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COMPARATIVE DATA STUDY WITH POWER BI

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Abstract: **Due to the inconsistent conditions of business, the importance of Business Intelligence hasacquired a great extent of consideration. The tools of Business Intelligence have been observed to allow the desired standardization by speedy as well effective managerial activity found in different sources of data, that mayinfluence an organization's longevityin the industrial situations. As there is a biguncertainty element in the extraneous industrial conditions in addition to the proficient necessities, a fresh approach for solution of BI called Self-service BI solution has been presented. Sinceprevious decade, there has been a spike in the quantity of business administrators utilising this proposal. The goal of this document was building a solution of business intelligence by employing a leader in the field of BI solutions known as Microsoft Power BI. This Self-service tool is amongthe mostdominating toolson the field ofBusiness Intelligence. The significance of this research document was a solution of business intelligencemade readyby making use of Power BI and it connected with the specifications laid down for it. In this case, a trial is made to exhibit the effortless modification of a dataset of comparative study by Power BI in the form of logical reports and dashboards that can be analysed easily.**

Keywords: **Comparative study, Power BI,Business Intelligence, Proficient, Dashboards**

I. INTRODUCTION

The following paper presents the principal potentials of Power BI, which is one of the cloud-based analytics service offered by Microsoft that is used for envisioning, researching, and taking outperception out ofinput specifics.The goal of this document is to show completely what all benefits Power BI gives and how it is able to support any business. The idea of BI is there for around a century and a half. From the heart, BI is concerned with understanding of the facts and its association between points of facts in a style that promotes good decisions and reactions. Starting from a technological point of view, BI is a system of tools and approaches for converting raw (meaningless) data into meaningful business insights.

Professionals working in IT consistently play an important part for adding utility to the given data by the creation and maintenance of the warehouses of data, making and out-bursting data models which are complex, or creating report or dashboard. Therefore, end rely mostly on IT support for meeting the necessary BI requirements, which also includes the designing of reports and dashboards.

The objective evolves around the hypothesis of Business Intelligence. It explains thefoundations of the Microsoft BI and interim research on it. For actual process, a trial case was implemented to aid in understanding the principal services offered by Power BI. The two objectives for this research are knowing the framework of Microsoft Power BI and figuring out on the process to create the different visualizations of the dashboard and by using Power BI.

The path to self-service BI was paved by Microsoft Excel and it was a basic footstep for giving business enthusiasts the art to take out insights through input particulars, which belongs to a self-service community got an authentic existence when Power Pivot feature was added to it. This further extended its abilities to Microsoft Excel which were earlier introduced particularly in databases. Hence by the help of Microsoft Power BI, more analytical potential have been extended to end users.

At the present time BI keeps on to evolve and Microsoft is dominating the path with the establishment of a modern era of BI to organizations by developing solutions that will increase and build on, in-spite-of replacing the contemporary analytics platforms and tools. By the help of Power BI, which is a business analytics service that is used for visualizing and analysing all of the data at a single spot, the goal of Microsoft is to propose business intelligence to everyone.

Starting from a technological point of view, BI is a system of tools and approaches for converting raw (meaningless) data into meaningful business insights.The term "Business Intelligence" (BI) was used for the first time in 1865 by Richard Millar Devens in the "Cyclopaedia of Commercial and Business Anecdotes" and Devens employed it to explain how the banker Sir Henry Furnese obtained payback value by receiving and acting upon details about his domain. In today's era, BI serves tools and techniques that lets a company to gather, store, access and analyse corporate data that aids in decision-making and tactical planning process.BI is represented as a skill to perceive the correlations of presented facts in such a way so as to guide action towards a desired objective (Hans Peter Luhn, IBM, 1958). "Business Intelligence is a process that turns data into information and then into knowledge thereby adding essential value to firm's decision-making processes (Loshin, 2003). The operations of collecting and analysing internal and external business information (Okkonen et. al). Information that is preferable to understand business and to make more informed real-time

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business decisions (Papadopoulos & Kanellis,2010). BI means taking advantage of information benefits within key business processes to get improved business performance (Williams&Williams,2007). The Business Intelligence (BI) refers to different solutions forincreasing the overall business performance (Wang & Wang,2008). BI is a set ofconcepts, methods and processes to improve business decisions utilizing information from different origins and applying experience and assumptions to develop an accurate understanding of business dynamics (Brackett,1999).

