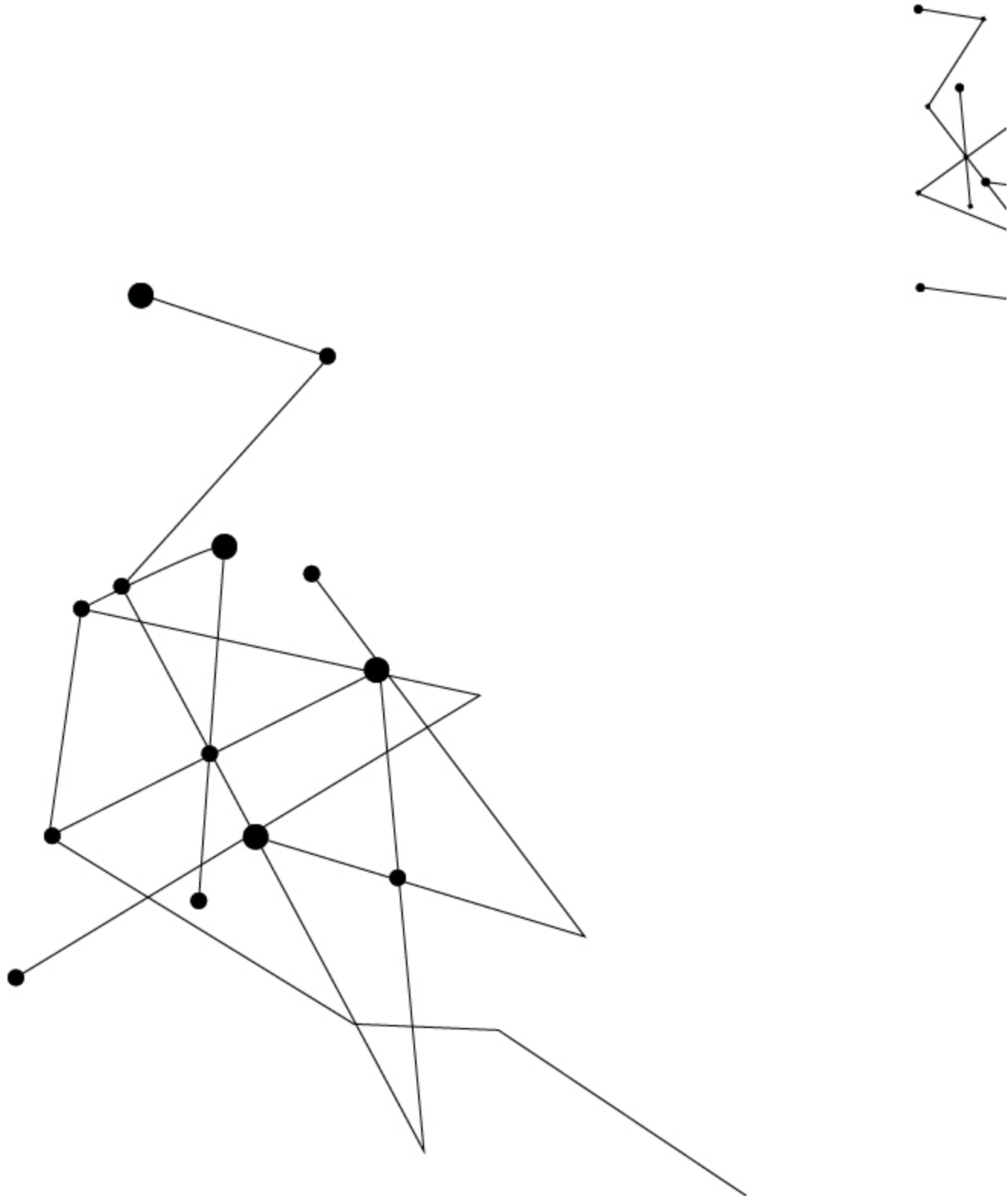


Project Proposal



Background and Motivation

I am currently a Director of International Marketing and Strategy for a healthcare vendor. One of my responsibilities is to determine which foreign markets we should be entering and focusing resources on.

In the past I have made use of the widely adopted practices of country clustering and ranking. In particular, one of the tools I used was the “Market Potential Index (MPI)”, developed by the Michigan State University-International Business Center, which I adapted for our industry. The MPI compares prospects on several dimensions which are weighted to determine an overall score. Each dimension is calculated using various indicators and transformed to a 1 to 100 scale.

