

The Effect of Bigdata Analytics Based on New Developed Model for Improving Mobile Customers Bills Generation Performance

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Abstract

Using the new big data tools and analytics in telecommunication firms provided many opportunities for development , create values and achieve enhancements to enhance company products and services and enable firms to increase services and complex products changes ,through this research it was possible to study and analyze in details the standard technical steps to customers mobile bills processing generation and agent review process in telecommunication companies and proposed relation to the current assumed accuracy percentage and time consumed to generate control group bills for agents review, and analyze the whole process details and actions in order to identify the lack of current used application and technical process and provide with new model and solution to enhance and reduce overall process time and increase bills accuracy with minimum errors and low cost through consumed less man

hours. the study show by distributing 250 survey questionnaires forms to employees to check the need for new automated applications for bills review scenarios and another one for changing systems features to enhance the process accuracy and time consumed ,The research sample included 250 experts in different telecommunications departments are responsible for handling customer bill cycle process, theses participants in the research were selected from telecommunication customer care ,retail and finance departments in mobile telecommunications operator ,research paper will provide an explanation to a new model developed using big data analytics for improving the poor performance of systems that used the traditional Database queries database while mobile customer bills generation technical process in telecommunication firms , and it was found by using the new bills generation model and availing new automated application for bills

review steps the outputs is positive as research equation variables show the higher increase in customer samples the higher increase in bills accuracy and decrease in bill review man hours and enhancement in overall customer bill cycle generation process SLA ,In summary to clarify using research equation figure (3) and study the variables relationships , the system needs new enhanced process using new speed technology to reduce processing time and allow users to increase numbers of needed samples ,numbers of review scenarios and increase the bills accuracy process and this is confirmed by providing new system architecture using big data analytics to speed up processing and enhance Time ,by using the research equation and study the relationship of its variables ,in the figure no. (4) the research null Hypothesis H0 has confirmed and prove that there is a relation between the increase of numbers of control group samples and increase of accuracy percentage but the null hypothesis's rejected due to the lack of application processing using structured SQL queries and relation achieved under condition of using fixed values to research equations variables people and time to achieve the same percentage of bills accuracy and accept the alternative hypothesis H1 as its proved that the higher samples variable the higher accuracy with condition of processing time enhancement using new provided model processing see table no. (4)and the second hypothesis achieve variables relations to research equation

Key words: Big data; SLA, GUI; Bill Cycle, Analytics,SQL,KPI;

1. Introduction and Framework of the Research

1.1 Introduction

The traditional process steps and tools used in telecommunication sector especially in mobile operators to generate the mobile users bills especially the samples preparations checklist and bills review team members needs to have easy and speed control to different products and services samples scenarios to ensure bills accuracy process and within short time, in addition to the bills review activities that may contain a lot of non-value-added activities such asking technical team to generate different repeated scenarios to same criteria's every bills cycle round and added controls after generation time should be short and efficient to avoid SLA violations, as per the current study there is a need to enhance the current process of customer bills generation technical querying model and the agents needs for automated application to control review scenarios and saving repeated scenarios for achieving bills generations in short time with low cost ,because old traditional bills review process with the complex of nature of products and services with the customer base increase will impact bills accuracy process and impact bill cycle time SLA and will consume more agents man hours as well. so the telecommunication firms must focus on how to maintain the customer bills process SLA and reduce time of review and automate different technical scenarios that become difficult to check to increase quality and reduce time using on-hand database management tools or traditional old data processing applications. In order to control

bills accuracy and reduce time consumed while customer's bills review from agents, there is a must to provide new model to enhance the current bills samples generations processing and develop new application to be used by users to save time. The two factors are "providing new model to enhance the users bills generation process and develop new GUI application for control business scenarios will solve the following issues points:

- a. the Lack of current used application processing that depend on old database tools due to search and preparation for complex scenarios and fixed samples
- b. the need to reduce overall bills review SLA and increase numbers of control group samples and accuracy percentage with less employee hours
- c. The need to develop new app GUI to control review process automatically instead of manual work
- d. Standard customer bills generation process and challenges in telecom. Firms

