The Power of Data Visualization through Dashboards: Insights from Information

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Abstract

The knowledge visualization is enhanced through the dashboard concept where it provides significant patterns of knowledge on real-world and theoretical modeling which could be called wisdom (Mohd, Embong and Zain, 2010). The dynamic dashboard supports learners in the creation of customizable indicators through a user-friendly interface (Ji, Michel, Lavour and George, 2014). Research has shown that data visualization is a powerful means to discovery, understanding, and communicating about the important stories that live in our data (Armitage, 2016). This presentation focuses on using data dashboards to report information on student enrollment and degrees awarded at Texas A&M University-Commerce. The department of Institutional Effectiveness and Research focusses on delivering efficient and effective data-driven outputs to university administrators to enable evidence-based decision making. Historically, data reports have been in a static format with limited information delivered. For example, when using an Excel spreadsheet, it may consist of multiple tabs in a single spreadsheet to convey the desired amount of information. WebFOCUS Dynamic Dashboard (WFDD) enables users to display large quantities of information on the same page through the use of interactive and user-customizable reports. The WFDD allows the user to select multiple levels of parameters to produce varied results of data output. Using dashboards simplifies the presentation of reports, and also delivers more robust information. Furthermore, data visualization graphical displays such as pie-charts, bar graphs, and tabular reports assist in intuitive understanding of the data. We will demonstrate the dynamic qualities of data dashboards compared to traditional, static format of traditional reports. Supporting the findings of past research, this presentation demonstrates the powerful influence of data visualization.

Background on WebFOCUS

WebFOCUS, the most powerful and flexible reporting environment in the industry, can be used to satisfy virtually any reporting need, from financial statements and form reports, to analytical reports, charts, forecasts, scorecards, and Geographic Information Systems (GIS) mash-ups. These reports can be saved and refreshed at any time, or automatically updated and delivered at scheduled intervals. WebFOCUS App Studio is the new Windows-based graphical user interface development environment for creating advanced WebFOCUS applications. App Studio utilizes the Microsoft Windows® ribbon framework to deliver an interactive user interface. In App Studio you can create reports, charts, HTML pages, documents, alerts and reporting objects. In addition to customizing your reporting applications by applying styling and color, you can add components like virtual fields, defined functions, joins and OLAP hierarchies to a procedure. The main components that enable functioning of WebFOCUS are the Graphical User Interface (GUI), Reporting Server and WebFOCUS Client.

Static Reporting

There are limitations to using static HTML or excel reports for analyzing data:

- It is time consuming if conducted manually.
- Automated tools do not support all programming languages.
- Automated tools produce false positives and false negatives.
- There are not enough trained personnel to thoroughly conduct static code analysis.
- Automated tools can provide a false sense of security that everything is being addressed.
- Automated tools only as good as the rules they are using to scan with.
- It does not find vulnerabilities introduced in the runtime environment.

