within the universities under study.

3.4. Data Collection Instruments

Data was collected from both primary and secondary sources. The primary data was generated by means of an adapted questionnaire titled *Assessment Tool for Entrepreneurship Education (ASSTEE).* The instrument was used in evaluating the influence of EEd taught in tertiary institutions in European Union (EU) countries. The instrument was adapted due to similarities of objectives of study and study variables. Using a random sampling technique, the questionnaire was administered to the 377 students from the three universities as follows: FUDMA – 37, UMYU – 124, and AUK – 216. The quota for the sample size in each university was arrived at using this formula:

$$\frac{\text{Sample Size}}{\text{Total Population}} \times \text{No. of EEd students of a University}$$

E.g. for FUDMA $\frac{377}{5{,}898} \times 575 = 37$

3.5. Method of Data Analysis

Descriptive as well as inferential statistics were used in the analysis of the data collected. Descriptive statistics in the form of frequencies and percentages was used to analyse the demographic data of the respondents, while means (averages) were used for the descriptive analysis of entrepreneurial education. Inferential statistics in the form of simple regression was used to investigate the effect of entrepreneurial knowledge on entrepreneurial self-efficacy and mindset.

4. Data Presentation and Analysis

4.1. Reliability Test

In order to test the reliability of research instruments, Cronbach's alpha was used. The seven items used in measuring entrepreneurial education, entrepreneurial self-efficacy, and entrepreneurial mindset were tested for reliability, and the results are presented in *Table 4.1*.

Table 4.1. *Reliability test using Cronbach's alpha*

	Variables	Cronbach's alpha	No. of items
1.	Entrepreneurial knowledge	.728	7
2.	Entrepreneurial self-efficacy	.777	7
3.	Entrepreneurial mindset	.813	7

Source: authors' computation (2017) using SPSS

From the results in *Table 4.1* above, it can be clearly seen that Cronbach's alpha for the three variables are well above .70, which implies that the research instruments are highly reliable.

4.2. Descriptive Statistics

Descriptive statistics in the form of frequencies, percentages, means, and minimum and maximum values were used in the analyses of demographic variables and entrepreneurial education.

4.2.1. Demographic Variables

There are three universities in Katsina State, namely: the Federal University, Dutsin-ma; Umar Musa Yar Adua University, Katsina; Al-Qalam University, Katsina. *Table 4.2* presents the descriptive results of the institutions where the respondents receive entrepreneurial education.

Table 4.2. *Institution of respondents*

	Frequency	**Percentage**
FUDMA	37	13
UMYU	96	34
AUK	152	53
Total	285	100

Source: authors' computation (2017) using SPSS

In the Table, 37 respondents, amounting to 13 per cent, are students of FUDMA, 96 respondents, or 34 per cent, are students of UMYU, while 152 students, making up 53 per cent of the respondents, are students of AUK.

In *Table 4.3* below, the descriptive results of respondents' age distribution are shown. The results in the Table indicate that the majority of the respondents are above 30 years, while only 14, or 5 per cent, of them are between 18 and 20 years. The result is thus quite worrisome, showing that the majority of the respondents, who are undergraduates, are above 30 years. The implication is that the respondents in this category are above the National Youth Service Corps (NYSC) age and cannot be gainfully employed by most organizations, which expect a graduate trainee to be around 26 years old. However, it can be argued that some of the respondents may already belong to the working class. Another argument is that most of the respondents are from AUK, which is a private university, where the most working-class members are enrolled compared to public universities.

Table 4.3. *The age-group of respondents*

	Frequency	**Percentage**
18–20	14	5
21–23	61	21
24–26	67	24
27–29	54	19
Above 30	89	31
Total	285	100

Source: authors' computation (2017) using SPSS

For the gender distribution of the respondents, results in *Table 4.4* below show that the majority of the respondents are male students, who account for 79 per cent, while the remaining 21 per cent of the respondents are female. This result confirms the male domination in the selected universities, which may be due to cultural and religious factors, among others.

Table 4.4. *Gender Distribution*

	Frequency	**Percentage**
Male	226	79
Female	59	21
Total	285	100

Source: authors' computation (2017) using SPSS

Respondents' level at the university is summarized in *Table 4.5* below. Descriptive results revealed that 12 (4%) of the respondents are in their second year (level 200), 49 (17%) are level 300, and 224 (79%) are level 400 students.

The implications for this are that the majority of the students who have had extensive EEd training are at level 400 and would most likely have taken all the courses in entrepreneurship and have had a reasonable number of interactions with lecturers taking entrepreneurship courses.

Table 4.5. *Level of respondents*

Level	Frequency	Percentage
200	12	4
300	49	17
400	224	79
Total	285	100

Source: authors' computation (2017) using SPSS

4.2.2. Entrepreneurial Knowledge

To examine the nature of entrepreneurial education acquired by the students, 7 factors of EEd were used. The mean distribution of the responses was fairly high with a minimum of 3.94 and a maximum of 4.40, as shown in *Table 4.6*. The high standard deviation scores indicate that the dispersion from the means appears to be normal.

Table 4.6. *Descriptive statistics of entrepreneurial education*

	N	Min.	Max.	Mean	Std. Deviation
i. In entrepreneurship education (EEd), I have been taught how to think creatively.	285	2	5	4.40	.875
ii. I have been taught how to generate business ideas.	285	1	5	4.24	1.065
iii. I have been taught how to translate business ideas into business opportunities.	285	1	5	4.12	.976
iv. I have been taught how to translate business opportunities into business ventures/projects.	285	1	5	3.94	1.012
v. I have been taught the role of entrepreneur in a business set-up.	285	1	5	4.15	.986
vi. I have been taught the role of entrepreneur in the society.	285	1	5	4.19	.913
vii. I have been taught different reasons why people start a business.	285	1	5	4.10	.867

Source: authors' computation (2017) using SPSS

From *Table 4.6* above, it can be seen that all the 7 items used in measuring entrepreneurial education, except Item 4, had a mean value greater than 4. This implies that on the average the respondents fairly agreed that they had been taught: how to think creatively, generate business ideas, translate business ideas into opportunities, translate business opportunities into business projects/ventures, the role of entrepreneur in a business set-up, the role of entrepreneur in the society, different reasons for starting a business – and they are satisfied with the teaching methodology adopted by the lecturers. The implication is that lecturers handling entrepreneurship in the three universities have a positive impact on students' knowledge. However, the mean value of Item 4, which is less than 4, should not be ignored. It shows that remedial actions are required concerning how business opportunities could be translated into business projects/ventures. On the whole, the students reasonably agreed that they had received education in the major areas of entrepreneurship included in the questionnaire.

4.3. Regression Analysis

In order to achieve the remaining two objectives, a simple regression analysis is utilized, and two models are used in this regard. In Model 1, entrepreneurial self-efficacy (ENSE) is regressed on entrepreneurial education (ENE), while in Model 2 entrepreneurial mindset (ENM) is also regressed on entrepreneurial education. The regression result of Model 1 is presented in *Table 4.7* below. The regression results reveal that entrepreneurial knowledge has a significantly positive influence on students' entrepreneurial self-efficacy, as confirmed by the t-value of 23.680, which is significant at 1 per cent level of significance. The regression coefficient of .735 is an indication that a 1 per cent increase in the level of entrepreneurial education acquired by students will positively influence their level or degree of entrepreneurial self-efficacy by .735 per cent. The implication here is that a student's level of self-efficacy is highly influenced by the level of entrepreneurial education acquired. The result is an attestation that entrepreneurial education is a strong determinant of entrepreneurial self-efficacy.

Table 4.7. *Regression results of Model 1*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.142	.804		7.635	.000
	ENK	.735	.031	.674	23.680	.000

Dependent variable: ENSE *Source: authors' computation (2017) using SPSS*

Similarly, to determine the extent of influence of the acquired entrepreneurial knowledge on students' entrepreneurial mindset, the regression results presented in *Table 4.8* are used. Regression results indicate that entrepreneurial education has a positive and significant influence on students' entrepreneurial mindset. Again, the level of significance is 1 per cent, which suggests that we have a 99 per cent confidence in our results. The regression coefficient of .629 connotes that a 1 per cent increase in the level of entrepreneurial education is positively associated with about .629 per cent increase in the level of students' entrepreneurial mindset. This implies that a student's level of entrepreneurial mindset is propelled by the level of the received entrepreneurial education to a larger extent. These findings are in agreement with that of Peterman and Kennedy (2003), Souitaris, Zerbinati, and Al-lahran (2007), Graevenitz, Harhoff, and Weber (2013), Karlson and Moberg (2013), Remeikene, Startiene, and Dumciuviene (2013), and Muhammad, Aliyu, and Ahmed (2015). The findings were inconsistent with those of Oosterbeek, Praag, and Ijsseitein (2010), Olumi and Sinyamule (2009), and Galloway, Anderson, and Wilson (2005), who revealed an insignificant influence of entrepreneurship education on students' EI.

Table 4.8. *Regression results of Model 2*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
2	(Constant)	9.401	1.032		9.106	.000
	ENK	.629	.040	.520	15.782	.000

Dependent variable: ENM *Source: authors' computation (2017) using SPSS*

4.4. Hypothesis Testing

To test the hypotheses, the regression results in *Table 4.7* and *Table 4.8* were utilized. The t-test was used in testing the significance of entrepreneurship education on entrepreneurial intentions (entrepreneurial self-efficacy and mindset). The decision rule is to reject the null hypothesis if the probability value (P-value) is greater than 1 per cent level of significance (0.01).

4.4.1. Test of Hypothesis One

The regression result in *Table 4.7* is employed in testing hypothesis one ($H0_1$). The hypothesis is recaptured below:

$H0_1$: entrepreneurship education does not have a significant effect on students' entrepreneurial self-efficacy.

The t-value of entrepreneurial self-efficacy (ENSE) in *Table 4.7* is positive and significant at 1 per cent level since .000 is less than .01. Therefore, this study rejects the null hypothesis one and confirms that entrepreneurship education has a positive and significant effect on the entrepreneurial self-efficacy of students in the three universities under review.

4.4.2. Test of Hypothesis Two

Table 4.8 is used in testing hypothesis two ($H0_2$). To do this, the hypothesis is recaptured as stated below:

$H0_2$: There is no significant effect of entrepreneurship knowledge on students' entrepreneurial mindset.

Similarly, the t-value of entrepreneurial mindset (ENM) in *Table 4.8* shows a positive sign, which is significant at 1 per cent level of significance. The p-value of .000, which is less than .01, confirmed the assertion. Since .000 is less than 1 per cent level of significance, this study rejects the $H0_2$, and affirms that entrepreneurship knowledge has a significantly positive effect on the entrepreneurial mindset of students in FUDMA, UMYU, and AUK.

5. Summary, Conclusions, and Recommendations

This study determines the level of influence of entrepreneurship education on the students' entrepreneurial intentions. Entrepreneurial intentions were represented using entrepreneurial self-efficacy and entrepreneurial mindset. The three studied variables comprising entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial mindset were measured using 7 items each. Descriptive as well as simple regression techniques were adopted as methods of data analysis. The study covers level 200, 300, and 400 students of Federal University Dutsin-Ma (FUDMA), Umaru Musa Yar'adua University (UMYU), and Alqalam University Katsina (AUK), respectively, who have taken course(s) in entrepreneurship. The major findings of the study are that students fairly agreed that they have received education in the major areas of entrepreneurship such as creativity, innovation, and venture creation and that entrepreneurial education has a significantly positive influence on students' entrepreneurial self-efficacy and entrepreneurial mindset.

On the basis of the major findings of the study, it was concluded that entrepreneurship education has contributed immensely to students' entrepreneurial intention. The study also concludes that the influence of entrepreneurship education is more pronounced on students' entrepreneurial self-efficacy than their entrepreneurial mindset. It is also concluded that for students to be able to translate business opportunities into business projects/

ventures, remedial actions and additional efforts are required. Following the major findings and conclusions, the study recommends the following:

i. The university management should devise means of an adequate follow-up of their graduates to ensure the translation of their entrepreneurial intentions into venture creation and management.
ii. In the course of teaching entrepreneurship education, lecturers should pay special attention to the area of venture creation as the students do not seem to be optimistic about their ability to translate business opportunities into business projects/ventures.
iii. To minimize the high mortality rate of ventures established by university graduates at infancy level, the entrepreneurship centres of universities should monitor and assist their graduates financially and morally to nurture the said ventures from infancy to maturity levels.
iv. Lecturers, the management of the university, state and federal ministry of education, and other relevant stakeholders should accord special attention to entrepreneurship education as doing so will enhance students' entrepreneurial self-efficacy and entrepreneurial mindset.
v. Adequate funding, motivation of entrepreneurial lecturers, provision of well-equipped entrepreneurship development centres should be provided, among others, to enhance teaching of entrepreneurship education in the three universities covered by the study.

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Theoretical and Conceptual Framework of Access to Financial Services by Farmers in Emerging Economies: Implication for Empirical Analysis

Dadson AWUNYO-VITOR
Department of Agricultural Economics, Agribusiness and Extension,
Kwame Nkrumah University of Science and Technology
College of Agriculture and Natural Resources
e-mail: awunyovitor@gmail.com/awunyo-vitor.ksb@knust.edu.gh

Abstract. This paper presents a discussion on the theoretical and conceptual framework on issues relating to access to financial services. The discussion begins by providing details of various theories that underpin the demand and supply side of access to financial services. The supply dimension of access to financial services is guided by the information asymmetry theory and the transaction cost theory, while the key demand dimension theories are the delegated monitoring theory and the rational choice theory. In the later sections, a conceptual framework was developed for the empirical evaluation of access to financial services and its impact on productivity with particular reference to farmers in emerging economies. The last section provides the concluding remarks, which recommends the use of empirical analyses to access factors influencing access and the impact of the access to farmers' productivity.

Keywords: financial services, savings, credit, developing economies, farmers
JEL Classifications: G21; Q14

Introduction

In developing nations, most of the citizens are employed in the agricultural sector of economy. This is either direct involvement in the agricultural production of crops or livestock or indirect involvement in agriculture for their livelihood by either marketing agricultural input to farmers or marketing agricultural produce from the farmers or carting the produce to the market centres. Others are indirectly employed in the agricultural sector by processing agricultural produce into semi-finished and finished goods. The agricultural sector contributes between 35 and 60% of the GDP (ISSER, 2008).

Due to the key role played by the agricultural sector in developing countries, several attempts have been made to develop agriculture and increase foreign exchange earnings from the export of agricultural produce to support the overall development of the country. In spite of these attempts, agricultural output has consistently fallen in most of these countries. This is coupled with the declining prices of agricultural products. Consequently, the smallholder farmers, who form the majority of agricultural producers, receive very little incentive to improve productivity. This is further exacerbated by poor infrastructure and the increasing prices of farm input and technology.

The literature has established the role of the financial system in agricultural development, particularly in developing countries. For example, Schumpeter (1934) opined that a nation with a well-developed financial system would support economic growth. This can be achieved via funds mobilization from savers for onward lending to lenders at a lower transaction cost.

Access to finance would similarly enable farmers to procure insurance to mitigate possible production and marketing risk. This would encourage more people to go into agricultural production at a commercial level and improve productivity. Theoretically, Richardo (1815) noted that agriculture can achieve great improvement with the increased application of capital to fixed factors of production. However, capital accumulation is influenced by the development within the financial system of a nation.

Access to financial services is important to the operations of the agricultural sector, especially with the diversification of agricultural exports, where effort is being made to increase the export of agricultural produce – these farmers require credit for their activities as most of these activities are capital intensive. In addition, due to the cyclical nature of the production, an optimal combination of productive resources is important to achieve an increase in productivity.

In view of the above, most developing countries have intervened in the agricultural sector to improve access to financial services for the participants therein, assuming a *trickle-down* effect that would ultimately benefit the poor. Thus, most of them have established state financial institutions under quasi-Keynesian principles of financial repression. This has been designed to improve access to financial services to farmers via cooperative agencies, these being the primary vehicles providing credit to the agricultural sector. This was followed by the establishment of state banks, which were used to provide funds for the agricultural sector's development. However, this approach was observed to aggravate inefficiencies in the financial sector saddled with moral hazards and adverse selection (Berger et al., 2002).

This has created a gap between credit supply and demand in the agricultural sector in developing countries. It was therefore necessary to develop a banking system in which rules and regulations guiding the access to financial services

suit the socio-economic circumstances of the participants in the agricultural sector, particularly smallholder farmers. This is necessary to improve farmers' access to financial services and increase productivity. High productivity in the agricultural sector would lead to improved income for the farmers and other agricultural sector participants.

Economic growth can be achieved through growth in the agricultural sector. Factors that contribute to agricultural productivity include investment in purchased agricultural inputs and use of appropriate technology coupled with technical efficiency. The efficiency of the farmers is influenced by the adoption of new technology and better infrastructure, availability of funds to purchase the needed inputs and agricultural producers' managerial capabilities. Farmers need funds to support purchase and optimal use of input.

Thus, access to financial services by farmers is a key ingredient in the promotion of agricultural production and the modernization of agriculture, and this forms an essential element of any poverty reduction/-oriented strategy for future development. According to Carter (1989), access to financial services, particularly to credit, affects the performance of agriculture via an efficient allocation of resources as it helps farmers to overcome credit constraints. He stressed that "this sort of effect will shift the farmer along a given production surface to a more intensive and more remunerative input combination". These funds can also be used to buy new packages of technology, for example, improved seed varieties that are high-yielding and resistant to diseases. A study by Hazell et al. (2007) revealed that the low level of crop production in Africa can be attributed to lack of access to financial services by smallholder farmers (Awunyo-Vitor, 2014). These results come close to a 50% loss of potential income; consequently, they are unable to get out of poverty (Hazell et al., 2007).

Generally, poverty reduction and food security in emerging economies can be achieved through improved agricultural productivity that requires access to financial services for adoption of new and improved technologies by the farmers (Bashir et al., 2010). However, the key challenge is how access to financial services can be improved for farmers in emerging economies. In fact, some authors have argued that current-day financing schemes, which are available to farmers, particularly in developing countries, are not very effective. Hulme and Mosley (1996) argued that poverty cannot be alleviated by access to credit alone. In some cases, the poorest individuals who have had to access credit become worse-off as a result of the terms and conditions attached to the service. Yet, nearly a decade later, DFID (2004) noted that strong evidence exists to support the theory of the linkage between farmers' access to financial services and poverty alleviation, therefore growth in the economy. Levine (2004) observed that many economists believe in a positive relationship between access to financial services and improved productivity (Awunyo-Vitor & Al-Hassan, 2014a).

For example, a study by Wongnaa and Awunyo-Vitor (2013) in Ghana revealed that credit influenced the productivity of yam farmers in Sene District. Similarly, a study by Chillo et al. (2017) in Pakistan shows that credit influenced the productivity of rice in Sindh. Thus, credit is an important factor among production factors that can lead to an increase in productivity and income for farmers (Khalid et al., 2010; Hussain, 2012). Several authors examine the relationship between access to finance and agricultural production efficiencies, using different econometric estimation techniques. For example, Asante et al. (2014) and Martey et al. (2015) used propensity score matching, while Coelli and Battese (1996) and Moses and Adebayo (2007) employed stochastic production frontiers in assessing the impact of credit on agricultural productivity. The results of the above studies revealed that access to finance that satisfied the need and aspirations of the farmers would result in increased productivity and efficiency of farmers. The results of these studies also revealed that the decision by farmers to undertake investment in farming activities is closely affected by their access to financial services. According to Awunyo-Vitor et al. (2014), access to financial services has a significant effect on input use and the productivity of maize farmers in Ghana. However, if the mode of operation of the financial intermediaries who offer services to farmers does not match farmers' needs, they are discouraged from new initiatives and investment – for example, the purchasing and use of inputs at an optimal level that would lead to an increase in productivity and efficiency. Therefore, improvement in access to financial services by farmers can provide incentives for investment and use of purchased inputs for efficient productivity.

A study conducted in Swaziland by Masuku et al. (2015) to assess how credit impacts the technical efficiency of farmers showed that in Swaziland credit has a significant positive impact on farmers' technical efficiency. Duy (2015) similarly arrived at this conclusion in their study on the impact of formal and informal credit on the production efficiency of rice farmers in the Mekong Delta. Likewise, Laha (2013) used customers of banks and non-bank entities to evaluate the impact of credit on the efficiency of farmers in West Bengal. The results of his study revealed that farmers who had access to formal credit had achieved higher efficiency than those who received credit from non-bank financial intermediaries sources. This supports the position of Shahidur and Khandker (2003) that credit from formal financial intermediaries is largely used to spur investment in agricultural production. In Ghana, a study by Abdallah (2016) to evaluate the impact of credit on the technical efficiency of maize farmers revealed that credit has increased the efficiency of farmers by 3.8%.

Thus, access to finance by farmers has the potential of improving the welfare of most people in the agricultural sector in developing countries where the majority of the population are in the agricultural sector. It also has the potential to reduce the level of unemployment being experienced by developing countries,

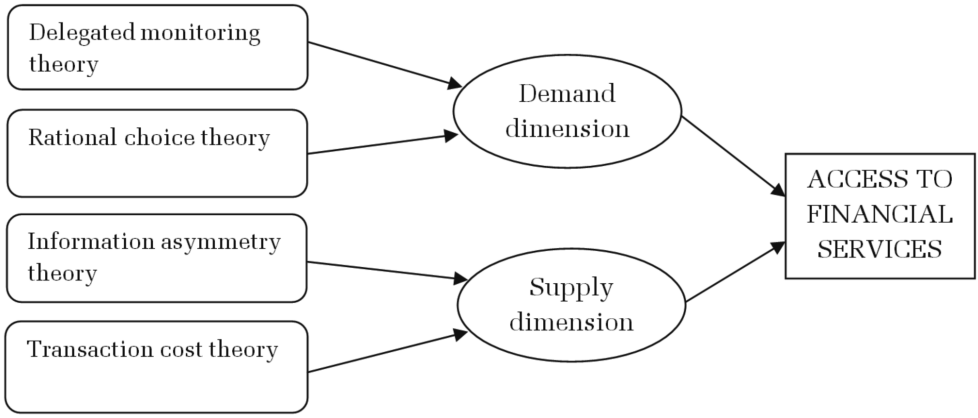
particularly African nations, by creating incentives for commercial agricultural production (Wold Bank, 2007).