1. Agents send manually business scenarios sheet to technical team to be ready per bill cycle and samples will be limited due to lack of application performance that use normal database queries
2. The standard application start run using traditional SQL DB querying to the test samples
3. Agents review team starts reviewing the control group samples bills and validate it manually against applied system setup configuration to decide if its match agreed pricing or not
4. Bill review team performs their work manually with support of some sources of Product

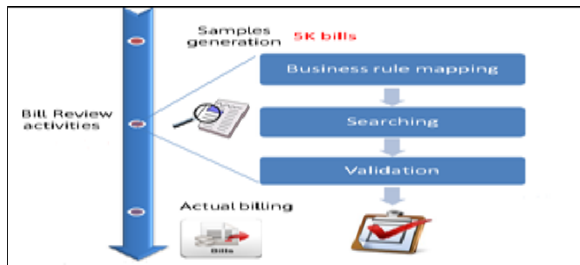


Figure 1: show the current standard bills review process

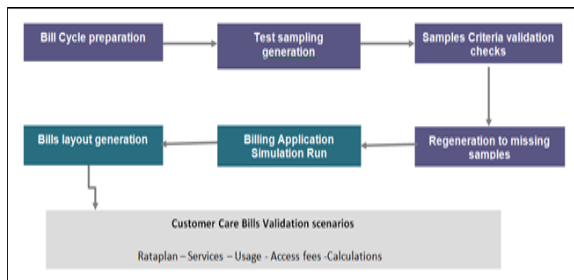


Figure 2: show the flow of bill cycle generation process

1.1.2 Telecommunication firms Bills Review KPIs

The below table will explain the current key performance indicator for mobile customers bill generation process

Table 1: Telecommunication Bills Review Service Level Management

Current Bills Review KPIs	
Bills Review Accuracy	Accuracy percentage as per proposed research equation is 62% under performance limitations, the mentioned fixed variable.
Bills generation Review SLA	5 to 6 days SLA time whole bills generations process
Resources and Man power	Review Man hours 15 mnth = (15 * 12 *5) = 900 hrs
Samples counts	Fixed 5000 per bill cycle
criteria sizing	Limited ability to get sizing sheets based on specific criteria
Reviewer Knowledge	Knowledge skills for agents is limited due to complex criteria of products and services.

1.2 Research questions

The current study will try to respond to the following questions:

a- How Telecommunication companies assure that the generated customer bills are accurate and error free in short time with high accuracy?

Q1 Is there a relation between numbers of samples increase and time consumed while review?

How Telecommunication companies can increase the accuracy percentage to the process and achieve monthly targets using current standard manual search engines?

Q2 Is there a relation between bills accuracy, numbers samples and risks of bills issues?

1.3 Research Objectives

This study aims to build and develop new optimized search model to automate and enhance the users bills generation process activities within short time in telecommunication firms with minimum errors to achieve high bills accuracy before actual generations.

1. This study aims at decreasing operation time consumption and introducing a new model to reduce BC generation process using new analytics techniques

2. This study aims to Reduce Man hours used while bills review process

3. This study aims to increase bills accuracy by increasing samples which lead to less errors

4. Studying the possibility of applying and use the new big data analytics in the technical activities to increase bills accuracy and reduce time of bills review and reduce users bill cycle SLA

1.4 Research hypothesis

1.4.1 The Design of The research Hypothesis

The relationship between accuracy , bills processing variables integrity and the processing time and man hours cost while mobile bills reviewing phases is directing business towards focusing on increase mobile bills calculation accuracy and flexibility to increase sampling accounts during review process as well as increase technical performance data processing flow that affects the proposed equation variables figure (11) so variables (processing time-numbers of samples and man hours) must be analyzed and investigated to have another faster processing way that affect the mobile bills generation process variables accuracy, processing integrity and time and cost of man hours monthly.

