
KNOWLEDGE AND PERCEPTIONS OF ACTUARIAL SCIENCE AMONG STUDENTS AND ACADEMICS: THE CASE STUDY OF JABU

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Abstract

The study discusses the link between actuarial science and insurance, and how the growing importance of investment in the latter operation has increased the role of actuaries in financial world. Attempts were made to find out reasons why few students do actuarial science; knowledge and perceptions of people (KPP) about actuarial science in Joseph Ayo Babalola University (JABU), one of the institutions offering actuarial science in Nigeria were sought. Descriptive method was used to analyze the data generated from 220 participants (194 students and 26 academics) randomly selected from four colleges of the university. The result of the findings shows that more than 96 percent of respondents in the survey mistakes actuarial science for insurance or do not have an idea of what actuarial science is. The study also reveals that since insurance industry cannot survive without active roles of trained actuaries and that no any economy in the world over can survive without active role of insurance, it becomes necessary to create awareness programmes in actuarial profession, in order to train and bring up more actuaries for the growing up of insurance industry.

Keywords: *Mathematics, Actuaries, Insurance and Actuarial Prospects.*

INTRODUCTION

Most students who go to universities where actuarial science is offered are told that actuarial science is another name for insurance. Unfortunately, many Nigerians have negative impression about insurance - perceived as a "legalized fraud business" organized to dupe unsuspecting members of the public. This group of persons had not been disillusioned of this negativity over time.

Although the manner in which many insurance companies operated before the industry was consolidated in 2007, as well as the present mode of hiring graduates for marketing their policies on commission basis seems to explain why students do not like to study insurance or actuarial science. Rather, they prefer to study popular courses which they believe will lead to employment opportunities after graduation. Since actuarial science is not well known even among the policy makers in Nigeria, works which are jurisdiction of actuaries are given to accountants, economists and business graduates to do. Coupled with this low level of awareness, it is very rare to see on the pages of newspapers where employers of labour in Nigeria deem it fit to invite actuarial graduates to apply for the positions they are suitably qualified for.

However, following the introduction of defined contribution (DC) into pension system in 2004, many studies have emphasized the need to train and bring up more actuaries for the growing up of economy through insurance and pension industries. In

response to this need, sometimes ago, a group of professionals such as accountants, economists, statisticians etc who perhaps had never taken any actuarial course at all, organized themselves into actuarial professional bodies to be providing actuarial training to those who want to be professionally qualified. Fortunately, the attempt was intersected by concerned actuaries by stopping the Bill sponsored by these fellows in the National Assembly. This incident indicates the lack of clarity on the role of other professions and actuarial science.

For awareness purposes, this study reveals the career prospects in actuarial science and ensures that the development of the course in Nigeria does not follow the negative part through which insurance companies have been perceived. In fact, many Nigerians view insurance differently. Adeyele (2011) revealed that insurance industry which supposes to take a lead in finance sector towards economic sustainability in the country has not been able to win public acceptance. Osipitan (2009) also confirmed this that insurance system as it is today means different things to different people in Nigeria. Osipitan cited in Adeyele (2011) revealed that Nigerians neither trust nor know anything about insurance systems due to sharp practices perpetrated by some who joined the industry in the past but known to have failed in other professions. This may not be unconnected with lack of regulatory framework to monitor the market participants which led to *laissez faire* between 1922 and 1960. The pre-1961 arrangement definitely gave rise to the feeling among Nigerians that insurance was less complex and less demanding and could be more easily run than banking.

As retirement system move from accumulation phase to payout phase, the number of actuaries in the country may not be adequate to handle retirement challenge. This will in turn lead to temptation of using non-actuaries who may not understand the technicality involved to solve retirement challenge. The decreasing number of students turning up for actuarial course annually in institutions where the course is offered calls for concern. In this study, the readers will learn areas of career opportunity open to graduates of actuarial science.

The paper will be of great value to the general public, especially, those who need to manage financial risk in their businesses.

STATEMENT OF THE PROBLEM

Actuarial science as a field of study had been offered for more than thirty years in Ahmadu Bello University and University of Lagos. Until 2005, these two institutions had been the only universities in Nigeria providing career training in actuarial science at undergraduate level. In spite of this long existence, it appears that most graduates and the current students from these universities as well as newly established universities Joseph Ayo Babalola University, Redeemer's University, Salem University and Ibrahim Badamosi Babangida University, presently offering the course do not know what actuarial science is all about.