In view of the evidence supporting strong positive linkages between access to financial services and economic growth via an increase in productivity, access to financial services by farmers in developing economies has emerged as a leading and effective strategy for food security and reduction in poverty. According to Bee (2007), it is now widely accepted that production opportunities for rural households can be opened up with access to financial services, which also supports job creation and builds up their asset base. This has been referred to as a new development paradigm that is built on market principles (Bee, 2007). In this context, the livelihood of rural households will be improved with access to financial services through efficiency gained in their production efforts. However, ineffective and inefficient analyses result in inadequate policies that do not allow farmers to gain full advantage of access to financial services. Appropriate analysis is required to develop a suitable policy to encourage farmers' access to financial services, which would support productivity and reduce poverty with an overall impact on economic growth. This requires the understanding of theories and concepts that underpin issues relating to financial services access and the impact finance has on the productivity of farmers. Thus, this study examined the theoretical and conceptual framework that underpins access to financial services and suggests empirical analysis that can be undertaken for an appropriate policy on access to financial services to be developed.

The paper furthermore presents a theoretical framework for access to financial services. Under this section, an exposition of the theories is presented, grouped into the demand-side and supply-side dimension of access to financial services. This is followed by a conceptual framework that was developed based on the theoretical exposition. Finally, concluding remarks summarize the thought process behind the theory and conceptual framework. In addition, this section highlights the implications for empirical analysis of access to financial services.

Theoretical Framework for Access to Financial Services by Farmers

Financial services access has two dimensions: demand and supply (Stijin, 2005). The demand side examines the choice made by individuals with regard to services provided by financial institutions, while the supply side relates to financial services provision or financial intermediation. Theories on access to financial services provide a general framework for demand for financial services (demand dimension of access) and financial intermediation (supply dimension of access to financial services) or, at least, for understanding these concepts of access to financial services.



Source: frame by author based on information from Coase (1937), Diamond (1984), and Stijin (2005)

Figure 1. *Four theories of access to financial services*

There are several theories that relate to decision making in the economic literature. These theories include rationality theory, bounded rationality theory, theory of satisficing, prospect theory, intertemporal theory, delegated monitoring theory, information asymmetry theory, and transaction cost theory (Scholtens & Wensveen, 2003). However, based on the theme of the current study, which deals with access to financial services by smallholder farmers in developing countries, the study concentrates on the four theories as presented in *Figure 1*.

Figure 1 presents the linkages between the theories and access to financial services. Two theories, the delegated monitoring and the rational choice theory, explain demand for financial services, while the information asymmetry and the transaction cost theory explain financial intermediation, or the supply side-dimension of access to financial services.

The theory of delegated monitoring claims that financial institutions possess the ability to act as delegated monitors for net savers (Diamond, 1984). In this context, depositors have delegated the role of safekeeping of their savings to the financial intermediaries as well as entrusting them to invest their savings prudently for better returns. Thus, financial service providers have the fiduciary relationship with their clients to ensure no depreciation in deposit value or losses occur through bank staff negligence or excessive risk taking. They are likewise being entrusted with keeping depositors' and borrowers' accounts strictly confidential as financial information is costly.

These intermediaries are being delegated to assess information correctly and sufficiently to arrive at sound investment and loan decisions. In this case, after loan disbursement, depositors expect the financial intermediaries to act as their agents to monitor the loan accounts and the financial position of the borrowers

in order to ensure smooth loan repayments and interest. Therefore, financial intermediaries take the necessary action to execute their delegated monitoring function honestly, effectively, and efficiently to ensure that the shareholders' wealth is maximized. In view of this, savers may withdraw their savings to discipline the financial institution if they believe the interest is not being upheld by the financial institution or if they believe the activities of the financial institutions are not in their interest.

This theory is linked to the demand side of access to financial services because, based on the theory, individual savers see the financial intermediaries as an entity that they can delegate their responsibilities to. For example, they are savers; they have surplus funds to give as loans or investment funds from which they would earn interest income. However, they do not have the resources to perform these duties or function themselves; hence, they decide to delegate this function to the financial intermediaries. This is assumed to influence the savers demand for the saving and other products of the financial intermediaries. Consequently, this theory is linked to the demand dimension of access to financial services.

The rational choice theory is propounded by neo-classical economists. The theory, generally, starts with the consideration of the choice behaviour of the individual farmers making the decision. The proponents of the rational choice theory believe that the individual making the decision is a "representative" of a group in a financial market, such as farmers. The analysis of rational choice theory of demand for financial services generally involves a description of the following: (i) the desire for financial services (savings, credit, and money transfer services); (ii) nature and type of services provided by the financial institutions; (iii) the condition under which these services are provided. The individuals face the problem of choice among services provided by the intermediaries. The approach of the rational choice theory is based on the fundamental principle that the choices made by the individual are the best choice to help him/her to achieve their objectives in the light of all the uncontrollable factors. The utility function is used by the rational choice theory as a mathematical function that assigns a numerical value to each of the possible alternatives the individual making the decision faces. The demand for financial services is a function of the service characteristics, the attributes of the provider of the service, and the decision-making unit.

This theory has been heavily criticized on the basis that the assumptions made under the rational choice theory fail to take account of the fact that the success of the outcome of a decision is also influenced by the conditions that are not within the control of the individual making the decision. Despite this criticism, the theory has demonstrated a good basis in explaining how individual economic decisions are affected by their attributes. In this regard, this theory is important in explaining access to financial services as the attributes of the individual heavily influence both the demand and supply dimensions of access to financial services.

This has led to the development of the bounded rationality theory. The bounded rationality theory proposed that, although individuals are rational in making decisions, their rationality in any decision making is limited by the tractability of the issues they make decisions about. In addition, it is influenced by the time available to make the decision and the cognitive limitations of their state of mind. This means that their decision is influenced by the contingent claims associated with access to the services provided by financial intermediaries.

Financial intermediation or financial services provision involves contingent claims relating to future resources for which the claims are determined in the present. Alternatively, it involves the sale and purchase of contingent promises. The ability of financial service providers to monitor their clients' conduct and credit worthiness depend greatly on the extent of information available. Some information on clients is not made accessible to these financial institutions. Thus, clients have more information than the institutions. This uneven distribution of information, known as information asymmetry, arises out of the fear that promises may be broken. This has a negative effect on the credibility of the promises issued by the intermediaries within the financial market resulting in an incomplete market. Therefore, the neo-classical economic theory of a complete market, where market participants are rational with perfect information, is inconsistent and inadequate to explain the supply dimension of access to financial services (Coase, 1937).

New institutional economists modify and extend neo-classical theory; and this can be used to explain the supply dimension of access to financial services. New institutional economists retain the fundamental assumption of scarcity, and hence competition that underlies micro-economics and, consequently, the theoretic choice approach, and introduce the theory of information asymmetry and transaction cost. The information asymmetry theory postulates that there is imperfect information resulting in an information problem. The consequences of information problems within the financial market can be classified as either ex-ante or ex-post. The ex-ante problems associated with information within the financial market result in adverse selection and moral hazard, while information problems that relate to ex-post leads to assurance services or expensive compliance verifications.

Hoff and Stiglitz (1990) classify the consequences of an information problem within a financial market into three main issues: (i) determination of the extent of the default risk (screening problem); (ii) the cost involved in ensuring credit contracts are honoured (incentives problem); (iii) the cost involved in the monitoring of credit beneficiaries to ensure loan repayment (enforcement problem). Information theory argued that financial services provision is an attempt to overcome these costs, at least partially, through improved access to information. For example, Leland and Pyle (1977) viewed intermediaries within the financial market as a coalition that facilitates access to information through information sharing and minimized information asymmetries. Diamond and

Dybvig (1983) argued that entities that provide financial services are a coalition of individual depositors within the financial market, who provide insurance against idiosyncratic shocks, which affects their liquidity position adversely due to lack of access to information. Diamond (1984) demonstrates that economies of scale can be achieved by the financial intermediaries as they can share information faster (Leland & Pyle, 1977).

The transaction cost theory argues that financial intermediaries emerged to utilize economies of scale as well as transaction technology. The key element of transaction cost theory includes costs associated with gathering and processing information that is needed to reach a decision during the transaction process, successful contract negotiation, and policing and enforcement of contracts (Benston & Smith, 1976). Thus, financial institutions convert one financial claim into another, which is referred to as transforming an asset qualitatively. As such, the financial intermediaries offer liquidity and the opportunity of diversification to their customers. The ease or difficulty used in achieving these objectives is determined by the level and nature of the cost of the transaction. Transaction costs are derived from a combination of bounded rationality (which reflects both imperfect information and a limited capacity to analyse it) and opportunism, which Benston and Smith (1976) defined as "self-interest seeking with guile". This has been the key problem of informal financial intermediaries serving larger borrowers. As a result, government intervention was necessary to reduce transaction costs and information asymmetry. Consequently, after Ghana's declaration of independence, the Bank of Ghana created a Rural Banking department to advise on appropriate methods of increasing access to financial services by farmers. The recommendation from this Department has led to the establishment of a specialized bank of the Agricultural Credit and Cooperative Bank, now known as Agricultural Development Bank (ADB) to offer financial services to farmers (Addaeh, 1989).

Due to the asymmetry information and cost associated with the administration of credit to farmers, by the mid-1970s, it had become evident that the Agricultural Development Bank did not have the capacity to offer services to small-scale farmers. Over the period, institutional innovations within the financial market emerged to minimize transaction costs (North & Thomas, 1973; Demsetz, 1967). This resulted in the establishment of rural banks in Ghana, designed to provide services to farmers at a lower cost. However, these rural banks are similarly finding it difficult to provide optimal services to small-scale farmers.

In conclusion, a financial service provision by intermediaries that emerges as a result of market imperfection does not allow optimal trading between savers and investors directly with each other. The market imperfection that affects savers and investors is information asymmetries between net savers/investors and net borrowers. Thus, individuals rationally demand financial services in order to

delegate monitoring to financial service providers. Financial intermediaries specifically attempt to narrow the gap between savers, investors, and borrowers. This is because the financial intermediaries have a comparative advantage with respect to information relative to savers and investors. They screen loan applicants and monitor those that they lend money to on behalf of the depositors. They furthermore bridge the maturity mismatch between savers and borrowers/ investors and offer money transfer services to facilitate payment between economic parties. These functions are the justification for the commissions they charge to clients.

The sustainability of financial intermediaries, who provide appropriate services to farmers, particularly in a developing country, requires appropriate regulation from the government. Hence, the justification of the intervention in the financial market by many governments, via regulations and supervision of the financial intermediaries, ensures that these intermediaries take appropriate action to effectively perform their financial intermediation roles.

Conceptual Framework

There is a well-established literature on access to financial services (Stijin, 2005) that covers or explains the determinants of credit constraint (Chen & Chivakul, 2008; Awunyo-Vitor & Al-Hassan, 2014a), lenders' credit-rationing behaviour (Stiglitz & Weiss, 1981; Awunyo-Vitor et al., 2013), and the effect of credit on farmers' productivity (Boucher & Guirkinger, 2007; Simtowe et al., 2006; Awunyo-Vitor & Al-Hassan, 2014a). Availability of finance (either from savings or credit) and insurance provides greater incentive for farmers to venture into technologies that raise productivity and incomes (Ghosh et al., 1999). Access to financial services has an effect on technology choices with a subsequent influence on productivity.

The financial market has formal and informal segments. Informal intermediaries provide only credit facilities while formal ones provide savings, credit, and money transfer services. Within each of the markets, farmers need to make rational choices as to the amount of services they utilize. In the case of informal intermediaries that provide only credit facilities, farmers need to make a choice between using credit or not. Formal financial intermediaries provide savings, credit, and money transfer services; hence, the farmers have the option to make a choice between these services or a combination of them.

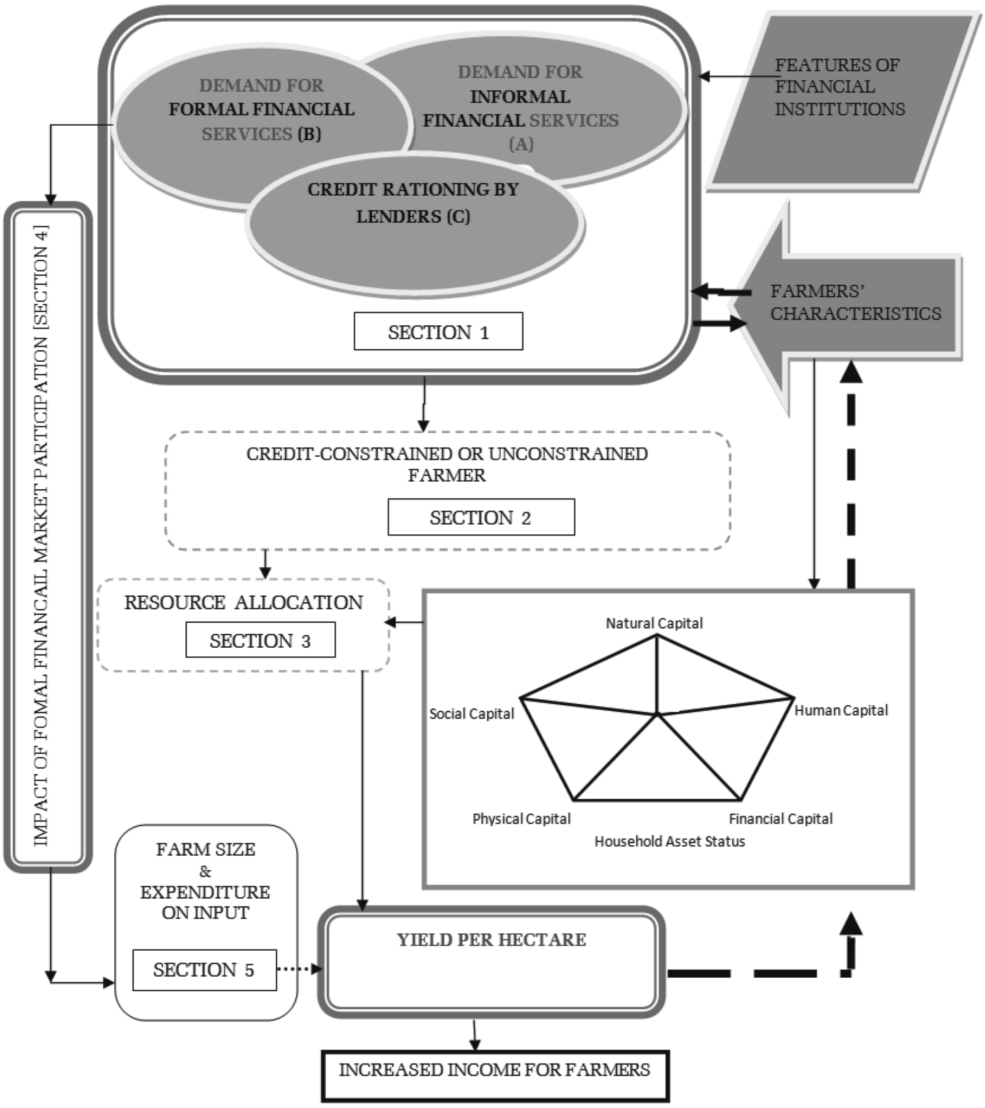
The financial market in an agrarian economy is characterized by a low level of savings, funds transfer facilities, and inadequate insurance (Bendiget al., 2009; Awunyo-Vitor & Al-Hassan, 2014b) coupled with limited coverage. Thus, farmers have to access credit to ease liquidity constraints for production and to smoothen

consumption. However, due to asymmetric information and adverse selection within the financial market, lenders tend to adopt rationing as the optimal behaviour in the credit market. This behaviour of lenders leaves some farmers credit constrained (Petrick, 2005), which has an adverse effect on resource use and productivity.

To conceptualize the factors that influence access to financial services by farmers and how these credit facilities influence their input usage and productivity, we draw on Beck and de la Torre (2006), Stijin (2005), Feder et al. (1990), Awunyo-Vitor and Al-Hassan (2014a), and Boucher and Guirkinger (2007). Beck and de la Torre (2006) argued that any investigation of access to financial services should examine both the supply and demand dimensions. According to Stijin (2005), the supply side of access to financial services relates to the availability of financial intermediaries providing services, the conditions under which these services are available, and rationing. The demand side, on the other hand, relates to factors influencing individual decisions to use financial services. Thus, for informal intermediaries, the demand side deals with the decision of the farmer to make use of a creditor or not, while in the case of a formal institution the demand side deals with a farmer's choice of services provided by the formal financial institutions.

This study examines both demand and supply dimensions of access to financial services (see *Figure 1*). Farmers are assumed to be rational; hence, if they are able to accumulate enough savings to support their production and consumption activities, they do not need to borrow, as credit is associated with cost, and so they are described as credit unconstrained. However, those who are unable to accumulate enough savings need to borrow to augment their equity resources to support their consumption and production activities. Yet, farmers who need credit may ration themselves out of the credit market due to risk and transaction costs, which might be unfavourable to them.

This group of farmers are risk-rationed and transaction-cost-rationed (Boucher & Guirkinger, 2007). Farmers who apply for credit and are either refused or offered an amount less than what they have applied for are classified as quantity-rationed in line with the theory of information asymmetry and transaction cost theory. Therefore, a farmer's decision to apply for financial services and subsequently rationing by the financial intermediary is assumed to be influenced by institutional attributes and the characteristics of the farmer. The activities within the financial market (Section 1, *Figure 2*) give rise to two distinct groups of farmers: farmers who are constrained in their access to credit and those farmers who are not constrained in their access to credit (Section 2, *Figure 2*).



Source: framed by the author

Figure 2. *Conceptual framework of access to financial services and its impact on farmers' income*

Resource allocation differs between the two groups of farmers. Petrick (2005) asserts that the credit constraint status of farmers may result in significant interaction between the production and consumption activities that influence the resource combination of the farmers (Section 3, *Figure 2*) and consequently productivity (Section 5, *Figure 2*).

It is conceptualized that farmers who use formal financial services are able to relieve liquidity constraints for the purchase of inputs and the cultivation of larger areas (Section 4, *Figure 2*). Therefore, formal financial market participation is conceptualized to have a positive effect on the amount of money the farmer spends on variable inputs, farm size, and, consequently, productivity. This is because farmers who use formal financial services would be able to relieve liquidity constraints for the purchase of inputs and the cultivation of larger areas. Farm productivity is expected to have a spin-off on farmers' access to financial services through asset endowments. Thus, factors influencing farmers' access to financial services and the effect of credit on productivity must be investigated empirically by examining:

– features of informal financial intermediaries and demand for services they offer,

– features of formal financial institutions and demand for their services,

– credit rationing,

– impact that the farmers' participation in the financial market has on expenditure, farm size, and input usage, and

– the effect of credit on farm productivity.

Concluding Remarks

The study aimed at presenting the theoretical underpinning of access to financial services and developing a conceptual framework for analysis. Based on the above theories, an analysis of access to financial services should be done by examining dimensions, that is, the supply-side and demand-side dimensions. This implies that the empirical analysis of access to financial services should be done with both qualitative and quantitative research methods with a multi-empirical analysis. The qualitative analysis should be used to examine the behaviour of both the supply and demand side while the quantitative approach should be used to examine the amount of supply and demand as well as factors that increase the demand and supply. Thus, a rigorous empirical analysis is required to identify factors influencing access to financial services and how access to these services influences farmers' productivity. This would support the development of an appropriate policy framework that would positively influence farmers' access to financial services and have a positive impact on farmers' productivity and ultimately national food security, poverty alleviation, and economic growth.

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Bank Capital, Operating Efficiency, and Corporate Performance in Nigeria

Abdulai Agbaje SALAMI[1]
Department of Accounting, Al-Hikmah University, Ilorin, Nigeria
e-mail: abdagbaje1@gmail.com

Ahmad Bukola UTHMAN
Department of Accounting, Al-Hikmah University, Ilorin, Nigeria
e-mail: ahmadbuthman@gmail.com

Abstract. This study examines the impact of bank capital and operating efficiency on the Nigerian deposit money bank financial performance with a view to resolving risk-based and non-risk-based capitals' dichotomy existing in the bank literature. Using bank-specific data obtained from the annual reports and accounts of 15 banks listed on the Nigerian Stock Exchange between 2012 and 2015, the panel data regression analyses revealed the superiority of standard capital ratio of equity-to-total-assets, a non-risk-based capital, over other measures. While all measures, both risk-based and non-risk-based capitals, showed significantly positive effects on bank performance as measured by return-on-asset, mixed results were obtained from other indicators: return-on-equity and net-interest-margin. Overall, only equity-to-total-assets influenced all adopted performance indicators positively. It was also found that operating efficiency measured by cost-to-income ratio had negative impact on bank performance, but on the average it appeared too high. Thus, incorporating the standard capital ratio of equity-to-total assets into regulatory regime by the banks' regulator is recommended to ensure its relevance is not overshadowed.