This hypothesis was made on the basis that:

The integration between the bills processing variables, mobile bills control group samples variable and accuracy and time consumed while bills generations' technical flow and numbers of needed man hours for manual review and prove the relation of increasing samples will effectively lead to increase the bills accuracy in less time, Accordingly, the hypothesis was formulated as follows:

1.4.2 The Main research hypothesis

There is a significant relationship between the relative improvement in performance to the mobile bills technical generation process and the research equations variables changes under study using the new development big data analytical model for mobile bills generation process

1.4.3 The research Equation

The Following research equation proposed to describe different variables like numbers of control group samples, , complex defined scenarios , processing time and bills accuracy percentage which should be measured during mobile users bills review process to measure the outcome according to below conditions

The higher numbers of control group samples this will lead to the higher increase bills accuracy. Applying Map Reduce agent to improve big data analysis and overcome system slowness to 3 variables in the research equation (Time- Numbers samples)

$$\text{Bill Accuracy} = \frac{\text{No of scenarios} \times \text{No. of checked bills} \times \text{no of reviewers}}{\text{Review Time consumed}}$$

Figure 3: Research Equation

1.4.4 Hypothesis testing method

The following table is first H0 test to bills generation process flow using old traditional model and the results of the proposed equation variables, the fixed numbers of test samples led to accuracy percentages didn't pass 62% see table(2)

1.4.5 H0 the null hypothesis

Table 2: Hypothesis H0 equation results using old model

Old Processing flow hypothesis test H0					
Mobile Bill cycles	Bill cycle 1	Bill cycle 2	Bill cycle 3	Bill cycle 4	Bill cycle 5
Predefined scenarios	5	5	5	5	5
Numbers of samples fixed	5000	5000	5000	5000	5000
Bills accuracy	62%	62%	62%	62%	62%

Numbers of employees	15	15	15	15	15
Total Review Hours for 15 emp	900	900	900	900	900
Current SLA	4	4	6	4	6

Equation solution:

$$\text{Bill Accuracy} = \frac{5000 \times 15}{12} = 62.5\%$$

Table no. (2) show the null Hypothesis H0 confirmed and prove that there is a relation between the increase of numbers of control group samples and increase of accuracy percentage but the null hypothesis's rejected due to the lack of application processing and relation achieved under conditions, to set fixed values to research equations variables people - time to achieve the same percentage of bills accuracy and maintain same bills generation time (SLA) as the current model can't accept increase number of samples accounts or even increase the predefined scenarios to cover all company products so the review accuracy always refer to 60 to 62% ratio with fixed values to the other used variables

1.4.6 H1 The alternative hypothesis

There is a significant relationship between the samples increase and accuracy under condition of performance enhancement in the processing time will gain the higher samples size the higher bills accuracy percentage with decrease the numbers of man hours and decrease in the overall bill cycle SLA, the table no.(3), table no.(4) and table no.(5) all show the different increases in used samples are impact accuracy percentage positively according

to the research equations solution and affects other variables also see comparison table no. (6)

1.4.7 Analysis of alternative hypothesis

Simple table to test the increase of the collected samples with the increase of number of predefined scenarios using less numbers of employees and in short SLA as described in figure no (4) ,the higher samples size the higher accuracy increase

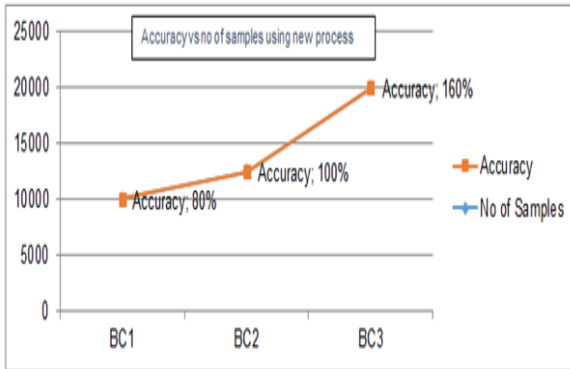


Figure 4: the relationship of the research equation variables the higher samples size the higher accuracy

