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Empowering the Library Data Diagraphics through Microsoft Power BI

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ABSTRACT

Library services and facility performance monitoring systems powered by Power BI enable libraries to effectively track, analyze and improve their operational performance. This system leverages the robust capabilities of Power BI, a leading business analytics tool, to deliver immediate insights into various dimensions of library performance, including collection management, usage statistics, circulation data, and publication metrics. The primary objective is to equip libraries with the necessary information to facilitate informed decision-making, enhance service delivery, and achieve better outcomes. This paper will explore the functionalities of Microsoft Power BI, the implementation process, and its application in managing library data.

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KEYWORDS: Microsoft Power BI, Library resources, Library Statistics, Business Intelligence, Visualization, Power BI Apps, Library Data**.**

1. INTRODUCTION

In today's data-driven environments, data visualization is an essential talent. Almost every element of our daily lives produces data. It has the potential to improve equity in data access and has been enormously popular during the previous five years. Visual is a contemporary picture of how data visualization is employed by professionals around the world.

Visualization, or the depiction of data in the form of visuals, is key to Microsoft's Power BI. We appreciate this function since it allows us to generate reports and dashboards with complicated or simple charts. And Business intelligence (BI) application that enables enterprises to display and analyze data. It is utilized by a variety of organizations and sectors to improve decision-making processes and, ultimately, profitability.

Microsoft Power BI is a robust set of corporate analytics services and products that include tools for data visualization, reporting, and business intelligence (BI). It enables you to share ideas and display data within your organization or Institute. We can include these insights in our website or app as well.Industries from a variety of sectors, including IT, healthcare, automotive, space, e-commerce, finance, and more, use it for data analytics. With the aid of customized dashboards and reports, they generate models and show the data using various Power BI tools.

In today's world, the execution of tasks is increasingly dependent on information technology tools crafted by human intellect. Libraries have adopted BI tools to carry out activities such as analyzing data, generating reports, creating

dashboards, and disseminating insights to both library personnel and patrons. For instance, Stellenbosch University has successfully employed Microsoft Power BI to efficiently analyze library statistics.

2. OBJECTIVES OF THIS STUDY

- ✓ To know the Power BI application in library management functions.
- ✓ To understand how Power BI functions in the library.
- ✓ To analyze the report.

3. MICROSOFT POWER BI IN KEY LIBRARY ACTIVITIES

Power BI can play a vital role in analyzing attractive library activities. Nowadays, a library is managing a vast amount of data related to the collection, users, transactions of books, services, e-resources, budgeting, etc. By integrating or incorporating Microsoft Power BI, libraries can enlarge valuable insights from this data, optimize operations, improve decision-making, and serve better user experience. Here, we indicate how Power BI can be applied to key library actions.

Collection Management:

Power BI is tracking the growth of collections or resources in the library. And it helps to develop insight into the data regarding the collection in an understanding manner.

Circulation:

Circulation is a key activity in the library, and Power BI can track and visualize how often books, journals, or other resources are being borrowed or accessed. By analysing the check-out frequency, libraries can identify popular resources, which may help with future acquisitions or weeding decisions.

Usage Management:

"Without resources, there is no user; without users, there is no use of resources." Therefore, usage of library material from users is an essential function/leading point in library management. So, Power BI helps to analyze the usage from their interface.

User Services:

Power BI can track the number of service requests; for example, if we provide document delivery services, this service includes statistical data on how many users requested the resources by year and how many requests we have satisfied. Thus, this platform helps to analyze service utilization through attractive insight.

Program & Event Management:

Power BI can help track the success of library programs or events by analyzing participation rates, demographics, and feedback scores. This allows librarians to identify successful programs and replicate them, as well as recognize areas for improvement.

By analyzing past program data, libraries can forecast future demand, identify trends, and plan upcoming events more effectively. For example, Power BI can be used to assess seasonal peaks in library use and plan programs accordingly.

Budget Management:

Power BI can assist in managing the library's budget for purchasing new materials by offering real-time insights into expenditures across different categories (books, digital resources subscriptions, etc.), helping ensure resources are allocated efficiently.