When presenting this to the executive in a table format, it fell completely flat. They could see the country scores and rankings but felt that they were meaningless. They couldn’t see how they were derived, despite being provided with an explanatory report, and questioned my choices of weightings.

This highlighted the limitations of tables and the fact that in order for the executive to trust a tool they would need to be able to interact with the data themselves (changing dimensions, indicators and weightings) and view the information in a meaningful way. Instead of simple scores, they need to see what they represent: What are they made up of?; How do they compare to other countries in the world and region?; How are they changing over time?; etc.

With an executive audience in mind, who doesn’t have the time or inclination to read reports, I need to develop a tool which is engaging, easy-to-use and provides valuable insights about which foreign markets to target.



Project Objectives

The goal of this project is to develop a visualization tool to help answer four primary questions:

1. Which **regions and countries** represent the best opportunities in the short, medium and long terms?
2. Which **language investments** should be made in terms of product and capability development?
3. Should **foreign branch offices** be established and if so, where?
4. Considering limited resources, which combination of answers to the above questions will provide the best **return on investment**?

To do this the following broad areas need to be considered:

1. **General Environment** (Incl. Economy, Politics/Legislation, Society/Demographics, Technology, Doing Business, Trade and Investment, Country Risks etc.)
2. **Healthcare System** (Incl. Health Outcomes, Structure, Coverage and Funding, Delivery, Governance, Policy and Strategy etc.)
3. **Product Market** (Incl. Size, Growth, Share, Demand, Profit Potential, Intensity, Capacity, Competition, Distance and Similarity, Customer Preferences, Regulations, etc.)

An in depth market analysis requires collecting a vast amount of internal, open and proprietary data from primary and secondary sources. For the purpose of this project the data will be limited to open sources of secondary data and relevant for a generic healthcare vendor. This will answer the questions above sufficiently to guide investments in more indepth research. The tool will however be designed to support a complete analysis, making it easy to add and analyse additional sources of data.

One of the most important aspects to look at when selecting markets is how close and similar they are to the home market. The tool should provide some intelligence to help identify clusters of countries which are similar, share ties or are related in some way.

Benefits:

- Engage the executive team, encouraging them to understand and trust the data.
- Take advantage of the power of visualization to create meaning and support optimal decision making.
- Establish a single repository of data regarding international markets.
- Provide a flexible and scalable tool.
- Help produce consistent, professional looking reports in less time.



Data

The following country indicators will be used for the initial test case however additional ones will likely be added as the analysis is conducted.

Geography

- Latitude ¹
- Longitude ¹
- Time Zone ¹⁴
- Bordering countries ¹

Economy

- GDP (current US\$) ¹³
- Government budget balance, % of GDP ⁶
- Gross savings, % of GDP ¹³
- Inflation, consumer prices (annual %) ¹³
- Government debt, % GDP ⁶
- Exchange rate (LCU per US\$, monthly ave.) ⁴
- Economic risk rating ²
- Global competitive index score (1 - 7[best]) ¹⁷
- Index of economic freedom score (0 - 100[best]) ⁹

Trade and Investment

- Openness of country for trade (trade as % of GDP) ¹³
- U.S. imports per capita (current US\$) ¹⁶
- U.S. trade in advanced technology products - life science (current US\$) ¹⁶
- Trade agreements ²⁰
- Foreign direct investment, net inflows (% of GDP) ¹³

Doing business

- Ease of doing business rank ¹¹
- Business risk rating (1[best] - 7) ⁸
- Commercial risk rating (A[best] to C) ³

Politics/Legislation

- Political risk rating (1[best] to 7) ³
- Political freedom index score (1[best] to 7) ⁵
- Perception of corruption index score (0 - 100[best]) ¹⁵
- Legal origin ¹

Demographics

- Population, total ¹³
- Age dependency ratio (% of working age population) ¹³
- Birth rate, crude (per 1,000 people) ¹³