Table 3: The dependent relation between equation variables using new model

New Processing flow hypothesis test H1					
Bills Cycle numbers	Bill cycle 1	Bill cycle 2	Bill cycle 3	Bill cycle 4	Bill cycle 5
Number of business scenarios	16	16	16	16	16
Numbers of control group samples	10000	10000	10000	10000	10000
Accuracy variable	80%	80%	80%	80%	80%
Numbers of agents	4	4	4	4	4
Total review hours (4 Agents)	40	40	40	40	40
Time (Days)	1.3	1.3	2	2	2

Table 4: The dependent relation between equation variables using new model

New Processing flow hypothesis test H1					
Bills Cycle numbers	Bill cycle 1	Bill cycle 2	Bill cycle 3	Bill cycle 4	Bill cycle 5
Number of business scenarios	16	16	16	16	16
Numbers of control group samples	12500	12500	12500	12500	12500
Accuracy variable	100%	100%	100%	100%	100%
Numbers of agents	4	4	4	4	4
Total review hours (£ Agents)	40	40	40	40	40
Time (Days)	1.3	1.3	2	2	2

Table 5: The dependent relation between equation variables using new model

New Processing flow hypothesis test H1					
Bills Cycle numbers	Bill cycle 1	Bill cycle 2	Bill cycle 3	Bill cycle 4	Bill cycle 5
Number of business scenarios	16	16	16	16	16
Numbers of control group samples	20000	20000	20000	20000	20000
Accuracy variable	160%	160%	160%	160%	160%
Numbers of agents	4	4	4	4	4
Total review hours (£ Agents)	40	40	40	40	40
Time (Days)	1.3	1.3	2	2	2

1.4.8 Statistical Analysis and Empirical Results

The benefits of using the New proposed model for mobile bills generation process were reviewed emphasizing that is useful for work and applicable

in the domain of work. Using the research equation and study the relationship of its variables as shown in table no. (2) the research null Hypothesis H0 confirmed and its prove that there is a relation between the increase of numbers of control group samples and increase of accuracy percentage but the null hypothesis's rejected due to the lack of current used application processing that depend on database queries and relation achieved under condition fixed values to research equations variables people and time to achieve the same percentage of bills accuracy ,and we accepted the alternative hypothesis H1 as its proved the higher samples the higher accuracy with condition of processing time enhancement using new model processing . The results that were extracted from the study showed that the telecommunication sector should change and enhance the process of bills generations and work to increase accuracy variable by increasing the control group variable samples for review and use automated GUI interface to enhance review time process and enhance the bills generation process overall SLA and depend on new big data analytics techniques. The analysis output showed the higher samples size the higher bills accuracy percentage with decrease numbers of man hours and decrease in the overall bill cycle SLA, tables no.(3),(4) show the different increase in used samples impact accuracy percentage according to the research provided equations and affects other variables also see comparison table no (6)

1.5 Research Methodology

Through personal interviews and distributing

questionnaire survey form to 250 experts in different telecommunications sectors departments which all are responsible for handling customer bill cycle process and activities and it was possible to assess the perception of the need of new enhanced IT system features capability process using new fast technology and to assess the need of new applications GUI as automation and to generate value and benefits .and process is including training to employees on the skills of dealing with new software in a correct way, analyzing , adding-removing scenarios and studying interaction with the user and the various activities in which this software are used.

1.5.1 Comparative study

To apply a reliable faster model, the study compares two model advantages and disadvantages to choose the best model see Table no. (6)

1.5.2 Data and Empirical Model

This study investigates how to enhance the processing performance and provide new GUI application to revivers agents in telecommunication firms and applying the test to dummy samples test control group accounts to be processed by the use of the big data analytics development model and using java code and Map Reduce in light of the changing the current used traditional process and activities and make use of new available resources in technological tools and their relationship to directing business towards success in organizational performance by improving the processing time of user bills and increase the accuracy percentage and reduce billcycle SLA , Data collected from test system server after

applying the configuration of new review scenarios and increase the samples of customers and run into new system and collect results of processing time variable See table(6)

1.5.3 Research Population and approaches

The Research population includes a group of experts in different telecommunications sectors departments.

1.5.4 The Research Sample

The basis of the study was to develop new model and process using fast big data analytics to enhance the performance while mobile bills generations and bills review activities according to provided predefined scenarios for market products and services see table (10).