Keywords: risk-based capital, non-risk-based capital, cost-to-income ratio, deposit money banks, Nigeria
JEL Classifications: G21, G32, L25, M41

1. Introduction

Banking business is expected to be run in a way to guarantee a safer return on investment to both shareholders and depositors. The role that capital plays in this regard cannot be overemphasized. The general consensus that brought about the

1 Corresponding author.

Basel Accords – an exercise that has given birth to Basel I, II, and III – with a view to entrenching the financial system's soundness and ensuring sustainable growth and increased profitability remains a global phenomenon. The significance of adequate capitalization and efficient running in the determination of the operating performance of a bank has been stressed (Eldomiaty, Fikri, Mostafa & Amer, 2015; Mills & Schumann, 1985). Capitalization, which comes in the form of capital adequacy, has been an integral part of the instrument used by bank regulators worldwide to regulate banking activities (Hogan, 2015). Bank capital could be either risk-based or non-risk-based. Risk-based capital (RBC) conforms to the requirements of the Basel Accords, and it is aimed at identifying risk banks, but despite this noble objective agreement is yet to be reached on whether RBC ratio has any value-added benefit over standard capital ratio (Hogan, 2015). While the motive behind the regulation of bank capital adequacy – shielding them from unexpected collapse (Abdulkarim, Hassan, Hassan & Mohamad, 2013) – remains sacrosanct, the influence of its accounting measure – risk-based or non-risk-based – is ever controversial (Hogan, 2015).

Evidence from previous research shows that RBC has lately contributed significantly to the financial crisis (Alkadamani, 2015; Dowd, Hutchinson, Ashby, and Hinchliffe, 2011; Friedman, 2011). This has led to the call by experts for the revocation of regulatory RBC in the United States (Hogan, 2015). Further empirical evidence showed that 'non-performing assets coverage ratio' (NPACR) – a non-risk-based capital (NBC) adequacy measure – outperformed RBC ratio in the ability to detect problem banks and predict bank failure (Chernykh & Cole, 2015). Although both RBC and NBC ratios are strongly informative of the financial condition of a bank, RBC is seen as the most effective predictor of banks' financial condition over long-time horizons (Estrella, Park, and Peristiani, 2000). This might suggest that NBC ratio has a greater positive impact on the performance of banks since profitability is a short-term measure of performance. The foregoing empirical results are not in tandem with that of Mathuva (2009), who found that RBC has a significantly positive impact on profitability measures.

Operating efficiency appears to be a reliable driving force of the banks' corporate performance (Eldomiaty et al., 2015). An organization believed to be efficient has the capacity to deliver products and services without sacrificing quality (Allen & Rai, 1996). That is why an efficient banking sector has the wherewithal to absorb unfavourable shocks and improve financial system stability (Odunga, 2016). Broadly, efficiency is an agent that ensures the inevitability of economic changes (Mat-Nor, Mohd Said, and Hisham, 2006), and banks as agents of economic growth (Ongore & Kusa, 2013) are required to be run in a manner to have a positive impact on the nation's overall economic growth (Rozzani & AbdulRahman, 2013). From a regulatory perspective, an insight into operating efficiency and the on-going measurement of banks' overall performance ensure better resource allocation, the

realization of audit objectives, and an understanding of banking operations (Barr, Seiford, and Siems, 1994).

Apart from the fact that studies providing a linkage of bank-operating efficiency and capital adequacy with their profitability failed to have a consensus view (Almazari, 2013; Mathuva, 2009), previous studies, most especially in Nigerian context, have ignored the dichotomy of the impact of RBC and NBC ratios on bank performance (see: Ejoh & Iwara, 2013; Ezike & Oke, 2013; Olanrewaju, 2016). The introduction of leverage ratio as a measure of capital adequacy by Basel III, which is non-risk-based and designed to act as a credible supplementary measure to RBC requirements (Bank for International Settlements–BIS, 2010), appears as a threat to the RBC regime. Based on prior rationale, this study examined the RBC–NBC dichotomy, incorporating measures of operating efficiency, and, indeed, contributed to the capital adequacy and bank performance literature.

The remaining part of this study is structured as follows. Section 2 focuses on the review of related literature, done both conceptually and empirically, as well as on the development of the hypotheses. Section 3 spells out the procedures adopted for data collection and analysis. Section 4 presents and discusses the results of data analysis, while the last section (Section 5) summarizes and concludes the study.

2. Literature Review and Hypothesis Development

This section reviews past studies in capital adequacy and bank performance literature. It navigates from conceptual issues to the empirical reviews and culminates in the hypothesis development.

2.1. Nigerian Banking Sector in Perspective

Although Nigeria is a developing economy, the modern banking system has spanned over a century in her financial system having been in existence more than sixty years before her independence (Oluduro, 2015). Specifically, the present system of banking was launched in Nigeria in the year 1892 when the African Banking Corporation, a South Africa-based bank, opened a branch in Lagos (Igweike, 2005; Oluduro, 2015; Uche, 1997). The era of banking in Nigeria between 1892 and 1951 could be described as the period of free banking (Ikpefan, 2012a; Oluduro, 2015) because the banking activities then were subject to no regulation (Oluduro, 2015). The year 1952 heralded banking regulation with an enactment of a banking ordinance that provided for a system of licensing, minimum capital base, liquidity ratio, maintenance of reserve, and bank supervision and regulation (Ikpefan, 2012a; Igweike, 2005; Obademi & Elumaro,

2014). This was subsequently followed by the enactment of the Central Bank of Nigeria (CBN) Act of 1958 and Banking Act of 1969 (Igweike, 2005). Indeed, the banking era between 1959 and 1969 marked the establishment of the formal money market, capital market, and portfolio management in Nigeria, including the enactment of Company Act in 1968 (Somoye, 2008).

The banking activities in Nigeria are governed by both statutory and regulatory frameworks. Notable among these legal frameworks are: Companies and Allied Matters Act (CAMA) Cap C20 and Banks and Other Financial Institutions Act (BOFIA) Cap B3 – both of Law of Federation of Nigeria (LFN) 2004. The BOFIA spells out the provisions guiding a banking business from establishment to winding-up. The regulators include CBN, Nigeria Deposit Insurance Corporation (NDIC), Securities and Exchange Commission, and Financial Reporting Council of Nigeria. Also guiding the activities of banks in Nigeria are monetary policy circular and prudential guidelines issued from time to time by the CBN.

The journey of the Nigerian banking system from the 1951 banking ordinance to the recapitalization and consolidation regimes between 2004 and 2011 was shaped by a number of significant events (Clementina & Isu, 2013). These events include: Indigenization Policy, Structural Adjustment Programme, universal banking (UB) model, global financial crisis, recapitalization and consolidation reforms, corporate governance reforms, and the adoption of International Financial Reporting Standards – IFRS (Clementina & Isu, 2013; Sanusi, 2012; Somoye, 2008; Yakubu, 2015). Based on the purpose of this study, events concerning capitalization and its attendant influence on the operation of Nigerian banks are cardinal points of focus.

In order to achieve the CBN bank's reform blueprint built around four basic pillars, that is, "enhancing the quality of banks, establishing financial stability, enabling healthy financial sector evolution and ensuring that financial sector contributes to the real economy" (Sanusi, 2010: 3), the bank capital adequacy is never taken with levity (Ikpefan, 2012b). The minimum capital base of Nigerian banks, most especially of the commercial and merchant banks, has been on the increase from the meagre amount in 1958 to a modest value of 10 million naira in 1988, 20 million naira in 1990, 50 million naira in 1996, a huge sum of 1 billion and 2 billion naira at the beginning of the era of the UB model in 2001 and 2002 respectively, and a whopping 25 billion naira in 2005 (Onaolapo, 2008; Somoye, 2008).

The periodic increase in the minimum capital base is not unconnected with the instability in the general price level represented by the consumer price index (CPI) otherwise known as inflation. The increase in capital base to 10 million and 6 million naira for commercial and merchant banks, respectively, in 1988 (Somoye, 2008) could be attributed to the inflation rate which stood at 61.2% in the same year compared to 1% and 9.7% in 1985 and 1987 respectively (CBN, 2014). The rationale for the increase in the minimum capital requirement to 50

million naira in 1996 (Somoye, 2008) cannot be separated from the higher inflation rate which ranged from 23% to 76.8% between 1991 and 1995 from a moderate rate of 3.6% in 1990 (CBN, 2014). Despite that the inflation rate plummeted to an all-time low of 0.2% in 1990, the increase in capital base to an all-time high of 25 billion naira in 2005 is evident from the CPI's skyrocketing increase to 23.8% in 2003. As provided by CBN (2017a), Nigeria was unable to sustain the single-digit CPI maintained between 2013 and 2015, when it rose to an average of 18.55% in 2016. This shows that the upsurge in the minimum capital requirement is to some extent associated with the increase in the inflation rate.

In order to attend to the problems associated with the UB model, where banks concentrate on non-bank financial businesses to the detriment of core banking activities (Sanusi, 2012), the model was reviewed to ensure that attention is shifted to core banking businesses, including commercial and merchant banking. This necessitated a review of minimum capital base because deposit money banks (DMBs) are now allowed to operate commercial banking on a regional, national, or international basis. Thus, with a minimum paid-up capital of 10 billion, 25 billion, or 50 billion naira, commercial banks can be operated with regional, national, or international licensing respectively. These periodic banking reforms, including the recapitalization exercise, have led to the rise and fall in the number of DMBs (Obademi & Elumaro, 2014) from 45 in 1978 to all-time high 112 in 1996 and later to 25 in the year 2005 (Somoye, 2008). As at May 25, 2016, DMBs with commercial banking licence are 21 in number, excluding the merchant and non-interest banks, which are 4 and 1 respectively (CBN, 2016).

To ensure that Nigerian DMBs are safe and sound, the Asset Management Corporation of Nigeria (AMCON) was established in the year 2010 (Sanusi, 2012). This singular effort reduced the banking industry ratio of non-performing loans to gross loans from 34.4% in November 2010 to 4.95% in December 2011 (Sanusi, 2012) because of its acquisition of the industry's toxic assets. All these periodic recapitalization exercises and other reforms have put some of the DMBs on a sound footing with dominance in the West African sub-region.

The banks under the supervision of CBN are not restricted to DMBs; there are other banks categorized as "other financial institutions and specialised banks" (BOFIA 2004, s. 31/2). The DMBs comprise commercial and merchant banks considered as those with core banking activities. The commercial banks consist of banks with conventional commercial and non-interest banking licences (CBN, 2017b). The banking businesses recognized as "other financial institutions and specialised banks include: development financial institutions (DFIs), primary mortgage banks, bureau-de-change, community banks, and discount houses (BOFIA 2004, s. 34/1). Other Financial Institutions which stood at 4,409 out of 4,435 as at the end of the first half of 2017 account for not less than 99% of the Nigerian banking structure (CBN, 2017b), while the remaining proportion

accounts for commercial and merchant banks. Among these banks, only the majority of DMBs have their financial information in the public domain with more than 60% being listed on the Nigerian Stock Exchange (NSE). The number of each type of bank under the supervision of CBN as at the end of June 2017 is presented in *Table 1*. Based on the information depicted in *Table 1*, there are 4,436 players, including CBN, in the Nigerian banking system. It is also evident that that bureau-de-change has the highest number of players – 3,292 (74.23%) – followed by microfinance banks (22.53%) and finance companies (1.74%), while mortgage refinancing companies are the smallest in number, but the Nigerian banking system is dominated by DMBs.

Table 1. *Banks and Other Financial Institutions under the supervision of CBN*

S/N	Bank Type	Number as at 30/06/2017	Percentage
1	Commercial Banks	22	0.50%
2	Merchant Banks	4	0.09%
3	Bureaux-de-change	3,292	74.23%
4	Finance Companies	77	1.74%
5	Microfinance Banks	999	22.53%
6	Development Financial Institutions	6	0.14%
7	Primary Mortgage Banks	34	0.77%
8	Mortgage Refinancing Company	1	0.02%
	TOTAL	**4,435**	**100%**

Source: adapted from CBN Financial Stability Report, June 2017. Items 1 and 2 stand for deposit money banks (DMBs), while items 3–8 belong to Other Financial Institutions and Specialized Banks.

2.2. Capital Adequacy and Bank Performance

In the regulation of banks, an all-encompassing importance is attached to the banks' capital. The strategic importance of capital in bank management cannot be overemphasized (Scannella, 2012). There is evidence in the literature that capital generally accounts for a small percentage of the financial resources of banking institutions, but it plays a crucial role in their long-term financing and solvency position and therefore in public credibility (Barrios & Blanco, 2000). The golden value assigned to banks' capital makes its regulation have an international touch (Scannella, 2012), although compliance is monitored and ensured by central banks of various jurisdictions. Capital plays a dual role of investment function and insurance function in the banking sector, meaning that their long-term investment is covered and stabilizing their economic and financial results becomes easier (Scannella, 2012). It is a known fact that no bank would like to appear undercapitalized because

doing so may amount to risking shareholders' reluctance to contribute to new capital (Rime, 2001). Capital is not only the first but also a very important component of the CAMEL model of banks supervision and regulation. CAMEL is an acronym for five components of bank safety and soundness: capital adequacy, asset quality, management quality, earning ability, and liquidity (Kumar & Sayani, 2015: 2).

Berger, Herring, and Szegö (1995) demonstrated that a decline in the capital ratios of a bank leads to an increase in the expected costs of financial distress, which eventually causes a rise in the probability of insolvency. This might be responsible for the idea of minimum capital requirement. Capital, whether economic, funding, regulatory, or risk (Frost, 2004), is expected to be kept at a level at which absorbing shocks will not be difficult. While regulatory or risk capital is a product of the Basel Accords, which forms the fulcrum of banking regulation worldwide, economic or funding capital is well-known and remains the source of standard capital ratio of shareholders' fund over assets. The RBC ratio is computed as the ratio of total RBC to total risk-weighted assets (RWA) (see: Białas & Solek, 2010; Hogan, 2015; Mayes & Stremmel, 2014). RBC incorporates Tier 1 (basic funds) and Tier 2 (complementary funds) capital – as defined by the Basel Accords – adjusted for items including intangible assets and unrealized gains or losses (Białas & Solek, 2010; BIS, 2010; Hogan, 2015). Tier 1 and Tier 2 capital are jointly referred to as going-concern capital in the Basel Accords standards (BIS, 2010). RWA is the addition of all bank asset categories multiplied by their designated risk weightings (Hogan, 2015) or an aggregate of credit RWA, market RWA, and operational RWA (CBN, 2015). Apart from the ratio of total RBC to total RWA (TRWA), Basel capital standards also require a capital adequacy ratio (CAR) of Tier 1 capital–core capital to total RWA–TWA (BIS, 2010).

Aside from a standard capital ratio of equity over total assets (ETA), other NBC ratios considered relevant in the determination of banks' financial condition include gross revenue ratio (GRR), leverage ratio (LVR), and non-performing assets coverage ratio (NPACR) (see: Chernykh & Cole, 2015; Estrella et al., 2000; Mayes & Stremmel, 2014). GRR is described as the ratio of Tier 1 capital to total interest and non-interest income (Mayes & Stremmel, 2014); it is comparable to TWA except that its denominator is a bank's gross revenue. There is a tendency that gross revenue reflects the riskiness of bank assets better than traditional total assets but not as well as regulatory RWA (Estrella et al., 2000). Although the use of LVR as a measure of bank capital adequacy is not novel as it has been in use in the United States of America (see: Baral, 2005; Estrella et al., 2000); its incorporation into bank capital regulation regime by the Basel Committee on Banking Supervision (BCBS) accentuates its importance (BIS, 2010) in the determination of banks' corporate performance.

The need to constrain the build-up of excessive leverage in the banking sector and reinforce risk-based requirements with a simple, non-risk-based backstop

measure is paramount, most especially during the banking crisis (BIS, 2010). "Leverage allows a financial institution to increase potential gains or losses on a position or investment beyond what would be possible through a direct investment of its own funds" (D'Hulster, 2009: 1). Although leverage is of three types – balance sheet, economic, and embedded (D'Hulster, 2009) –, balance sheet leverage appears most visible and widely adopted (D'Hulster, 2009). LVR is usually measured as the ratio of Tier 1 capital to total adjusted assets (TAA), where TAA is total assets less intangible assets, which include goodwill, software expenses, and deferred tax assets (D'Hulster, 2009). NPACR, proposed by Chernykh and Cole (2015), is also a non-risk-based measure of capital adequacy and has been found to be a good predictor of bank failure. NPACR is defined as the "total equity capital plus loan-loss reserves less non-performing assets, all divided by total assets" (Chernykh & Cole, 2015: 132).

A number of indicators are used to measure bank profitability, but the most prominent of them are return on assets (ROA), return on equity (ROE) (Olson & Zoubi, 2011), and net interest margin (NIM) (see: Alper & Anbar, 2011; Aymen, 2013; Ejoh & Iwara, 2014; Eldomiaty et al., 2015; Odunga, 2016; Tan, 2016). ROA is obtained by dividing Net income by total assets, while ROE is generated from the results of the ratio of Net income to shareholders' fund. NIM is the net interest income, that is, interest received minus interest paid, expressed as a percentage of earning assets, that is, loans plus other earning assets, excluding fixed assets (Eldomiaty et al., 2015). It is a reflection of how successful a bank's investment decisions are relative to its interest expenses and is distinguished from ROA because it focuses on profit earned on interest-generating activities against ROA's focus on profit earned per unit of total assets (Tan, 2016). These three variables have been individually or collectively used in the literature in related studies as dependent variables (see: Almazari, 2013; Mathuva, 2009; Ozili, 2015; Tan, 2016). Thus, they are adopted for this study as measures of bank performance.

Past research findings on the impact of bank capital on bank performance are diverse. While some studies found a positive impact, others reported negative effects. It is also important to state that only a few studies have examined the RBC–NBC dichotomy, and in Nigeria this area is yet to be explored. For Mathuva (2009), who conducted his study for the Kenyan banking environment and examined the RBC–NBC dichotomy, RBC ratio has a significantly positive impact on bank performance. He specifically found significant positive relationship between regulated and risk-based capital adequacy measures of the leverage ratio (LVR) and the ratio of Tier 1 capital to total RWA (TWA) as well as profitability measures of ROA and ROE. He also found standard capital ratio of shareholders' equity to total assets (ETA) to have a significantly negative impact on both measures of profitability. Although Mathuva (2009) found mixed results of the impact of the ratio of total RBC to total RWA (TRWA) with positive and negative impact on ROA and ROE respectively, the study

showcased the relevance of Basel capital standards with LVR and TWA. In a Saudi context, Almazari (2013) could not establish empirically that any of the capital adequacy measures – both RBC and NBC ratios – have a positive relationship with bank profitability as well; capitalized banks were found to have negative returns.

In a study examining the effectiveness of various measures of capital adequacy in predicting bank distress, Mayes and Stremmel (2014) concluded that an NBC and regulatory capital measure of leverage ratio (LVR) explains best a bank's financial condition, with considerable accuracy against another NBC ratio – GRR – and an RBC ratio of TRWA. An earlier study – Estrella et al. (2000) – conducted in the same banking environment with Mayes and Stremmel (2014), that is, in the United States of America, had confirmed the superiority of both GRR and LVR in the same capacity, most especially over short-term horizons as against the TRWA that works more efficiently over long-term horizons. While comparing LVR and GRR, Estrella et al.'s (2000) further evidence specifically revealed that GRR seems to have a higher significance. Hogan (2015) examined the predictive abilities of RBC and NBC ratios of the bank risk using standard deviation of stock returns and Z-score indicator of bank insolvency. He found that both ratios are good predictors of banks' stock returns volatility and z-score, but in comparison ETA is statistically significantly better than TRWA in the prediction of bank stock returns volatility and insolvency, most especially during financial crisis. Using univariate logistic regression, Chernykh and Cole (2015) empirically found his proposed capital adequacy measure (NPACR) to be statistically superior to regulatory capital ratios: TWA, TRWA, and LVR, as well as ETA in triggering prompt corrective actions and predicting bank financial condition. For Azar, Bolbol, and Mouradian (2016), a Lebanese study which used bank-level data between 2003 and 2014, capital adequacy ratio (CAR) measured by TRWA has a significantly positive relationship with bank profitability represented by return on average total assets. Ramlan and Adnan (2016), a Malaysian study, tested only the impact of ETA on ROA and ROE and found a negative impact of ETA on both measures of performance for both Islamic and conventional banks. Ramlan and Adnan's (2016) findings are at variance with the findings of a recent Bangladesh study of Siddiqua et al. (2017), which empirically established a positive relationship between an NBC ratio of ETA and profitability measures of ROA and ROE.

Okafor, Ikechukwu, and Adebimpe (2010), who measured capital adequacy with natural logarithm of shareholders' fund (NBC measure), found with a bank-level data of twenty banks in Nigeria between 2000 and 2003 that bank earnings, as measured by profit after tax (PAT), are driven by capital adequacy and liquidity but with a clause that the effect is more pronounced for weak banks than strong banks. Ejoh and Iwara (2014) tested only the impact of the NBC ratio of ETA among other variables, using the Engle–Granger two-step procedure in co-integration, and found a positive relationship with ROA for Nigerian DMBs

with bank-level data of 1981–2011. As for the Nigerian banking world using bank-level data of systematically important banks (SIBs) between 2006 and 2013, Ozili's (2015) empirical conclusion was that the RBC ratio has a significantly positive impact on bank profitability as measured by ROA and NIM, but the Basel capital regime – a binary variable – provides no significant impact on Nigerian DMBs' corporate performance.

Evidence from the foregoing empirical findings reviewed shows that there are mixed conclusions of the effect of capital adequacy measures on bank performance. Based on this and the fact that capital is an important ingredient in the world of bank regulation, it is hypothesized that:

Hypothesis I

Capital adequacy has a significantly positive impact on Nigerian DMBs' corporate performance.

It is evident that there are different measures of capital adequacy, including NBC, RBC, and regulatory capital ratios, and that each has its place in the literature. Using the foreknowledge of different measures of capital adequacy in the bank, the first hypothesis is divided into the following:

H_{1a}: Ratio of total RBC to total RWA (TRWA) has a significantly positive impact on the Nigerian DMBs' corporate performance.