The Power BI service or powerbi.com provides straight-forward and perceptive experience for interacting with data. From creating and sharing dashboards to prospecting and enhancing visual reports, Microsoft Power BI offers uncomplicated way to involve with the data from different sources, giving fastened and more insightful business decisions.

Business Intelligence Architecture

Carlo (2009) used the pyramid shown on the next page for describing the process of construction of business intelligence system. It is comprised of the following parameters-

Data sources: Sources of data mainly comprise data needed for operating systems. It may still include unstructured data in the form of emails in addition to data extracted from external sources.

Data warehouse/Data mart: Data warehouses are used for consolidating various forms of data at a core location by utilizing an activity called extract, which is used to transform and load (ETL). It also standardizes the outcomes across different systems which are allowed in examination. Therefore, data marts are usually small warehouses that center around information at a single area, in-spite gathering data beyond the reach of company. It limits the difficulties of databases and is also cheaper for implementing with respect to full warehouses.

Data exploration**:** Data exploration is an un-resistive way of BI analysis comprising query and systems of reporting with an additional reach to statistical method. Data mining: Data mining is one of the functional methodology offered by BI with the emphasis on informational and knowledgeable extraction of data.

Optimization: Optimization model guides in determining solution which is best from a sample of another activities, that are generally reasonably extensive and can also become infinite at times.

Decisions: The choice of a decision pertains to the decision makers after business methodologies are successfully adopted. They may even take benefit from informal and unordered informationaccessiblefor adapting and modifying the recommendations and needful conclusions reached by the usage of models which are mathematical in nature.

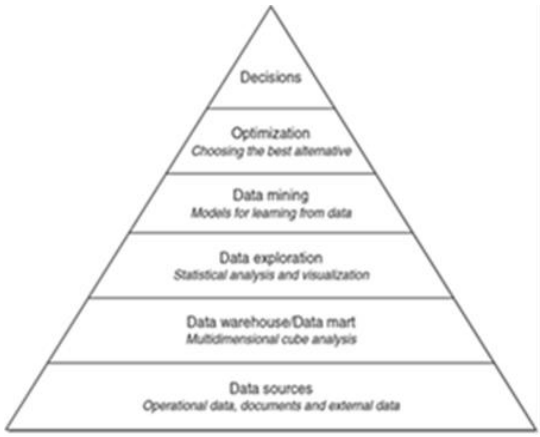

Figure 1: Main components of Business Intelligence System by Carlo.

POWER BI

Microsoft Power BI, a suite used for business analytics serviceis utilized for visualizing and analysing information and data. It also gives a option to share insights in the form of various visuals. A Power BI user data may be in different forms like text files, spreadsheets, databases, etc.The datasets are finally made after modifying the information contributed by various users. Data modifications are performed by the concerned user. Hence, the following stepis used to eliminate unessential information, correct formatting and then make information ready for advance analysis by organizing them into the form of fitting standard forms.Dependingupon dashboard that is analysed, filtering the data for including solely materialisticinformation authorizes a user to concentrate on the information which counts.

After data-set is finalized, visuals, reports and dashboards may be designed by choosing across several choices of multiple visualization elements. The components of visualization range from displaying a single number to a gradient multi-colored map. In this way, visuals guide in presenting information in a style which incorporates insights and contexts. The filters may need to be executed on the visuals for guiding about applicable information to the users concerned in analyzing that information. These reports may be constructed by using the Quick Insights feature or manually. The Quick Insights feature makes use of different algorithms for analyzing the concerned information and gives back a set of visualizations that it builds spontaneously without any manual help from user.After publishing of reports, parts of that report or complete report itself may be incorporated in visually interesting dashboards. The dashboards display a 360-degree view of concerned information by authorizing a user to place his utmost valuable important metrics at a single destination. It allows every user to interact with the reports for filtering the data. However, it's confined to a one page. Hence, it mainly includes the top-most concerned parts of information for making possible for every user to draw insights without any difficulties. Also, it's viable

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to regularly refresh visuals, reports and dashboards instantaneously and then make that accessible in all smart devices like smartphones and PCs.