2. Perspective of Big Data Analytics

2.1 Big data analytics and business value

In This research the new presented process using big data infrastructure mapping the source of data in order to make use of parallel processing of Hadoop ,and the data retrieval show processing enhancement and enable users to search about complex criteria's that's can't be retrieved using SQL queries due to lack of application performance. nowadays Big data analytics have been considered by many as the next frontier for innovation, competition, and productivity (Manyika et al., 2011). as a result, there has been considerable attention from both academics and practitioners on the value that organizations can derive from the use of big data analytics towards the attainment of organizational goals. a widely used definition of big data analytics regards them as "a

new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high velocity capture, discovery and/or analysis" (Mikalef, Pappas,Krogstie, & Giannakos, 2017). The literature reviews suggests that through focused deployment of big data analytics, firms are able to sense emerging opportunities and threats, generate critical insight, and adapt their operations based on trends observed in the competitive environment (Chen et al., 2012).The increased interest in big data analytics has been particularly evident in companies operating in complex and fast-pasted environments (Wang, Gunasekaran, Ngai, & Papadopoulos,2016). Managers nowadays are basing their decisions more and more on real-time insight generated from big data, and are directing a growing number of initiatives in this direction (Constantiou & Kallinikos, 2015). Several literature reviews papers demonstrate that big data analytics, when applied to problems of specific domains such as performance tuning, service provision, supply chain management, and marketing, can offer substantial value (Mikalef et al., 2019; Raghupathi &Raghupathi, 2014; Waller & Fawcett, 2013; Wang et al., 2016). from the empirical work performed to date, there have been several studies that isolate factors that contribute to successful organizational diffusion of big data analytics. Their findings demonstrate that investing in these resources is associated with increased market and operation performance. Similarly, Wamba et al. (2017) empirically showcase how investing in infrastructure, management

capabilities and personnel expertise capabilities can lead to gains in overall firm performance in the case of big data analytics there is still limited research looking into how resource importance may differ based on the context of examination, and how the blend of resources and context may lead to improvements in performance. Big data analytics may adversely impact the result of the data in terms of effectiveness and accuracy in output data. The techniques used for analyzing the data are as follows.

2.2 Text Analytics

The text mining process is used to extract figures from unstructured data like the blogs, corporate documents, and online forums, etc.

2.3 Predictive Analytics

It makes use of historical data and current data for predicting future outcomes. Predictive analytics can be employed to all sectors such as customer behavior that related to specific usage type either data or voice, churn of employees from the company, and using this analytics bill review team be able to save any detected scenarios See Tables (1) once to be used per bill cycle and no need to repentance

3. Case Study applied in telecommunication Firms

3.1 Research Telecommunication Population

Telecommunication sector and operators are follow standard process and activities while generating mobile users bills and all have same objectives and challenges and facing same variables challenges time, numbers of samples and accuracy .

3.2 Design and evaluation of a Questionnaire and sample of users

Kindly note that they survey questionnaires are designed to assess the customer benefits before and after applying new model in telecommunication firm to help the process of generating and reviewing customers' bills to reduce SLA and reduce man hours and avoid manual work and use automated process. and questionnaire designed and directed to different users in telecom organizations See Appendix A results ,the research sample included 250 experts are responsible for handling customer bill cycle process, a copy of the questionnaire was sent to all concerned teams, and completed questionnaires were retrieved from each department spocs, representing the total employees are responsible for bill cycle decision making

3.3 Users Responses Analysis results before applying new model

The possibility of applying the new system and develop new automated tool for bills scenarios review, it was found that the majority of the responses were (Strongly agree - Agree (198)) with 92.5% according to the questionnaire of the application of the system, none of them showed any impediments to system failure. While 3.3% were (Opposed - Strongly disagree (8)), & a 4.2% were neutral (9). See Appendix(A)

3.4 Users Responses Analysis results after applying new model

The feedback after using the system. It was found that the majority of the responses were (Strongly agree - Agree(187)) with 87.4% according to the

questionnaire of the system capabilities and feature, which is very important and required in the system While 5.2% were (opposed - Strongly disagree(11)), & 7.4% were neutral. See Appendix (A)