Dynamic Dashboards and Info Apps

Info Apps are highly interactive, analytical apps for non-technical users. Info Apps deliver interactive analytic content such as data visualizations, charts, graphs, and reports. Info Apps go beyond dashboards by offering a variety of controls and filters on a custom user interface to aid with highly intuitive decision support. Examples of Info Apps include self-contained data visualizations, predictive analytics apps, guided self-service reports, and search-based apps, all of which can be customized for a highly personalized user experience.
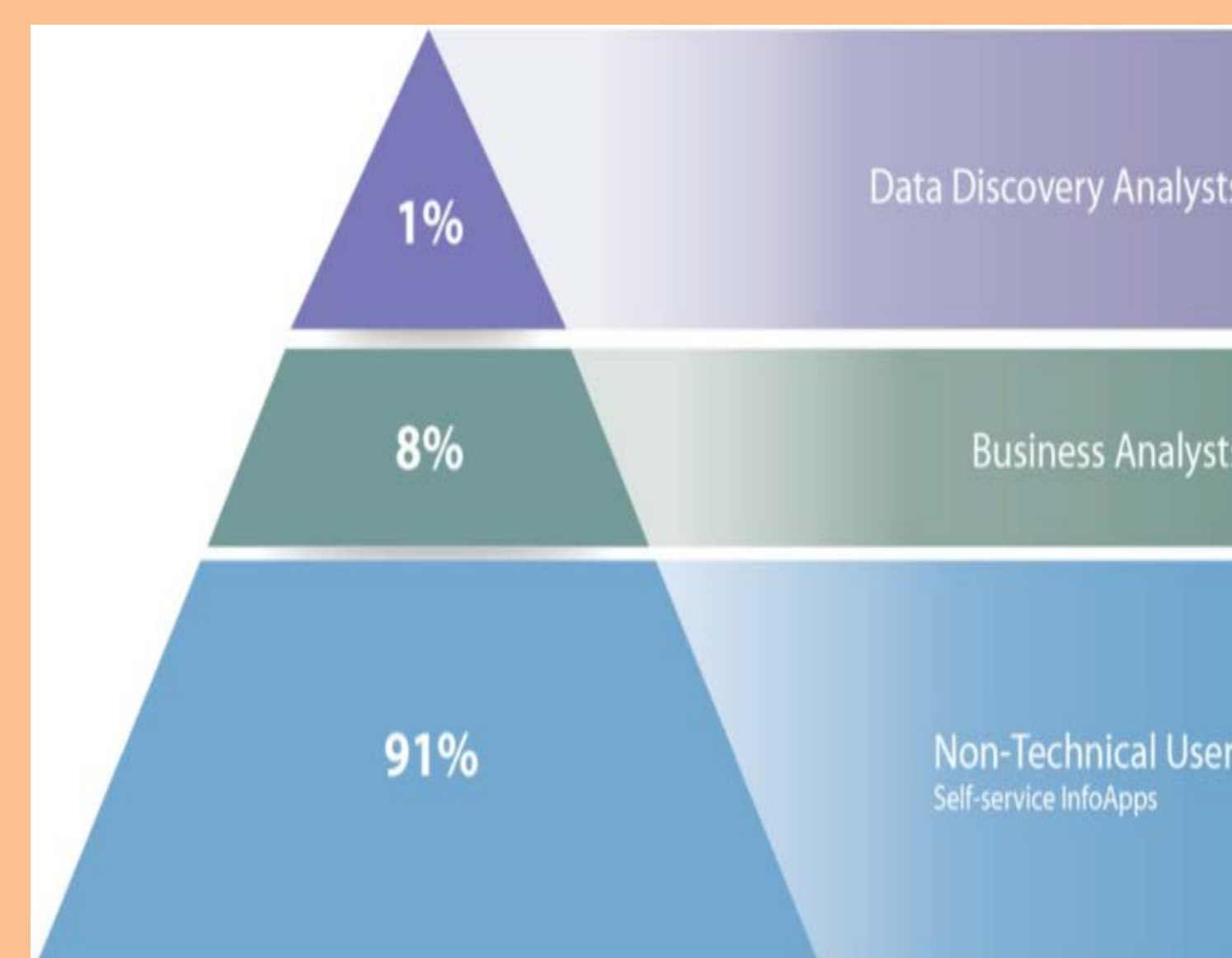
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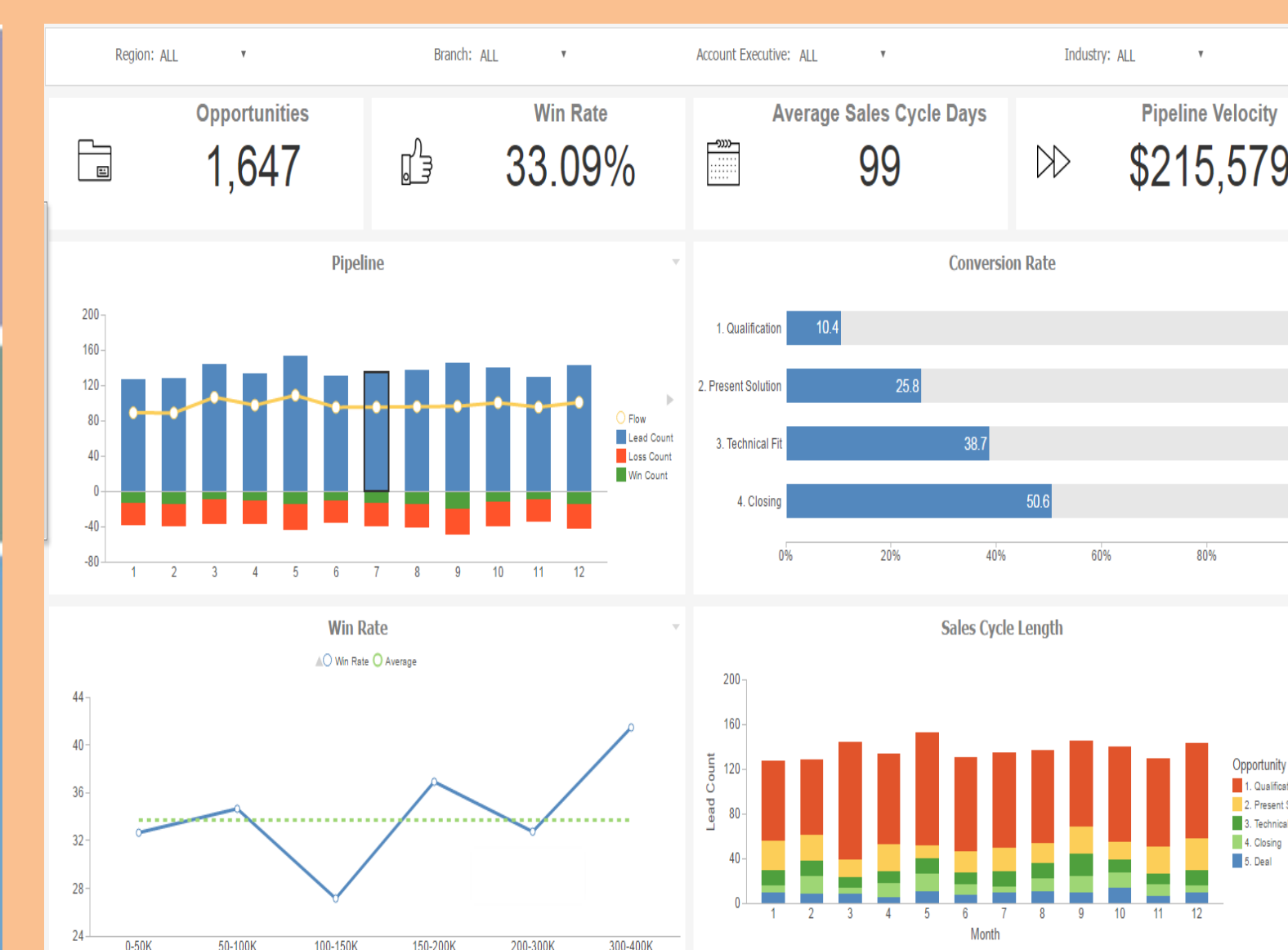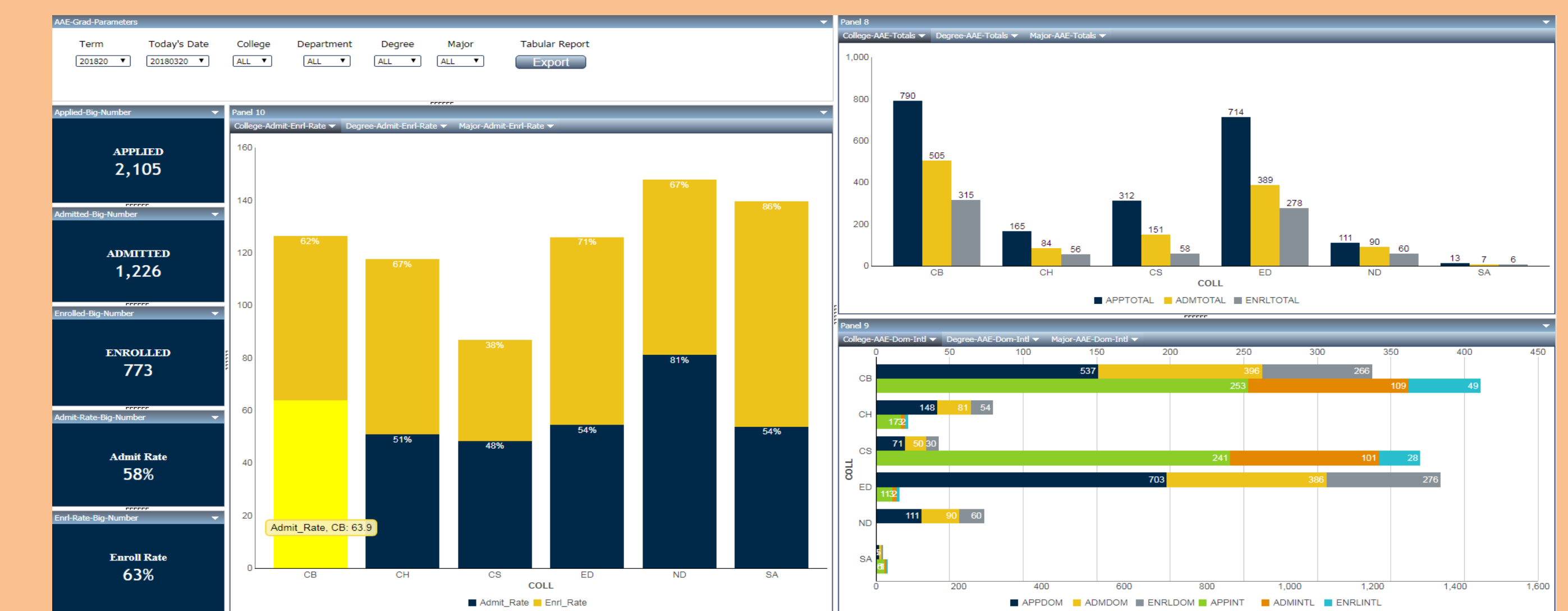