Although there are some elites who claimed to have knowledge of actuarial science but have continued to misinform the general public that 'actuarial science' is another name for insurance. It will not be surprising therefore to hear staff members of universities where actuarial science is offered saying the course is insurance. The vague idea of what actuarial science is all about among the elites reached its peak when the course was presented for accreditation by two universities in 2009. They presented *B.Sc. Actuarial Science* for accreditation exercise. Surprisingly, when the National University Commission's report came out, instead of it stating *B.Sc. Actuarial Science* denied or accredited, the report simply read

Insurance accredited in one of these universities, and Insurance denied in the other. In fact, in the university where insurance was accredited by the NUC, the course was just introduced into the department and was not presented for accreditation.

Also, it must be mentioned that there are some of those who studied insurance as a course who do not know what actuarial science is all about. It has been identified that some holders of B.Sc. Insurance who had worked in insurance industry but presently teaching insurance in universities also sometimes mislead the university community that graduates of actuarial science work for insurance graduates. They believe that a graduate of actuarial science cannot work in other establishment because of their vague idea about the career opportunities in actuarial profession. This has generated serious tension between the two fields of study. The insurance advocates always claim that actuarial science covers only one tenth of insurance (life aspect) but actuarial advocates are not too pleased with the strategy used by the insurance advocates to increase their students' enrolment.

Because of lack of knowledge about career opportunities in actuarial science, the few people who are aware of this profession tend to avoid studying the course. Although there are few honourable exemption of students who are aware of the course but avoid studying it due to their perceived mathematical contents of the course. Nevertheless, this study attempts to assess the knowledge and perceptions about actuarial science among students and lecturers in Joseph Ayo Babalola University (JABU).

REVIEW OF RELATED MATERIALS

Historical Development of Actuarial Science

The origin of modern insurance can be traced back to Great Britain. The insurance industry in this part of the world had once operated without the help of actuaries, but could not stand the test of time as the policyholders could no longer rely on insurance companies for the promised financial protection. For example, in 1740 not less than 47 insurance companies were registered in Great Britain but all went out of operation before 1748 because no actuaries then to manage the financial risks confronting the companies (Hickman, 2004). This incident led to development of mathematical methods to solve financial problems in insurance.

In fact, 17th century was a period of extraordinary advances in mathematics in Germany, France and Britain. At the same time there was a rapidly growing desire and need to place the valuation of personal risk on a scientific basis. Independently from each other, compound interest was studied and probability theory emerged as a well understood mathematical discipline. Previously an important advance came in 1662 from a London draper named John Graunt, who demonstrated that there were predictable patterns of longevity and death in a defined group or cohort, of people, despite the uncertainty about the future longevity or mortality of any one individual person. This study became the basis for origin of life table (see http://en.wikipedia.org/wiki/Actuarial_science). It was therefore made possible to set an insurance scheme to provide life insurance or pension for a group of people, and to calculate with some degree of accuracy, how much each pension in the group should contribute to a common fund assumed to earn a fixed rate of interest. The first person to publicly demonstrate how this could be done was Edmund Halley (Hickman, 2004). He wrote an article entitled: ***'that the price of insurance on Lives might be regulated by age of the person whose life insurance is made'***. James Dodson followed this idea and on being refused assurance by Amicable on account of his age 'determined to form a new

society on a plan of assurance on a more equitable terms than those of the Amicable, which takes the same premium for all ages' (Chartered Insurance Institute, 1999).

As a result, Equitable Society was formed in 1762 and transacted business on the basis suggested by Dodson (Chartered Insurance Institute, 1999). They were able to offer life assurance on level premiums, which were dependent upon the age of the person when he took out the policy. This was significantly different from the previous insurance companies. Also, the Equitable Society offered a whole life policy that paid the sum assured on death of the assured person. This was possible as the work of Dodson and others had introduced an element of science into the business of knowing how much to charge. This science is now known as actuarial science. Other insurance companies which did not originally use such mathematical scientific methods suggested by Dodson most often failed or were compelled to adopt the methods pioneered by Equitable (Buhlmann, 1997; Chartered Insurance Institute, 1999).

The term actuary which was derived from latin 'actuarius' denoting the clerk who recorded the proceedings of the senate, court or similar body, was first used by the society for Equitable Life Assurance in 1762 for its chief officer. Previously, the use of the term had been restricted to official who recorded the decisions, or 'act', of ecclesiastical courts (Fellow Institute of Actuaries, 2004). However, the term is now used to describe someone who studies actuarial science, which has grown to a world class profession that serves public purpose. The formation of society for Equitable Assurance on Lives and survivorships in 1762 as mutual company, initiated a process that created a public purpose for actuaries (Hickman, 2004).