4. The new automated proposed model and Its Effects for Improving Customers' Bills Generation Performance.

4.1 Technical idea architecture overview

The new model is depending on different inputs from different data sources before the complex processing by the telecommunication system that depend on using the SQL queries in order to prepare requested samples and mapping them to the provided business scenarios See Table [1] ,ie: Systems sources inputs customer usage voice , data , sms , customers adjustments files , customers recharges , cash payments , daily offers , daily data and voice bundles ,point of sale files ,subscription management systems RBTetc ,

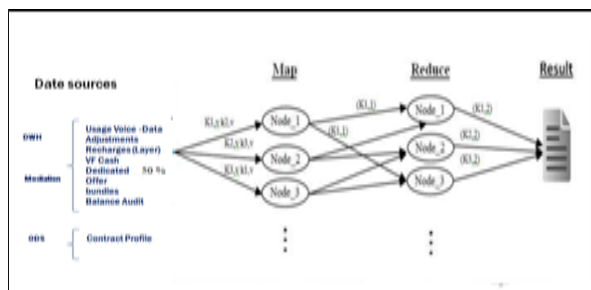


Figure 5: The map reduce mapping phase data sources inputs

The new model prototype for the study ,I decided to use Map-Reduce in order to get the benefit of a processing framework used to process data over a large number of machines, then Hadoop uses Map-Reduce to process the data distributed in a Hadoop cluster.

As when the data is stored on multiple nodes as shown in Figure 3 Map-Reduce will copy the program to all the machines where the data is present.to maximize the Map-Reduce feature called Data Locality, is the potential to move the computations closer to the actual data location on the machines. Since Hadoop is designed to work on commodity hardware it uses Map-Reduce as it is widely acceptable which provides an easy way to process data over multiple nodes So by mapping the different data sources to different nodes to enable parallel processing under fast HDFS file system and generate output can be inserted to SQL schema in order to enable application GUI to use it in its interface see Appendix (A)

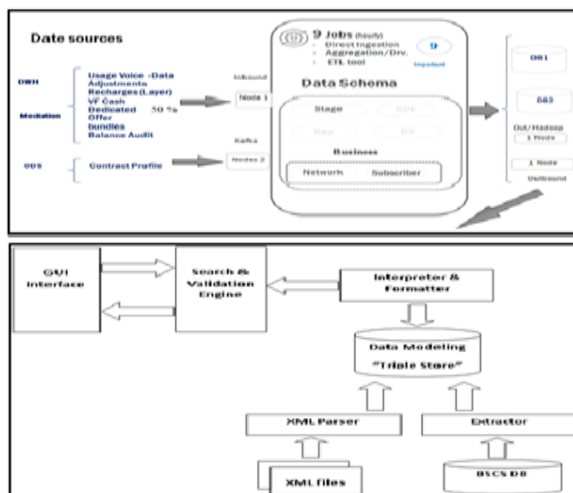


Figure 6: New proposed Model architecture and data visualization diagram

4.1.1 Data types and Data sources in telecommunication firms model inputs

In telecom firms most of the early big data efforts are targeted at analyzing the existing data the main idea of the proposed model objectives for this research such as CDRs, network data and

subscriber data. More than half of the operator experts define internal data as the primary source of big data within their organizations. There are three types of data in telecommunications industry from an operator's point of view, namely Subscriber data, Network data and Call detail record.

4.1.2 Subscriber

Data Telecommunication firms all have millions of subscribers and it requires keeping and maintaining an information database of all subscribers. For example, operator saves the subscriber account information which includes e.g. name and address, billing information including payment type and details history for every payment. Subscriber data includes the information about the connection, status and its historical types like disconnection-reconnection and itemized information of the that subscriber use.

4.1.3 Call detail record

Every time a call is initiated on the telecommunications network, descriptive information about the call is produced and saved as Call Detail Record (CDR). The number of call detail records that are generated and stored in an operator's database is huge. For example, in telcome sectors samples average generations nowadays about 400 million CDRs per day.