- Death rate, crude (per 1,000 people) ¹³
- Fertility rate, total (births per woman) ¹³
- Net migration ¹³
- Urban population (% of total) ¹³
- Public spending on education, total (% of GDP) ¹³
- Literacy rate, adult total (% of people ages 15 and above) ¹³
- Primary completion rate, total (% of relevant age group) ¹³
- Labor force participation rate, total (% of total population ages 15-64) ¹³
- Unemployment, total (% of total labor force) ¹³
- GNI per capita, Atlas method (current US\$) ¹³
- GINI index (World Bank estimate) ¹³
- Poverty headcount ratio at national poverty line (% of population) ¹³
- Improved water source (% of population with access) ¹³
- Improved sanitation facilities (% of population with access) ¹³
- Languages ¹
- Religions ¹
- World bank income group ¹⁰

Health Outcomes

- Life expectancy at birth (years) ¹⁹
- Life expectancy at age 60 (years) ¹⁹
- Health-adjusted life expectancy (HALE) ¹⁹
- Disability Adjusted Life Years (DALYs) ¹⁹
- Under-five mortality rate (per 1000 live births) ¹⁹
- Adult mortality rate (probability of dying between 15 and 60 years between 1000 population) ¹⁹
- Maternal mortality ratio (per 1000 live births) ¹⁹

Healthcare

- Health expenditure, total (current US\$) ¹²
- Health expenditure, total (% of GDP) ¹²
- Health expenditure per capita (current US\$) ¹²
- Health expenditure, public (current US\$) ¹²
- Health expenditure, private (current US\$) ¹²
- Out-of-pocket health exp. (% of total) ¹²
- Physicians (per 1,000 people) ¹²
- Hospital beds (per 1,000 people) ¹²
- Density of MRI units (per million people) ¹⁹
- TB treatment success rate (% of new cases) ¹²
- Immunization, DPT (% ages 12-23 months) ¹²
- Births att. by skilled health staff (% of total) ¹²

Technology

- Networked readiness index score ¹⁸
- Internet users, % of population ⁷



	Source	Method of Extraction
1	CIA, World Factbook	Scrape from website / Manual
2	Coface, Country Risk Survey	Scrape from website
3	Credimundi, Country Risk Survey	Scrape from website
4	exchangeratelab.com, API	API
5	Freedom House, Survey of Freedom in the World	Excel spreadsheet
6	International Monetary Fund (IMF), World Economic Outlook	Excel spreadsheet
7	International Telecommunication Union (ITU), Statistics	Excel spreadsheet
8	Swiss Export Risk Insurance, Country Risk Survey	Copy website table
9	The Heritage Foundation, Index of Economic Freedom	Excel spreadsheet
10	The World Bank, Country Profiles	Scrape from website
11	The World Bank, Doing Business	Excel spreadsheet
12	The World Bank, Health, Nutrition and Population Data and Statistics	API
13	The World Bank, World Development Indicators	API
14	timeanddate.com, API for Developers	API
15	Transparency International, Corruption Perception Index	Excel spreadsheet
16	United States Census Bureau, Foreign Trade Data	Copy website table
17	World Economic Forum, Global Competitiveness Index	Excel spreadsheet
18	World Economic Forum, Global Information Technology	Excel spreadsheet
19	World Health Organization (WHO), Global Health Observatory (GHO)	Excel spreadsheet
20	World Trade Organization (WTO), Regional Trade Agreement Database	Manual

Indicators currently collected are highlighted in pink.

Still need to fetch metadata for indicators.

Data Processing

The data which is downloaded or manually collated will be reformatted into a standard spreadsheet layout. Each indicator will be in a separate spreadsheet with rows for countries and columns for years.

It will be important to ensure that countries are either named consistently or that another unique identifier is included in all data sources.

When loading the tool a number of derived indicators and scores will be calculated including:

- Market size
- Market growth rate
- Market intensity
- Market capacity
- Market receptivity
- Market distance
- Market similarity
- Country clusters
- Country risk
- Healthcare outcomes
- Cost per outcome percentage
- Population Growth
- GDP Growth
- Number of Physicians
- Number of Hospital Beds

