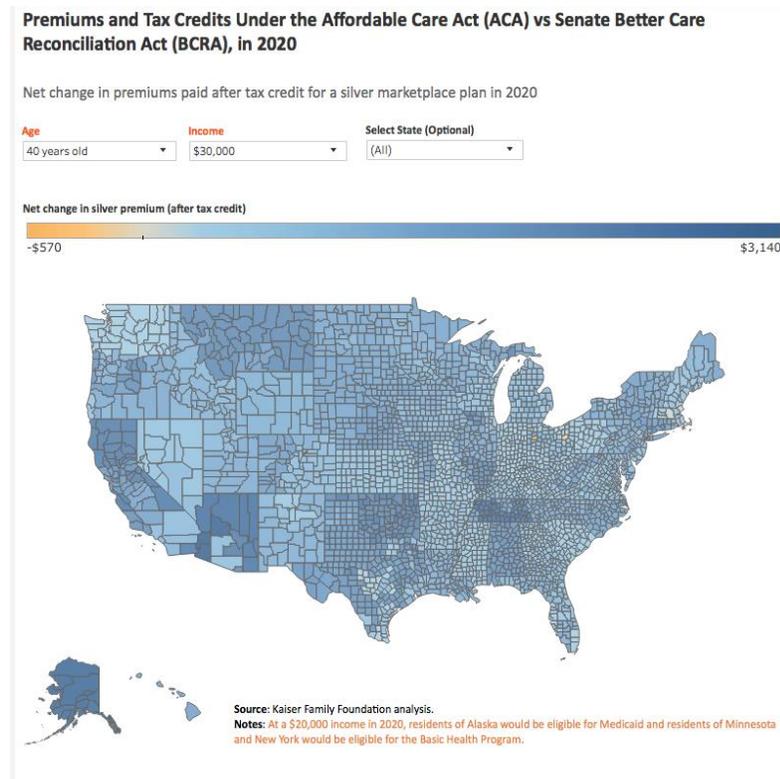**The Era of Visualization-Based Analytics Has Arrived –
Users of Financial Information Expect High Impact Delivery**

By Larry Kanter, CPA-Dallas, CFF, CFE

Our profession has always sought to deliver financial information in clear, but not always concise terms. After all, there can truly be a lot of gray in our black and red numbers, and the nuances need to be explained! Columnar tables followed by footnotes will always be necessary, but that sort of presentation requires the user to do a lot of searching for specific information.

Our society (and our profession) now demands information that is customizable, exciting, easy to understand and immediately available.

Which approach fits those requirements best? Is it a 1,200-page document with pages and pages of narrative interspersed with tables of numbers? Or are visualizations presented in PowerBI or Tableau more effective? By way of example, look at the following visualization prepared by the Kaiser Family Foundation back in 2017 when the Affordable Care Act was being challenged in Congress.

Premiums and Tax Credits Under the Affordable Care Act (ACA) vs Senate Better Care Reconciliation Act (BCRA), in 2020

Net change in premiums paid after tax credit for a silver marketplace plan in 2020

Age: 40 years old · Income: $30,000 · Select State (Optional): (All)

Net change in silver premium (after tax credit)
-$570 — $3,140

Source: Kaiser Family Foundation analysis.
Notes: At a $20,000 income in 2020, residents of Alaska would be eligible for Medicaid and residents of Minnesota and New York would be eligible for the Basic Health Program.

You can obtain your own interactive version of the visualization by clicking on the hyperlink below. If the hyperlink does not work, you can copy and paste the following into your browser: https://public.tableau.com/en-us/s/gallery/premiums-and-tax-credits-under-affordable-care-act-aca-vs-senate-better-care?gallery=votd.

This visualization has been prepared by importing the raw data (and creating formulas similar to those used in Excel) into a program called Tableau and using Tableau's functionality to prepare the visualization. No "programming" is necessary – simply telling Tableau that you want a map of the U.S. by county and loading the necessary data will yield the above visualization.