Changing Role in Actuarial Science

In the earlier days, actuarial skills were only applied to insurance industry. Most of those who thought of themselves as actuaries then were employees of life insurance companies and hence part of the industry. The few consulting actuaries providing actuarial services to smaller companies closely associated with the industry. "This close connection between the actuarial profession and insurance industry is largely a thing of the past" (Trowbridge, 1989:4).

Today, the systematic body of knowledge which actuarial science lies has changed the scope of the financial security systems that actuaries design and manage. "When there developed an actuarial role in the design and management of old-age income social security systems, demography and microeconomics become part of this systematic body of knowledge" (Hickman, 2004). The uniqueness of actuarial science which lies in actuary's understanding of investment policies of premiums, and the inner working of the many different types in particular.

The mathematicians and economists can, of course, postulate all sorts of models and approaches here, but it is the actuary who will need to choose the specific methods and data to use, so to be able to stand by the results and accepts the real-life consequences of being wrong. So actuaries are very much of persons of judgment rather than one who simply applies techniques.

The growing importance of investment performance in insurance operations, the volatility in financial markets and emergence of investment-link insurance contracts are creating the need for actuaries to develop skills to address variable cash-flow for life insurance for greater performance of investment. For a general and systematic method to

address the variable cash-flow requirements for life insurance, the actuarial techniques have moved to the concept of asset shares which involve a projection of cash-flows based on particular policy characteristics and experience assumptions (including gross premiums, investment returns, expenses, costs of insurance, lapses, policyholder dividends, taxes, etc) that the actuary feels are relevant for the purpose of the calculation (Yam, 2011).

Aspects of insurance where actuarial science has been applied are the asset share calculations for calculating premium rates, setting surrender cash values, establishing dividend scales, assessing profit signatures, testing solvency, making projections for policyholder illustrations and determining embedded values. Apart from mathematics, probability and statistics, actuarial profession has to cater for other social aspects including finance, economics, social expectations, legislation, prudential regulations, practices of other related professional bodies, technology advancement, etc. Hence, actuarial science is better describe as a business profession rather than mathematical techniques, and it is informative to reveal that this discipline is needed in all areas of business because of financial risks that need to be professionally dealt with. For example, business today is, more than ever before, fraught with uncertainty and pressure. The need for a business to perform competitively, and yet respect the interests of its customers and the economic setting it operates, poses some special problems (Adeyele, 2011). The changing role in actuarial science is a way of tackling the operational issues to which financial business is exposed, particularly where there are significant financial uncertainties in running the business (Adeyele and Maiturare, 2012).

Actuarial science is needed to deal with uncertainty of how much will be paid (amount) and when (timing). The amount and timing variables can be modeled mathematically to produce a workable model of the monetary liability today. The statistical distributions and methods will vary widely and depending on the nature of the liability-modeling car accidents, latest industrial diseases claims, and how long varying economic cost. One of the main functions of actuaries is to help businesses assess the risk of certain events occurring and to formulate policies that minimize the cost of that risk (Sloan Career Cornerstone Center). For this reason, actuaries are essential to finance industries particularly, the insurance industry.

Actuarial Skills and Where Actuaries Can Work

Having examined the irreplaceable role of actuaries in economic development of a nation, Trowbridge (1989) concluded that it seems logical to describe them as that of the designers, the adaptors, the problem solvers, the risk estimators, the innovators, and the technicians of continually changing field of financial security systems. Actuaries do not, however, undermine the important roles play by other professions in the financial security systems. Among these are economists, statisticians, accountants, demographers, lawyers, administrators, politicians, the regulators, and the marketers - to name only a few. Trowbridge (1989), however, observed that actuarial science must be mesh with capabilities of others if financial security systems are to be successful in minimizing the financial consequences.

Actuaries assemble and analyze data to estimate the probability and likely cost of the occurrence of an event such as death, sickness, injury, disability, or loss of property. Actuaries also address financial questions, including those involving the level of pension contributions required to produce a certain retirement income and the way in which a company should invest resources to maximize its return on investments in light of potential

risk. Using their broad knowledge of statistics, finance, and business, actuaries help design insurance policies, pension plans, and other financial strategies in a manner which will help ensure that the plans are maintained on a sound financial basis.

Recent areas of applying actuarial science are in the assessment of capital projects and in helping a broad range of large financial organizations to better understand their liabilities and cater for them. Historically, actuarial science used deterministic models in the construction of tables and premiums. The science has gone through revolutionary changes during the last 42 years due to proliferation of high-speed computers and synergy of stochastic actuarial models with modern theory.

