

# The Application of Pareto Principle in a Product Marketing System

Prof. Enoch Nwachukwu and Opuh, Iwedike Jude  
Department of Computer Science,  
University Of Port Harcourt Choba,  
Rivers State Nigeria

**Abstract** - This research is all about developing software that applies the Pareto Principle in the marketing of bank products. The Proposed system adopts an object oriented methodological approach in its development. The input requirement used in designing this system includes customer details such as the account name, residential address, telephone number, State of origin etc. The system outputs account number, customer identity and names of the 20% customer that generate 80% profit as transaction progresses. The result shows that the 80/20 Principle is actually obtainable from the developed software as 14 and 18 customers from a total of 70 and 90 customers respectively generated close to 80% of the profit. In conclusion, the developed system will technically assist bank management in business decisions as it relates to customer transaction profitability, performance tracking and budgeting of resources.

**Keywords:** Pareto Principle, Product Marketing, Software and Java Programming.

## 1. INTRODUCTION

The Pareto Principle is also referred to as the 80-20 rule, the law of the vital few, or the principle of factor sparsity [3]. It states that for many events, roughly 80% of the effects come from 20% of the causes. It is named after an Italian Economist Vilfredo Pareto who in 1906 noticed that 80% of the land in Italy was owned by 20% of the population. He confirmed the principle when he also noticed that 20% of the pea pods in his garden produced 80% of the peas [4]. He went on to carry out surveys on a variety of other countries and found out that the principle held when it came to land ownership versus population. Close observation of many fields would yield the realization that this principle is in fact more wide spread. In banks for example, a common rule of thumb is that 80% of your sales come from 20% of your clients/products. It might not come as a surprise that the top 20% of the world population control 82.70% of their income [7]. The actual mathematical principle is that "where something is shared among a sufficiently large set of participants, there must be a number  $k$  between 50 and 100 such that  $k\%$  is taken by  $(100 - k)\%$  of the participants.  $K$  may vary from 50 (in the case of equal distribution) to nearly 100 (where, for example,  $k = 98$ , or 98% of sales are to just 2% of clients). There is nothing special about the number 80% mathematically, but many real systems have  $k$  somewhere around this region of intermediate imbalance in distribution.

It is not the 80/20 rule but a Principle. We can isolate systems where the imbalance is 80-20 relation and others where the numbers are very different but still follow the Pareto Principle. The numbers can be *anything* where a *majority* effect generated a *minority* number: 90/6 or 60/49. Clearly, the numbers must not add up to 100 and where the Principle applies, 80% of 80% (64%) can also generate 20% of 20% (or 4%) of something. So 4% of your customers could generate 64% of your revenues! Now you have a 64/4 'rule' [10].

It is interesting to know that the rule also applies to subsets of the income range. An example is that the top 3 richest people in the world own as much as the next 7 combined. Banks is the field where this rule is observed the most. Banks managers for example realize that: [6]

- 80% of their profits come from 20% of their customers,
- 80% of their complaints come from 20% of their customers,
- 80% of their profits come from 20% of the time they spend,
- 80% of their sales come from 20% of their products, and
- 80% of their sales are made by 20% of their sales staff.

Because it is observed so often in this field, many Banks have achieved dramatic improvements in efficiency and profitability by concentrating on the important areas, and ignoring, eliminating or automating the rest. This research centers on how little effort can generate high positive results in a product marketing system. The software developed in the course of this research will generate 20% customers that access these bank products to yield 80% profit viewable at a glance. Bank management use the software to study the customers that yield higher profit to the bank. The management checks the database for products linked to bank customers from time to time and focuses on them for business growth and profitability.

## 2. LITERATURE REVIEW

Alfred (2002) proposes a theory to explain this empirical observation. The yield gained by the subdivision of a project into several tasks is measured. The requirements for such a yield lead to the axioms of Shannon Information. With the right adjustment of units for cost and yield this gives the definition of Entropic Yield. Pareto's 80/20 law thus results from an economic optimization of Entropic Yield in the form of minimizing unrealized potential. As an application of the theory we have derived precise limits for ABC-analysis. The outlined theory adds to Information Theory the consideration of production costs for information [1].

Kaushik (2006) construct general rules for when we may violate the PFC. The argument is constructed within the Paretian framework. Hence, the violation of the PFC is not justified by appeal to deontological ethics or non-welfares

criteria. This is not an easy task since the principle of free contract is often viewed as a rule that is a derivative of the Pareto principle [13].