Libraries can create dashboards in Power BI to track expenditure on books, staff, utilities, technology, and other operational expenses. Power BI can help to create forecasts based on historical data to assist with budget planning

Reporting:

Power BI can simplify the creation of reports that compare key metrics over time, offering a quick visual understanding of growth, trends, and performance against goals.

Digital Library Services:

Power BI is easily able to track or analyze reports of e-resources usage or some digital library services (remote access facility). By this analysis, we can find out which resources are being accessed most frequently, helping librarians assess the value of subscriptions.

Visitor Management:

In library management, visitor statistics is also a key point. Using the Power BI tools, we can effortlessly review the report. Power BI implementation empowers the library data analysis and execution of statistical data in a simple and understandable manner. In academics, institutional efficiency and educational outcomes can be improved by integrating Power BI.

4. REVIEW OF LITERATURE

Gurpreet Singh (2019) examined COVID-19 data and utilized Microsoft Power BI for visualization, revealing pandemic trends and patterns through various charts, tables, and maps. Power BI offers tools to transform data into visual representations. The paper discusses Power BI's historical development and the types of visualization charts available. Data was obtained from Scopus, Web of Science, and Worldometer websites, encompassing COVID-19 statistics such as total cases, fatalities, active cases, and recoveries. [2]

Bhargava and Mandava Geetha et al. (2018) explored the application of Microsoft Power BI for analyzing and designing educational institutions. Their study outlined the tool's process model and visual components, as well as its interactive data visualization capabilities. The authors described various data sources and demonstrated how to visualize data such as student placement, internal marks, placement progression, and module views within Power BI Services. This visualization serves the purpose of displaying educational data effectively. [6]

Vijay Krishnan (2017) demonstrates the capability of Power BI to convert data into easily shareable reports and dashboards for analysts. Their study utilized information from the Scopus database, focusing on data from Anna University. [7]

5. METHODOLOGY

For data visualization, we have collected the sample from REVA Central Library, and the collected data covered some major statistics in library functions. Statistical data was obtained, which includes circulation statistics, usage, collection, service statistics, faculty publication, etc., and MS-Excel was used for primary data analysis.

6. DATA INTERPRETATION

Power BI is a business intelligence tool for data analytics and visualization. Its report dashboard consists of some steps to analyze the report that is Get Data, Navigate Data, Transform Data, Load the Data, Edit Data, Visualize Data, and Publish the Data.

Get Data: Get the data from some format, i.e., Excel, CSV, or text. Other than that, we can create data on the dashboard.

Navigate Data: Browse the data from the system.

Transform Data: Once the data is transmitted into the Power BI dashboard, we can edit the data by using respective operations while loading the data into Power BI, or we can clean and shape the data by using Power Query Editor.

Load Data: Load the transformed data into Power BI.
Edited Data: Data edited through the Power Query Editor.

Visualize Data: Build charts, tables, and other visuals to represent the data.

Publish the Data: Share reports by publishing them to Power BI Service.
In Figures 1 to
4, we see the Power BI interface for constructing the data visualization.