An example of analytical Dashboard

Methodology and Tools

We use WebFOCUS App Studio to create reports and charts by coding or using the GUI. Custom parameters based on different fields from tables in the banner are assigned to get custom outputs. Filters based on requirements like College, Level, Gender, Ethnicity and Majors are added using where clauses. In addition, it is important to give the user the ability to get their output in various formats, not only excel. HTML painter is used to create parameter pages which include drop downs, radio buttons etc. Special tasks need to be assigned to each user control based on their selection or clicks. Finally, BI portal formatting needs to ensure efficient use of real estate for all the charts and reports. Fluid canvas is the most common layout for all the dashboards. We can also add multiple charts and reports in a single panel by adding new tabs thus allowing users to view up to 15 reports in a single dashboard. Info App sorts are created to allow selection of different sorts such as college, level, gender, residency etc. which combined with the filter allows to create thousands of distinct reports at the ease of one click.
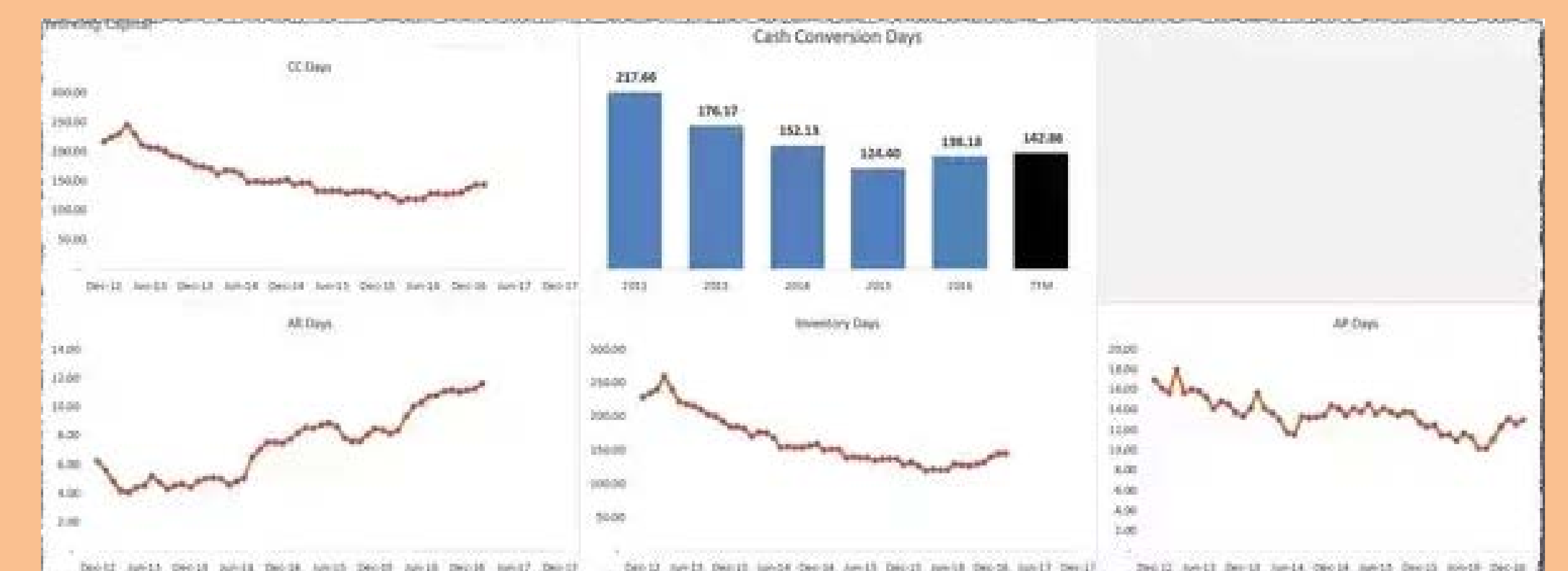

Traditional AAE Report

Visualization of AAE data

Trends in finance

Conclusion

It is very clear from the study that using Info Apps gives advantages over static reports. They are extremely straight-forward and easy to use. An intuitive interface, workflow, and interactivity enable users to analyze and manipulate information, with no training required. A single Info App can be used to answer hundreds, even thousands of questions from your data. They are web and mobile-optimized, and can be consumed on any desktop or device - tablets, PCs, laptops, or smartphones. They significantly cut down on licensing, development, and maintenance costs. They can leverage simple, purpose-built apps that put vital information right at their fingertips. Info Apps can be efficiently and economically built using Information Builders WebFOCUS BI platform, and shared with any user, inside or outside the firewall.