Actuary, being someone who has a thorough grounding in economics, statistics and financial mathematics as earlier mentioned, must use these skills to solve business problems. In practice, the mathematics and statistics just form a base from which an actuary will work. Other skills will be as important. Actuaries in their day-to-day work use knowledge of relevant legislation, business practice, marketing and accounting to meet the need of organization they work for.

Since actuarial science developed from the concept that the experience of the past could be utilized to measure the changes of the future, most actuaries engage themselves into the field of insurance and have evolved into the scientists within the structure of insurance industry. The actuary thus plays a major role in the development of insurance coverage and establishment of investment policy. That is why some people believe that actuarial profession is limited to insurance industry.

Although, insurance industry has played an irreplaceable role in economic development of nations and there have not been any economy in the world over reported to have survived without active role of insurance (Adeyele, 2011). However, the insurance industry will not perform credibly and effectively without the employment of trained actuaries to manage the insurance industry. Efficiency ensures that things are done at the right but effectiveness is the most important. It ensures that the right things are done at the right time. Consequently, any insurance company that aspires to achieve economic goals but ignores the role of actuarial science will most often fail the public purpose it serves. Most of the students might not be aware of this field called actuarial sciences but the fact is this field is one of the best fields any commerce student can opt for

Most actuaries are employed in the insurance industry, specializing in life and health insurance or property and casualty insurance. They produce probability tables which determine the likelihood that a potential future event will generate a claim. From these tables, they estimate the amount a company can expect to pay in claims. For example, property and casualty actuaries calculate the expected amount payable in claims resulting from automobile accidents, an amount that varies with the insured person's age, sex, driving history, type of car, and other factors. Actuaries ensure that the price, or premium, charged for such insurance will enable the company to cover claims and other expenses. The premium must be profitable, yet competitive with other insurance companies. Within the life and health insurance fields, actuaries are helping to develop long-term-care insurance and annuity policies, for many individuals. Actuaries in other financial services industries manage credit and price corporate security offerings. They also devise new investment tools to help their firms compete with other financial services companies. Other organisation actuaries work includes but not limited to the following: banks, hospitals

(particularly health sector), oil companies to manage risk, universities and all areas of business who want to make financial sense of the future.

Actuaries need a strong background in mathematics. Courses in economics, accounting, finance, and insurance also are useful. Companies increasingly prefer well-rounded individuals who, in addition to having acquired a strong technical background, have some training in liberal arts and business and possess strong communication skills. In addition to knowledge of mathematics, computer skills are becoming increasingly important. Actuaries should be able to develop and use spreadsheets and databases, as well as standard statistical analysis software. Knowledge of computer programming languages, such as Visual Basic, also is useful.

Actuaries may play a role in determining company policy and may need to explain complex technical matters to company executives, government officials, shareholders, policyholders, or the public in general. They may testify before public agencies on proposed legislation affecting their businesses or explain changes in contract provisions to customers. They also help companies develop plans to enter new lines of business or new geographic markets by forecasting demand in competitive settings.

Both staff actuaries employed by businesses and consulting actuaries provide advice to clients on a contract basis. The duties of most consulting actuaries are similar to those of other actuaries. Some may evaluate company pension plans by calculating the future value of employee and employer contributions and determining whether the amounts are sufficient to meet the future needs of retirees. Others help companies reduce their insurance costs by lowering the level of risk the companies assume. They may provide advice on how to lessen the risk of injury on the job, which will lower worker's compensation costs. Consulting actuaries sometimes testify in court regarding the value of the potential lifetime earnings of a person who is disabled or killed in an accident, the current value of future pension benefits (in divorce cases), or other values arrived at by complex calculations. Many consulting actuaries work in reinsurance, a field in which one insurance company arranges to share a large prospective liability policy with another insurance company in exchange for a percentage of the premium.

METHODOLOGY

Design: The design for the study was descriptive method.

Population and Sampling: The population comprised students and academic staff of JABU. The questionnaire was designed around KPP model for 220 participants (194 students and 26 academics) selected from the four colleges of the university. The entire questionnaire distributed were filled and returned.

Instrumentation: A questionnaire backup with interviews was used to obtain level of knowledge in actuarial science and insurance. This was divided into two sections. Section A provided socio-demographic data of the respondents, while section dealt with knowledge, perceptions and views of people about actuarial science and insurance. Socio-demographic questions sought for respondents' information regarding their age, gender, and departments. The mean and standard ages of the population are 21.75 and 10.00 respectively. Samples from each college are as follows. College of Social and Management Science, 68.18%; Humanities, 4.55%; Agricultural Science, 11.36% and Natural Sciences, 15.91.

