**Data Report on strategies to upgrade MTN Cote d’Ivoire technology infrastructure in Ivory coast**

***Introduction***

The MTN company has over the years enjoyed dominance in the market as many mobile users have been subscribed to their services. There has been increased demand for data, voice and messaging services coupled with upcoming alternative and competitive companies offering the same services at a pocket friendly cost. This has necessitated looking into the possible ways of upgrading the company’s technological infrastructure which is up to date and offers a greater signal and wider coverage.

The main aim of this data report is to manipulate the data that has been selected and best suits the answer to the problem of how best to upgrade the technology infrastructure so as to ensure that the subscribers get the best services that are equivalent to what they pay for.

The CRISP-DM will be used in this project to help come up with the objectives and give a step by step process of how best to deploy their resources in upgrading their infrastructure so as to increase customer satisfaction and loyalty. The pertinent issues concerning the data will be tackled as follows:

***1. Business Understanding***

Mobile subscribers in Ivory Coast have in the recent years strived to keep up with technological advancements in providing services to their users. MTN is largely owned by the government and it is for this reason that it has enjoyed customer loyalty. However, this is not enough as there is a need to look into how they have been providing services to their customers by looking at the current usage of in terms of data, voice and Short Messaging Services (SMS).

The company is currently facing stiff competition and if drastic measures are not taken to by the managerial team then there is a chance that customers will subscribe to other providers in the market. This study is carried primarily with the following objectives in mind:

* Review and upgrade the available infrastructure.
* Enhance customer loyalty by personalizing services to suit different customers
* Improving sales by coming up with deliberate and tactical strategies and recommendations
* Increase customer awareness by rebranding and coming up with better advertising strategies.

The following will be the key primary indicator of success:

-Positive feedback from customers about the improved service delivery.

-Increment of sales by 15%.

-Completion of the study as scheduled and in line with the proposed budget.

***Business background***

The MTN has regional outlets located in Ivory Coast. Governance is done centrally at the Head Quarter office in Cote d’Ivoire by the Lead Managers. The organization structure of key decision-making personnel in MTN is best described using the illustration below:











MTN has a simple organizational structure under the governance of a Lead Manager who collaborates with the chief of: Human Resource, Operations Sales, ICT and Finance. The Chief of Sales and operations works directly with the Regional Managers in the day to operations of the company. This project will basically affect all the departments as the ICT will spearhead the most suitable technology to adopt from the data mining results looking into the available resources. The Sales and operations department will also be affected as there will be a total overhaul of how business will be conducted, going forward.

This project will be fully funded by the Ministry of Telecommunications in Ivory Coast in conjunction with The Voice International (an NGO dealing with Telecommunication).

This project will be conducted by a committee of professionals in no particular order as follows:

* Lead Manager
* Chief of Finance
* Chief of Sales & Operations
* Chief of Human Resource
* A representative from the Regional office
* Executive Secretary from the Ministry
* Technical Engineers from The Voice International
* Financial Director from the Ministry
* Project Manager from the Ministry
* Data Analysts
* Technical Engineers
* MTN legal adviser
* Legal officer from the Ministry
* Software programmers
* Database administrator
* Support staff

***Problem Statement***

The problem areas that are going to be focused on in this project are:

-Technological Infrastructure

-Marketing

-Customer care

To ensure that the company is able to improve its service delivery the technological infrastructure that is in place currently has to be upgraded. An upgraded infrastructure will enable customers get better services in terms of transmission

Another issue that is of utmost importance is the marketing strategy. It will need to be customized for different areas depending on the media used in the particular area.

There is a need to come up with tailor made services for individual customers who request for satisfaction of user specific needs. This will ensure that more customers are attracted to subscribe to MTN services.

A prerequisite of the project will be a detailed documentation of the operations of the company for the last ten (10) years presented by the Chief of Sales & Operations and it should have been read by the member of the project committee before the commencement of the project.

***Current Solution***

As regards the daily technical maintenance of the current infrastructure being used, the ICT department has been doing constant troubleshooting and benchmarking with other Mobile Subscribers in other countries. For more efficiency there is a need to procure an advanced technological infrastructure.

The level of acceptance has been fairly good but with the increased demand of data driven society and high-speed internet the company will not be able to deliver with the current resources.

***Defining the Business Objectives***

The main problem that is going to be solved in this problem is to understand the underlying pattern of MTN subscribers in terms of the services mostly used and in relation to their locality so as to be able to appropriately deploy services as per need. In addition, also looking at other strategies such as marketing and service delivery strategies that will need to be scrutinized so that the cost against the benefit of procuring a new infrastructure is favorable.

