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Visualization for Equity Analysts: Using DSM in Stock Picking

http://openaccess.city.ac.uk/12335

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We used the **Design Study Methodology (DSM)** in a short term project to apply visualization to equity analysis.
We did so in light of existing work on financial data visualization (e.g [1, 2, 3]) to determine whether a visual approach to data exploration improves this process, with a view to developing the visualization capability in Thomson Reuters' flagship financial product: Eikon.

DSM

DSM helped structure the design process by providing the four nested **levels of vis design**: domain, data/task abstraction, visual encoding/interaction idiom and algorithm. Each level requires validation and consists of a set of activities and a required output.

Domain

To understand the domain, gather the requirements, and abstract and validate the tasks [Figure 1], we had access to **7 different domain experts**.
Requirements gathering happened throughout the project.

We used sketches, interviews and other techniques to elicit these requirements.

What, why, how?

We used the "What data?, Why vis? How to encode?" framework [4] to abstract the tasks, explore visualizations and create interaction paradigms that would fulfill these tasks.

Short term

DSM is usually applied in long term projects because understanding the domain and validating each vis design level is time-consuming.
However, being part of the team and the use of parallel prototyping [5] to explore different encodings facilitated discussion and contributed to rapid feedback loops.

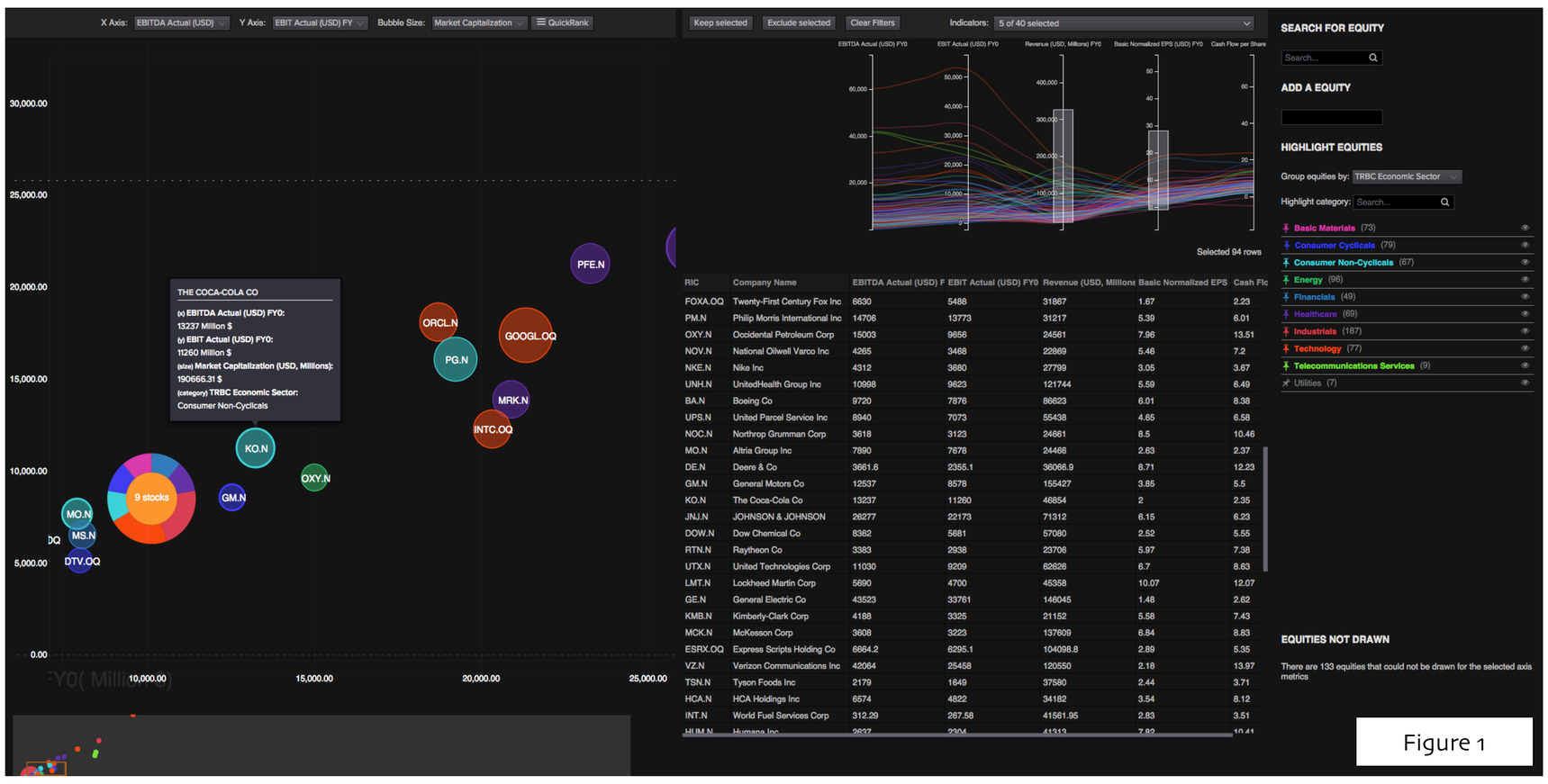
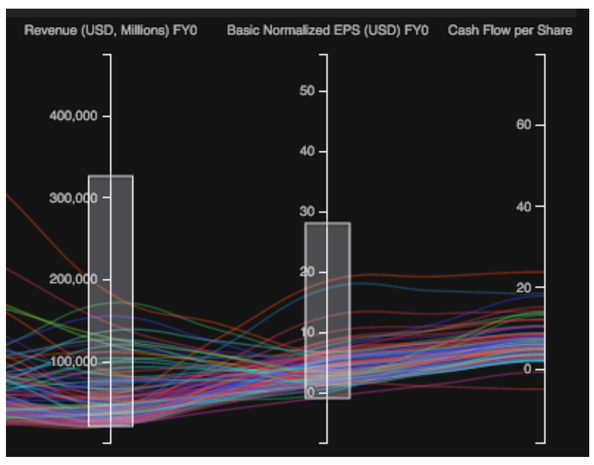