An IT professional can-
a)Concentrate on information to prepare qualitative and relative data-sets for end users, data scientist.
b)Successfully connect with the increasing needs of enterprise for consumable data.
c)Utilize comparatively lesser time on maintenance of infrastructure or development of report.
d)Concentrate at rising demand for streaming and real-time data sources.
e)Meet the needs for reliable information with confidence and ease.
f)Traverse statistics visually.
g)Traverse between information easily and quickly. Hence, optimized for higher performance.
h)Collect data together from various sources which support in creating interactive reports and data models.
i)Build and share data models, reports and dashboards to end users easily. In this way, end user is authorized to analyze outcomes swiftly.
j)Observe live what matters the most at a single destination.
k)Share reports and dashboards.
j) Stay connected with Power BI from anywhere.

At last, the important note is that Microsoft Power BI is spreading analytics to more end users than ever before possible or achieved.

FEATURES AND SERVICES OF POWER BI

There are four features of Power BI: Power Query, Power Pivot, Power View and Power Map. The first main feature is Self-service BI feature in Excel. Microsoft Power BI is a cloud-based Self-service BI solution. All of them are utilized for providing data analytics service to business users. Second main feature is Power BI for Office 365. It gives a opportunity where a user can share datasets, reports and queries online. A user may also discover answer to the queries by using Q&A features in Power BI. Third most important feature in Power BI is the IT infrastructure for Power BI. It helps in building a straight-forward path for data management and administration between on-premises and in-cloud data.

a) Interactive reports-Power BI authorizes each user to create interactive and rich reports by using its user-friendly interface. Report of Power BI is a complete set of charts called visuals or visualizations, that are developed from some primary dataset. A user can select a pre-designed report (like a one designed in Power BI Desktop) or may develop it from scratch. For customizing a report, one needs to modify a visualization or add a new visualization.

b) Live dashboards-Power BI dashboard is a set of visualizations displaying data. It is based on some underlying reports which are displayed in a attractive style which makes it quite simple to get insights from data. The advantage which Power BI offers is that its dashboards are live and real-time. For an example, like when a visual in a dashboard is connected to a real-time data source, the visualization updates itself constantly. Hence offering insights that are faster. A Power BI dashboard can consist of visualizations that are from different reports. A Dashboard can be extremely customized. A user can "pin" a chart to any dashboard from any report.

c) Data visualizations-A Power BI report and dashboard are designed by including different kinds of visuals. Microsoft Power BI provides plethora of visualizations, authorizing a user to display the data in visually appealing and compelling manner. Some of these include: -composition charts (tree maps, pie charts and donut charts), comparison charts (line, bar, waterfall and bar charts), mixed-comparison charts, etc.

d) Natural Language Query -It is also called as Q&A. It's a special feature of Microsoft Power BI which makes it possible for a user to ask questions in English which in turn feedbacks answers in the form of new visuals. Q&A smartly sorts, filters, groups, accumulates and shows data. All the visuals are constructed on the basis of keywords in the question being asked.

e) Mobile applications-Microsoft Power BI supports reliable and live dashboard which can be accessed on any random smart-device through interactive apps from Android, IOS and Windows. For enhancing the experience of viewer, user interface of dashboard is improved for minor displays. By setting favourites, it becomes uncomplicated for accessing specific tiles of visualizations. These apps have various mobile supporting properties.A Power BI user can zoom in and out of visuals for looking at information being depicted more keenly. For staying on top of changes, a user can set up alerts for receiving notifications as to when a given quantity outstrips or falls below definite levels. Also, one can take a screenshot of a visual or report when needed.

f) Data Scheduling-The reports that are saved to cloud are able to connect back to on-premises data sources in order to refresh the data and stay up-to-date. So, when a user refreshes a dataset by utilizing the option 'Refresh Now' or by setting timetable for refreshing then Power BI utilizes information in that particular dataset for connecting with sources of data designated for the same purpose. It queries for the modified data and then fills that data in the provided dataset. As a result, any visual in report or dashboard build from the data is updated assuredly. The Data may be refreshed in any of these the following two ways: -

a) Automatic refresh-In the following refresh, no configuration from user is needed to refresh it at a regularly. Data refresh context are arranged for a user by Power BI. Modifications happen approximately each hour for data not coming from an extrinsic source of data. Whilst users may set random refresh settings and manually refresh it each time, they not need to do it mandatory.

b) Scheduled refresh or User-configured refresh-This means a user may decide to refresh datasets manually by using Refresh

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Now. The following refresh is primarily needed when Excel workbooks and Power BI Desktop files are connected to on-premises and extrinsic data sources.