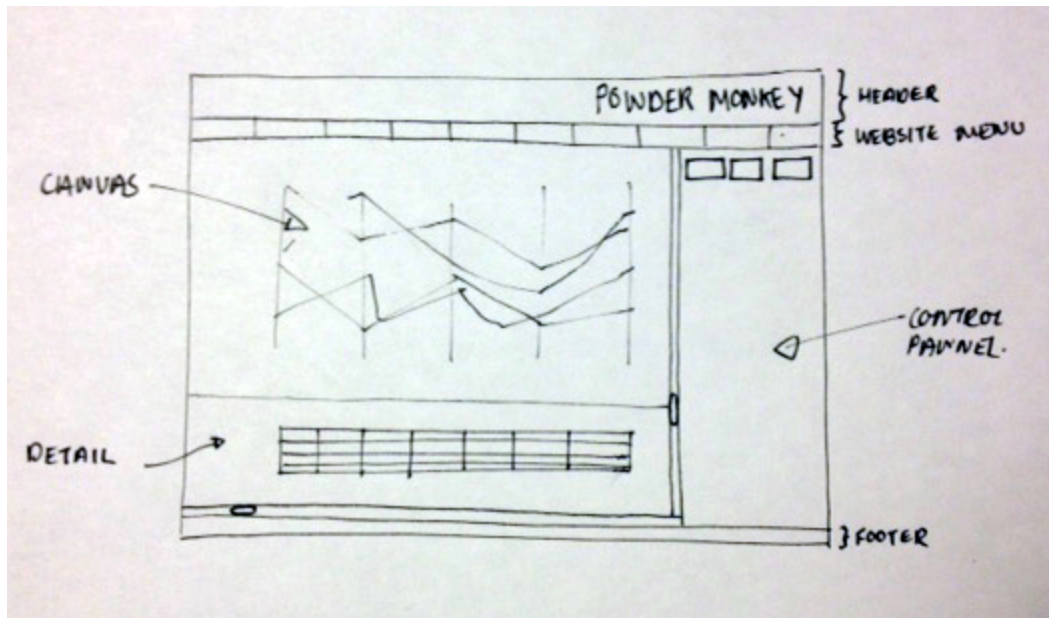
The user will have the option to interactively change the indicators and weightings used to calculate many of these scores which will result in recalculations on-the-fly.

The clustering strategy for “Country clusters” has yet to be determined.



Visualisation

Image 1: Wireframe layout



The Powder Monkey tool layout has the following components:

- Header
- Website menu
- Control panel
- Canvas
- Details section
- Footer

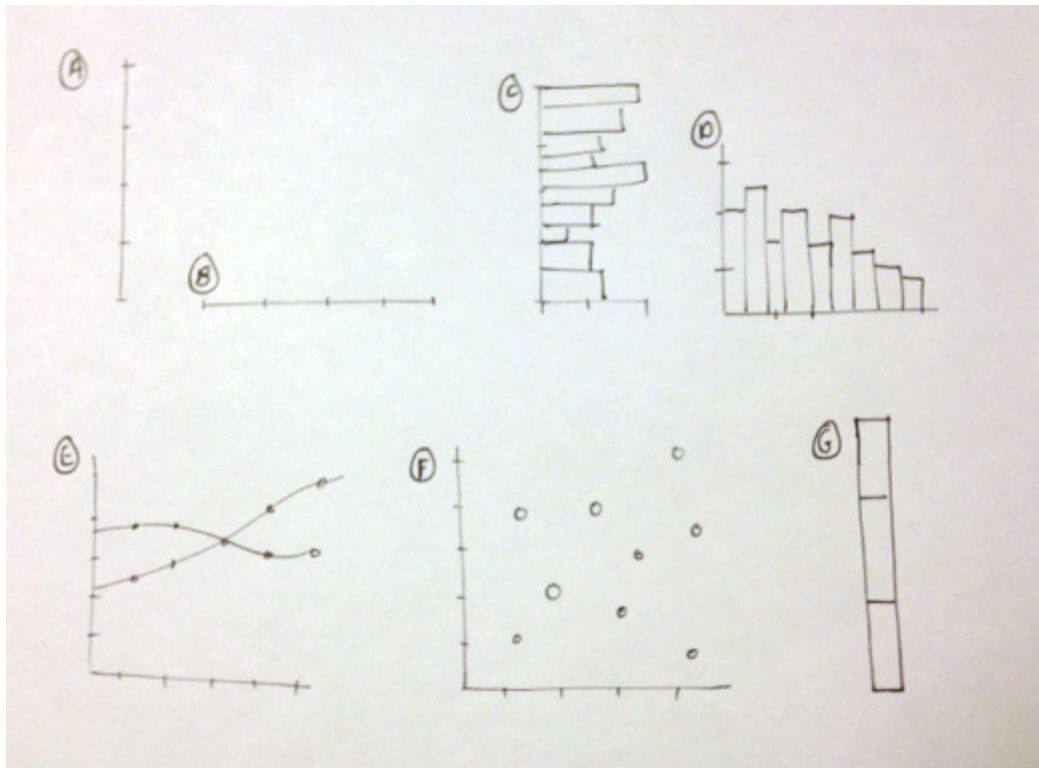
The **website menu** has links to other sections of the website.