Erik (2007). Investigates how demand-side factors contribute to the Internet's "Long Tail" phenomenon. It first models how a reduction in search costs will affect the concentration in product sales. Then, by analyzing data collected from a multi-channel retailing company, it provides empirical evidence that the Internet channel exhibits a significantly less concentrated sales distribution, when compared with traditional channels. The difference in the sales distribution is highly significant, even after controlling for consumer differences [9].

Newman, (2006), says that the probability of measuring a particular value of some quantity varies inversely as a power of that value, the quantity is said to follow a power law, also known variously as Zipf's law or the Pareto distribution. Power laws appear widely in physics, biology, earth and planetary sciences, economics and finance, computer science, demography and the social sciences. For instance, the distributions of the sizes of cities, earthquakes, solar flares, moon craters, wars and people's personal fortunes all appear to follow power laws. The origin of power-law behavior has been a topic of debate in the scientific community for more than a century. Here we review some of the empirical evidence for the existence of power-law forms and the theories proposed to explain them.

Ankunda et al (2011) extend the principle to the software development process making it less work intensive, and yet more efficient. This was done by applying it to the Waterfall model of the Software development process as it is one of the most applied models in the field. The results obtained did in fact agree with the principle, and show which tasks can be ignored, designated, or eliminated altogether in an attempt to reduce the effort to 20% of its original value, and yet maintains high as 80% of the output [2].

Cam, et al (2005), considers two performance issues for several types of alcohol category penetration and consumer concentration. Consumer concentration is addressed using the performance measure of "Pareto Share", which is defined as the percentage of category sales to the top 20% of its consumers. The beverage categories of beer, wine and spirits are first compared for their observed 1-week time period. The categories are then modeled, using the Negative Binomial Distribution in order to extrapolate market behavior to longer time periods of observation – in this case a month and a year. Findings of this study are that the Pareto effect varies considerably across alcohol types and that the apparent Pareto effect increases as the sample time increases. The implications for managers are discussed and areas of further research highlighted.[3]

### 3. RESEARCH METHODOLOGY

The Pareto's Principle concept has been applied in the implementation of banking software to automatically analyze the transaction records of all customers in the bank database and use it to determine the customers' high profit margin. The algorithm of the proposed system consists of the following steps:

Step 1: Customer Bank Account Opening (first input dataset).

Step 2: Customer transaction updates e.g. cash deposits, withdrawals, loans e.t.c (input dataset updates).

Step 3: Sending inputs to the database.

Step 4: Querying the database with search criteria

Step 5: Computing customers transaction profits from the result returned from the database query in Step 4.

Step 6: Returning the top customers computed in Step 5 as output.

The case and activity diagrams of the proposed system is represented in figure 3.1 and figure 3.2 respectively