Self -service BI Features in Excel

The self-service business intelligence (BI) features in Microsoft Excel spreadsheet software make visualising and analysing of data easy. All these tools include Power Query, Power Pivot, Power View and Power Map. These all engage with each-other smoothly. They are composed to extend BI functionality and help Power BI users convert data into meaningful information which is very helpful. But still, Power BI users may upload the identical excel spreadsheet into Power BI website by making use of Share Point and can then auto-refresh data by making use of Power BI Data Management gateway confidently. The excel plugins required to create reports include: -

1)PowerQuery-Connects to extrinsicdata2)PowerPivot-Creates different data models

3) Power View-Creates reports

4)Power Map-Analyses geospatial data

After the reports are ready in excel, then a user may upload it to the website version of Power BI.

Research Methodology

Getting started with Power BI- To get started for Power BI, a user can download Power BI Desktop windows version for free from the website-https://powerbi.microsoft.com/en-us/get-started/.Desktop version of Power BI for Windows is able to be used for creating reports and datasets on the computer. It is particularly necessary for users working offline or for those who don't have any other option. It helps them to save their visuals, reports, dashboards and then publish it to the online service of Power BI later. Data modelling is also an option available with Power BI services. A user has the option to sign up for Power BI from the URL mentioned above. Power BI online service gives a Quick Insight feature besides an alternative to share reports and dashboards.

Answers to some common questions on academic pricing, software requirements, etc can be found at the following site:- https://powerbi.microsoft.com/en-us/documentation/powerbi-frequently-asked-questions/.Finest place to learn Power BI is:https://powerbi.microsoft.com/en-us/guided-learning/.This guide presents all Power BI users to various concerned topics that are relevant to their interest of this dominant visualization and analytical platform. After a Power BI user is signed up for Power BI online service, various kinds of visuals are capable of being developed without taking much time.

At present a user can sign up on Power BI, particularly using an organization email address. It does not allow signing up with personal email addresses from commercial and public mail service providers like Gmail, Yahoo, Hotmail, etc. The emails which are registered from research institutions and domains of colleges may also be utilized for signing up. For example, ResearcherEmail@researchinstitute.ac.inmay be utilized.

For a case in which an organization is using Microsoft Azure or Office 365, then their users may login using it. But specifically for users without any organizational email and not wanting to share reports or dashboards with others, option is available at- https://powerbi.microsoft.com/en-us/documentation/powerbi-admin-signing-up-for-power-bi-with-a-new-office-365-trial/.

Power BI assistsnumerous forms and formats of input data which it is able toexamine. The datasets that were used were from internet for this purpose. It had data regarding the life insurance, market share, penetration, ratio of reinsurance and retention ratio of various countries in different years. The data had earlier been obtained in a year wise manner, and had been aggregated for the desired time period along with addition of various calculated fields. There was input dataincluding several subjects of concern that was arranged in various sheets. The maindata consisted of information about these topics-

1. Country
2. Year
3. Life Insurance Share: Selected period Value
4. Life Insurance Share: Previous period Value
5. Market Share: Selected period value
6. Market Share: Previous period value
7. Penetration:Selected period value
8. Penetration: Previous period value
9. Ratio of Reinsurance: Selected period value
10. Ratio of Reinsurance: Previous period value
11. Retention Ratio: Selected period value
12. Retention Ratio: Previous period value

Creating a Dataset with the Given Data-For creating a dataset, the first step is to login to Power BI or start using the desktop version of Power BI. After that use Excel spreadsheet retrieved from the internet to build a dataset. Once logged into the account, select the online service option from the navigation bar which had a choice to Get Data. After requesting for the option Get Data, there are several options available comprising from online services to content packs. The following steps need to be implemented to execute this step: For the following case the option "Import Data" is used for that. It had Files as one of the alternatives and Database as the other option. After choosing File, it prompts with choices for Local File, One Drive – Business, One Drive–Personal and SharePoint-Team Sites. For the following criteria, because there was a workbook of excel, which is a Local File, so the Local File was selected. Finally at the end, there were choices available for Import or Upload. The option Upload is chosen for viewing the data and making changes, if any. Here the need was to create reports. Therefore, the alternative to Import data was chosen.

