

AN ENTERPRENEURAL CHARACTERISATION OF THE SUPPLY CHAIN SYSTEM OF AUTOMOBILE BATTERY IN IBADAN SOUTHWEST NIGERIA

V. O. OLADOKUN and O. P. OLADIRAN

Department of Industrial Engineering, University of Ibadan, Ibadan, Nigeria

Abstract : Problems such as the importation of substandard auto batteries are some of the challenges confronting the supply of the product in Nigeria. In this work some aspects of the supply chain system of the automobile batteries have been studied in Oyo state, Nigeria. The automobile battery supply chain system has been segmented into three: suppliers, users and the repairers for analysis. Using direct observation, questionnaires relevant data on each of these three segments were collected and analysed based on typical 12 Volts automobile battery. Data obtained from the vehicle Licensing office was used to illustrate and analyse the entrepreneurship opportunities of the automobile battery market in Nigeria. The study reveals a huge market in the supply system of the auto battery in Nigeria. Also provide a template applicable to the analysis of other engineering products.

Introduction

There has been an increasing demand for automobile batteries in Nigeria due to the increasing number of vehicles, generators-inverters and some other battery powered machines in use. More so, the development and integration of sophisticated electronic components into new vehicles makes it more necessary for vehicle owners to have reliable batteries. While there is a considerable increased demand for auto batteries, there has been limited studies on the structure of activities in this subsector [6,7].

This work is aimed at carrying out some assessment on the supply chain system of the automobile battery in a typical Nigerian city. The study considers some aspects of the flow distribution of the automobile batteries from the marketers through the consumers and down to the repairers.

An automobile battery is a type of electric battery that supplies electric energy to the starter of motor and the ignition system of a vehicle's engine. The term is also used for the main power source of an electric vehicle. They are usually lead - acid batteries that provide a nominal 12 volt (actually 12.6volt) potential difference by serially connecting six cells that each produces about 2 to 2.1 volts [8]. The battery is made up of plates of lead and lead oxide. These plates are submerged into a sulphuric acid and water solution called the electrolyte solution. This process causes a chemical reaction that releases electrons, allowing them to flow through conductors thus producing electricity. As a lead acid battery discharges, the lead plate gets thinner. When the battery is recharged, the lead is re-deposited on the plates allowing the process to be repeated. A typical automobile battery has five basic parts: A resilient plastic container, Positive and negative internal lead plates, Porous plates separators, Electrolyte, and Lead terminals shown in fig-1.