The **control panel** is where the user manages the visualisation and includes options such as adding graph objects to the canvas, changing settings, filtering and exporting graph images. Because of the number of options available, buttons at the top allow the user to navigate between multiple panels

The **canvas** is the area where graph objects are displayed. The user is able to add multiple graph objects to the canvas, establish links between them and move them around. If graph layouts become large, the canvas allows for scrolling.

When the user selects one or more nodes on the graph layout, either by clicking, brushing or using a lasso tool, a table is displayed in the **details** section with a row for each node and fields for the indicators included in the graph layout above. A total row at the bottom is also included.

Image 2: Graph objects which can be added to canvas



The graph objects that can be added to the canvas include:

- a. Vertical axis
- b. Horizontal axis
- c. Horizontal bar chart
- d. Vertical bar chart
- e. Time series graph
- f. Scatter plot
- g. Category bar

Graph objects can be linked to one another on the canvas. For example, multiple vertical axis can be used to build a Parallel Coordinates graph. Likewise, multiple category bars can be used to build a Parallel Sets graph.

Image 3: Example layout of graph objects on canvas

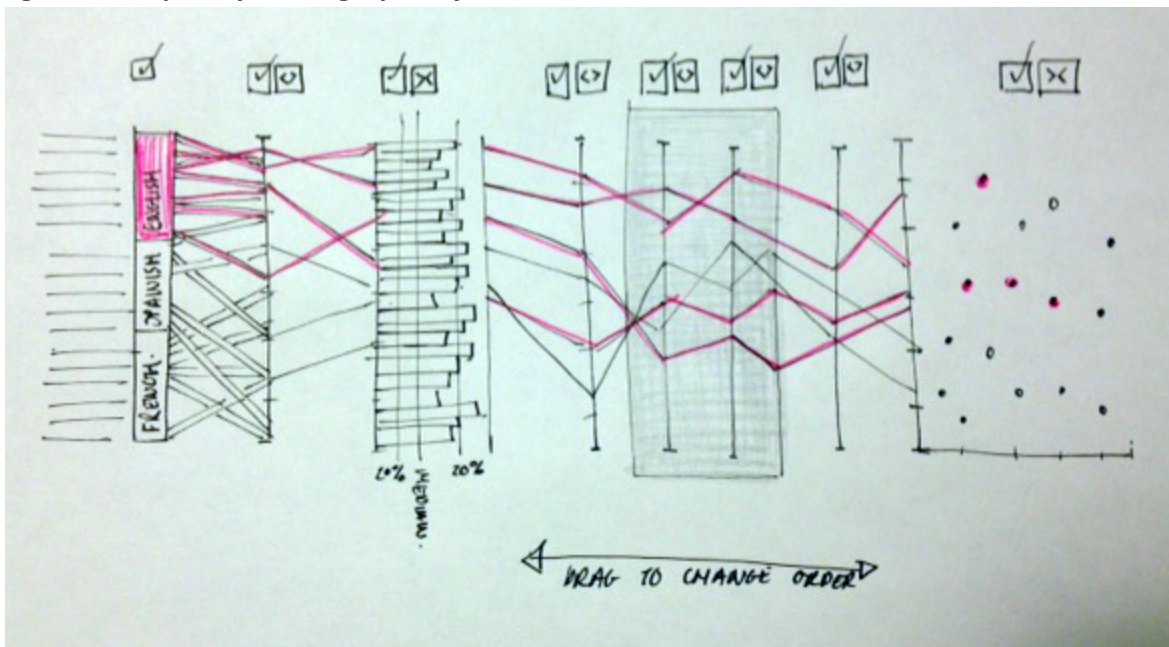
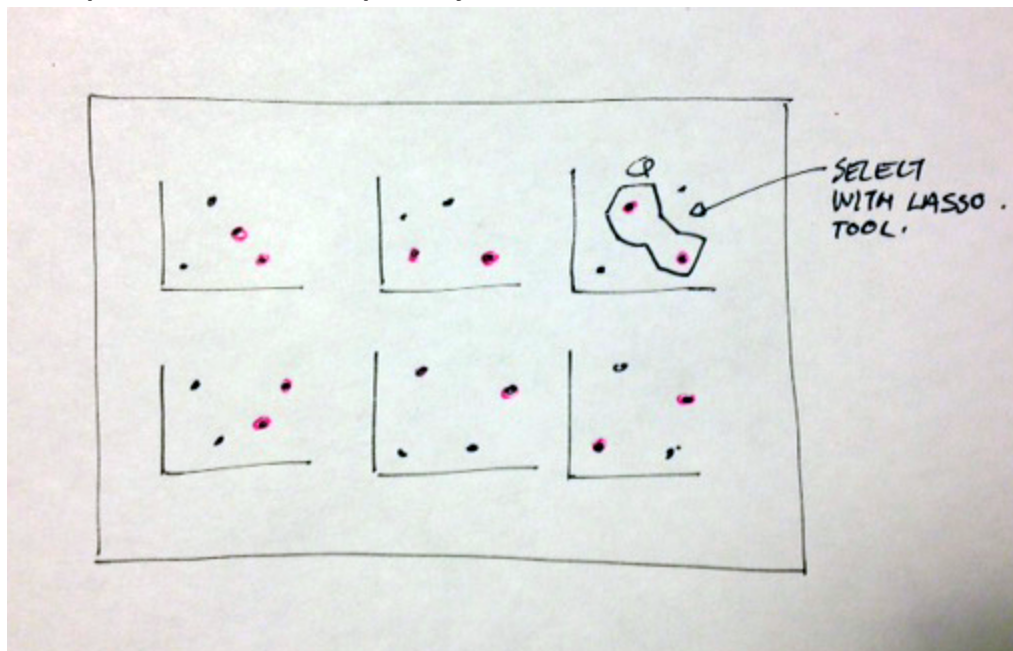