H_{1b}: Tier 1 capital – core capital – to total RWA (TWA) has a significantly positive impact on the Nigerian DMBs' corporate performance.

H_{1c}: Standard capital ratio of shareholders' fund to total assets (ETA) has a significantly positive impact on the Nigerian DMBs' corporate performance.

H_{1d}: Gross revenue ratio (GRR) has a significantly positive impact on the Nigerian DMBs' corporate performance.

H_{1e}: Leverage ratio (LVR) has a significantly positive impact on the Nigerian DMBs' corporate performance.

2.3. Banks' Operating Efficiency and Corporate Performance

The central factor which prioritizes the need for banks to operate efficiently is to avert failure (Barr et al., 1994). A bank's efficient operation is noticeable in its ability to compete favourably in the market and survive in the long run against all odds (Mat-Nor et al., 2006; Rozzani & Abdul Rahman, 2013). A bank or any other business is said to be efficient if it utilizes the technical facilities and input factors in the optimal way, uses the resources in the best possible way, and produces at an optimal scale (Coelli, Rao, O'Donnell, and Battese, 2005). Efficiency could be measured with a number of indicators, including asset utilization ratio (AU) and cost-to-income ratio (CIR), but the discussion about the productivity and efficiency

in banks is often based on CIR (Burger & Moormann, 2008). CIR symbolizes a relationship between the expenses and operating income of a bank or a measure of cost of running a bank as a percentage of income generated before provisions (Burger & Moormann, 2008; Eldomiaty et al., 2015). The general rule is that a high CIR is synonymous to low productivity and efficiency (Burger & Moormann, 2008), indicating that a decrease in efficiency ratio is a positive sign, while an increase is undesirable (Odunga, 2016). An insight into the past works in this regard appears to be in compliance with the CIR-Profitability golden rule. The findings of a number of previous studies are that CIR has a negative impact on or is negatively related to bank corporate performance (see: Almazari, 2013; Mathuva, 2009; Ozili, 2015; Siddiqua et al., 2017). Based on this, it is hypothesized that:

Hypothesis II

Cost-to-income ratio (CIR) has a significantly negative impact on Nigerian DMBs' corporate performance.

2.4. Other Relevant Variables

There are a number of other relevant variables which have bearing on bank performance. These variables, as obtained from previous studies, include: asset growth (AGR), ratio of assets to liabilities (RAL), debt–equity ratio (DER), and bank size measured by natural logarithm of total assets–LgTA (see: Christian, Moffitt, and Suberly, 2008; Ghosh, Narain, and Sahoo, 2003; Mathuva, 2009; Olson & Zoubi, 2011; Tan, 2016). Others include risk as measured by ratio of risk-weighted assets to total assets (RATA) (Van Roy, 2008), deposit specialization ratio (DPLB) defined as ratio of total deposit to total liabilities (Olson & Zoubi, 2011), and diversification measured by ratio of non-interest income to gross revenue (NIGR) (Tan, 2016). It is also considered appropriate to examine the impact of deposit growth (DGR), bank status (BST), and listing status (LST) on bank corporate performance. Asset growth (AGR) is defined as the difference between current year total assets and previous year total assets scaled by previous year total assets. Like AGR, deposit growth (DGR) is computed as the difference between current year and previous year total deposit scaled by previous year total deposit. Bank status (BST) emphasizes whether a DMB is classified as a systematically important bank (SIB) or not. "1" is assigned if a DMB is classified as SIB; it is otherwise "0". Listing status (LST) is also accorded the same treatment as BST. A DMB listed in other jurisdiction besides Nigeria is assigned "1", otherwise "0". All these variables, labelled "control variables", are adopted for this study. It is expected that AGR, LgTA, DGR, and BST have a positive impact, while DER has a negative impact on bank corporate performance. There is no prior expectation for other control variables.

3. Methodology

Having realized the need to resolve RBC–NBC controversy, this paper examined the impact of a number of measures of capital adequacy and efficiency ratio on Nigerian DMBs' corporate performance. In an attempt to do this, banks' profitability measure is modelled as a function of capital adequacy ratios (CARs) and a number of control variables on the one hand and then as a function of CIR and other control variables on the other hand. This is presented below:

Bank corporate performance (BCF) = f (CARs and other variables),

Bank corporate performance (BCF) = f (CIR and other variables).

BCF is the dependent variable and has three proxies – ROA, ROE, and NIM – as adopted for the study. CAR, as an independent variable, is measured by five indicators: TRWA, TWA, ETA, GRR, and LVR, while CIR, an indicator of efficiency, is another independent variable. Based on the purpose of this study, a multiple regression analysis is considered appropriate in determining the effect of CARs and CIR on bank profitability. It is recognized that all measures of bank performance have the same purpose, while all capital adequacy indicators are close substitutes; therefore, for each model, each of the dependent variables is applied to each of the independent variables alongside all the control variables at a point in time. This translates into six models for each of the dependent variables. Thus, the relevant equations for this study are:

For models using ROA as dependent variable:

$$(1)\quad ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

$$(2)\quad ROA_{it} = \alpha + \beta_1 CIR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

For models using ROE as dependent variable:

$$(3)\quad ROE_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

$$(4)\quad ROE_{it} = \alpha + \beta_1 CIR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

For models using NIM as dependent variable:

$$(5)\quad NIM_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

$$(6)\quad NIM_{it} = \alpha + \beta_1 CIR_{it} + \beta_2 AGR_{it} + \beta_3 RAT_{it} + \beta_4 DER_{it} + \beta_5 LgTA_{it} + \beta_6 RATA_{it} + \beta_7 DGR_{it} + \beta_8 DPLB_{it} + \beta_9 NIGR_{it} + \beta_{10} BST_{it} + \beta_{11} LST_{it} + \in_{it}$$

In the equation with CAR as explanatory variable, CAR represents TRWA, TWA, ETA, GRR, and LVR, each being incorporated at a point in time. Thus, five separate models are derived altogether.

'i' stands for bank 1–15, while 't' represents years 2012–2015.

A description of all the study's variables is presented in *Table 2*.

Data were extracted from annual reports and accounts of Nigerian DMBs between 2012 and 2015. These annual reports were downloaded from the websites of the individual DMBs and the repository of NSE. The period was chosen because it marked the era of regulatory changes in the financial reporting system, most especially the adoption of International Financial Reporting Standards (IFRSs) by Nigerian DMBs. Although there are 26 DMBs licensed to operate in Nigeria, only 15 of them have their financial information in public domain in the sample period. By this, 60 firm-year observations were expected, but, due to missing annual reports of a number of banks, the analysis was carried out with an unbalanced panel data of 57 firm-year observations.

The panel data regression analysis requires a choice between fixed-effects model and random-effects model based on the result of the Hausman test (Gujarati & Porter, 2009). For this study, random-effects model was adopted for all models with ROA and ROE, while a mix of the two approaches was adopted for models with NIM based on the results of Hausman tests. To control for the presence of heteroscedasticity and autocorrelation, cluster robust was added to any model with significant results of both tests. The results of Hausman tests and tests of autocorrelation are included in the results of regression estimates presented in tables 5, 6, and 7.

Table 2. *Description of all variables of the study*

S/N	Variable	Variable Name	Measurement
1	**ROA**	Return on Asset	Net income scaled by total assets
2	**ROE**	Return on Equity	Ratio of Net income to shareholders' fund
3	**NIM**	Net Interest Margin	The net interest income, expressed as a percentage of earning assets
4	**TRWA**	Total risk-based capital ratio	Sum of Tier 1 and Tier 2 capitals scaled by risk-weighted assets
5	**TWA**	Core capital ratio	Tier 1 capital scaled by risk-weighted assets
6	**ETA**	Traditional capital ratio	Ratio of equity over total assets
7	**GRR**	Gross revenue ratio	The ratio of Tier 1 capital to total interest and non-interest income
8	**LVR**	Leverage ratio	The ratio of Tier 1 capital to total adjusted assets

S/N	Variable	Variable Name	Measurement
9	**CIR**	Cost-to-Income ratio	Ratio of operating expenses to operating income
10	**AGR**	Asset Growth	Difference between current year total assets and previous year total assets scaled by previous year total assets
11	**RAT**	Asset-Liability Ratio	Ratio of total assets to total liabilities
12	**DER**	Debt-Equity Ratio	Total debts scaled by Shareholders' funds
13	**LgTA**	Size	Natural Logarithm of Total Assets
14	**RATA**	Risk	Ratio of risk-weighted assets to total assets
15	**DGR**	Deposit Growth	Difference between current year and previous year total deposit scaled by previous year total deposit.
16	**DPLB**	Deposit specialization ratio	Ratio of total deposit to total liabilities
17	**NIGR**	Diversification	Ratio of non-interest income to gross revenue
18	**BST**	Bank Status	"1" is assigned if a DMB is classified as Systematically Important Bank (SIB), otherwise "0"
19	**LST**	Listing Status	DMB listed in other clime besides Nigeria is assigned "1", otherwise "0"

Source: authors' compilation (2017). Items 4–8 represent different measures of Capital Adequacy Ratio (CAR) adopted for the study.

4. Results and Discussion

This section presents the results of descriptive statistics, correlation analysis, and regression analysis. Descriptive statistics provides majorly the mean, standard deviation, and minimum and maximum values of all variables of the study. The correlation matrix is set to determine the extent of multicollinearity among explanatory variables, while regression depicts the impact of each of the explanatory variables on DMBs' performance in Nigeria.

4.1. Descriptive Statistics

Basically, it is observable from *Table 3* that Nigerian DMBs have a positive profitability between the sample periods with an average profit of 1.6% and 4.1% for ROA and ROE, but negative minimum values of -5.6% and -394% should be a source of concern. From a capital adequacy angle, Nigerian DMBs appear to meet the CARs requirements with mean values of 16.8% and 14.3% for TRWA

and TWA respectively. Although CARs (RBC) are as high as 30.5% and 30.3% respectively, the negative minimum value of 21.46% is also a serious regulatory matter. Among all the CARs, it is only ETA that does not have a negative minimum value though is close to zero, that is, 0.5%. Although CIR is as low as 39.8%, a maximum value of 284% is not tenable for a profit-oriented sector like banking. An average CIR of 78% is said to be too high compared to the average CIR in Egypt, a number of Middle East nations, and China with CIR below 50% (Bratton & Garrido, 2016). Deposit specialization ratio (DPLB) and diversification (NIGR) are as high as 81.6% and 24.2%. Regression results will reveal whether this influences positively the performance of Nigerian DMBs within the sample periods. Other summary statistics are as presented in *Table 3*.

Table 3. *Descriptive statistics of all variables in the study*

Variables	Observation	Mean	Std. Dev.	Min.	Max.
ROA	57	0.016	0.016	-0.056	0.053
ROE	57	0.041	0.555	-3.94	0.296
NIM	57	0.058	0.017	0.03	0.115
TRWA	57	0.168	0.094	-0.2146	0.305
TWA	57	0.143	0.09	-0.2146	0.303
ETA	57	0.137	0.039	0.005	0.23
GRR	57	0.777	0.464	-0.74	1.56
LVR	57	0.092	0.061	-0.144	0.18
CIR	57	0.78	0.33	0.398	2.84
AGR	57	0.148	0.143	-0.11	0.6
RAL	57	1.44	1.507	1	11.14
DER	57	9.85	24.52	3.33	191.2
LgTA	57	20.91	0.666	19.32	22.05
RATA	57	0.633	0.111	0.32	0.84
DGR	57	0.124	0.139	-0.17	0.56
DPLB	57	0.816	0.072	0.65	0.95
NIGR	57	0.242	0.065	0.15	0.44
BST	57	0.386	0.491	0	1
LST	57	0.316	0.469	0	1

Source: authors' computation (2017) based on Stata version 14 outputs

4.2. Correlation Matrix

An inference from correlation matrix as depicted in *Table 4* is that there is a high correlation among the independent variables, most especially the CARs. This is suggestive of multicollinearity, but having considered CARs as close substitutes and deciding not to use them concurrently in a model have adequately taken care

of it. Thus, multicollinearity is no more an issue. Another deduction is that high correlation among CARs is indicative of their similar explanatory potentials. This shows that similar explanatory effects on bank performance of TRWA and TWA, GRR and TRWA, GRR and TWA, LVR and TRWA, LVR and TWA, and LVR and GRR are imminent.

Table 4. *Correlation matrix among explanatory variables*

	TRWA	TWA	ETA	GRR	LVR	CIR	AGR	RAL	DER	LGTA	RATA	DGR	DPLB	NIGR	BST	LST
TRWA	1.000															
TWA	0.946	1.000														
ETA	0.348	0.364	1.000													
GRR	0.864	0.931	0.335	1.000												
LVR	0.901	0.959	0.367	0.968	1.000											
CIR	-0.60	-0.62	-0.41	-0.64	-0.69	1.000										
AGR	0.190	0.201	-0.17	0.193	0.182	-0.17	1.000									
RAL	0.055	0.061	0.003	0.109	0.069	-0.04	0.077	1.000								
DER	-0.50	-0.48	-0.53	-0.46	-0.44	0.303	-0.02	-0.04	1.000							
LGTA	0.484	0.543	0.258	0.699	0.618	-0.50	-0.05	0.094	-0.34	1.000						
RATA	-0.11	-0.03	0.016	0.227	0.197	-0.07	-0.03	0.027	-0.10	0.409	1.000					
DGR	0.214	0.232	-0.19	0.147	0.141	-0.06	0.809	0.106	0.061	-0.10	-0.25	1.000				
DPLB	0.223	0.240	-0.21	0.328	0.255	-0.10	0.266	0.122	-0.16	0.340	0.149	0.221	1.000			
NIGR	0.224	0.197	0.108	0.144	0.217	-0.27	0.099	0.137	-0.14	0.094	0.045	0.132	-0.08	1.000		
BST	0.108	0.156	-0.03	0.331	0.246	-0.28	-0.17	0.092	-0.11	0.678	0.361	-0.21	0.258	0.003	1.000	
LST	0.185	0.260	0.099	0.421	0.357	-0.31	0.215	-0.12	-0.10	0.460	0.423	0.154	0.203	0.043	0.547	1.000

Source: authors' computation (2017) based on Stata version 14 outputs

4.3. Regression Results

The results of panel data regression models are presented in tables 5, 6, and 7 based on the dependent variables (one for each) adopted for the study. Regression results with ROA as dependent variable, as contained in *Table 5*, show that all proxies of CARs have significant positive impact on Nigerian DMBs' performance as measured by return on assets. This means that the higher the bank's capital ratio, the higher its profitability when it is measured by ROA, regardless of the measures of CAR (NBC or RBC). While TRWA, TWA, and LVR are significant at 1%, ETA and GRR are significant at 10% and 5% respectively. Most of the control variables do not exhibit any significant effect except for LgTA, DER, NIGR, and BST. LgTA is positively significant at 1%, 5%, and 1% when TRWA, TWA, and ETA, respectively, are independent variables. This shows that the higher the total assets, the higher the bank profitability as measured by ROA. NIGR exhibits an effect similar to LgTA but when TRWA, TWA, GRR, and LVR are independent variables. DER and BST have significant negative impact when CIR is the independent variable. The results obtained from BST show an inverse relationship between being categorized as SIB and increased profitability.

Table 5. *Regression estimates of all models with ROA as a dependent variable*

Var.	Model I	Model II	Model III	Model IV	Model V	Model VI
TRWA	0.0581(3.27)*	.....	.....	.....	.....	.....
TWA	.....	0.0756(3.64)*	.....	.....	.....	.....
ETA	.....	.....	0.2352(1.79)***	.....	.....	.....
GRR	.....	.....	.....	0.0176(2.53)**	.....	.....
LVR	.....	.....	.....	.....	0.1416(4.54)*	.....
CIR	.....	.....	.....	.....	.....	-0.0390(-16.25)*
AGR	0.0249(0.68)	0.0286(0.77)	0.0212(0.76)	0.0257(0.71)	0.026(0.76)	-0.0036(-0.48)
RAL	-0.0002(-0.35)	-0.0003(-0.69)	-0.0005(-0.97)	-0.0006(-1.56)	-0.0004(-1.00)	-0.0003(-1.63)
DER	-0.00(-0.66)	-0.0000(-0.40)	0.0000(0.44)	-0.0000(-0.41)	-6.09e(-0.24)	-0.00003(-2.21)**
LgTA	0.0085(3.19)*	0.007(2.42)**	0.0092(4.2)*	0.0051(1.18)	0.0057(1.46)	0.0026(1.26)
RATA	-0.0104(-0.39)	-0.0086(-0.32)	-0.0116(-0.54)	-0.0183(-0.74)	-0.021(-0.87)	0.0064(0.63)
DGR	-0.0218(-0.43)	-0.0265(-0.52)	-0.0046(-0.14)	-0.0234(-0.46)	-0.022(-0.46)	0.0082(1.01)
DPLB	-0.0144(-0.66)	-0.0172(-0.74)	0.011(0.40)	-0.0197(-0.90)	-0.0187(-0.82)	0.0146(1.43)
NIGR	0.047(2.05)**	0.050(2.12)**	0.0441(1.42)	0.0563(2.30)**	0.0438(1.97)**	0.0078(0.53)
BST	-0.005(-1.34)	-0.0043(-1.30)	-0.0038(-1.01)	-0.0043(-1.34)	-0.0037(-1.18)	-0.0044(-1.83)***
LST	0.0056(0.71)	0.0045(-0.61)	0.0029(0.48)	0.0031(0.47)	0.0032(0.47)	-0.0003(-0.09)
Cons.	-0.165(-2.61)**	-0.1340(-2.05)**	-0.2229(-5.59)*	-0.0900(-0.94)	-0.0982(-1.12)	-0.0234(-0.58)
R^2	0.5981	0.6316	0.5311	0.6464	0.6098	0.7829
Haus.	3.83(0.9746)	3.21(0.9877)	4.04(0.9688)	3.1(0.9893)	4.26(0.9618)	10.65(0.4731)
AutoC	17.66(0.0009)**	46.42(0.0000)**	1.50(0.2406)	15.68(0.0014)**	54.88(0.0000)**	0.249(0.6255)

*Source: authors' computation (2017) based on Stata version 14 outputs. Coefficients and z-values are reported, with z-values in parentheses, where *, **, and *** stand for significance at 1%, 5%, and 10% respectively. Hausman tests (Haus) report chi-square values and tests of autocorrelation (AutoC) report F-values with p-values in parentheses.*

With ROE as a measure of performance (see *Table 6*), all the measures of CAR have positive impact but with only four being significant – TRWA, TWA, ETA, and LVR, all at 5%. Like its effect on ROA, CIR has a significantly negative impact on ROE. DER has a significantly negative influence on ROE, which is in agreement with prior expectation. LgTA and DGR are also positively significant when ETA and CIR, respectively, are the independent variables.

Using NIM as the proxy of bank performance (see *Table 7*), all indicators of CARs exhibit negative influence except ETA, although TWA and LVR are not significant. While the TRWA and GRR are significant at 1% and 10% respectively, ETA is significantly positive at 5%. CIR maintains its negative influence at 1% level of significance. Another significant result is that of NIGR, which exhibits negative influence regardless of the independent variables. This result is regarded as statistically sensible because it is justifiable to say that the higher the ratio of non-interest income to gross revenue, the lower the net-interest-margin (NIM). The BST has a significantly negative impact on NIM when TRWA is the independent variable.

The findings of this study are consistent with the findings of Mathuva (2009) on the impact of TWA and LVR on ROA but in contrary to his findings on ETA and bank performance. They also conform to the works of Ozili (2015) on the relationship between ROA and TRWA but disagree on the effect of TRWA on NIM. Despite using different dependent variables, these findings are also at par with the work of Hogan (2015) on the superiority of ETA. Although different methodologies were applied, these results accord substantially with the findings of Ejoh and Iwara (2014) on the impact of ETA on ROA. On CIR, there is an agreement between the findings of this paper and those of Mathuva (2009), Almazari (2013), Ozili (2015), and Siddiqua et al. (2017).