Keywords : Automobile Battery, Supply Chain System, Entrepreneurship, Ibadan

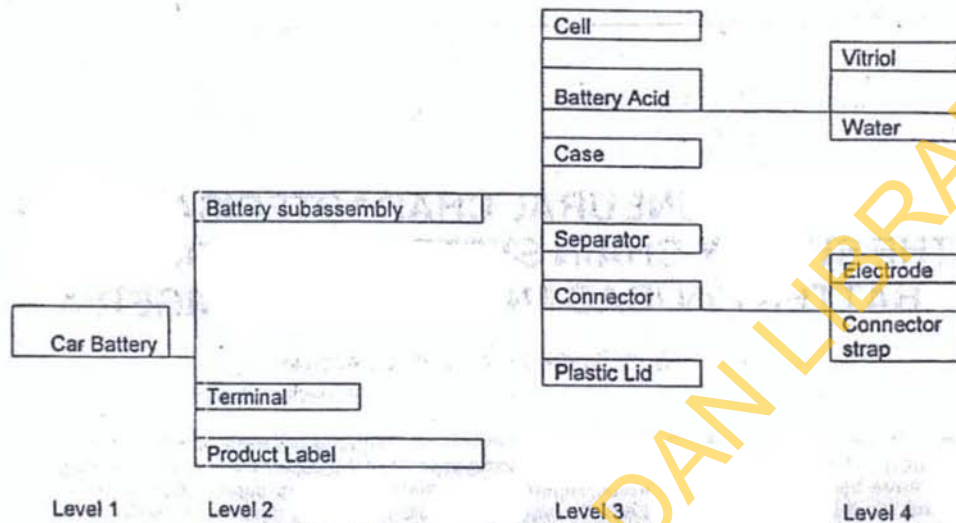


Figure-1 : A product tree for battery

Automobile batteries have different uses and various other elements are alloyed with the lead such as calcium, cadmium or strontium to change density, hardness, or porosity of the plates. Car batteries can be classified into two broad classes namely Shallow Cycle and Deep Cycle [2]. The Shallow Cycle type is designed to deliver quick bursts of energy, usually to start an engine. The Deep Cycle type is designed to continuously provide power for long period of time (for example in a golf cart). They can also be used to store electrons from a photovoltaic array or a small wind turbine. They usually have thicker plates in order to have a greater capacity and survive a higher number of charge and discharge cycles.

The distribution of battery in Nigeria has created some opportunities for various entrepreneurs along its supply chain system. Hence, there is a need to study the supply chain characteristics of this product. Supply chain is a series of interconnected activities which are concerned with planning coordinating the flow of materials, parts and finished goods from manufacturer to the final consumer [1]. Another definition is given as "A supply chain is referred to as the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer" [3, 5].

Getting the right product to the right customer at the right time as efficiently and cost-effectively as possible is the main objective of logistics and supply chain management [4]. However this will depend on the availability of adequate and relevant information about the local environment involved. Every supply chain system depends on the local environment characterizing its operations. There have been few studies on the Nigerian environment vis-a-vis the supply and distribution of auto battery, hence the need for this study.

Study Methodology

The research methodology utilized for this project work was designed to generate qualitative and quantitative information. The study area covers Ibadan and Lagos of south west Nige-

ria. Selected major auto-parts markets were visited. The data for the project was sourced directly from learned individuals in the organizations using structured questionnaires and interview. Three sets of questionnaires targeting marketers, the users and the repairers of the product respectively were administered. The questionnaires were developed to elicit response from three categories of respondents marketers, users and repairers. The questions cover both socio-economic and technical variables.

Results and Discussion

Education: Some level education is required to do the business of battery sales well; more than 80% of the responds have at least secondary school education. Gender and Age data shows generally that the bussines (Fig-2–fig-5) is dominated by men and in their virile ages, 84% of of respondents can be referred to as the active working class age group. This busines as currently been practiced requires some great deal of physical exertions and manual handling of shop activities.

The demograhic and educational characteristics of the vendor and servicing groups make them receptable to new knowledgel thus a potential market for continous bussiness and technical training programmes.

Some Implications of Results

From table-2 and 4 the sale of second hand batteries can be seen to be prevalent. More than a quarter of the batteries bought by are fairly used or used imported. This is an indicator that Nigeria is serving as the dumping ground of potentially hazardous damaged batteries from developed countries.