The business questions that will be answered by this project will be:

*1.How best can the technological infrastructure be deployed? This will be based on knowing;*

*- which ones were the most used cities for the three day?*

*-which cities were most used during the business hours?*

It is important to note it makes business sense to invest more in areas where there is more usage of the services provided.

2. *How to improve customer service. This can be done through tailor made packages:*

*-looking at the cities that were most used during business hours. Perhaps the Sale & Operations department could make a data package for such areas which would probably be procured by most businesses which offer online services such as banks.*

*3. How does the usage of the MTN services tally by cities? What advertising strategies could be used to reach out to users in the different cities.*

*Perhaps it could be that the remote cities only used SMS services or only voice calls. This is important as it helps the company know how to come up with advertising strategies for their services.*

The expected business benefits upon successful completion and deployment of the project will be:

* Increased sales revenue by 15%
* Improved service delivery
* Customized consumer packages as per need basis

***Assessing the Situation***

The data that will be used for analysis for this project will be the information collected by the MTN ICT team of usage of the services by cities for three days. There are six (6) data files that will be used for this project.

The committee task to handle this project is constituted with the necessary professionals that will give guidance on data, business, project and legal issues. In any undertaking there has to be a risk.

The following are the risks involved:

* *Constraints in the funding of the project. The Ministry of Telecommunication may not be fully able to live up to the funding responsibility due unanticipated redirection of resources on need basis by the Ministry of finance.*

***Contingency plan: The CEO of the Voice International agreed to fund the project budget by 40% should the Ministry be faced with a challenge of fully funding the budget.***

* *Challenges in laying out of the infrastructure especially during the deployment phase this is as a result of some community clashes in some areas.*

***The contingency plan for this risk is to liaise with the Ministry of Youth and welfare to come up with community awareness and development programs as a way to give back to the society. This will ensure that during the deployment phase the project runs smoothly.***

***Resource Inventory***

It is of utmost importance to take a look at the resources available and at the discretion of the committee that will be used during the project.

*Hardware*

The hardware resource that will be used is basic computer hardware that will be used in storing the data and documenting the project. In addition, cameras for taking photos that will be used for illustrations in the final report.

*Data*

The data available for this project is availed by the ICT team of the company. The data types involved in the files that will be used for analysis are mostly string and numerical in nature. It is stored in the company cloud storage. There is live access to the data warehouse containing the data needed by the company.

There are no plans to procure external data as the data available is sufficient enough to be able to achieve the desired business objectives. There are no security issues regarding the data available as the data has an element of anonymity hence it is not easy to identify the particular user.

*Personnel*

To ensure unlimited access to business and data experts they are included in the committee to ensure that proper guidance in those areas is accorded. There is a team of support staff identified by the lead manager that will be called upon when need arises.

***Requirements, Assumptions, and Constraints***

*Requirements*

For this project there are no security or legal issues that may hinder carrying out the project or getting the final results. Everyone is aligned on the scheduling requirements of the projects through active involvement of the key professionals and necessary information about the company. Upon completion of the project the company will be required to make a publication and present it to the Ministry of Telecommunication which will serve as a reference for future government funded projects,

*Assumptions*

* Since it is just the beginning of a new financial year the money for the project might not be facilitated at the required time.
* All the members of the committee are well briefed on the project and all the necessary nitty gritty.
* There are a few missing values in some entries. These missing values will be completely omitted so as not to give wrong results.
* The Ministry of Telecommunication being the main sponsor for this project is interested in getting the final results of the project and the deployment plan.

*Constraints*

* There is only financial constraint for this project as result of the government not being able to fully meet the budget due to high authority financial directives.

***2. Data Understanding***

*Initial data collection*

The data available and relevant for this project is availed by the ICT from the customer registration and transactional data. The data is not easily identifiable to the consumers.

The column that will be most useful for our analysis is the product for the consumers against the city or the region from which the consumer is. The data available is enough to make conclusions that will pave way for the deployment of new infrastructure and more strategic operational practices that will increase revenue.

***Data description***

There are six (6) data files consisting of information as follows:

* Three data files consisting of information of consumers regarding the service used, city, cell phone ID region etc. These files have approximately 5002 entries which is not too large for manipulation.
* One data file containing information of the areas and their status of the area of the MTN cellular network with fine details of their geographical location.
* The data types of the attributes are majorly string and integer.