The visualization is interactive and, in this example, users can compare premiums and tax credits under the Affordable Care Act to a plan proposed in the Senate using various scenarios. Here is a partial list of the variables that a user can apply to this visualization:

- Age,
- Income,
- State of residence,
- County of residence,
- Plan type (Silver vs. Bronze).

Now, let's say we want to look at the data for a 40-year-old in Tarrant County, Texas (Ft. Worth) making $30,000 per year. To see that data, users simply hover their mouse over Tarrant County, Texas on the map and they see the following. (This is a screen shot. To see the actual interactive visualization, use the link above.)

Premiums and Tax Credits Under the Affordable Care Act (ACA) vs Senate Better Care Reconciliation Act (BCRA), in 2020
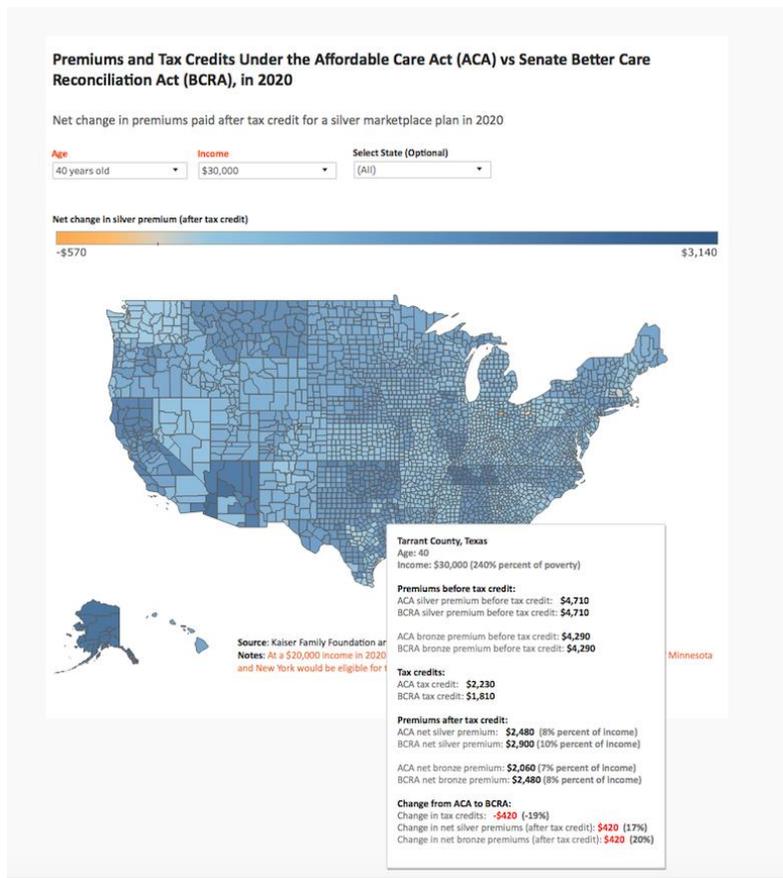
This sort of information can be obtained by using the mouse to hover over any one of the counties on the map!

This and thousands of other visualizations can be created using either Tableau or Microsoft's Power BI. Both products can best be described as having characteristics of Microsoft's Excel, PowerPoint and Access all in one tool and laced with many additional capabilities. While Tableau or Microsoft's Power BI are not replacements for Excel, PowerPoint or Access, both tools add entirely new capabilities, including the ability to load data from a multitude of additional sources.

Analysis and Collaboration for the Forensic and Valuation Professional

By now, you are probably wondering how these tools can assist a forensic or valuation professional given the need to prepare those "documents with pages and pages of narrative interspersed with tables of numbers" required in a legal proceeding. In reality, we will still be preparing those reports in the future. However, we have to perform the analytics to get to the point of preparing those reports. And we need to do that in a collaborative fashion, either with the engagement team members or our client. Moreover, some analyses we perform are just easier to understand using a picture.