Table 6. *Regression estimates of all models with ROE as a dependent variable*

Var.	Model I	Model II	Model III	Model IV	Model V	Model VI
TRWA	0.5689(2.22)**	.....	.....	.....	.....	.....
TWA	.....	0.6319(2.09)**	.....	.....	.....	.....
ETA	.....	.....	2.6415(2.24)**	.....	.....	.....
GRR	.....	.....	.....	0.1513(1.64)	.....	.....
LVR	.....	.....	.....	.....	1.2504(2.54)**	.....
CIR	.....	.....	.....	.....	.....	-0.3841(-31.78)*
AGR	0.3331(0.90)	0.3642(0.97)	0.3174(0.89)	0.3324(0.92)	0.3279(0.96)	-0.0584(-1.21)
RAL	-0.0018(-0.30)	-0.0032(-0.57)	-0.0021(-0.47)	-0.0055(-1.04)	-0.0039(-0.68)	-0.0002(-0.02)
DER	-0.0203(-38.43)*	-0.0204(-38.26)*	-0.0209(-16.82)*	-0.0204(-32.09)*	-0.0203(-44.33)*	-0.0205(-218.60)*
LgTA	0.0489(1.56)	0.0406(1.17)	0.0862(4.07)*	0.0251(0.52)	0.0282(0.65)	0.0047(0.19)
RATA	-0.2088(-0.78)	-0.204(-0.79)	-0.3285(-1.22)	-0.2936(-1.08)	-0.3139(-1.17)	-0.0913(-1.32)
DGR	-0.2259(-0.46)	-0.2576(-0.52)	-0.1732(-0.44)	-0.2311(-0.47)	-0.2163(-0.47)	0.1525(1.91)***
DPLB	-0.0522(-0.22)	-0.5556(-0.22)	0.0232(0.09)	-0.1014(-0.43)	-0.1062(-0.42)	-0.0798(-0.74)
NIGR	0.3136(1.08)	0.3491(1.17)	0.3804(1.18)	0.3979(1.24)	0.2797(0.97)	-0.1442(-1.00)
BST	0.0026(0.09)	0.0095(0.37)	-0.0202(-0.74)	0.0059(0.24)	0.0112(0.45)	-0.0135(-0.99)
LST	0.0117(0.26)	0.0023(0.06)	0.0191(0.46)	-0.0069(-0.17)	-0.0046(-0.12)	-0.0088(-0.43)
Cons.	-0.8004(-1.26)	-0.6292(-0.96)	-1.5344(-3.20)*	-0.2408(-0.25)	-0.2646(-0.29)	0.6024(1.19)
R^2	0.9555	0.9616	0.9420	0.9593	0.9564	0.9646
Haus.	2.41(0.9965)	2.74(0.9937)	7.84(0.7280)	2.64(0.9947)	4.31(0.9599)	1.90(0.9988)
AutoC	17.60(0.0009)**	18.73(0.0007)**	2.79(0.1168)	14.79(0.0018)**	112.69(0.0000)**	5.24(0.0382)**

*Source: authors' computation (2017) based on Stata version 14 outputs. Coefficients and z-values are reported, with z-values in parentheses, where *,**, and *** stand for significance at 1%, 5%, and 10% respectively. Hausman tests (Haus) report chi-square values and tests of autocorrelation (AutoC) report F-values with p-values in parentheses.*

Table 7. *Regression estimates of all models with NIM as a dependent variable*

Var.	Model I	Model II	Model III	Model IV	Model V	Model VI
TRWA	-0.0528(-3.18)*	……..	……..	……..	……..	……..
TWA	……..	-0.0251(-0.69)	……..	……..	……..	……..
ETA	……..	……..	0.2358(2.54)**	……..	……..	……..
GRR	……..	……..	……..	-0.0113(-1.94)***	……..	……..
LVR	……..	……..	……..	……..	-0.0371(-0.97)	……..
CIR	……..	……..	……..	……..	……..	-0.0081(-3.40)*
AGR	-0.0092(-0.43)	0.017(0.87)	-0.0095(-0.58)	0.019(0.90)	0.0184(0.87)	-0.0047(-0.28)
RAL	-0.0008(-2.70)*	-0.0005(-1.17)	-0.0008(-1.42)	-0.0002(-0.57)	-0.0005(-1.15)	-0.0006(-2.56)***
DER	-0.0001(-2.73)*	-0.00004(-0.54)	0.0001(2.81)*	-0.0001(-1.04)	-0.00004(-0.54)	0.00001(0.55)
LgTA	0.0010(0.15)	-0.017(-0.93)	-0.0041(-0.56)	-0.0176(-1.02)	-0.0172(-0.95)	-0.0047(-0.57)
RATA	0.0115(0.66)	0.0021(0.10)	0.0190(1.11)	0.0049(0.23)	0.0063(0.31)	0.0160(1.07)
DGR	-0.0090(-0.29)	-0.0455(-1.59)	-0.0033(-0.20)	-0.0479(-1.57)	-0.0477(-1.55)	-0.0185(-0.94)
DPLB	0.0233(0.65)	0.0508(1.12)	0.0263(1.09)	0.0583(1.42)	0.0508(1.22)	0.0335(1.17)
NIGR	-0.0859(-3.19)*	-0.0997(-5.71)*	-0.1169(-3.84)*	-0.1041(-5.46)*	-0.0966(-6.12)*	-0.1071(-4.09)*
BST	-0.0077(-2.25)**	-0.0032(-0.65)	-0.0033(-0.91)	-0.0032(-0.67)	-0.0031(-0.64)	-0.0049(-1.38)
LST	0.0075(1.15)	0.0019(0.34)	0.0048(0.95)	0.0019(0.31)	0.0025(0.44)	0.0054(1.15)
Cons.	0.0459(0.33)	0.4035(1.05)	0.1092(0.72)	0.4151(1.15)	0.4054(1.05)	0.1554(0.89)
R^2	0.4533	0.3349	0.2322	0.3619	0.3344	0.1559
Haus.	11.52(0.4005)	37.31(0.0001)**	2.15(0.9979)	31.52(0.0009)**	50.17(0.0000)**	4.52(0.9920)
AutoC	9.56(0.0080)**	7.51(0.0159)**	11.01(0.0051)**	12.32(0.0035)**	7.82(0.0143)**	8.99(0.0096)**

*Source: authors' computation (2017) based on Stata version 14 outputs. Coefficients and "z" or "t" values are reported, with z/t values in parentheses, where *, **, and *** stand for significance at 1%, 5%, and 10% respectively. Hausman tests (Haus) report chi-square values and tests of autocorrelation (AutoC) report F-values with p-values in parentheses.*

5. Summary and Conclusions

This paper investigated the potential influence of risk-based and non-risk-based measures of capital and CIR on DMBs' performance in Nigeria. Three measures of performance were identified – ROA, ROE, and NIM –, while five measures of capital adequacy were adopted – TRWA, TWA, ETA, GRR, and LVR. CIR was adopted as the indicator of bank operating efficiency. Two of the capital adequacy indicators are risk-based (RBC) (TRWA and TWA), while the remaining are non-risk-based (NBC), but TRWA, TWA, and LVR are regulatory. Six models, one for each, based on all CARs and the CIR were used with particular reference to each measure of performance. This turns out to be eighteen models in all. The data related to the study's variables were extracted from the annual reports and accounts of all commercial banks listed in NSE between 2012 and 2015.

With panel data regression analyses, the findings revealed that all measures of CARs had a significantly positive impact on ROA as a measure of performance. All these measures of capital adequacy also positively influenced ROE, with only TRWA, TWA, ETA, and LVR being significant. Nonetheless, mixed results were obtained with NIM as a measure of performance. While the ETA exhibited a significantly positive impact, others negatively influenced DMBs' performance, with only TRWA and GRR being significant. The findings also complied with the CIR-profitability golden rule by showing a significantly negative effect on all adopted measures of bank performance. These findings have policy implications for the supervision and regulation of DMBs in Nigeria, whereby attention is required in the regulation of non-risk-based capital. The findings further have implications for DMBs–investors relations, whereby additional information will be required in the DMBs' periodic investors' presentations.

Based on these findings, it is concluded that, first, the effect of CAR (RBC or NBC) on bank performance depends on the measure of the performance adopted. It is also observable that RBCs are still much relevant given their effect on ROA and ROE. The results also provide empirical support for the inclusion of leverage ratio in the regulatory regime by Basel III. Although ETA is regarded as archaic, its superiority and much more relevance is manifest given its positive influence on all adopted measures of performance. Since the indicators of bank performance are not restricted to ROA and ROE (see Eldomiaty et al., 2015), there is an urgent need to take cognizance of a measure of CAR with consistent predictive potentials on bank profitability. This conclusion necessitates the need for banks to include the ETA prominently in their investors' presentations in addition to RBC. Also, the investors are advised to pay emphasis on the ETA in their analysis of DMBs' performance. Overall, bank regulators – Central Bank of Nigeria (CBN) – should incorporate ETA into the regulatory regime by fine-tuning it to the banking supervision model to ensure its relevance is not eroded.

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Determinants of Automated Teller Machine Usage in Lagos State, Nigeria

Salome IGHOMEREHO,[1] Patrick LADIPO,[2]
Bolajoko DIXON-OGBECHI[3]

[1] Department of Economics and Business Studies, Redeemer's University, Ede, Osun State, Nigeria,
e-mail: ighomerehosalome@gmail.com

[2,3] Department of Business Administration, University of Lagos, Lagos, Nigeria,
e-mails: pkaladipo@gmail.com[2]
dixonogbechi@yahoo.com[3]

Abstract. Research has shown that ATMs provide an extremely useful service to customers but the machine is characterized by several service quality inadequacies, and at times it can be very frustrating to use. Consequently, this study investigated socio-demographic factors and service quality dimensions as determinants of ATM usage in Lagos State, Nigeria. A questionnaire was used to collect data from bank customers who use ATM and the data were analysed using General Linear Model (GLM) and multiple regression. The results from the analyses reveal that socio-demographic factors, such as age, education, and income, influence ATM usage, while gender and occupation do not influence ATM usage. The study also revealed that all the service quality dimensions identified in the study have a significant positive influence on ATM usage. When the joint effect of socio-demographic factors and service quality dimensions on ATM usage was assessed, it was found that service quality had a greater influence on ATM usage than socio-demographic factors.

Keywords: automated teller machine, socio-demography, service quality, usage, self-service
JEL Classifications: M19, M39

1. Introduction

The emergence and growth of information technology have revolutionized operations in business organizations and the way businesses and customers interact in both developed and developing countries (Adelowo, 2015). This paradigm shift prompted several industries to align their service delivery with

electronic channels (e-channels). One of the industries that have experienced significant changes and development in the use of e-channels to render services to customers is the banking industry (Onyesolu, Asogwa, and Chukwuneke, 2016). Banks use technology to provide self-service to customers through various e-channels (Sindwani & Goel, 2015). Apart from branch banking, banks offer e-banking services such as Automated Teller Machine (ATM), Internet Banking, Mobile Banking, and Point-of-Sale (POS). Among these technology-based service options, ATM appears to be the most popular one (Oghojafor, Muo, and Alaneme, 2013). ATM is a technological innovation developed to offer diversified financial services and to provide 24 hours a day, 7 days a week (24/7) service to customers, without human interaction or bank teller (Odusina, 2014).

Nigerian banks have been investing huge sums of money in the deployment and maintenance of e-channel platforms, especially in ATMs (Ayo, Oni, Adewoye, and Eweoya, 2016). To encourage customers to use the e-channels effectively and efficiently, banks and the Central Bank of Nigeria (CBN) have been promoting strategies and practices aimed at increasing usage. Onyesolu et al. (2016) noted that banks persuaded their customers to subscribe to ATMs. Some banks have placed restrictions on over-the-counter withdrawals, such that customers are not encouraged to withdraw below a certain amount across the counter. Also, some banks debit the account of customers whose ATM card has expired before requesting for a new one. On the part of CBN, there have been some efforts to encourage an increased use of e-channels. In 2003, CBN stipulated guidelines on electronic banking for banks to ensure the security of e-channels and to promote customers' trust in the various e-channel platforms (CBN, 2003). The regulatory body also introduced cashless policy in 2012 (CBN, 2012) and guidelines on operations of electronic payment channels in 2016 to encourage bank customers to actively utilize e-channels for payment (CBN, 2016). Despite these efforts, it has been observed that bank customers are not making full use of ATMs.

For ATMs to champion the cause of a cashless society in Nigeria, it is important to identify the factors influencing usage. Gelderman (1998); DeLone and McLean (2003) assert that technology usage is an important success measurement in e-marketing especially, when customers' use is voluntary but essential to the desired outcomes. Mohammed (2012) noted that in the study of ATM usage, two factors need to be considered. Firstly, factors that have to do with the individual bank customer in terms of socio-demography and, secondly, factors that have to do with the bank in terms of service quality dimensions. This implies that service quality is not sufficient to determine ATM usage. One of the ways to understand how different customers interact with technologies is to segment customers based on their demographic profiles (Chan & Chong, 2013). Socio-demographic factors have been widely used in consumer research to distinguish between segments of customers with regard to adoption and usage of e-banking (Joshua & Koshy, 2011;

Mohammed, 2012; Bishnoi, 2013). The authors are of the opinion that there is a relationship between socio-demographic factors and usage pattern and that there are important differences in acceptance and usage of e-banking across customers. Several researchers (Mohammed, 2012; Onyedimekwu & Oruan, 2013; Sindwani & Goel, 2015) have noted that the most relevant socio-demographic factors in the banking industry are gender, age, education, income, and occupation. As ATM continues to redefine how customers interact with banks, there is need to provide deeper and better understanding of the influences on usage.

Consequently, the objectives to be achieved in this study are to:

i. determine the socio-demographic factors (gender, age, education, income, and occupation) that affect ATM usage in Lagos State, Nigeria;
ii. ascertain the influence of service quality dimensions (reliability, convenience, ease of use, security, fulfilment, and responsiveness) on ATM usage in Lagos State, Nigeria;
iii. assess the joint effect of socio-demographic factors and service quality dimensions on ATM usage in Lagos State, Nigeria.

The paper is organized into 6 main sections. Besides the introduction, which is Section 1, Section 2 provides a literature review for the study, issues of methodology are discussed in Section 3, while Section 4 deals with results and the discussion of findings. Section 5 presents the conclusion based on the findings, while the final section, which is Section 6, offers limitations and directions for future research.

2. Literature Review

2.1. The Nigerian Banking System

Banking operations started in Nigeria between 1892 and 1894 when the African Banking Corporation and the Bank of British West Africa were established by the colonial masters (Ajayi & Sosan, 2013). The first indigenous bank in Nigeria, called Industrial and Commercial Bank, was established in 1929. Over the years, several banks came on board, and as at 2004 there were 89 banks operating in Nigeria (Adesina & Ayo, 2010). During this period, the banking system was mainly branch banking. In recent years, there has been a shift from the branch banking process of delivering banking services to electronic means. This revolution started in 2003 with the introduction of Guidelines for Electronic Banking by the Central Bank of Nigeria. This was accompanied by a bank reformation exercise in June 2004. The reformation exercise left Nigeria with 25 strong and reliable banks as opposed to 89 banks previously in existence (Adesina & Ayo, 2010). The Nigerian banking system currently consists of 21 commercial banks. The surviving banks

of the recapitalization exercise have enormously engaged in the use of ICT as a platform for effective and efficient delivery of banking services (Onyedimekwu & Oruan, 2013). The most commonly used e-banking platforms include:

ATM: This is a computerized machine that provides the customers of banks the facility of accessing their accounts for dispensing cash and to carry out other financial transactions without the need of actually visiting a bank branch (Asabere, Baah, and Odediyah, 2012).

Telephone Banking: This is a service provided by a financial institution, which allows its customers to perform some banking transactions over the telephone. Most telephone banking services use an automated phone answering system with phone keypad response or voice recognition (Onyedimekwu & Oruan, 2013).

Mobile Banking: This is also referred to as M-Banking or mbanking. This is a service that enables bank customers to perform balance checks, account transactions, payments, credit applications, and other banking transactions through a device such as a mobile phone or Personal Digital Assistant (PDA) (Agwu & Adele-Louise, 2014).

Internet Banking: This is also known as online banking, web banking, or virtual banking. It is a system that enables bank customers to access accounts and general information on bank products and services or perform account transactions directly with the bank, using the Internet as the delivery channel. It allows customers of a financial institution to conduct financial transactions on a secure website operated by the institution. To access a financial institution's online banking facility, a customer having personal Internet access must register with the institution for the service and set up some password under various names for customer verification (Imola & Claudia, 2014).

Point-of-Sale (PoS) Terminal: This is an electronic device that is used for verifying and processing credit card transactions. They are connected via highly reliable telephone wired connections and they require rapid dial-up time, low power, and reliable performance capability (Onyedimekwu & Oruan, 2013).

Among these e-banking options, ATM appears to be the most popular one (Oghojafor, Muo, and Alaneme, 2013; Alma & Tedis, 2014; Adelowo, 2015; Onyesolu et al., 2016). This may be due to the nature of the e-banking channels. Unlike the other channels, ATM can dispense cash. Consequently, the focus of this study is on ATM.

2.2. Theoretical Framework

The theory underpinning this study is the attribution theory proposed by Fritz Heider in 1958 (Heider, 1958) and developed by Weiner (1974, 1986). Attribution is the inference one makes about the causes of other people's behaviour (McLeod, 2012). Attribution theory explains how individuals interpret events and how

it relates to their thinking and behaviour. It explains how and why people do things as they do. An individual seeking to understand why another person did something may attribute one or more causes to that behaviour. Through this theory, Heider (1958) explained the inferences on individual behaviour and noted that the way a person understands an event is related to the person's thinking process. In the view of Swanson and Kelley (2001), attribution theory is a collection of several theories that are concerned with the assignment of causal inferences and how these interpretations influence perceptions and behaviour.

The general attribution approach recognizes that man tries to make sense of their surroundings and themselves and that explanations or the finding of meaning to a phenomenon is an integral part of investigation (Bertram, 2003). As noted by Heider (1958), a person can make two attributions: internal attribution and external attribution. Internal attribution is the inference that a person is behaving in a particular way because of something about the person, while external attribution is the inference that a person is behaving in a certain way because of something about the environment or some event outside a person's control. Internal attributions are driven by the motives and emotional attitudes of an individual, while external attribution is driven by external events. In this study, an attempt is made to determine the inference that could be made with respect to ATM usage. In this case, the internal attribution is the socio-demographic factors, while the external attribution is the service quality dimensions. The issue here is whether usage behaviour can be attributed to internal characteristics of ATM users in terms of socio-demographic characteristics or to external factors in terms of service quality dimensions or both.

2.3. Empirical Review

Some studies have examined the influence of demographic factors and service quality on ATM usage. Rugimbana (1995) conducted a study in Australia to predict Automated Teller Machine usage by examining the importance of perceptual and demographic factors. Six demographic factors as well as five perceptual variables were investigated. Using factor analysis and logistic regression; age, occupation, and education were found to be significant predictors of ATM usage, while all the perceptual factors, which include convenience, ease of use, compatibility, reliability, and accuracy, were significant. It was concluded that perceptual factors predict ATM usage significantly better than demographic factors. Mohammed (2012) conducted a study to determine the factors influencing ATM usage in India. He identified demographic factors as internal factors and banking attributes as external factors. The demographic factors examined are gender, education, occupation, and income, while the banking factors are bank type, account type, convenient accessibility, number of services offered, and cost of services. Using

binary logistic regression, it was found that all the demographic factors significantly influence ATM usage, while the banking attributes were not significant. Ayimey, Awunyo-Victor, and Somuah (2012) carried out a study in Ghana to determine if ATMs met the expectations of the customers and what limits their use by the customers. The results indicated that poor ease of use as a result of inadequate education given to users of ATM and other limitations with the machine were cited as factors contributing to customers' unpleasant experiences with ATM.

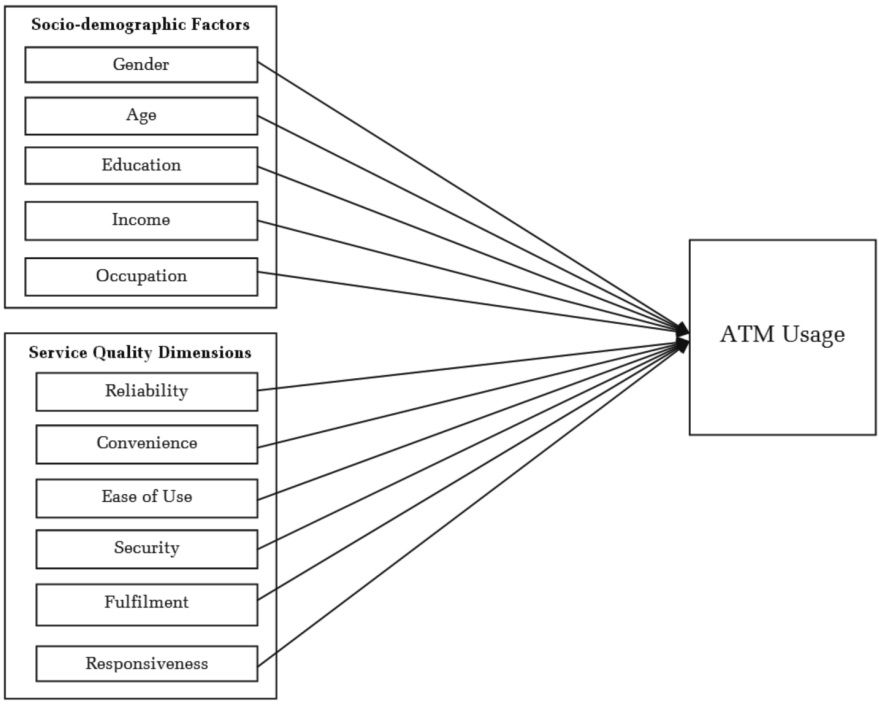
Bishnoi (2013) examined seven demographic variables (gender, education, sector, occupation, income, age, area of residence) and ATM services in the Indian banking sector. Data were collected through a structured questionnaire, and the analysis was carried out using t-test and ANOVA. It was found that there were no significant differences between gender, age, and the dimensions of ATM banking transactions, while significant differences were found with respect to education, occupation, income, and area of residence. Similarly, Yazeed, Yazidu, and Ibrahim (2014) studied ATM operation features and usage in Ghana. The study is on the operational features of ATM using queuing model and probit model. The factors identified as determinants of customers' usage of ATM include gender, education, location, ATM number, convenience, security, efficiency, breakdown, denominations, charges, and account type. The result indicated that higher educational attainment, number of ATMs per bank, convenience, security features, efficiency, and low transaction charges have a significant effect on the use of ATM. Alma and Tedis (2014) conducted a study on the usage of electronic banking services by individual clients of banks in Albania. They examined the influence of demographic characteristics of clients and bank factors on electronic services usage. The results of descriptive analysis indicated that the most commonly used electronic banking service is ATM. The results of chi-square test indicated that education and income have a statistically significant relationship with the use of e-banking, while no significant relations were found between age, gender, marital status, and residence and the use of e-banking. The results of one sample mean comparison test also indicated that the bank factors influencing the use of e-banking were poor bank measures taken to raise customers' awareness, inadequate awareness of e-banking products, while regular breakdown of ATM, lack of privacy and confidentiality as well as unreliability of ATM were not significant.