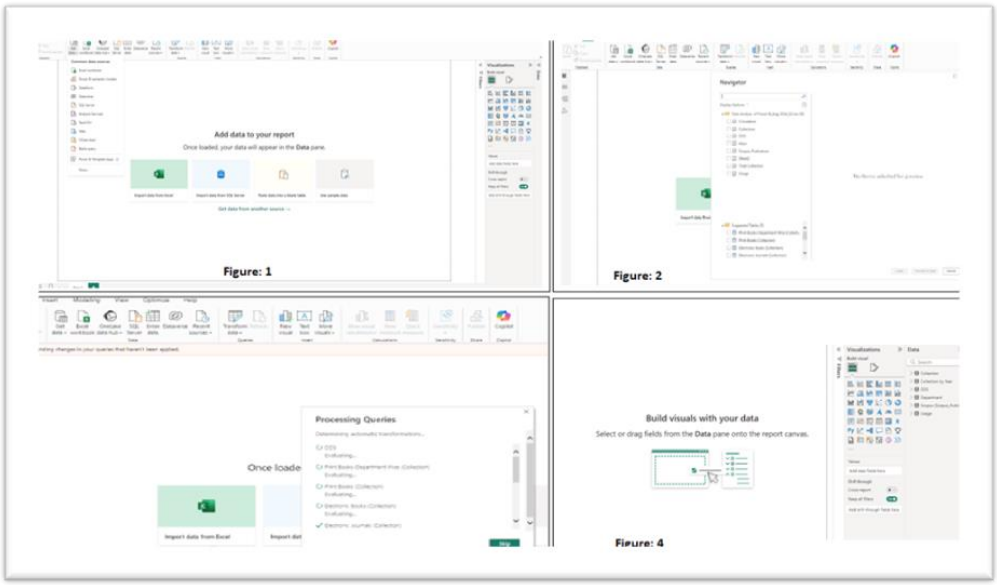

Figure 1-4 Power BI Data Processed Interface

Visual data representation has become prevalent in contemporary society, as it offers an engaging and readily comprehensible format. Business analytics platforms, such as Microsoft Power BI, are frequently employed for this purpose. Figure 5 showcases the data visualization capabilities of MS Power BI, demonstrating how a unified interface emerges after data is loaded, transformed, or generated. Users can leverage the Visualization and Data Menu Bar to create diverse graphical representations of their information within this integrated environment.

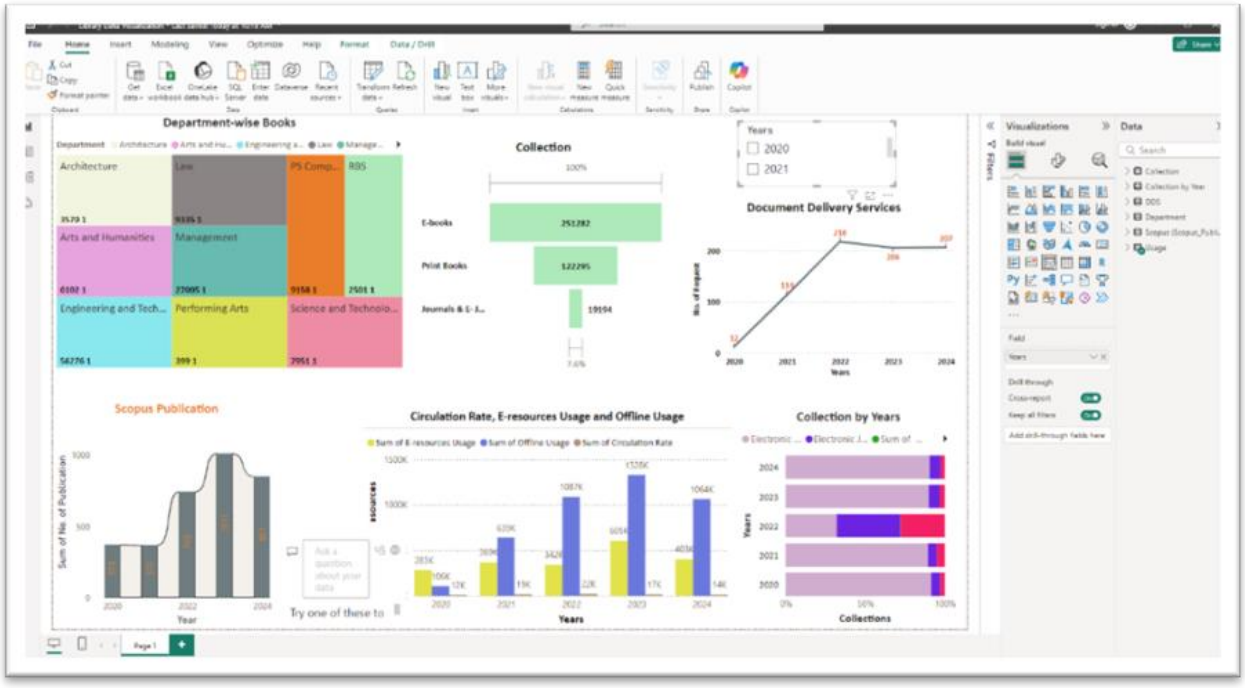

Figure 5: Visualized Dashboard

After designing the dashboard to our specifications, we need to make the data accessible online or integrate the Power BI report into our web platform or internet-based application. This requires utilizing Power BI Pro, Power BI Premium, or Power BI Embedded Capacity. For those needing offline access, reports can be converted to PDF or PowerPoint formats. Figure 6 illustrates the transformation of library data into a Power BI Diagraphic. This visual representation encompasses various library metrics, including book distribution by department, total collection size, annual document delivery service statistics, faculty publications extracted from Scopus, circulation rates, and the usage of library resources through both digital and physical means.