Figure 1

Task: (1) Compare multiple stocks in a range of different metrics to decide which one to buy. (2) Find outliers within these metrics. (3) Filter down the universe of stocks to around 100 which can be evaluated easily.

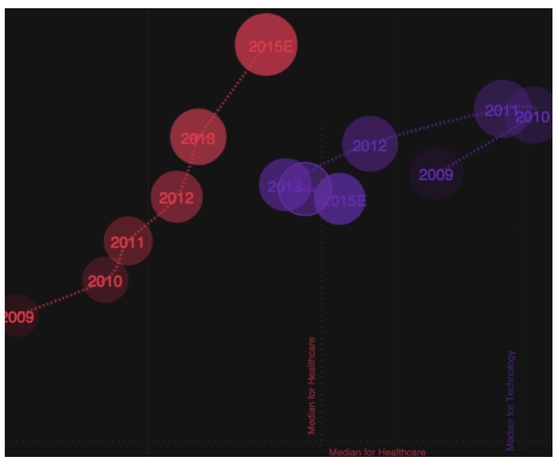


Parallel coordinates display multi-dimensional information about the stocks allowing you to compare, filter, find trends and outliers.

Task: (4) Spot outliers i.e. stocks that don´t behave as the majority as they are investment opportunities. (5) Find patterns by industry (grouping by color).

Qualitative data is color-coded enabling stock categories to be distinguished and compared quickly. Stocks are grouped in clusters to avoid excessive overlapping.

Task: (6) Display the stock´s movement through time to know if the company is improving or not. (7) Compare the stock against the median for the industry and check if it performs better or worse.



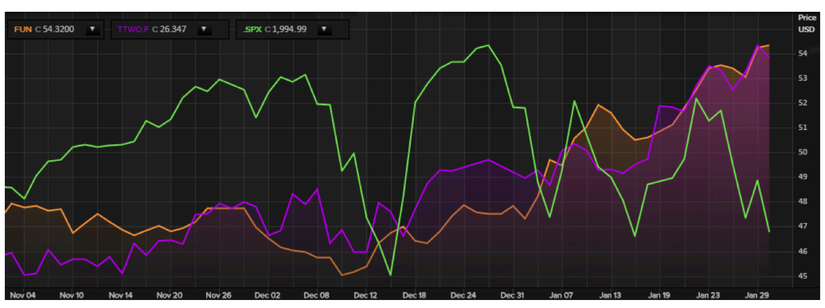
Trend path shows the evolution of the equity through time and its forecasted value. The median for each industry is also displayed to enable comparison.

Prototype Evaluation

The evaluation used a real data subset with which users performed various activities derived from the task abstractions.

Evaluation tasks were designed using Visual Data Reasoning (VDAR) [6] in order to measure the degree of knowledge generation the visualization provided. For VDAR tasks the number of findings about the data was recorded. For other tasks, error rates and task times were measured.

These metrics were analyzed in the context of rich qualitative feedback.



TTWO & **FUN** were picked by analysts during the task and have since increased in price – surpassing the **S&P500 index**.

Head of Advisory Investment Management:

"some of the features designed could go into the product; this will be taken into account for the set of features being designed for the upcoming year."

Equity Analysts:

"it's so much easier comparing stocks in the prototype than with Eikon."

"I can see the data now ... this is really cool stuff for an analyst."

Conclusion

Our interactive prototype was positively received and our work suggests that this approach to design and the application of the DSM to short term visualization projects has potential in stock picking and more broadly in financial analysis.

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[5] Parallel Prototyping Leads to Better Design Results, More Divergence, and Increased Self-Efficacy

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