***Data quantity***

The data that will be used for analysis is in Microsoft excel format. The method that was used to capture this information is primarily through transactional and registration data from that collection database managed by MTN. The three files containing the information for the users for three days have 5001 entries (rows) and ten (10) columns.

***Data Quality***

The main aim of this project is to do an upgrade of the available infrastructure. Important attributes such as the product that the user subscribed to, location, cell ID are among the useful information necessary for this project. Knowing the type of products that most customers subscribe to and the precise location will be useful in making deployment decisions as how to allocate the resources. The data types in the files that will be analyzed consist majorly of string and integer.

The key attributes such as the product, site id, city, and the date time are important for our analysis in this project. By getting the count of the products segregated along the area which the user is and considering the time that they used is a game changer for MTN. The Sales & Operations department can come up with appropriate subscription services custom made to suit the consumer needs.

***Data Exploration***

While exploring the data:

* Cities with the most used product as voice and data during the day were located in an urban setting is one of major hypotheses that was formulated during exploration.
* The attributes that seem most useful for our analysis and fulfilment of the business objectives is the product, number of cells on site summed up for the particular area and the area where the users are located.

***Verifying data quality***

The data contains some missing values like the in-status attribute in the cell\_geo excel file. Since these entries will not affect the final results after analyzing the data, the data will be used as it is.

***4. Data Preparation***

***Cleaning data***

In the data sets that are going to be used for this project, there are entries that do not have any value. Python recognizes them as NaN. In most instances when analyzing data, the ideal action to deal with the missing value is to remove or omit those particular entries that have no values in some attribute. The reason for removing the missing values is because they could affect the final outcome of the analysis and hence lead wrong decisions based on those results.

In this project we will not remove these missing values as they will not affect the final results upon analysis. Justifying why the missing values are not going to be removed is because in our analysis where the missing values are contained we will not need the specific columns to make the decisions concerning the business.

***Deriving attributes***

Before proceeding to model the data, it is important to first normalize the data. In this case, the data does not need to be normalized. Due to the fact that most of the data contained here is string, there is no need for the missing attribute to be constructed using aggregation, induction or averaging.

***Integrating data***

There will be a need to merge the three datasets (TelcomDataset.csv, TelcomDataset2.csv, TelcomDataset3.csv) containing the user information for the usage of the network in the three days. This will help in being able to find the overall city that was most used in the three days. No aggregates will be computed as the data involved here is strings.

***5. Analysis***

This data will be analyzed using python and the libraries that will be used here will be pandas and numpy. The notebook containing the analysis for this project as well as the data sets are accessible through the following link to the GitHub repository:<https://github.com/annettembeyu/2020myfirstproject>

***Modelling***

In analyzing the data, the models that will be used will be:

* The mode function will be very important in obtaining the cities most used in the three days and the overall city that was used in the three days. In addition, the mode function can also be used to find out the product that was most used in the four days.
* The sort function will be used to gather information for the users regarding their consumption between business and home hours.

***Findings***

*1. Which ones were the most used city for the three days?* The most used cities for the three days were: **Yopougon, Yopougon** and **San-pedro**

*2. Most used city for the three days?* The most used city for the three days is **Yopougon**

*3. Which cities were the most used during business and home hours?*

*4. What were the products that were most used for the three days?* For TelcomDataset.csv the most used product was voice, TelcomDataset2.csv the most used product was SMS and the most used product for TelcomDataset3.csv was also SMS.

*5. In the three days which product was most used?* After merging the three datasets. The most used product for the three days is voice

***6. Recommendation***

The following are the recommendations made from the findings:

* The voice bundle packages for consumers should be customized not only to have it affordable during business hours but also during home hours so as to realize more profits.
* Priority in laying down infrastructure should be done in the two cities which are YOPOUGON and SAN PEDRO
* Pocket friendly packages for data products should also be made so as to encourage more people to subscribe to their products and also it should be done along well-defined classes.

***Evaluation***

Updating of technological infrastructure would be worthwhile if some of the strategies that support it are implemented as well. This is to ensure that the dynamics of Cost-Benefit Analysis are maintained. For any profit-oriented organization any effort undertaken should ensure that the effort undertaken is worthwhile in comparison to what is gained, business wise.

From the finding obtained during the analysis and the informed opinions from the professional involved in this project will enable the deployment of resources and successful implementation of the project.