Figure 6: Diagraphic Library Data

7. POWER BI APPS

Power BI Apps are profound compilations of related Power BI reports, dashboards, and datasets that are packaged together for easier sharing and distribution. This will come in multiple platforms like Power BI Desktop, Power BI Service, Power BI Embedded, Power BI Pro, Power BI Premium, and Power BI Mobile. In the three-way, the user can view this as report views, data views, and model views.

The Power BI Apps interface in Power BI Service (the cloud-based platform) is designed to provide a centralized location for users to access, organize, and interact with a collection of reports, dashboards, and datasets that are packaged together by an organization or a specific team.

You can publish the report from Power BI Desktop to Power BI Service. Then add the Power BI report to a Power BI app using a Power BI Pro license or be part of a Power BI Premium workspace. Once an app is published, you can update it by adding new reports or dashboards to the workspace and then republishing the app to reflect the new changes. Users accessing the app will see the updated content.

Figure 7 portrayed how Power BI looks with the analysis of library data in mobile applications.

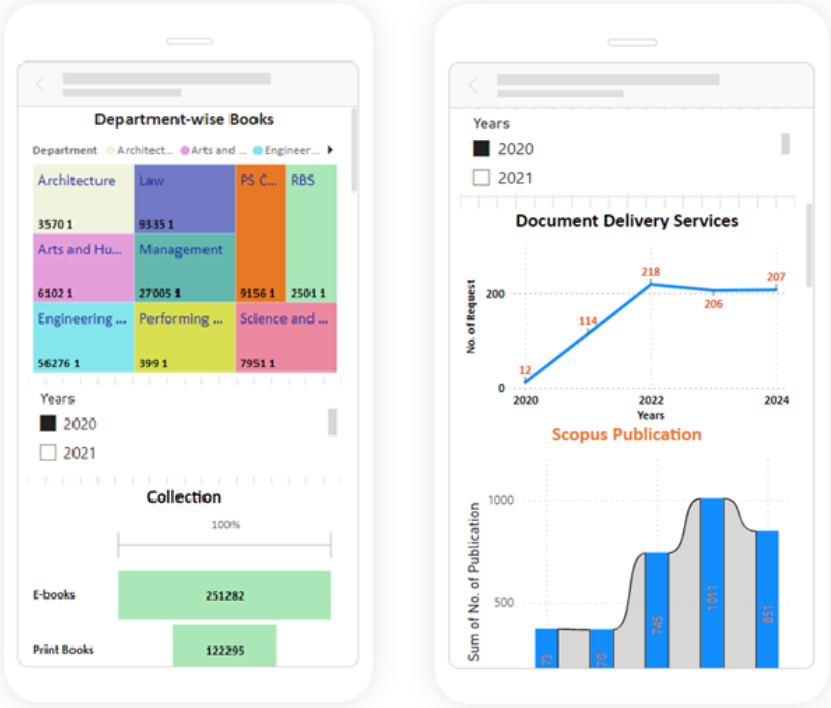

Figure 7: Power BI Mobile App Interface

CONCLUSION

We can use Power BI for library data analysis. It is a powerful business intelligence tool that allows you to visualize, analyze, and share insights from your data. and libraries often have large sets of data, such as circulation data, user activity, book collection, and more, which can be effectively analyzed using Power BI.

We can host, publish, or embed the report on our website or web or internal application. If you want to share your report publicly, you can use the "Publish to Web." In the digital era, we have technological advantages and disadvantages. Therefore, this option is not recommended for sensitive or private data, as it makes the report accessible to anyone on the internet.

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