In another study by Abdulrahman and Premalatha (2014) on the level of ATM usage by bank customers in Sokoto, Nigeria, it was revealed that the use of ATM depends on the positive or negative perception that bank customers develop towards trust in ATM. They also found that perceived ease of use and perceived usefulness have a significant and positive effect on customers' trust in the use of ATM service. The study of Adelowo (2015) on the perception and use of electronic banking revealed that ATM is the most popular and widely used e-channel globally. The two demographic variables that significantly affect

the use of e-channels identified in the study are gender and education. It was also found that the respondents are of the opinion that e-banking is easy to use, useful, and convenient. They noted that the service quality of e-banking should be improved so that customers can have increased confidence in e-banking.

2.4. Conceptual Framework

Based on the foregoing discussion, this study developed a conceptual framework to guide this study, as illustrated in *Figure 1*:



Source: developed by the researchers for this study (2017)

Figure 1. *Conceptual framework for Determinants of ATM Usage*

The conceptual framework in *Figure 1* depicts the variables in this study and their relationships. It shows that socio-demographic factors and service quality dimensions have direct influence on ATM usage. The model proposes that when customers use ATM they experience service quality dimensions, and, coupled with their socio-demographic characteristics, they manifest a particular usage behaviour. The variables and their relationships are discussed below:

ATM Usage: DeLone and McLean (2003) noted that usage has to do with the extent, nature, appropriateness, and quality of a technology's use in terms

of assessing the extent to which the technology is being used for the intended function. In this study, ATM usage is conceptualized as the degree and manner in which ATM users utilize the machine in terms of regularity of use, time of use, purpose of use, and continuity of use.

Socio-Demographic Factors: This refers to the grouping of customers into segments. In this study, it is measured on the basis of gender, age, level of education, monthly income/allowance, and nature of occupation of the respondents.

Service Quality Dimensions: This refers to the set of features that describe customers' experience with ATM. It is measured by reliability, convenience, ease of use, security, fulfilment, and responsiveness.

3. Methodology

3.1. Population

The target population comprised individual bank customers who use ATM in Lagos State, Nigeria. Lagos State was chosen because it is one of the most cosmopolitan States in Nigeria. It is also the most commercialized and industrialized state.

3.2. Sampling

Since the exact population size of ATM users is difficult to estimate as some bank customers have more than one ATM card, the sample size formula proposed by Godden (2004) was used to determine the minimum number of respondents to include in the sample that will ensure representativeness of the population. It is given as:

$$n = \frac{Z^2\{P(1-P)\}}{C^2}$$

$$n = \frac{1.96^2\{0.50(1-0.50)\}}{0.05^2}, \quad (1)$$

$$n = 384.16 \quad n \approx 385$$

where:

n = Minimum Sample Size

Z = Z-value (95% confidence level, which is 1.96)

P = Population Proportion of 50% (0.50)

C = Confidence interval or margin of error allowable in the sample estimate of population, which is estimated to be 5% (0.05)

Saunders, Lewis, and Thornhill (2009) posited that the actual sample size should exceed the minimum sample size to accommodate for cases of non-response. To achieve this, the formula in equation (2) was suggested.

$$n^a = \frac{n(100)}{re\%}$$

For this study,

$$n^a = \frac{385(100)}{70}, \quad (2)$$

$$n^a = 550$$

where:
n^a = actual sample size required
n = minimum sample size derived from the first formula above (385)
re% = estimated response rate expressed as a percentage (70%)

The actual sample size is five hundred and fifty (550). Therefore, the sample size for this study is put at five hundred and fifty (550) bank customers who use ATM in Lagos State, Nigeria.

Due to the inability to obtain a sampling frame of ATM users, two-stage sampling technique was adopted to select respondents for the study. First, cluster sampling was used to select the three (3) senatorial districts in Lagos State. The senatorial districts are Lagos Central, Lagos East, and Lagos West. In the three divisions, there are twenty (20) Local Government Areas (LGAs), and the number of LGAs in each division comprises Lagos Central (5), Lagos East (5), and Lagos West (10). On the basis of the number of LGAs in each division, the total number of respondents (550) as calculated above was proportionately distributed to each division. Thereafter, purposive sampling technique was employed to select the respondents who had used ATM for a minimum period of one year and who had volunteered to participate in the study.

3.3. Data Collection Instrument

A structured questionnaire was used to collect data for the study. The questionnaire consists of forty-seven (47) items categorized into three sections. Section A consists of five (5) items on socio-demographic factors, which include gender, age, level of education, monthly income/allowance, and nature of occupation. Section B comprises thirty-six (36) items on service quality dimensions. Section C consists of six (6) items on ATM usage. The respondents were required to indicate their degree of agreement or disagreement with each statement in Sections B and C on a five-point Likert scale in the order as follows: strongly agree (SA), agree (A), fairly agree (FA), disagree (D), and strongly disagree (SD).

The validity of the instrument was established using content validity and face validity, while the reliability was tested using Cronbach's alpha. Cronbach's alpha coefficients for each of the constructs in the study are as shown in *Table 1* below:

Table 1. Test of reliability of the constructs

Constructs	Number of Items	Cronbach's Alpha Coefficient
Reliability	5	0.893
Convenience	6	0.782
Ease of Use	5	0.811
Security	7	0.736
Fulfilment	6	0.754
Responsiveness	7	0.729
ATM Usage	6	0.817

Source: field survey (2017)

Pallant (2010) noted that Cronbach's alpha coefficient of 0.7 or higher denotes a good internal consistency. Based on the Cronbach's alpha coefficients in *Table 1* above, the constructs in the research instrument can be deemed reliable and suitable for the research.

4. Data Analyses

4.1. Analysis of Questionnaire Distribution

Five hundred and fifty (550) copies of the questionnaire were administered to bank customers who use ATM in Lagos State but only four hundred and fifty-two (452) were returned fully completed. Forty-seven (47) copies of the administered questionnaire were eliminated due to incomplete responses, while fifty-one (51) were not returned. The analysis of the copies of the questionnaires administered and retrieved is depicted in *Table 2*:

Table 2. Copies of the questionnaires administered and retrieved

Senatorial District	Copies of the Questionnaires Distributed	Copies of the Usable Questionnaires Retrieved	Percentage (%)
Lagos Central	138	105	76.09
Lagos East	138	122	88.41
Lagos West	274	225	82.12
Total	**550**	**452**	**82.18**

Source: field survey (2017)

Table 2 shows the distribution of questionnaires in the three (3) senatorial districts in Lagos State. One hundred and thirty-eight (138) copies of the questionnaire were administered in Lagos Central and Lagos East each, while two hundred and seventy-four (274) copies of the questionnaire were administered in Lagos West. In all, five hundred and fifty (550) copies of the questionnaire were administered. The usable copies of the questionnaire retrieved from each senatorial district are as follows: Lagos Central (105), Lagos East (122), and Lagos West (225). Overall, four hundred and fifty-two (452) copies of the questionnaire were retrieved. This represents a response rate of 82.18 percent.

4.2. Socio-Demographic Profile of Respondents

The socio-demographic characteristics of the respondents are summarized in *Table 3*:

Table 3. Socio-demographic characteristics of respondents

	Variable	**Frequency**	**Percentage (%)**
Gender	Male	237	52.4
	Female	215	47.6
	Total	452	100
Age	Below 21	51	11.3
	21–30	113	25.0
	31–40	147	32.5
	41–50	107	23.7
	51 and above	34	7.5
	Total	452	100
Level of Education	No formal education	Nil	0.0
	Primary	Nil	0.0
	Secondary	126	27.9
	Graduate	186	41.1
	Post-graduate	140	31.0
	Total	452	100
Monthly Income/ Allowance	Below N100,000	198	43.8
	N100,000 – N300,000	135	29.9
	N300,001 – N500,000	67	14.8
	N500,001 and above	52	11.5
	Total	452	100
Nature of Occupation	Government Service	124	27.4
	Private Service	144	31.9
	Self-employed	99	21.9
	Student	85	18.8
	Others	Nil	0.0
	Total	452	100

Source: field survey (2017)

As shown in *Table 3*, the sample consists of both genders, all age-groups, income and occupation except for level of education, which did not have respondents with no formal education and primary education. Despite this, the other categories of the level of education were adequately represented. The diversity across respondents can be considered reflective of the socio-demographic characteristics employed in this study. Therefore, the data collected can be said to be balanced and reliable for the purpose of this study.

4.3. Analysis of Objective One

Objective one of this study is to determine the socio-demographic factors (gender, age, education, income, and occupation) that affect ATM usage in Lagos State, Nigeria. General Linear Model (GLM) analysis was conducted to determine the socio-demographic factors that influence ATM usage in Lagos State, Nigeria. The result is summarized in *Table 4* below:

Table 4. Summary of GLM Analysis of Socio-demographic Factors with ATM Usage

Source	Type III Sum of Squares	Df.	Mean Square	F	B	T-value	P-value	R^2
Corrected Model	41.777	5	8.355	18.339			0.000	**0.171**
Intercept	15.311	1	15.311	33.605	1.255	5.797	0.000	
Gender	0.651	1	0.651	1.429	-0.077	-1.195	0.233	
Age	19.470	1	19.470	42.733	-0.272	-6.537	**0.000**	
Education	32.775	1	32.775	71.937	0.380	8.482	**0.000**	
Income	1.419	1	1.419	3.114	-0.054	-1.765	0.078	
Occupation	0.477	1	0.477	1.047	0.033	1.023	0.307	
Error	203.203	446	0.456					
Total	1728.361	452						
Corrected Total	244.981	451						

Source: field survey (2017)

The result in *Table 4* shows the GLM analysis of the determination of the influence of socio-demographic factors on ATM usage. The analysis indicates an R-Square value of 0.171, meaning that socio-demographic factors explain 17.1 percent of the variation in ATM usage. Results also reveal that age ($F = 42.733$, $\beta = -0.272$, $t = -6.537$, $p = 0.000 < 0.05$) and education ($F = 71.937$, $\beta = 0.380$, $t = 8.482$, $p = 0.000 < 0.05$) have a statistically significant influence on ATM usage, while gender ($F = 1.429$, $\beta = -0.077$, $t = -1.195$, $p = 0.233 > 0.05$), income, ($F = 3.114$, $\beta = -0.054$, $t = -1.765$, $p = 0.078 > 0.05$) and occupation ($F = 1.047$, $\beta = 0.033$, $t = 1.023$, $p = 0.307 > 0.05$) have no statistically significant influence on ATM usage. Results in *Table 4* further show that age has a negative while education a positive relationship with ATM usage. This implies that the higher

the age of a customer, the lower the ATM usage. The positive sign of education reveals that the higher the level of education of a customer, the higher the ATM usage. This seems to suggest that young bank customers with a high level of education are more likely to use ATM regularly for different ATM services than older and less educated customers.

4.4. Analysis on Objective Two

Objective two of this study is to ascertain the influence of service quality dimensions (reliability, convenience, ease of use, security, fulfilment, and responsiveness) on ATM usage in Lagos State, Nigeria. Multiple regression was employed to determine the weight that each of the service quality dimensions contributes to the prediction of ATM usage. The results are presented in *Table 5* below:

Table 5. Summary of regression analysis of service quality dimensions with ATM usage

Model 1	B	T-value	P-value	R	R^2	F-value	F-sig
Constant	0.505	5.120	0.000	0.769	0.592	107.482	0.000
Reliability	0.136	2.620	**0.009**				
Convenience	0.349	8.635	**0.000**				
Ease of Use	0.131	2.919	**0.004**				
Security	0.122	3.076	**0.002**				
Fulfilment	0.211	4.582	**0.000**				
Responsiveness	0.267	6.695	**0.000**				

Model 1: Predictors: (Constant), reliability, convenience, ease of use, security, fulfilment, responsiveness
Dependent Variable: ATM Usage *Source: field survey (2017)*

Multiple regression results in *Table 5* show goodness of fit of the model because the F-value ($F = 107.482$, $p = 0.000 < 0.05$) is statistically significant at 5 percent level of significance. It indicates a statistically significant relationship between service quality dimensions and ATM usage. This means that reliability, convenience, ease of use, security, fulfilment, and responsiveness jointly determine ATM usage. The R-Square value (coefficient of determination) of 0.592 indicates that service quality dimensions explain 59.2% of the variation in ATM usage. All the service quality dimensions were found to have a statistically significant positive influence on ATM usage. Comparatively, the dimensions of service quality that significantly influence ATM usage are convenience ($b_2 = 0.349$, $t = 8.635$, $p = 0.000 < 0.05$), responsiveness ($b_6 = 0.267$, $t = 6.695$, $p = 0.000 < 0.05$), fulfilment ($b_5 = 0.211$, $t = 4.582$, $p = 0.000 < 0.05$), reliability ($b_1 = 0.136$, $t = 2.620$, $p = 0.009 < 0.05$), ease of use ($b_3 = 0.131$, $t = 2.919$, $p = 0.004 < 0.05$), and security ($b_4 = 0.122$, $t = 3.076$, $p = 0.002 < 0.05$).

4.5. Analysis on Objective Three

Objective three of this study is to assess the joint effects of socio-demographic factors and service quality dimensions on ATM usage in Lagos State, Nigeria. The General Linear Model was employed to assess the joint effect. In this case, both sets of variables (i.e. socio-demographic factors and service quality dimensions) were combined. *Table 6* illustrates the individual and simultaneous influence of socio-demographic characteristics of ATM users and service quality dimensions on ATM usage.

Table 6. Summary of GLM analysis of socio-demographic factors and service quality dimensions with regard to ATM usage

Source	Type III Sum of Squares	Df.	Mean Square	F	B	T-value	P-value	R^2
Model 1a	41.777	5	8.355	18.339			0.000	**0.171**
Intercept	15.311	1	15.311	33.605	1.255	5.797	0.000	
Gender	0.651	1	0.651	1.429	-0.077	-1.195	0.233	
Age	19.470	1	19.470	42.733	-0.272	-6.537	**0.000**	
Education	32.775	1	32.775	71.937	0.380	8.482	**0.000**	
Income	1.419	1	1.419	3.114	-0.054	-1.765	0.078	
Occupation	0.477	1	0.477	1.047	0.033	1.023	0.307	
Error	203.203	446	0.456					
Total	1728.361	452						
Corrected Total	244.981	451						

Source	Type III Sum of Squares	Df.	Mean Square	F	B	T-value	P-value	R^2
Model 1b	144.956	6	24.159	107.482			0.000	**0.592**
Intercept	5.893	1	5.893	26.218	0.505	5.120	0.000	
Reliability	1.543	1	1.543	6.864	0.136	2.620	**0.009**	
Convenience	16.760	1	16.760	74.565	0.349	8.635	**0.000**	
Ease of Use	1.916	1	1.916	8.522	0.131	2.919	**0.004**	
Security	2.127	1	2.127	9.461	0.122	3.076	**0.002**	
Fulfilment	4.718	1	4.718	20.991	0.211	4.582	**0.000**	
Responsiveness	10.076	1	10.076	44.828	0.267	6.695	**0.000**	
Error	100.025	445	0.225					
Total	1728.361	452						
Corrected Total	244.981	451						

Source	Type III Sum of Squares	Df.	Mean Square	F	B	T-value	P-value	R^2
Model 1c	166.229	11	15.112	84.432			0.000	**0.679**
Intercept	0.111	1	0.111	0.620	0.114	0.787	0.432	
Gender	0.225	1	0.225	1.254	-0.045	-1.120	0.263	
Age	15.224	1	15.224	85.061	-0.251	-9.223	**0.000**	
Education	10.298	1	10.298	57.535	0.225	7.585	**0.000**	
Income	5.458	1	5.458	21.560	-0.131	-5.600	**0.000**	
Occupation	0.144	1	0.144	0.806	0.018	0.898	0.370	
Reliability	3.157	1	3.157	17.640	0.173	4.200	**0.000**	
Convenience	10.992	1	10.992	61.415	0.281	7.837	**0.000**	
Ease of Use	3.568	1	3.568	26.415	0.171	5.140	**0.000**	
Security	1.929	1	1.929	14.280	0.140	3.779	**0.000**	
Fulfilment	9.127	1	9.127	50.992	0.265	7.141	**0.000**	
Responsiveness	7.385	1	7.385	41.262	0.267	6.424	**0.000**	
Error	78.751	440	0.179					
Total	1728.361	452						
Corrected Total	244.981	451						

Source: field survey (2017)

Table 6 shows the individual and joint effects of socio-demographic variables and service quality dimensions on ATM usage. Results indicate that the R-Square value for socio-demographic variables is 0.171, for service quality dimensions is 0.592, while the joint R Square value is 0.679. This means that socio-demographic factors explain 17.1 percent of the variation in ATM usage, while service quality dimensions explain 59.2 percent of the variation in ATM usage. This implies that service quality dimensions have a greater influence on ATM usage than socio-demographic factors. The results indicate that three of the socio-demographic variables, that is, age (β = -0.251, t = -9.223, p = 0.000 < 0.05), education (β = 0.225, t = 7.585, p = 0.000 < 0.05), and income (β = -0.131, t = -5.600, p = 0.000 < 0.05) as well as all the service quality dimensions have significant influence on ATM usage. Convenience (β = 0.281, t =7.837, p = 0.000 < 0.05) has the highest weight on ATM usage. This was followed by responsiveness (β = 0.267, t = 6.424, p = 0.000 < 0.05), fulfilment (β = 0.265, t = 7.141, p = 0.000 < 0.05), reliability (β = 0.173, t = 4.200, p = 0.000 < 0.05), ease of use (β = 0.171, t = 5.140, p = 0.000 < 0.05), and security (β = 0.140, t = 3.779, p = 0.000 < 0.05).

4.6. Discussion of Findings

The first objective of this study was to determine the socio-demographic factors (gender, age, education, income, and occupation) that influence ATM usage in Lagos State, Nigeria. The results of the analysis indicate that ATM usage is significantly influenced by age and education. Contrary to the expectations of

this study that the selected socio-demographic factors will significantly influence ATM usage, gender, income, and occupation do not have a significant influence thereupon. The relationship between age and ATM usage was found to be negative, while the relationship between education and ATM usage was found to be positive. The findings of this study that age and education are significant socio-demographic factors influencing ATM usage support the findings of Rugimbana (1995) that ATM usage is high among young and educated people because e-banking usage pattern tends to decrease with age. Also, Yazeed et al. (2014) noted that to use ATM adequately and appropriately the customer needs some level of education. Contrary to the finding of Joshua and Koshy (2011) and Mohammed (2012) that gender significantly influences ATM usage, this study did not find gender to be significant. However, it is in agreement with the finding of Bishnoi (2013) and Yazeed et al. (2014) that gender does not influence ATM usage. The finding that gender does not influence ATM usage may be attributed to the change in the role of women. Currently, most women are working, and so they have bank accounts which necessitate ATM usage. Also, due to the increase in the level of education of women, the gender divide seems to be disappearing. Moreover, in this study, income and occupation were found to be non-significant, but Mohammed (2012) and Bishnoi (2013) found income and occupation as significant factors influencing ATM usage.

The second objective was to ascertain the influence of service quality dimensions (reliability, convenience, ease of use, security, fulfilment, and responsiveness) on ATM usage in Lagos State, Nigeria. Results indicated that all the service quality dimensions have a significantly positive influence on ATM usage. In order of importance, the dimensions are convenience, responsiveness, fulfilment, reliability, ease of use, and security. Contrary to previous studies (Ayimey et al., 2012; Abdulrahman and Premalatha, 2014) that ease of use is the most important service quality dimension influencing ATM usage, this study found convenience to be the most significant service quality dimension influencing ATM usage. This indicates that the location of ATMs, the range of services provided through the ATMs, as well as the waiting time at ATM points influence ATM usage more positively than any other service quality dimension. Generally, the findings seem to suggest that when customers believe that ATM services are convenient, responsive, reliably meet the needs of customers, easy to use, and secured, they tend to use more of the ATMs than others who think otherwise. This implies that an improvement in the service quality dimensions of ATM will lead to an improvement in ATM usage.

The third objective was to assess the joint effects of socio-demographic factors and service quality on ATM usage in Lagos State, Nigeria. Results indicated that service quality influences ATM usage to a significantly greater degree than socio-demographic factors. This supports the finding of Rugimbana (1995) that

perceptual factors have a greater influence on ATM usage than socio-demographic factors. However, it contradicts the findings of Mohammed (2012) that socio-demographic factors influence ATM usage more than banking attributes do. Service quality dimensions were found to have a strong positive relationship with ATM usage. This seems to suggest that an increase in ATM service quality may likely give rise to an increase in ATM usage. In the study of Petter, DeLone, and McLean (2008), it was found that service quality positively influences usage. In addition, age, education, and income were found to influence ATM usage. In the analysis of the influence of socio-demographic factors on ATM usage, income was not significant; however, when socio-demographic factors were combined with service quality, income became significant. This seems to suggest that the influence of income on ATM usage may be due to customers' perception of service quality.

5. Conclusions

This study examined the influence of socio-demographic factors and service quality dimensions on ATM usage. Based on the analyses and the results obtained, it can be concluded that there is some level of association between socio-demographic characteristics of ATM users and ATM usage. The analyses revealed that age, education, and income influence ATM usage. Therefore, the socio-demographic characteristics of ATM users, especially age, level of education, and income should not be overlooked when designing and implementing ATM marketing strategies. This could be an important part of a bank's strategy in attracting and retaining older customers, less educated customers, and high-income earners.

Despite the relevance of socio-demography in the usage pattern of ATM, service quality was found to influence ATM usage more than socio-demographic factors. Therefore, an improvement in service quality will have a positive effect on ATM usage in terms of how often it is used, the banking transactions it is used for, and commitment towards its use. Banks need to see ATM service quality from the customer's perspective so as to meet or exceed their expectations. The findings from this study can be used by bank managers to better understand the sources of customers' perceived service quality and address them appropriately. The findings of this study also suggest that there is need to develop customer-related strategies that can fulfil customer requirements according to their expectations so as to increase customers' perceptions of ATM service quality and usage.