Image 3 shows an example where multiple graph objects of different types are linked together. In this case, when selecting “English” on the language category bar, all links and values for English speaking countries are highlighted. This allows the user to see how English speaking countries are positioned relative to others.

The user can brush and click on all graphs to select nodes and can select check boxes above graph objects to apply options from the control panel. They can also expand and collapse bar, scatter and time series graphs into horizontal axis and can show or hide child or component value graphs.

Image 4: Example matrix of scatter plot objects on canvas



When selecting nodes in a graph, they are highlighted across all graphs on the canvas.

Features

The Powder Monkey tool must have the following features:

- Add graph objects to canvas.
- Select one or more indicators to apply to graph objects.
- Both source and derived data items are available for selection.
- Add links between graph objects.
- Click, brush or lasso to select nodes.
- Highlight the nodes selected across all graph objects and the links between them.
- Display a table for selected nodes in the details selection. This should include all fields included in the graph layout above and a total column.
- Allow for a node selection set to be saved for comparison to a subsequent selections. This would allow the user to, for example, compare the health care expenditure in viable French speaking countries compared to Spanish ones.
- Color nodes by selected categorical indicator.
- Size nodes based on selected indicator.
- Advanced filtering, including the ability to apply a selection of nodes as a filter.
- Select indicator(s) to include links, including inward and outward flows, between nodes.

Nice to Haves:

- Factbook for country indicators. Click on indicator to launch graph in visualization tool.
- Export graph images for use in reports.
- Retrace history to understand a decision pathway.
- Ability to include states and provinces.



Schedule

Apr 6 - 12

- Detailed design / feedback.
- Collect, process and test data.
- Build tool layout.

Apr 13 - 19

- Build core functionality including ability to add graph objects to canvas.

Apr 20 - 26

- Prototype testing / feedback.
- Complete development of advanced algorithms and functionality.

Apr 27 - May 3

- User testing.
- Conduct analysis and document outcomes.
- Build website.
- Record screencast.
- Polish process book.

May 4:

- Grace Period.



References

" Complementary Approaches to Preliminary Foreign Market Opportunity Assessment: Country Clustering and Country Ranking " - S. Tamer Cavusgil, Tunga Kiyak, and Sengun Yeniyurt
Industrial Marketing Management, October 2004, Volume 33, Issue 7, 607-617