In addition, in the not-too-distant future, these tools will become as ubiquitous as Word and Excel. You will be able to send the visualizations you prepare to your clients in Tableau or PowerBI and they will be able to "hover" over relevant parts of the visualizations and see the

underlying data, just like you can by opening the link above. In fact, the students who are currently in or have recently graduated from university accounting programs have likely been exposed to these tools. Law firms are in the beginning stages of learning about these tools.

Even now, you can send a file (such as the one in the link above) to your clients in Tableau as a packaged workbook. They can then open the file with the accompanying data in Tableau Reader. Tableau Reader is a free program similar to Adobe Acrobat Reader. Although Tableau Reader does not allow the user to create visualizations, Tableau Reader allows anyone to:

- Open and interact with Tableau workbooks,
- Present views as a slideshow,
- Export views or data,
- Print views,
- Publish views as PDF files.

Power BI has a slightly different business model in that the entire Power BI program is free, so anyone with a MS Windows computer (running Windows 10) can download and use the program.

Either of these tools allow for analysis and collaboration in a way that we have never experienced before. Once data is loaded into the tool, the user can view the data in a multitude of different visualizations with unlimited color choices – from pie charts to histograms and from maps to t-accounts, all with the press of a button.

Data Cleaning and Normalization

As fantastic as these tools are, they will only produce visualizations that are as good as the data that is loaded into them. By way of example, let's look at some actual credit card transaction data below.

Vendor
FEDEX# 798617830060 79861
FEDEX# 793568960544 79356
FDX# 986310000094 98
FEDEX# 842498617559 84249
FEDEX# 872393640176 87239
FEDEX# 798668908599 79866
FEDEX# 793523432306 79352
FEDEX# 871038241714 87103
FEDEX 837628015005047
FEDEX PYMT 05352574 C0535
1800GOFEDEX 010007 7781
FEDEX# 848889639867 84888
FEDEX# 871747846131 87174
1800GOFEDEX 010007 7781
FEDEX 871196500188
FEDEX# 796822840637 79682

The data came from a credit card billing statement for a business. Notice all the different ways the vendor name appears – FEDEX# with a number, FDX# with a number, 1800GOFEDEX# and a number, etc. Both Tableau and PowerBI have functionality that allow the user to find and

extract vendor names containing FEDEX, but this must be done prior to creating visualizations where, for example, the user wants to visualize total charges by vendor for all vendors on six months of credit card statements. If this cleaning and normalization process does not take place first, the visualization created will contain every iteration of FEDEX as a separate data point in the visualization, thereby making the visualization overly complex and even useless.

Although both tools have the ability to be used to perform some types of cleaning and normalization, in certain situations cleaning and normalization are more easily performed in another tool, such as Excel or UltraEdit (a text editor). The cleaned and normalized data can then be loaded into Tableau or PowerBI, where analysis can be performed and visualizations can be created. Cleaning and normalization are driven by the analysis you are seeking, so not every little item needs to be cleaned and normalized prior to creating a visualization. In the above example, if the name of the vendor was not germane to the analysis being developed, there would be no need to clean and normalize the vendor name data.

Closing Comments

More information can be obtained about these exciting tools at www.tableau.com or at www.powerbi.microsoft.com. Those of us who have basic Excel skills will find that while there is a learning curve associated with data visualization tools, either tool can be learned using the various free tutorials available online. The best way to master the tools is to simply apply what you learn from the tutorials to real data that you have available in your practice.

About the Author:

Larry Kanter, CPA-Dallas, CFF, CFE, is the managing director of Kanter Financial Forensics, LLC, and is an adjunct professor at SMU's Cox School of Business, where he teaches courses in Data Analytics and Forensic Accounting. Kanter was a long-time Big 4 accounting firm partner, where he founded one of the first forensic technology practices in a public accounting firm. He can be reached at 214-207-5238, by email at larry@kanterforensics.com or by visiting his firm's website at www.kanterforensics.com.