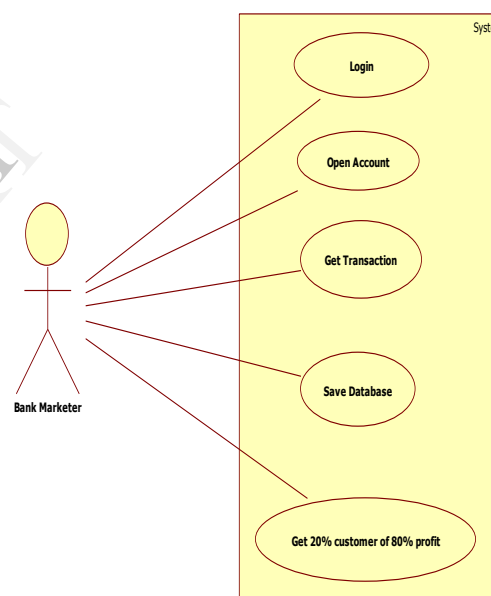


Fig 3.1 Case Diagram of the Proposed System

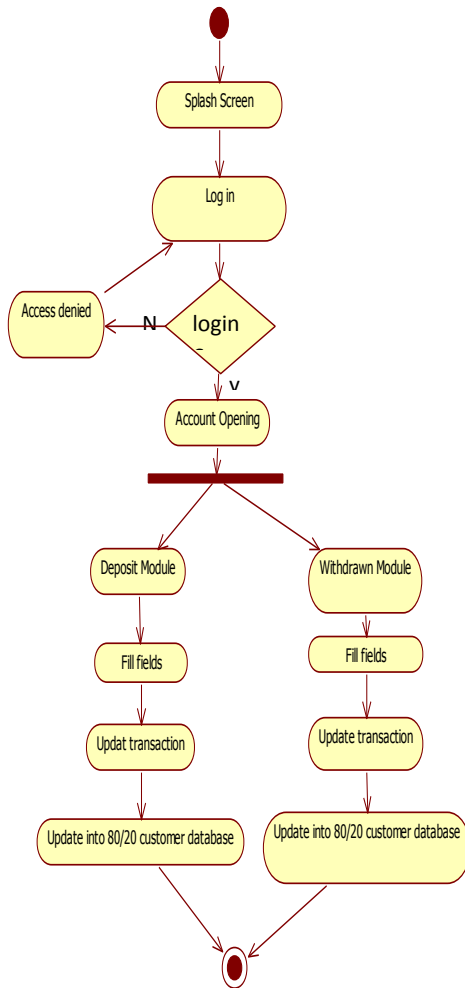


Fig 3.2: Activity Diagram of the Proposed System

#### A. How The System Gets 20% Customers That Generates 80% Profits

The system embeds a mathematical formula into a Structure Query Language (SQL) to generate the 20% of customers with the highest profits in the database. The formulation involves a situation where each customer in the database is represented by a variable  $x$  and the profit made from each customer transaction is represented by a variable  $y$ . We can then say that:

$$\sum_x = 100\% \text{ of Customers}$$

$$\sum_y = 100\% \text{ of Profits}$$

Getting our 100% with an SQL statement from our database will look like this:

$\sum_x = \text{SELECT COUNT(Cust\_ID) as [Total Cust] FROM Customers;}$

$\sum_y = \text{SELECT SUM(Profits) as [Total Profit] FROM Cust\_Transactions;}$

To get the 80% of  $\sum_y$  we can say:

Let  $p$  represent 80% of  $\sum_y$ .

$$p = \sum_y * (80/100).$$

Let  $c$  represent 20% of  $\sum_x$

$$c = \sum_x * (20/100).$$

Let  $q$  represent total profit generated by  $c$ .

We can get a value for  $q$  from a result return by our SQL.

$q = \text{SELECT SUM(Profits) FROM Cust\_Transactions WHERE Cust\_ID IN (c);}$

To determine if Pareto's principle applies in our proposed system variable  $q$  must be equal to variable  $p$ .

In order to return our 20% customers that generates 80% of our profit, we use java code to compare the variables above before it can return an output.

Pseudo code:

Public void get20%Customers(){

...if( $p==q$ ){System.out.println(Show variable  $c$ );}

}else{(add or reduce numerator value % to variable  $c$ ) &&(reduce or add numerator value % to variable  $p$ )}

## 4. EXPERIMENT AND RESULT

This module updates customers' transaction and ranks them on profitability as illustrated in figure 4.1. It extracts the idea behind Pareto principle in terms of product sale and profitability. Marketers on daily basis study transaction trend to enable them focus on vital customers.

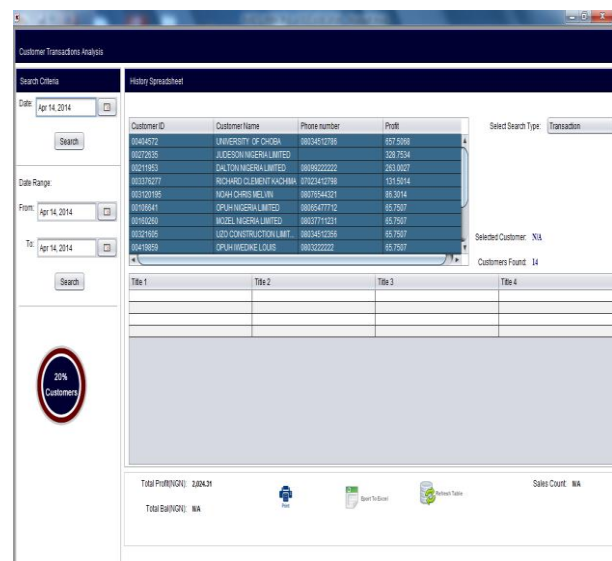


Fig 4.1: Transaction of 20% Customers that yield 80% Profits

This module ensures successful processing of qualified customers loan request as shown in figure 4.3

Loan Dialog

Account No:

Customer Name:

Available Balance:

Account\_Type: N/A

Loan Type:

Loan Amount:

Fig 4. 3. Graphical User Interface Loan Assess

The deposit module accept customers credit transactions into the system and was illustrated in figure 4.4

Deposit Dialog

Account No:

Customer Name:

Balance on Ledger:

Account\_Type: N/A

New Deposit:

Payment Type:

Fig 4.4 Graphical User Interface Account Deposit

The withdrawal module accept customers debit transactions into the system and was illustrated in figure 4.5

Withdrawal Dialog

Account No:

Customer Name:

Balance on Ledger:

Account\_Type: N/A

Withdrawal Amount:

Payment Type:

Fig 4.5. Graphical User Interface Account Withdrawal

This module ensures tracking of daily transactions up date for easy reference as illustrated in figure 4.6

Customer History

File Edit

Search Criteria

Get Customer By

Customer Name:

Cust_ID	Title	Surname	FirstName	MiddleName	NickName	Gender	MaritalSta	DOB	MMN	Nationality	RPN	State/DC
01139494	Mr	OPLAH	MEDINE	JUDE	BOB	Male	Single	2014-04-	AKIN	NIGERIA	N/A	DELTA
01144720	Dr	Uche	Marco	N	Doc	Male	Married	2014-03-		USA	Yes	Atlanta
01107789	Mr	OPLAH	CHRIS	CURRENT	BOB	Male	Single	2014-04-	AKI	NIGERIA		DELTA
01103142	Miss	OPLAH	STELLA	SAVINGS	STEM	Female	Single	2014-04-	INNEW	NIGERIA		RIVERS
01107047	Mr	OPLAH	FELIX	FIVED DE	FEL	Male	Single	2014-04-	WADU	NIGERIA		DELTA
002899	Miss	OPLAH	GRACE	NGODI	NGO	Female	Single	2014-04-	JAK	NIGERIA		DELTA
00843912	Mr	OPLAH	EMENIA	DANIEL	SETTLE	Male	Married	2014-04-	ANLUM	NIGERIA		DELTA
00916071	Mr	OPLAH	JUDE	BEN	JA	Male	Single	2014-04-	NAWA	NIGERIA		DELTA

Fig4. 6 Graphical User Interface on Customer History

Fig 4.2. Graphical User Interface for Account Opening Form

Table 4.1 The profit transactions of 70 customers and their account information

CUSTOMER ID	ACCOUNT NAME	PHONE NUMBER	PROFIT
0404572	UNIVERSITY OF CHOBA	08034512786	657.5068
0272635	JUDESON NIGERIA LIMITED	08035278695	328.7534
0211953	DALTON NIGERIA LIMITED	08099222222	263.0027
3376277	RICHARD CLEMENT KACHIMA	07023412798	131.5014
-	-	-	-
-	-	-	-
-	-	-	-
3274578	CHIYEM ADA JOY	08076599142	5.7534
3411078	MOSES JANE NKIRU	08056433212	4.8904
2862079	OKORO GIFT NNEKA	08074326645	4.6027
3547408	EKELE MATHEW MORGAN	08096544322	4.3151
	<b>TOTAL</b>		<b>2590.6789</b>

Table 4.2 represents the 20% deposit customers that yield 80% profit. The software generated these profits in table 4.2 and the table assists management scientifically in taking quick decision on customers to be focused for profitability.

Table 4.2 The 20% Customer Profitability

CUSTOMER ID	ACCOUNT NAME	PHONE NUMBER	PROFIT
0404572	UNIVERSITY OF CHOBA	08034512786	657.5068
0272635	JUDESON NIGERIA LIMITED		328.7534
0211953	DALTON NIGERIA LIMITED	08099222222	263.0027
3376277	RICHARD CLEMENT KACHIMA	07023412798	131.5014
3120195	NOAH CHRIS MELVIN	08076544321	86.3014
0106641	OPUH NIGERIA LIMITED	08065477712	65.7507
0160260	MOZEL NIGERIA LIMITED	08037711231	65.7507

0321605	UZO CONSTRUCTION LIMITED	08034512356	65.7507
0419859	OPUH IWEDIKE LOUIS	08032222222	65.7507
0451615	UNIVERSITY OF CHOBA TEACHING HOSPITAL	08054637812	65.7507
3983386	OSAFELE MARTIN EHIKOME	08098712345	65.7507
0357278	PETRO OIL NIGERIA LIMITED	08034412389	65.7507
0016397	ONWUACHU UZO CHRISTIAN	07066666666	57.5342
3063510	AKAN JANE INIOBONG	08099965432	39.4504
	<b>TOTAL</b>		<b>2024.3052</b>

In Table 4.3 represent the 90 customers under study found in the database with their various profits displayed with other details.