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Prepare data: Build relationships and use calculations- Microsoft Power BI Desktop helps a user to model data and then analyze it with some similar features like those that are available in Microsoft Excel. In this way, Power BI Desktop imparts advanced-analytics based abilities which support users to construct complex-data, create relationships in it, perform different type of calculations in it, then find correlations in it, resulting in highlighting exceptions in it which further help in forecasting the outcomes of business and much more.
Whenever some data is imported in Power BI, some data model is spontaneously constructed. The Power BI Desktop helps detect the relationships automatically, categorize data and then apply default summarization in order to jump start modelling of that data.The AutoDetect feature available on Power BI helps to identify relationships beyond a single dataset by including on-premises and cloud data sources to increase analysis by a large amount. A user may refine the model as needed.Like for example in manually creating relationships or modifying a type of relationship. Power BI Desktop supports one to one, many to one, one to many and many to many relationships as well.
Firstly retrieve the data from primary dataset. After that create secondary dataset named Calendar by using appropriate DAX. To do that create relationship between primary dataset Insurance Indicators and secondary dataset Calendar.Then add required data fields to the visualizations and apply filters as necessary.To add shapes indicating growth add respective values in the table and then right click on the field to select conditional formatting, and in it selecticons to choose the shapes.

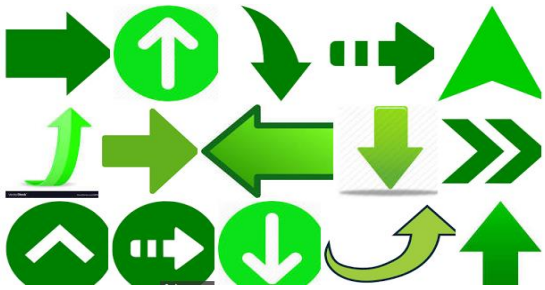

Figure 2: Some custom Power BI KPI icons.

Designing a Report-Once the steps to extract the data are executed, the name of the workbooks got displayed on the navigation pane as Insurance Indicators and Data plus it gets listed underneath the Datasets column. At the workspace was a blank white canvas in the middle of the screen and on the right there were various options for different visualizations. Other than this, there were options available for Filter and Field that allow enhancing of a report.There were certain visualizations that were needed keeping in mind the necessities. All these were created from scratch after selecting desired name of dataset andthen drawing desired fields upon the blank space. Choice of dataset was selected by the type of visualization to be achieved. At last when the report was according to the needs, it was then saved andgiven a name. As a result, it got displayed underneath the list of navigation pane as a report.

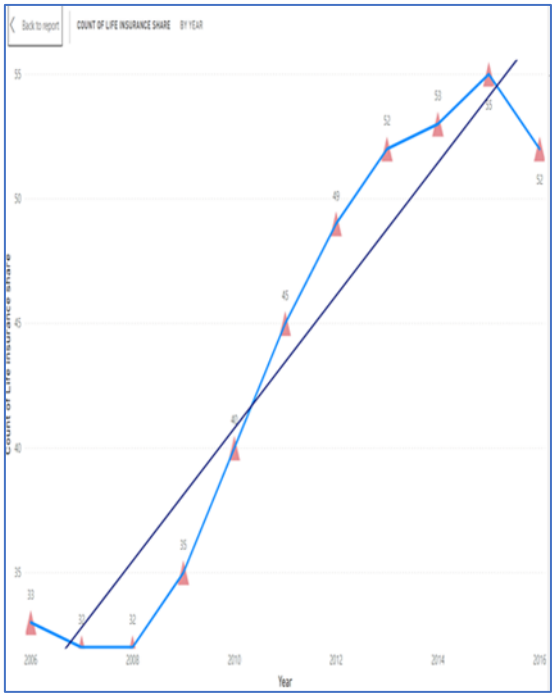

Figure 3: Count of Life Insurance Share

Designing a dashboard-
Every visualization was shown in rectangular boxes which are known as Tiles. All the tiles gave a choice to Pin the visuals. On clicking, it gotprompted with two alternatives-whether to pin the visualization to a before-hand existing dashboard or a completely new dashboard. New option was selected for the first visualization. Same procedure was followed for the remaining visualizations, change being only in the secondary option which was selected as existing dashboard this time. To embed a tile for data regarding information from world bank, choose edit option available on dashboard from the website of Power BI. Thenselect as follows-Add tile-web content and then copy paste the URL from the internet to click on apply. All this was achieved in 30-45 days, and demonstrates how easy it is to analyse comparative data by the use of Power BI.