4.1.4 Network usage

Is another data source which generates subscribers' network usage data, such as CDRs, XDRs, Internet Protocol Detail Record (IPDR) and data from Business Support Systems (BSS) or Operational Support Systems (OSS).

4.2 The Mobile user bills Generation Process using New proposed model

The workflow of the proposed new model shown in Figure (6). It has the following steps: See Sample scenario Appendix (B)

,Input different data from sources dwh, mediation and online data source ODS to the platform. Server portioning the file to blocks with the same size and application server assigns a data block to each computing node, The computing node runs map on the input data and producing intermediate data pair for every word. It then sends its intermediate data pairs to application to perform the reduce operation, The reduce operation counts the number of occurrences of each word using the values and emits it as a key-value pair and save the result in file passed to GUI. New developed GUI .Generate the reports according to the business criteria inserted by the business team on daily bases the time (saved business scenarios) and to be ready before starting the review. The generated reports will contain all criteria for the search scenarios. Enable Business team to enter the criteria (search or validation) through a rich GUI interface to cover all possible combination and to be more generic as much as possible even for the complicated criteria. Customer care business team start reviewing the reports according to the business scenarios and nature of each product. Bill review team will perform any other validation according to their needs automatically.

4.3 The effects of the new proposed model for improving Mobile customers' generation performance results

4.3.1 Research Analysis and Empirical Results

The data resulting from personal interviews and survey analysis, which were collected during the

normal running process and after applying model using use case business scenarios Appendix(B) The benefits of using the new software development process and new application interface GUI instead of the old manual one were reviewed , tested and emphasizing that fulfilling the implemented test is useful for bill review team and applicable in the field of bills review automation the new model improvement see Table(6).In summary to clarify using research equation figure (1.4) and study the variables relationships , the system needs new enhanced process using new speed technology to reduce processing time and allow users to increase numbers of needed samples ,numbers of review scenarios and increase the bills accuracy and this is confirmed by providing new system architecture using big data analytics to speed up processing and enhance Time ,by using the research equation and study the relationship of its variables the figure (1.4) the research null Hypothesis H0 confirmed and prove that there is a relation between the increase of numbers of control group samples and increase of accuracy percentage but the null hypothesis's rejected due to the lack of application processing and relation achieved under condition fixed values to research equations variables people - time to achieve the same percentage of bills accuracy and Accept the alternative hypothesis H1 as its proved the higher samples the higher accuracy with condition of processing time enhancement using new model processing

4.3.2 Research Contributions

The research contributes to providing a new automated model for mobile bills review steps

in telecommunication companies by introducing new technical prototype software development according to enhance processing performance while preparing control group samples which proved that is flexible to increase samples and enhance over all bills review time with less man hours, as The traditional methods of application are not able to meet the customer base increase or new added company complex products and services challenges , Through the research, it was possible to develop new GUI interface that help users to use it instead of manual sheets

This research can provide a work around solution to telecommunication firms to enhance mobile bills technical review process. In this research, the focus is on the understanding of the users nature of work to reduce manual work and a review of the practices associated with collecting requirements, and in the end applications are developed using the flexible and friendly tools according to user requirements.

Table 6: Old and New Model Bills Review Advantages and disadvantages

Comparison	Old Advantages	Old Disadvantages	New Advantages	New Disadvantages
Samples	N/A	Limited number of samples due to lack of search	Cover 100% of Base customers	N/A
Bills Review accuracy	N/A	50% Accuracy for reviewed limited samples	Accuracy increased due to increase in sampling by 100%	N/A
Bills SLA (time)	N/A	Longtime SLA	Short time SLA	N/A
Review Scenarios	N/A	Manual review according	Automated using smart GUI search engine	N/A
Resources Manpower	to experience	High	Low	
System HW Cost	Low Cost	N/A	N/A	High Cost

4.3.3 Disadvantages of old customers bills generation Model

- 1- Current process service level agreements" SLA" in operators up to 6
- 2- Reviews are depending on manual test samples should be requested before start review cycle
- 3- Bills review variables factors are fixed due to lack of application processing
- 4- Sizing and review scenarios is direct and no complex scenarios are applicable
- 5- Not possible to increase numbers of control group samples so its impact bills accuracy percentage