Table 4.3 The profit of 90 customers and their account information

CUSTOMER ID	CUSTOMER NAME	PHONE NUMBER	PROFIT
203757	BANTY INTEGRATED LIMITED	00805623412	710.137
165375	OIL PETROLEUM LIMITED	07034277889	677.2603
404572	UNIVERSITY OF CHOBA	08034512786	657.5068
-	-	-	-
-	-	-	-
-	-	-	-
3411078	MOSES JANE NKIRU	08056433212	4.8904
2862079	OKORO GIFT NNEKA	08074326645	4.6027
3547408	EKELE MATHEW MORGAN	08096544322	4.3151
	<b>TOTAL</b>		<b>7005.606</b>

Table 4.4 represents the 20% deposit customers that yield 80% profit. The software generated these profits in table 4.4 and the table assists management scientifically in taking quick decision on customers to be focused for profitability.

Table 4.4 The 20% Customer Profitability

CUSTOMER ID	CUSTOMER NAME	PHONE NUMBER	PROFIT
203757	BANTY INTEGRATED LIMITED	08056234120	710.137
165375	OIL PETROLEUM LIMITED	07034277889	677.2603
404572	UNIVERSITY OF CHOBA	08034512786	657.5068
634157	JASPER COMMUNICATION LIMITED	08034522678	427.3973
195952	BEKE NIGERIA LIMITED	08095412238	361.6438
232864	MIBA GROUP LIMITED	08045621388	328.7671
272635	JUDESON NIGERIA LIMITED		328.7534
581359	NKWOCHA ERNEST IKE	08065548754	287.6712
211953	DALTON NIGERIA LIMITED	08099222222	263.0027
9957	GATSON INTEGRATED LIMITED	08076412366	197.2603
231658	OKWUOSA ANGELA CHIKA	08053412222	190.6849
176358	CHRIS PHARMACY LIMITED	08055533876	164.3836
544429	GIBSON AND SONS ENTERPRISE	08034877761	164.3836



85407	CITA NIGERIA LIMITED	08023411123	131.5068
215538	ASIKA TONY IKE	08066542312	131.5068
3376277	RICHARD CLEMENT KACHIMA	07023412798	131.5014
158248	OKEYSON NIGERIA LIMITED	08045623489	118.3562
105551	BROWN COLE MICHAEL	08123499887	98.6301
<b>TOTAL</b>		<b>5370.353</b>	

## 5. RESULT DISCUSSION

Table 4.1 is the copy of the 70 customers deposit found in the database with their various profits displayed and other important details. The table was generated from the developed software that updates customer transactions for profitability on committing the process. It can be seen from the developed software, that if someone wants to check the profitable customers, he/she will not spend time and energy searching in the database. Pareto Principle demands that those customers that generate 80% of your profit should be given more attention.

Table 4.2 represents the 20% customer that generates 80% profit based on their deposit transactions in the system.

Table 4.3 is the copy of the 90 customers deposit and loan found in the database with their various profits displayed and other vital details.

Table 4.4 represents the 20% customer that generates 80% profit based on their deposit and loan transactions in the system. The idea behind Pareto Principle gave rise to tables 4.2 and 4.4 respectively as it aids bank management to view customers' profitability at a glance.

The software that was developed in the course of this research was used in generating these profitable customers. The result assists management scientifically in business decisions based on customers' transaction profitability, budgeting of resources and tracking of performance. The software was designed as a systematic tool for management and it automates customers' transaction that generates 80% profit to the bank. It is imperative to know that the result is not always 80-20, it can be 78-22, 77-23 or even 64-4, what matters is that majority of the result came from little effort.

## 6. CONCLUSION

Applying Pareto principle to product marketing has been shown in this research to be an efficient relation for bank product marketing. The application developed in the course of this research was used to implement Pareto Principle as it relates to marketing of the best products that will yield growth in profitability to the bank. The three products that were compared revealed that Current account product gives higher profit return to the bank. Also, based on the fact that money received from customers are traded for profit and risk assets availed to customer yielded higher profit, fulfilling the idea behind Pareto Principle. . In conclusion, the developed system will technically assist bank management in business decisions as it relates to customer transaction profitability, performance tracking and budgeting of resources.

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