Sharing Reports and Dashboard-
Power BI gives ample of choices so that business analysts can share their reports and dashboards with ease. An analyst may choose to publish the results of analysis at a blog or known website. In addition, Power BI also offers the alternative to share the analytical visualizations with different users, groups, etc.

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II. RESULTS AND DISCUSSION

The results that were achieved in the process include-
1)A Geographic map showing countries field. Colour of the map is based on Income column from the secondary dataset.
2)Includes a webpage to show data from world bank webpage driven by URL action from geography map.
3)A KPI Table showing comparison between the selected period and the prior period to the selected one.
4)Growth Indicator Shapes based on the Growth Percent.
5) Trend line to show the various category values.
6) Dashboard contains a filter for income group applied throughout.
7) Formatting done appropriately throughout.
8) A pie chart showing Bank deposits to GDP(%) by imfn and country.
9) An ArcGIS map showing Life insurance premium volume to GDP(%) by country.
10) A area chart showing a comparison between Liquid liabilities to GDP(%) and Gross portfolio debt liabilities to GDP(%).
The experience with Power BI has proven to be a progressive proposal for simplifying data analytics and business intelligence needs. Hence, organizations and individuals are able to prepare data, build reports and visually attractive dashboards which can be sharedwith minimum speculation of effort and time.