Table 7: Old and New Model Comparison

Comparison	Old Model	New Model
Samples	5%	100%
Bills Review accuracy	50%	99%
Bills SLA (time)	6 days	2 Days
Review Scenarios	Manually	Automated
Resources Man power	900 Hrs 15 * 12 *5	100s 4 * 5 * 5

5. Conclusion

Through the research, the feasibility of using new proposed technical process method using new big data analytics to be used while mobile bills generations and bills review phases in telecommunications firms to reduce overall bill cycles generations time and increase bills accuracy by increasing the size of reviewers samples and enabling users to increase review complex scenarios predefined for review process, and through personal interviews with

process stockholders, it was possible to identify the benefits of using new developed model and provide the research equation with different variables which proved the relationship between different variables and confirm the main research hypothesis the higher samples size the higher bills calculations accuracy in addition to enhance the other research equation variables by reduce time as well as a survey was distributed to different users in telecommunication firm and was analyzed to check the research variables results

6. Challenges

- Cost of building complete big data cluster and its disaster recovery
- The difficulty of current capabilities and knowledge experience and specialists,
- Insufficient of similar researches for telecommunication solutions and use cases

7. Future Work

- 1- Build big data complete cluster to extract from all data sources to be used in one model
- 2- Trying to build the proposed model on the private and public cloud by highlighting the points of strength and weakness of each, taking in consideration the efficiency in performance and security issues
- 3- Enhancement to GUI to include dynamic scenarios and apply fixes
- 4- build fail over scenario in case of servers

unavailability

5- Apply more dynamic and intelligent feature to reduce man working hours and use robotics for validations

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Appendix A: 1. Responses table analysis for model acceptance

Note: Data prepared in questionnaires' is confidential and used for the purpose of scientific research only

Table 8: Responses results accepting new model for bills review activities

Assessment	Average percentage of responses of The sample
Strongly agree + Agree	92.5%
Neutral	4.2%
opposed + Strongly disagree	3.3%

Table 9: Responses results confirming new model after applying solution

Assessment	Average percentage of responses of The sample
Strongly agree + Agree	87.4%
Neutral	7.4%
Opposed + Strongly disagree	5.2%

Appendix B: 2. Sample login screen of new bills review GUI



Figure 7: user login screen interface with authentications

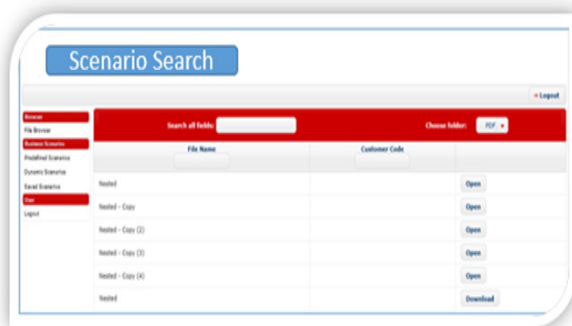


Figure 8: Sample use case scenario search of bills review GUI

3. The Research business scenarios Sample

Note: Data set samples and system inputs data are created manually to test the research variables using assumed equation for scientific research purpose only

Table 10: Shows the research business scenarios sample

Scenario Name	Scenario Description
Contract - Rate plans	Extract contracts and cross ponding tariffs or rate plans
ContractServices_Specific	Extract automatically contracts and cross ponding services
RatePlanChange	Extract all contracts that has tariff change
HighestTotalBillAmount_RateplanWithService	Extract the highest amount per rataplan

3.1 Business scenario types samples

There are three types of Business Scenarios supported by this module:

Predefined scenarios: scenarios defined in the Database by the technical team. Then Review Team can select a scenario and execute it to get the scenario resultant samples

Dynamic scenarios: bill Review Team can customize their own criteria for search, execute, and then get the related samples. The user can save the selected criteria to be executed later or during a different run.

Saved scenarios: the user can select the scenarios saved while creating a Dynamic scenario.