The banking system in Nigeria can improve ATM service quality if the ATMs are made more reliable, convenient, easy to use, with adequate security as well as increased fulfilment and responsiveness to the challenges faced by ATMs. The six service quality dimensions identified in this study (reliability, convenience, ease

of use, security, fulfilment, and responsiveness) can provide practical leverages for bank managers to improve customer experience with ATMs. The weight of the factors identified in the study can also provide managers with a guide as to the most important factors to focus on in order to improve ATM service quality and usage. As indicated in the findings, to maintain a high level of ATM service quality and usage, banks should pay attention to all the dimensions identified in this study. They should ensure that ATM service is always available, convenient, and easy to use. The security of ATM should be improved, customers should have a sense of fulfilment for using ATM, and attention should be paid to customers' complaints when problems occur.

6. Limitations and Directions for Future Research

In the banking system, there are currently several e-banking platforms that bank customers use to carry out banking transactions. However, this study investigated only ATMs. Future research may examine other e-banking options such as Internet banking, mobile banking, and POS. Future studies may also focus on customer satisfaction, motivation of consumer's decision, and the factors influencing it.

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Research Questionnaire

Section A: Customers' Socio-Demographic Characteristics

Instruction: Please, tick (√) the appropriate box where applicable.

1. **Gender:** Male [ ] Female [ ]
2. **Age in years:** Below 21 [ ] 21–30 [ ] 31–40 [ ] 41–50 [ ] 51 and above [ ]
3. **Highest Completed Level of Education:** No formal education [ ] Primary [ ] Secondary [ ] Graduate [ ] Post-graduate [ ]
4. **Monthly Income/Allowance:** Below N100,000 [ ] N100,000-N300,000 [ ] 300,001–N500,000 [ ] N500,001 and above [ ]
5. **Nature of Occupation:** Government Service [ ] Private Service [ ] Self-employed [ ] Student [ ] Other, please specify----------

Please evaluate the following service quality dimensions according to your experience of using ATM and indicate the extent to which you agree or disagree with the statements based on the response scale:

SA = Strongly Agree
A = Agree
FA = Fairly Agree
D = Disagree
SD = Strongly Disagree

Section B: Service Quality Dimensions

S/N	STATEMENT	SA	A	FA	D	SD
	(a) Reliability					
6	ATM service is always available.					
7	Cash is always available in the ATM.					
8	ATM provides consistent services.					
9	ATM transactions are always accurate.					
10	ATM gives instant money all the time.					
	(b) Convenience					
11	ATMs are conveniently located.					
12	ATM saves me time.					
13	ATM saves me money.					
14	ATM provides a different range of services.					
15	ATM can be used at any time of the day.					
16	ATM maximum withdrawal limit per day is convenient.					

S/N	STATEMENT	SA	A	FA	D	SD
	(c) Ease of Use					
17	ATM provides clear instructions on how to use it.					
18	ATM is easy to use for transactions.					
19	ATM language is easy to understand.					
20	I can use ATM without assistance from anybody.					
21	I use other bank's ATM with my bank ATM card easily.					
	(d) Security					
22	I feel safe during ATM transactions.					
23	I fear for the security of my personal information.					
24	The location of ATMs is secure for transaction.					
25	Security guard is always present at every ATM.					
26	ATMs provide privacy during transactions.					
27	ATMs protect information about my card.					
28	ATMs protect information about my transactions.					
	(e) Fulfilment					
29	ATM gives quality bank notes.					
30	ATM charges are reasonable.					
31	ATM provides feedback after transactions are completed.					
32	ATM returns my card after completing the transaction.					
33	ATM provides receipt to confirm my transactions.					
34	I receive alerts on my ATM transactions.					
	(f) Responsiveness					
35	ATM provides me with convenient options to cancel transactions.					
36	ATM returns my card if the machine did not accept it.					
37	ATM does not tell me what to do if my transaction is not processed.					
38	The bank quickly resolves problems I encounter with ATM.					

S/N	STATEMENT	SA	A	FA	D	SD
39	ATMs credit me when my transaction is not completed but deductions were made.					
40	Jammed ATM cards are not returned promptly.					
41	Expired or lost ATM cards are replaced quickly.					

Section C: ATM Usage

Please indicate the extent to which you agree or disagree with these statements:

	STATEMENT	SA	A	FA	D	SD
42	I use ATM regularly.					
43	I use ATM for withdrawal and balance inquiry only.					
44	I prefer to use ATM during banking hours.					
45	I can use the ATMs of any bank.					
46	I cannot stop using ATM.					
47	I expect my use of ATM to continue in the future.					

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Analysis of Accessing Rural Development Funds

Andrea CSATA
Sapientia Hungarian University of Transylvania, Cluj-Napoca, Romania
Faculty of Economics, Socio-Human Sciences and Engineering, Miercurea Ciuc
e-mail: csataandrea@uni.sapientia.ro

Abstract. The present study aims to analyse successful projects of the Romanian Rural Development Funds from different perspectives based on a county level. The framework of the analysis focuses on two periods: one before the accession, the 2002–2006 period of SAPARD applications, and the other one, the first period of the Rural Development Programme, more specifically, the period between 2007 and 2013. Results show that there is a positive correlation between applications and targeted areas based on infrastructure, tourism, and agriculture indicators. Findings also highlight that there is a positive correlation between the number of previous applications (SAPARD applications before the accession) and the grant size of current applications. Moreover, there is a negative correlation between the grant size of previous applications and the size of current applications. Cluster analysis revealed important social changes: on the one hand, the western counties of Romania (Bihor, Arad, Timiş, and Cluj) have strengthened their position, while other counties are lagging behind.

Keywords: Romanian Rural Development Programmes, European Union support policy
JEL Classification: P25

Introduction

The present study provides a comparative analysis of accessing European Union rural development funds by Romania in the 2007–2013 period and the projects of the previous period, including their effect on relevant indicators. There are only a few studies on accessing rural development funds, and even less papers focus on comparing the results of the first period before the accession and the next, 2007–2013 period (Desjeux et al., 2015; Pelucha et al., 2017). There are several analyses in the literature focusing on narrow segments such as environmental effects (Desjeux et al., 2015). Sarvašová et al. (2017) analysed the effects of the Natura 2000 programme, while Slee et al. (2015) examined the relationship

between climate change and funding. There are several studies focusing on the 2007–2013 programming period as well. Bonfiglio et al. (2017) focused on the programming period's knowledge transfer. Caruso et al. (2015) examined the effects of the so-called Measure 121 only, within the 2007–2013 period. Similarly to the present study, Pelucha et al. (2017) focus on comparing the results of the previous programming period and the 2007–2013 period. In their study, Furmankiewicz et al. (2016) aimed at examining the civil society, the relationship between LEADER funds and the third sector in the two programming periods. This article aims to fill the gap and contribute to research done in the field of rural development, comparing several programming periods (2002–2006 SAPARD and 2007–2013 National Rural Development Programme) and rural development measures in Romania.

The present research focuses on analysing the effects of successful applications on the indicators of the targeted areas (e.g. comparing tourism-based projects with tourism indicators or agriculture-based applications with agricultural indicators). Moreover, the research also examines whether the applications of the previous period have any effects on the applications of the current programming period. Another aspect investigated was the effects of successful applications on the development of the county, namely whether the county has experienced any progress compared to other counties.

Findings also highlight that there is a positive correlation between the number of previous applications (SAPARD applications before the accession) and the grant size of current applications. This is most probably the result of previous experiences and of the learning effect, i.e. those who learnt how to apply for smaller funds in the previous period applied for larger funds in the following period. Moreover, there is a negative correlation between the grant size of previous applications and the size of current applications – those who accessed larger grants in the first period were less likely to access such large funds in the next period. Cluster analysis revealed important social changes: on the one hand, the western counties of Romania (Bihor, Arad, Timiş, and Cluj) have strengthened their position, while lagging behind regions – although they successfully accessed SAPARD funds – could not gain any advantages/benefits as the grant size was not enough to overcome their economic conditions.

The present study aims to contribute to the above-mentioned research not only with its results but with the applied methodology as well. On the one hand, the research considers the applications of the previous programming period and, on the other hand, it takes a look at the effects of other types of rural development programmes and at whether such funding had any effect on the overall situation of counties.

The first section of the study provides a brief presentation of the relevant literature, followed by data analyses and results. Data analysis first introduces statistical data and then proceeds to present the results of the correlation analysis

– namely, whether accessing funds had any statistically relevant effects on the targeted areas and whether the results of the previous programming period had any effects on the current period. Correlation analysis focuses on whether accessing funds had any effects on the overall situation of the respective counties. The last section of the paper formulates the conclusions, recommendations, and possible directions for further research.

1. Literature Review

The present research focuses on accessing rural development funds as Romania is mostly made up of rural areas. 87% of the total territory of Romania is rural, and 45% of the total population lives in rural areas. Moreover, in some counties, the population is concentrated in the county seat, and the population density in other parts of the county is so low that the entire county is classified as a rural area. Therefore, the present study focuses on the quantifiable results of rural development programmes.

Rural development programmes generally aim to solve the characteristic problems of rural areas. These problems usually occur due to the isolation and reduced mobility of the population as a result of underdeveloped communication and transport infrastructure. Further characteristic of rural areas is limited economic opportunities due to low income, lack of capital, the small number of well-paid jobs, and increased dependence on agriculture. There are other demographic challenges as well such as the aging population and young people leaving the area. Young people often move away to avoid low-quality services and seek better job opportunities.

Rural areas present a complex challenge, and therefore they require complex solutions, the cooperation of several sectors, and a variety of financing programmes. The lack of capital in rural areas makes all kinds of financial aid very important – in many cases, this is the single most important factor in the development of the region. Rural areas in Romania receive a significant amount of funding within the rural development system and direct payments within the CAP. Regional operative programmes also grant funding to reduce disparities together with national funding schemes available for development.

Non-EU funding is characterized by political influence in many cases. Therefore, they are connected to election cycles. Implementation of projects usually occur two or three years after the elections because time is needed for political negotiations to take place between the government and their local political partners until public procurement procedures can finally start. Distributing non-EU funds by the government bodies could also be used to gain political leverage just for the upcoming elections. National funding therefore depends largely on the national

budget – so, there is a risk of suspending the project implementation if the budget deficit is high. Thus, local development projects include projects that could not access other (more secure) sources of funding and have a low chance to be influenced by politics (small repairs, renovation). First, it is useful to explain some particularities of the European Union rural development funding programmes that have significant influence on the present analysis. There is an ongoing delay between the planning and implementation of the EU rural development programmes. This phenomenon is similar to a sonic boom produced by an aircraft; however, I would describe it as a double planning delay. Rural Development programmes (and most EU programmes) are characterized by a duality, a delay on both the EU and country level. Development plans are always ahead of implementation. The gap between planning and implementation is increasing not only in time but also in execution. In other words, the results of the implementation differ from the original plans. The large EU system and the number of parties involved make the planning process time consuming; therefore, plans are made ahead of time, and they only consider the current realities and the foreseeable changes and needs of their respective time period. However, by the time of the implementation, global policy (e.g. unpredictable migration crisis), global economy (economic crisis), or social changes (unemployment among the young generation, increasing social gaps) might need different objectives and implementation programmes. The implementation of programmes is always slightly delayed since the new objectives require organizational restructuring, the development of adequate infrastructure, transmitting information to potential applicants, etc. Therefore, the implementation of programmes is behind schedule and is not always able to adapt to the real needs.

Operation of the EU funding system depends on the assessment of the results not only from a political perspective (visible effects of accessed funding) but beneficiaries also need to be able to experience the benefits of these programmes. The EU Commission has also realized the importance of result evaluation, and now the Directorate General for Agricultural and Rural Development is monitoring and assessing the results of rural development applications of the 2007–2013 programming period within the Common Monitoring and Evaluation Framework (CMEF). The CMEF includes preliminary, interim, and final evaluation reports. The importance of result analysis is also shown by the fact that the CMEF has been extended to include all the pillars of the Common Agricultural Policy, not only the second pillar, that is, rural development. However, the complexity of interventions, of rural areas and of the funding system requires further analyses besides the CMEF.

One of the major problems regarding result assessment is the partial lack of data; there are no sufficient or adequate data available (Bakucs et al., 2013; Desjeux et al., 2015; Slee et al., 2015; Kinsella et al., 2010). In many cases, the evaluation documents are written in the national languages, wherefore exchanging information and experience becomes limited. Another problem is that

the conclusions and recommendations of existing evaluations are not considered in the planning process of the next programming period (Andersson et al., 2017).

The overlap between funding schemes makes it difficult to separate the effect of individual funding sources, raising several problems of methodology. Many studies report about difficulties in separating effects (Bakucs et al., 2013; Wakeford, 2010; Michalek et al., 2012). Since rural areas and their development are complex challenges, some studies recommend using complex indicators that allow for the analysis of global effects (Bakucs et al., 2013; Michalek et al., 2012).

Another approach is to choose one type of funding scheme and focus on its effects. A good example is a study carried out by Bonfiglio et al. (2017), who focus only on the effects of knowledge transfer and innovation. Caruso et al. (2015) examine only the effects of Measure 121, while Furmankiewicz et al. (2016) analyse the effects of LEADER programmes on civil society. Sarvašová et al. (2017) chose to examine the effects of the Natura 2000 programme.

The Common Monitoring and Evaluation Framework (CMEF) is a common evaluation methodology combining quantitative and qualitative methods, used to assess EU rural development programmes within the 2007–2013 programming period. It is a complex system containing 160 hierarchical indicators (83 measuring outputs, 12 measuring results, 7 for the impact, 36 for objective-related baseline indicators, and 23 context-related baseline indicators) and 140 common evaluation questions. The advantage of the CMEF lies in its comparability and standardized form, which might be a disadvantage in certain cases as it might not consider the unique characteristics of projects. Most indicators are quantitative and are less concerned with the qualitative nature of project implementations (why and how).

A comparative study carried out by Terluin and P. Roza (2010) takes into account the CMEF and groups the impact studies of rural development programmes into 5 categories. The first category includes the CMEF used to analyse the impact of EU programmes – this involves both quantitative and qualitative elements. The second category includes the Tally approach, which simply counts the number of achieved objectives. The third is an econometric approach to efficiency analysis. The fourth relies on modelling when measuring impact, while the last one is a combination of quantitative and qualitative assessment in the form of a case study. The latter is thus capable of examining both direct and indirect impact.

Most of the impact analysis concerning the 2007–2013 programming period were produced after the period or much later since the impacts of the projects became visible and quantifiable only later (Andersson et al., 2017; Slee et al., 2015; Sarvašová et al., 2017; Furmankiewicz et al., 2016; Desejeux et al., 2015; Caruso et al., 2015; Bonfiglio et al., 2017).

The preconditions of a good evaluation are adequate time and available data but also the initial goal of the project. In the 2007–2013 programming period, sustainability was a strategic goal. In the case of rural development programmes,

a key performance indicator is sustainable growth, but the operationalization of sustainability and its measurement remain in the background, wherefore we have only a few studies on the topic. Sarvašová et al. (2017) set out to analyse the impact of the Natura 2000 programme. The Natura 2000 programme is concerned with the conservation of endangered species on EU territories; its main goal is the preservation of biodiversity. In some countries (Romania is not among them), territories participating in the Natura 2000 programme entitle the owners of the land to receive compensation for missed opportunities to generate income, and the study is concerned with the impact of these payments in 7 countries (Belgium, Hungary, Czech Republic, Germany, Slovakia, Greece, Lithuania). The study examines Measure 224, also known as Natura 2000 payments, using context analysis. Results of the study show that there are major problems with the implementation of Measure 224, the amount of compensation given, and the restrictions placed on owners show significant discrepancies. Contrary to initial expectations, only half of the forests and 1/3 of forest associations are eligible. Implementing countries spent 92% of their budget. Unfortunately, there are no data on the conservation of biodiversity, and therefore the study cannot report on that.

Slee et al. (2015) also analysed sustainability and environmental impact of the rural development programmes. Their paper examines the 2007–2013 EU rural development programmes and specifically their impact on climate change. The impact study has been conducted on the Scottish rural development programmes. According to the authors, measuring the effects of climate change in relation to rural development is in its early stages, and there is need for better measuring criteria as well as instruments that are necessary to analyse the effects of rural development programmes and climate change.

Rural development is closely connected to agriculture, and for this reason the agricultural sector also receives funding from rural development funds to develop farms, increase competitiveness, agricultural product processing, and environmental protection.

Desjeux et al. (2015) compare France and the Netherlands, analysing environmental protection funds and rural development funds given to the agricultural sector. They highlight the environmental impact farms have on the environment and biodiversity. The research compares two distinct periods: 2000–2006 and 2007–2013 on a national level and on the level of NUTS 2 development regions. The authors claim that certain programmes and payments have delayed effects, especially in underdeveloped regions (in the period of 2000–2006). In the 2007–2013 period, this effect can be felt on a national level.

Pelucha et al. (2017) also believe it is important to stress that rural development is still mostly focused on agriculture. The aim of their paper was to evaluate agricultural and non-agricultural funding between 2004 and 2013. The analysis focused on correlations and targeted agricultural lands and counties receiving

subsidies, comparing them with the characteristics of financed sectors. According to their results, there is no obvious correlation between the amount of financing and the socio-economic situation. Most of rural development policies are not in line with the socio-economic dimension of cohesion policy.

Furmankiewicz et al. (2016) also analyse the effect of rural development funds on non-agricultural sectors. Authors consider the civil sector to be of key importance in rural development, and for this reason it is interesting to examine EU funding sources for this sector and the effects thereof. One of the core elements of intrinsic development is the civil society, which is or would be capable of using local knowledge and resources. Authors have found that a certain part of EU funds, such as the LEADER programme, enable the involvement of the third sector in the decision-making process of local rural development. This effect has been shown by analysing two closed LEADER programmes (Poland's LEADER + Pilot programme (2004–2006) and the LEADER 4th Axis in Rural Development Programme (2007–2013). There was a significant increase in the number of third-sector organizations thanks to these two programmes. However, receiving funds did not increase the influence of the civil society and its presence in local decisions and government.

The major objective of the 2007–2013 programming period was knowledge transfer and fostering innovation in rural areas. In line with the new trends, knowledge transfer and innovation are becoming more important in rural areas (sometimes only in theory), which might become an important factor in achieving sustainability. Innovative and knowledge-based sectors might have an advantage in rural areas. These sectors do not pollute the environment, have a high added value, and might retain the local young population and qualified workforce. In this context, we need to mention the study of Bonfiglio et al. (2017), who examine the spatial effect of knowledge transfer and innovation in the 2007–2013 period. They highlight the factors which had the most influence on accessing rural development funds. Their focus was on the differences between rural development programmes on NUTS 3 or county level. They observed a disproportionate concentration in favour of urban areas. According to the authors, this inequality comes from both top-down financing programme design and the ability to access funds (Bonfiglio et al., 2017: 83). Funding for knowledge transfer and innovation was concentrated in urban areas (in Romania, only Bucharest had a significant number of winning projects). Authors found positive correlation between grants received on knowledge transfer, innovation, and population density, but there was a negative correlation with the size of agriculture. Based on their findings, the authors suggest that those regions (counties) that are most in need of knowledge transfer and innovative investments chose to invest in less innovative, short-term measures, resulting in counterproductive outcomes. In other words, rural areas will become less innovative, and the gap between urban and rural areas will continue to grow.

Several papers formulate recommendations for the CMEF. One of them suggests that it would be important to pay attention to spatial effects as well as national, regional, and local particularities; furthermore, complex indicators may make evaluation easier (Desjeux et al., 2015; Slee et al., 2015; Bakucs et al., 2013). According to Slee et al. (2015), CMEF work with unreliable indicators as far as land use and climate change are concerned. Their recommendation is that we could improve the measurement of climate change. They suggest that we could measure the effects of land use and greenhouse gas emission with the help of new indicators such as emission per household or emission per output unit.

Andersson et al. (2017) analyse whether impact studies and result evaluations had any effect on future rural development policies, on planning the next programming period and whether impact studies had any influence on regulation. Their results show that although the EU Commission is convinced of the importance of evaluation in rural development, the results somehow failed to influence the planning of the next programming period (this is true for both national programmes and regulations which seem to change under external pressure). The authors believe that this might be possible due to the vagueness of recommendations and inaccurate feedback. On the other hand, many studies are written in the national language of member states, which makes knowledge sharing more difficult.

In conclusion, it can be said that several studies have been conducted on the topic of accessing rural development funds, but in order to fully understand their impact we need further studies over longer periods of time and more complex methodology. In what follows, the paper presents the research methodology and the results of the current study with the hope that they might contribute to the previously described line of research.

2. Materials and Methods

Data and Methods of Analysis

The present study includes the analysis of two periods of rural development data available for Romania, on a county basis. On the one hand, it analyses data referring to the period of the Special Accession Programme for Agriculture and Rural Development (SAPARD, 2002–2006); on the other hand, it deals with the data of the first half of the first Rural Development programming period, i.e. 2007–2012. (The official EU programming period was planned between 2007 and 2013; however, Romania was among the "N+2" countries, meaning that they could implement and account for rural development funds by the end of 2015. Therefore, the year 2012 can be viewed as an interim period.) The dataset consists

of data referring to the applications in both periods (the number of applications and the amount of required grant for each call for applications), demographic and economic data on county level (GDP, no. of active companies, etc.), data referring to those sectors which were affected by the applications (tourism, agriculture), and some data on the infrastructure. The exact year of closing the application is unknown, only the end of the programming period, wherefore indicators are calculated for a period of time, using either periodical average or calculated changes within a given period. Data come from the Romanian National Statistics (INS) website and the official website of the Ministry of Agriculture and Rural Development and Regional Development Agencies. In what continues, the results will be presented according to the different methods of data analysis – first presenting the results of the descriptive statistics and then the findings of the correlation analysis followed by the cluster analysis.