RESULTS

Table 5.1 reveals that 54.13% and 53.85% of the students and academics respectively were already aware of actuarial science before coming to JABU. When the respondents were asked what they know about actuarial science, 62.37% of the students misconceived actuarial science to mean insurance while 35.3% of those who are aware of actuarial science before coming to JABU said they only hear about actuarial science but do not know what the course is all about (Table 5.2). Also, 50% of the academics reported that they have no knowledge what actuarial science is while 43.3% admitted that they thought actuarial science is another name for insurance (Table 5.2). In order to assess long held beliefs about insurance, and to determine whether the business is now attractive to Nigerians since the industry had been reformed, Table 5.3 was used to carry out this exercise. Good, fair and poor are the options made available to the respondents to rate insurance about their views and perceptions. Among the students sampled, 39.18% rated insurance companies as good, 35.05% rated it fair though 21.65% still have their reservation about insurance industry and said they could not rate insurance for now due to inadequate information to do so (Table 5.3).

DISCUSSION

The findings revealed that 62.37% and 42.30% of students and academics respectively used to think that actuarial science was another name for insurance (Table 5.2). When those who ticked insurance as their knowledge of actuarial science were interviewed further, they said they were being misinformed that another name for actuarial science was insurance. With these figures (121 students plus 11 academics) together with those who have no idea of what actuarial science (68 students and 13 academics), all totaling 213 out of 220 respondents, it can be inferred that more than 96.81% of the sampled respondents has no knowledge of actuarial science.

As regard the views and perceptions of the participants to insurance, it can be said that with the present level of awareness programmes in insurance, the industry is now rated fairly-good (Table 5.3). This rating may be as result of the recapitalization and reconciliation that took place in industry. However, 5.45% of the participants still believe that insurance is a bad business while 20.91% reported lack of knowledge to make form opinion about insurance companies.

CONCLUSION

This study has revealed the link between actuarial science and insurance, and sought people's level of knowledge about the two disciplines. From the balance of evidence, it can be concluded that majority of people (including the academics) have no idea of what actuarial science is.

In light of the above, it is suggested that efforts should be intensified by the institutions offering the course to explore every legal means to promote the prospects of the profession to the general public. While it is vital to orientate or re-orientate the students and academics within the universities communities, the stakeholders in the country especially the policymakers have much responsibility to champion this course. This can be achieved by inviting individuals to career talk in actuarial science and insurance and educate them about the difference and relationship between the two disciplines.

By so doing, the stakeholders who find reasons to higher more actuaries to perform variety of functions in their respective organisations will likely do so through national dailies where the general public can get to know about actuarial science. Since insurance industry

cannot survive without trained actuaries and that no any economy in the world can survive without active role of insurance, it has become necessary to train and bring up more actuaries for the growing up of Nigerian economy.

However, the above will not be achieved without public awareness about actuarial profession. In my opinion, one of the way to intensify awareness campaign about actuarial science is to include it in senior secondary school curriculum and make it compulsory for all students. Through this medium, many people will be informed about the profession.

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TABLES

Table 5.1: Knowledge of actuarial science reported by students and academics before coming to JABU

	Yes		No		Total Sample	
	Number	Percentage	Number	Percentage	Number	Percentage
Students	105	54.13	89	45.87	194	88.18
Academics	14	53.85	12	46.15	26	11.81
Total	119	53.8	101		220	100

Source: Field survey, 2011

Table 5.2: Perception of actuarial science reported by students and academics in JABU

	Students		Academics		Total Sample	
	Number	Percentage	Number	Percentage	Number	Percentage
Insurance	121	62.37	11	42.3	132	60
Investment companies	5	2.58	1	3.85	6	2.73
Pension Industry	0	0	1	3.85	1	0.45
No Idea	68	35.05	13	50	81	36.82
Total	194	88.18	26	11.18	220	100

Source: Field survey, 2011

Table 5.3: Views and perceptions of insurance reported by students and academics in JABU

	Good	Fair	Bad	NEIFA*	Total sample	
Students	76(39.18%)	68(35.05)	8(4.12%)	42(21.65%)	194	88.18%
Academics		14(53.85%)	4(15.38%)	50(22.73%)	26	11.81%
Total	76(34.55)	82(37.27%)	12(5.45%)	50(22.73%)	220	100%

Source: Field survey, 2011

**No enough information for assessment*