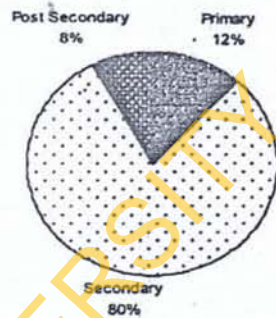


Fig-2 : Academic, level of vendors

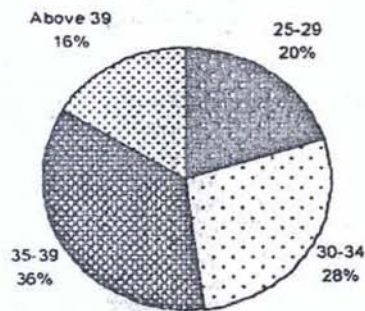


Fig-3 : Age distribution of vendors

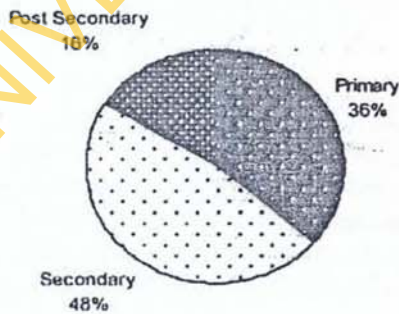


Fig-4 : Education level of battery repairers

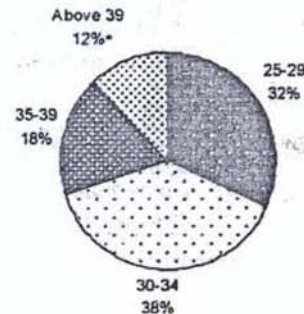


Fig-5 : Age distribution of battery repairers

That majority of the vendors (90%) offer warranty period of less than 6 months is a pointer to the low quality level of the bulk batteries available in market. The prevalent use of standby generators by repairers is as result of poor state of power supply in Nigeria generally.

Table-2 also shows that more than 70% of new auto batteries in the market are imported products, this is indicate the lack of adequate local production capacity.

Table-2 : Auto Battery Vendors: A Summary of Bussiness Characteristics

Sales Characteristics	Percentage (%)
Warranty given	
Yes	84
No	16
Period of warranty	
From 2 to 4 months	92
Up to 6 months	8
Sell battery parts	
Yes	58
No	42
Belong to a Vendor association	
Yes	92
No	8
Sales Characteristics	Percentage (%)
Types of battery on sale	
Imported New	56
Fairly used	24
Nigeria made New	20

Table-3 : Auto Battery Repairers and Consumers: A General Charactersation

Usage Characteristics Repairers	Percentage (%)
Parts mostly repaired*	
Cells	38
Terminals	6
All parts	56
All service iterrjs available	
Yes	24
No	76
Use generator	
Yes	96
No	4
Usage Characteristics end users	Percentage (%)
Vehicle Purpose	
Private	60
Commercial	40
Type of battery use	
New	72
Fairly used	28
Age of last battery	
Below 12 months	68
1 yr to 3 yrs	22
above 3 yrs	8
No of services/year	
Once	56
Twice	24
Thrice	20

Conclusions/Recommendations

The study has compiled data on characteristics of the automobile battery supply chain in Nigerian. The study reveals that the supply and distribution chain of auto battery and allied services offer some entrepreneurial opportunities and challenges. The importation of substandard products which can cause a serious adverse effect on the environment is a challenge to relevant government agencies such as the Standard Organisation of Nigeria.

Training and skills acquisition also present opportunities and challenges to Nigerian educational sector. Hence, it is desirable for the higher institutions to make entrepreneurial skills courses part of their curriculum. The government should also assist in providing support for small and medium scale businesses through the help of microfinance institutions that can assist with capital for such ventures so as to improve the economy of a developing nation like ours.

Acknowledgement : This work is part of project supported by senate research grants No SRG/FTEC/2006/1A, University of Ibadan.

REFERENCES

1. Arntzen, 1995: Complementary theories to supply chain management. *Supply Chain Management: An International Journal*, Volume 12 Issue 4, 284-296.
2. Bode, H.(1997): "Lead-Acid Batteries". New York, John Wiley and Sons, 1997
3. Christopher, M. (1992): *Logistics and Supply Chain Management*. London, UK: Pitman Publishing.
4. Gordon, D, Emiliani, M. L., & Stec, D. J. (2000): Online reverse auction purchasing contracts. *Supply Chain Management: An International Journal*, 6(3), 101- 105.
5. Lambert, D., Cooper, M. and Pagh, J. (1998): Supply chain management: implementation issues and research opportunities. *International Journal of Logistics Management*, 9 (2) 1-19.
6. Oladokun, V.O and Adekunle, D.O. (2008): Small Scale Production of Auto-Battery in Nigeria; An Engineering Economic Model. *The Nigerian Journal of Industrial and Systems Studies* Vol.8 No.2,1-8
7. Oluleye, A.E, Oladeji, O and Agholor, D.I (2000): Inventory System Modeling: A case of an Automotive Battery Manufacturer. 1st International Conference on System Thinking in Management.
8. Sullivan, K.R.: "12-volt Lead Acid Battery Basics" <http://www.autoshop101.com/trainmodules/batteries/101html>. Accessed May 2008.