3. Results and Discussion

Descriptive Analysis

The aim of the present paper was to examine who are the winners of rural development applications and who are those who have failed to win.

Table 1 contains relevant data – according to the number of applications, Călăraşi submitted the lowest number, while Alba County submitted the highest number of applications. Cluj County received the highest amount of funds, while Covasna County received the lowest amount. The per capita distribution of the funds was the highest in Bistrița-Năsăud County and the lowest in Bacău County. If we look at the data, we can see some differences. Those who submitted the largest amount of applications submitted ten times more than those on the lower end of the spectrum. However, if we look at the sum of the money granted, the difference is only 3.7-fold, and the per capita distribution is higher in the case of those who submitted less applications.

Table 1. *Rural development applications submitted in Romania between 2007 and 2012*

	Minimum value/county	Maximum value/county	Max./Min. coefficient	County average	St. deviation
No. of applications	428	4,561	10.7	1,541	915
Value of applications (EUR)	55,325,733	205,283,378	3.7	117,041,322	40,790,054
Value of applications/capita	106	557	5.3	255	111

Source: own elaboration based on data retrieved from the National Institute of Statistics (INS) and the Regional Development Agency

The table above should be completed in the future with values referring to the per capita distribution of the funds in the case of rural inhabitants as this indicator would show us the differences that emerged among those affected.

Results of the Correlation Analysis

Correlation analysis was used to investigate and to answer the following research questions and hypotheses:

H1: There should be some correlation between the results of the first programming period and the results of the current programming period.

RQ1: What is the relationship between SAPARD and Rural Development programmes?

H2: The received rural development funds must have had an effect on the target regions.

RQ2: Are the effects of rural development funds visible in the respective target regions?

Correlation is used to measure the strength and direction of the relationship between variables. Linear correlation shows the relationship between two variables and the correlation coefficient has to be between -1 and 1. The stronger the relationship between the variables, the closer will be the value to -1, and whether it is minus or plus reflects the direction of the relationship.

A value above 0.7 means a strong relationship, values between 0.2 and 0.7 are considered to reflect a relationship of medium strength, while values below 0.2 show a weak relationship between variables. The squared correlation coefficient (also called R squared) denotes the coefficient of determination, which shows the proportion of the variance in the dependent variable that is predictable from the independent variable.

For testing the first hypothesis, I examined the correlation between the number of submitted applications, the received amount of funds, and the per capita distribution of funds in the case of both the SAPARD and the rural development funds. There seems to be two, not very strong relationships – on the one hand, there is an inverse relationship (negative correlation) between the received amount of SAPARD funds and the per capita distribution of rural development funds. I believe this might be the result of the fact that during the SAPARD programming period the largest amount of funds were received by the large rural infrastructure projects; therefore, if a county had implemented more projects of this kind, then most probably at the beginning of the following programming period they could not apply for such big funding, and so the per capita distribution of the funds is lower.

The positive correlation between the number of submitted SAPARD applications and the received amount of rural development funds shows the "learning" effect – namely, in those counties where they learned how to apply for projects starting

with a smaller amount of funds, by the next programming period, they would have learnt how to write adequate applications and received a larger amount of funds. Therefore, it can be said that the first hypothesis has been validated. There is indeed an observable relationship between the first programming period and the following one; however, this relationship is rather weak.

Table 2. *SAPARD projects and Rural Development projects – correlation coefficient*

		Value of rural development applications	Value of rural development applications/capita	No. of rural development applications
Value of SAPARD applications	Pearson correlation	.225	-.343*	-.075
	Sig. (2-tailed)	.163	.030	.646
Value of SAPARD applications/capita	Pearson correlation	-.084	.203	-.036
	Sig. (2-tailed)	.608	.209	.825
No. of SAPARD applications	Pearson correlation	.346*	-.177	-.080
	Sig. (2-tailed)	.029	.276	.623

Source: own elaboration

The second hypothesis refers to the changes that can be observed within the target region or economic sector as a result of accessing development funds. In the case of infrastructure projects, the relationship between the number of projects, received funds, and the value of projects/capita and the changes in modernized roads, water supply network, and sewerage network was examined.

There is a strong correlation between the number and value of infrastructure projects and the length of modernized public roads. This is the result of large infrastructure projects submitted in this programming period and used for modernizing and mending roads. It is interesting that there is no strong correlation between changes in the sewerage network and the value of projects per capita. What is more, water supply network does not even appear in the statistics though it is usually constructed together with the sewerage network. I believe there are two explanations for this situation: on the one hand, in most cases, the water supply network was constructed in the first programming period, and the number of those constructed later is not significant. On the other hand, in most cases, complex projects were submitted for the renewal and modernization of the water supply network, but this change does not appear in the statistics as the size of the network did no extend.

Table 3. *Correlation between infrastructure projects and infrastructure indicators*

		Length of public roads average 2007–2012	Length of sewerage network changes 2007–2012
No. of rural infrastructure projects	Pearson correlation	.466**	.199
	Sig. (2-tailed)	.002	.219
Value of rural infrastructure projects – EUR	Pearson correlation	.444**	.228
	Sig. (2-tailed)	.004	.157
Project value/capita – EUR	Pearson correlation	.257	.347*
	Sig. (2-tailed)	.110	.028

Source: own elaboration

Statistical data referring to tourism projects shows interesting changes, i.e. in case of many counties there is a dramatic decline in tourist accommodations. These data clearly reflect the process of market clearing and changing, meaning that the old socialist accommodation types (camping and hotels) are slowly replaced by new types of accommodations in a totally different hospitality system such as pensions or holiday chalets (data on latter is usually missing from statistical databases). As it can be seen from *Table 4* below, this effect was adequately balanced by the implementation of several projects. Thus, it can be said that there is a positive relationship between the number and value of the projects and the number of tourist accommodations, but the decline in accommodation could not be stopped or reduced (it was not necessary because of the transformation of market demands). However, data also shows that within the examined period these implemented projects and the growth in the number of accommodations did not result in the increase of nights spent. This can be explained by the assumption that implementing these projects only expanded the accommodation facilities, but touristic programmes and other important services did not extend.

Table 4. *Correlation between tourism projects and relevant indicators*

		Tourist accommodation establishments – average 2007–2012	Tourist accommodation establishments – changes 2012–2007	Accommodation capacity – average 2007–20012	Accommodation capacity – changes 2012–2007	No. of tourism nights spent – average 2007–2012	No. of tourism nights spent – changes 2012–2007
No. of tourism projects	Pearson correlation	.323*	.408**	.004	.258	.098	.152
	Sig. (2-tailed)	.042	.009	.980	.109	.546	.348
Value of tourism projects	Pearson correlation	.308	.405**	.002	.255	.099	.137
	Sig. (2-tailed)	.054	.009	.992	.112	.541	.400

Source: own elaboration

For what regards agricultural funds, I examined the changes in the case of all types of livestock, agricultural lands, or machinery, but very strong positive correlation was found only between one type of livestock and the value of agricultural funds. However, it needs to be mentioned that such strong correlations are the result of not only the rural development funds but also of other agricultural subsidies.

Table 5. *Correlation between agricultural funds and relevant indicators*

		Agricultural land – average 2007–2012	Cattle population – changes 2012–2007	Tractor, agricultural machinery – average 2007–2012	Value of agricultural production – average 2007–2012 (thousand RON)	Value of agricultural production – changes 2012–2007 (thousand RON)	Value of crop production – average 2007–2012 (thousand RON)
Value of agricultural projects – EUR	Pearson correlation	.647**	.142	.582**	.498**	.572**	.544**
	Sig. (2-tailed)	.000	.383	.000	.001	.000	.000
Value of agricultural project/farm	Pearson correlation	.384*	.520**	.251	.104	.391*	.160
	Sig. (2-tailed)	.014	.001	.118	.523	.013	.323

Source: own elaboration

A similar analysis on agricultural funds was carried out by Caruso et al. (2015), who compared the region of Apulia in Southern Italy and Lithuania in the 2007–2013 period. They were interested in Measure 121 of the rural development

programme and examined the effects of these rural development programmes on the regional and national agricultural system. Their findings show that in the case of Lithuania the large number of smaller projects led to a more uniform development helping entrepreneurs, while in Italy larger projects won the funding.

In the case of the present research, both hypotheses have been validated; correlation can be found in both cases but in a very different direction. The strongest relationships can be found between the value of agricultural funds and agricultural indicators; however, this strong relationship is not only the effect of rural development funds.

Cluster Analysis

Cluster analysis is a dimensional reduction process that results in the observation being grouped into similar groups (Sajtos–Mitev: 283, Székelyi–Barna: 109). As a result of the analysis, the observed units are divided into homogeneous, very similar groups, and the groups are clearly distinguishable from each other.

Cluster analysis is used to test the following hypothesis: counties with similar characteristics show similar performance in accessing funds. The study set out to examine the following research questions: in what categories can we include the counties? What similarities are there between well-performing and poorly performing counties? Is there any change compared to the first programming period?

Sajtos–Mitev (284) draws our attention on some limitations of cluster analysis:

– In this case, there is no single good solution (belonging to the cluster depends on the chosen method). I tried several procedures until I got a meaningful result. Bakos et al. (2014) used factor and cluster analysis to compare rural development programmes in Romania and Hungary. Their results show that there is a correlation between the GDP of a county and the received amount of funds (this correlation is even stronger in the case of Hungary). They identified two factors: amount of funding for a certain agricultural activity and funding per population. These factors were used in the cluster analyses. The clusters identified in Romania are more difficult to explain, and in my opinion the authors have failed to identify clusters that correspond to reality. Therefore, I believe they should have introduced other indicators as well, as it will be shown later.

– The emerging segments are not independent of the observed database order (323–324), and I received different clusters by changing the order of data.

– As a result of the analysis, clusters will always be created, even if this cannot be identified and cannot be evaluated in the actual dataset.

– It is very important to have relevant and theoretically justifiable variables in the dataset as this determines the results. I had tried many indicators and

verified (cleaned) indicators until I arrived at the best explainable cluster with the following indicators: value of funds, number of projects, number of unemployed people, number of active companies, size of agricultural land, number of rural population, and GDP/capita.

When looking at the outliers within the dataset, it could be observed that Bucharest and Ilfov counties differ from all other counties in many aspects. Since it is an economic and social agglomeration, every indicator of it can be double or even triple of the other examined counties (GDP, number of population, rates of payments, etc.), but this area cannot be said to be rural, and so it is not the target area of rural development resources. Therefore, these counties are not relevant from the perspective of this study either. Thus, Bucharest has been eliminated from the database to avoid any distortion of the values. Similarly, Ilfov County is not a rural area and shows very different data.

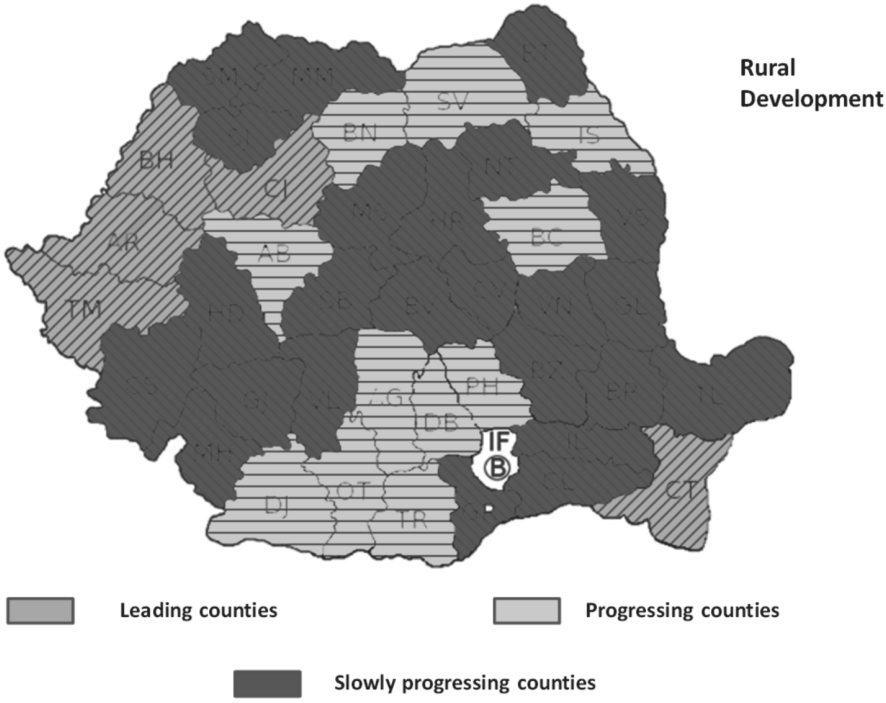
If the data shows different values, it is necessary to standardize, meaning that the average is subtracted from each of the values, and then the difference is divided by the standard deviation (the average of the standardized scale is 0, its standard deviation is equal to one, the positive values are above average, and the negatives are below average). There was a need for standardization in our database as well. To what extent do the variables of the study correlate? In this case, it is important to filter the variables with very high (above 0.9) correlation coefficients since the combination of the two leads to distortion (Sajtos: 289). By checking this condition, I performed the cluster analysis. I used K-means cluster analysis, while the variance analysis showed the indicators to be appropriate for the examination.

Table 6. *Cluster analysis – ANOVA*

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Z score: no. of projects	4.131	2	.831	37	4.973	.012
Z score: total value of projects	9.649	2	.532	37	18.121	.000
Z score: no. of unemployed	5.362	2	.764	37	7.017	.003
Z score: no. of active comp	9.986	2	.514	37	19.418	.000
Z score: size of agr. land	8.205	2	.611	37	13.439	.000
Z score: GDP/capita 2007–2012	7.791	2	.633	37	12.308	.000
Z score: no. of rural population	7.911	2	.626	37	12.629	.000

Source: SPSS table of results

Clusters have been created after four repetitions, and they were entitled as follows: leading, progressing, and slowly progressing counties.



Source: own elaboration

Figure 1. *Distribution of clusters in the case of Rural Development projects*

1. The 11 counties within the progressing category could be characterized as medium-developed counties and as good applicants.

2. The 5 leading counties are actually developed counties and efficient applicants.

3. The cluster of slowly progressing counties includes 24 members and is made up of economically disadvantaged and inefficient applicants who did not perform well in accessing funds.

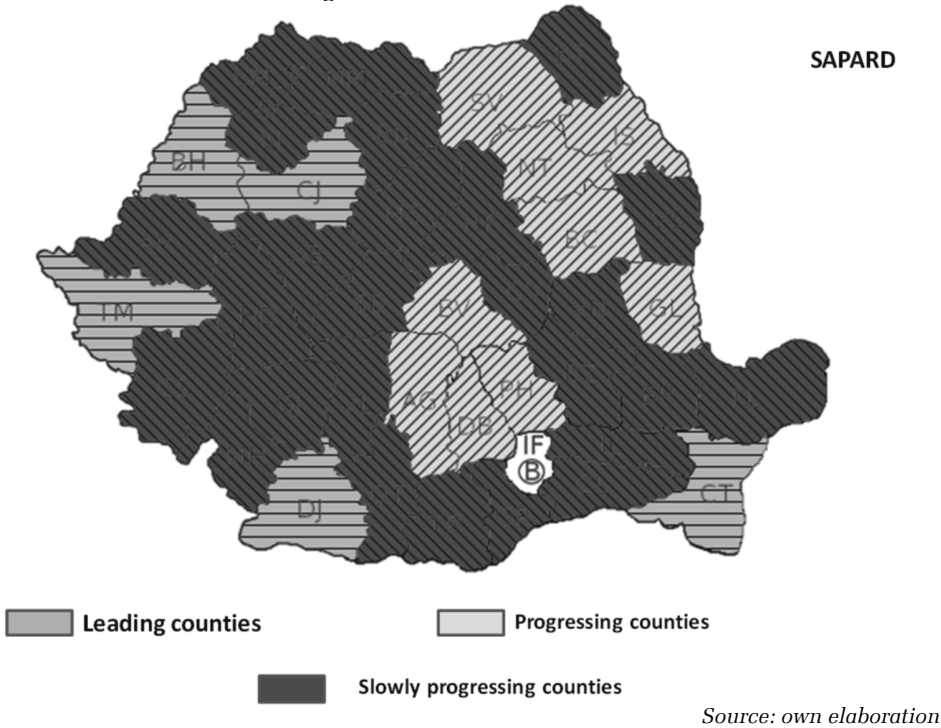
The characteristics of the leading counties are the following: they performed the best regarding the value of the projects; they achieved good results in the number of projects; the number of rural population and the unemployment rate shows medium values. Here can we find the largest number of active companies, the highest GDP/capita, and the biggest sizes of agricultural land.

The characteristics of progressing counties: they are the best regarding the number of projects; however, the unemployment rate and the size of the rural population is high, and they achieved medium values regarding the total value of projects, GDP/capita, and the number of active companies.

The slowly progressing counties fall behind all aspects and categories. We can find Braşov and Sibiu counties in this cluster; however, from an economic

perspective, they should belong to a cluster with better results – the only possible explanation could be their poor performance in accessing funds.

Using the same indicators, the cluster analysis has been run on the SAPARD data as well, and similar changes could be traced.



Source: own elaboration

Figure 2. *Distribution of clusters in the case of SAPARD projects*

In the case of SAPARD data, the leading counties had the greatest number of projects and showed good economic indicators. The progressing counties have efficiently accessed big funds with greater values and their economic indicators show medium values. Slowly developing counties include those counties which performed poorly in accessing funds and they were also economically lagging counties.

Map names and cluster accuracy are not the best, but the difference between the two maps captures a very important social transformation/change: on the one hand, we can see the strengthened position of the western counties (Bihor, Arad, Timiş, and Cluj), while at the same time those counties which managed to effectively access funds could not gain any significant advantages as the value of the grant was not large enough to overcome the existent economic conditions.

4. Conclusions, Recommendations, and Future Prospects

In conclusion, it can be said that accessing rural development funds and their effects could be analysed using the methods presented above (descriptive statistics, correlation and cluster analysis). Based on the above analyses, we were able to identify some explanatory factors. Unfortunately, some factors have imposed limitations on the analysis such as lack of data, no knowledge of the projects' initial objectives, results, start and completion date, incompleteness of related statistics, and their not being updated in due time. The complexity of the research setting, of rural areas is another source of complication.

Furthermore, we cannot separate the effects of other projects and programmes which have overlapping objectives (National Local Development Programme, Regional Operational Programme, etc.). Therefore, in future research, it would be interesting to compare different funding sources and data. It is possible that accessing local development funds and EU funds are negatively correlated, but validating such hypothesis would be the topic of another research.

Based on the results, it can be said that if we only consider the results of descriptive statistics we can notice a significant difference among the counties' ability to access EU funds. The most successful county accessed five times more funding than the least successful one. Further analyses should also include a per capita amount of funding received. This indicator would point out the differences between target group members. It would also be interesting to compare the present results with those obtained after the end of the programming period because experience shows that towards the end of the programming period there is a greater interest in submitting project applications, and hence there is an increase in the number of successful projects. In the next stage of the research, we could analyse available local funding and their cycle – this would allow for a more precise description of the effect of rural development programmes.

Based on the correlation analysis, we can see that agricultural funds had the most significant impact (even though there is a significant proportion of land-based funding and other agricultural funds which had a greater effect since they provided farms with larger grants). In the case of agricultural funding, there is a positive correlation between changes in livestock (cattle), agricultural production, and the number of tractors and other farm machinery. The effect of funding can be felt in tourism as well (there is a noticeable correlation between successful projects and the number of hospitality units), but a stronger effect and more positive correlation is to be expected in the future. In the case of infrastructural development projects, the effects are already visible and there will not be any significant changes at the end of the programming period. There is an interesting connection between the results of the current programming period and the results of the SAPARD projects in the previous period before the accession. This

can be explained by a learning effect – those who submitted more applications in the previous period were now able to access funds for larger projects. It is also interesting that there is negative correlation between the size of the projects in the previous period and the number of projects submitted in the current period. Probably, those who applied for larger grants in the previous period did not apply for large grants in the current period.

The results of the cluster analysis show that successful projects had a positive influence on certain counties (mostly western counties such as: Arad, Bihor, Timiş, and Cluj), while others missed this opportunity. It would be interesting to examine these results at the end of the programming period and maybe find more appropriate cluster names.

All in all, results show the positive changes of EU Rural Development projects and the development of targeted areas in Romania. However, the western counties of Romania were able to make better use of the obtained funds and thus were able to achieve better general development.

Recommendations:

– In order to avoid or reduce problems caused by the double planning delay, a part of the available funds should be withheld to cover unpredictable changes, to allow for a more flexible adaptation, and to focus more on specific local needs.

– The agricultural dependence of rural development could be reduced by measures aimed at the general development of rural areas, which help rural areas in accessing and using new forms of knowledge (such as IT skill development for the elderly or for those who need it, IT-based social reference services, etc.).

– In the case of poor, lagging settlements, a better development could be achieved with the support of a local development and programme-planning specialist, who would only deal with the planning, preparation, and submission of EU projects. However, it would also be important that this specialist be employed not by the local councils but work on behalf of an EU agency as poor settlements could not afford to hire an appropriate specialist at their own expense.

Some further steps of the present research might include analysing longer programming periods and comparing the results obtained with other development funds (local development funds, Regional Operative Programme). Background factors that influence settlements' abilities to access funds could be analysed by comparing groups of settlements that were able to win a lot of projects and another group of settlements who were not successful in accessing EU rural development funds.

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Sapientia Hungarian University of Transylvania
RO 400112 Cluj-Napoca
Str. Matei Corvin nr. 4.
Email: acta-econ@acta.sapientia.ro

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