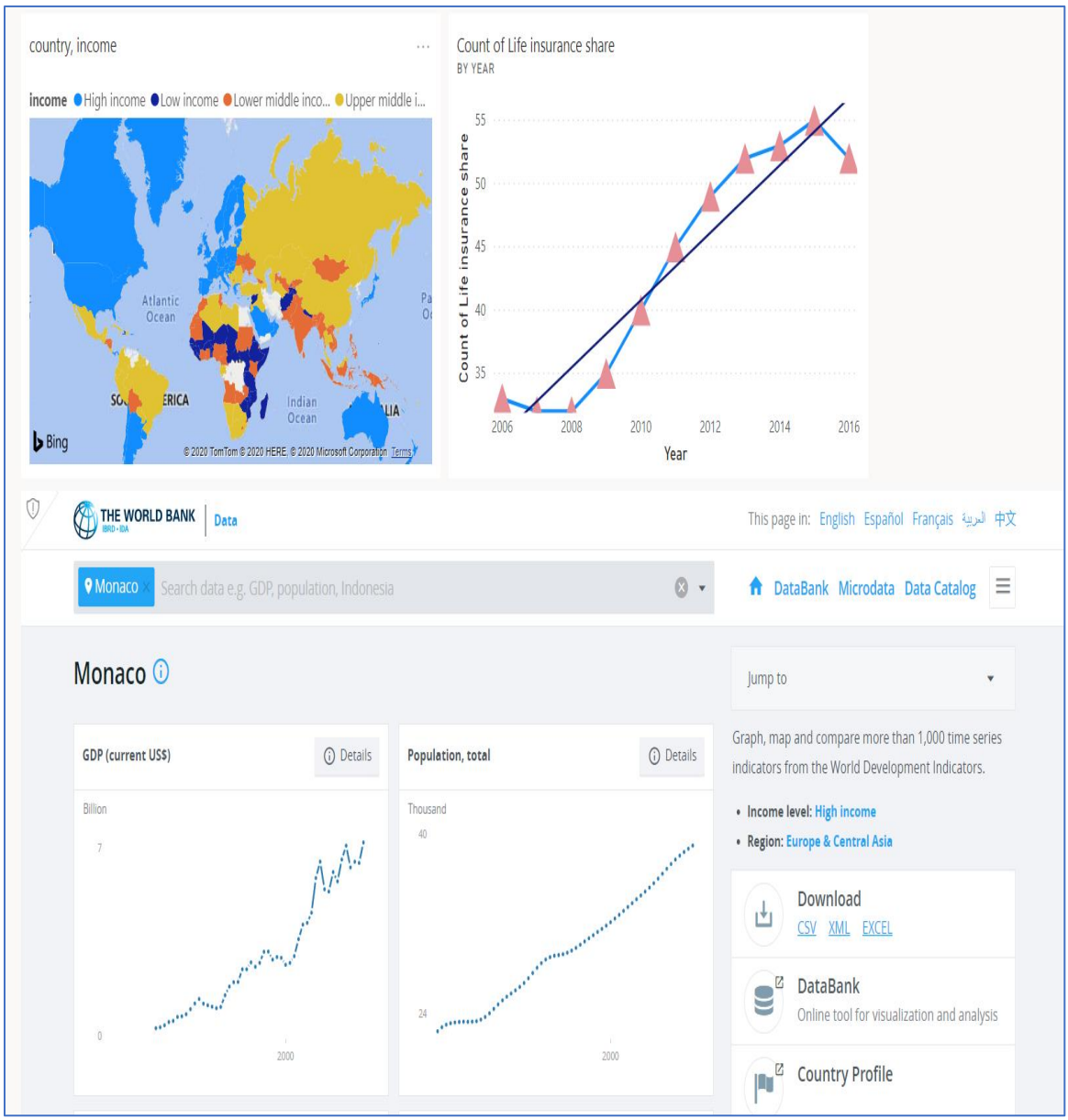

Figure 4: A glimpse of the dashboard

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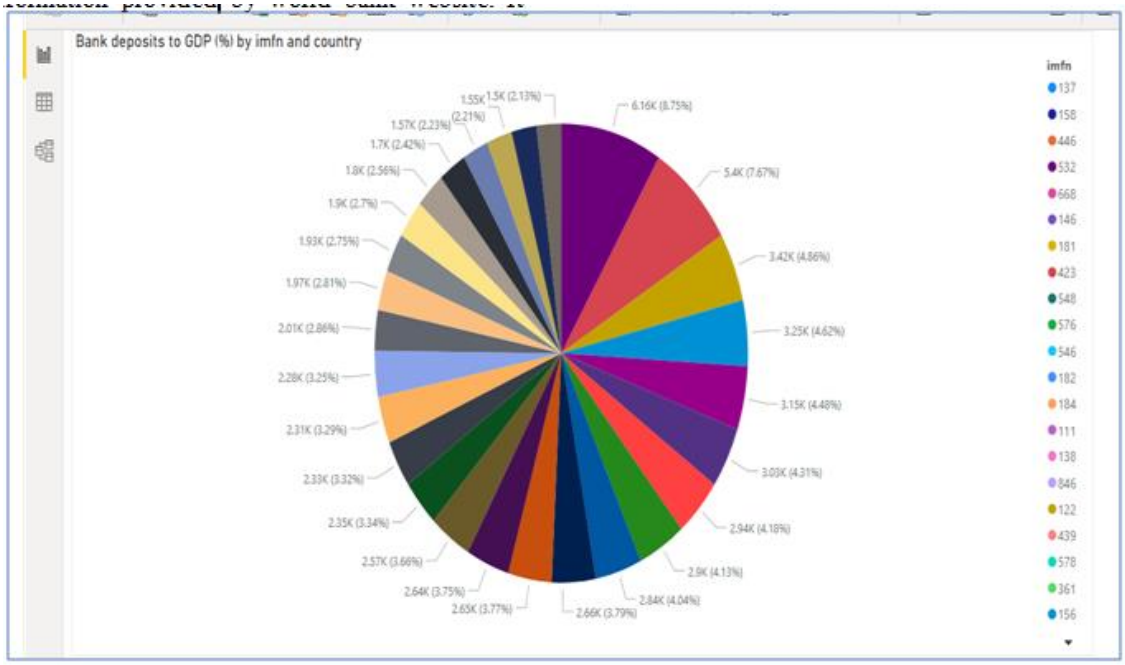

Figure 5: Pie chart showing relevant information

III. CONCLUSION AND FUTURE SCOPE-

As per the work performed the conclusion that can be draw is that the growth percent of Life InsuranceShare, Market share, Penetration and retention ratio will continue to decrease year after year because the trend lines of these parameters clearly show that their values are decreasing year after year which in turn decreases the net growth ratio. On the other side the growth rate of Ratio of Reinsurance will increase in the next years as its trend line is showingdrastic increase in values continuously.

This data can also be useful to find that which country of a continent lies in which income group (High, Low, Lower middle or Upper middle) by analyzing the Geographical map. All this can be achieved by just moving the cursor of a mouse on to the map and it automatically shows that the particular country belongs to which income group. This information could be used to imagine the income filter in which a particular country will come after some years.

Even it is possible to predict and analyze any information provided by world bank website. It can be used to find information such as GDP, Population, Life expectancy, Poverty,dead-count ratio, Gross national income and much more related to any particular country of the world.

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