DATA VISUALISATION TERM PROJECT

Anthony Guarnieri (50178491)
Anubhav Ghosh (50336902)
Phu Le (50198027)

Overview

The presentation answers various questions which startup investors, precisely the **angel investors** have. The insights help them to drill down on the prospects of the startups, market segment and the fate in terms of closure and acquisition. The first part covered by Mr. Phu Le tells about the cities where most funding is available and the equity types that have been heavily invested over the last two to three decades. The second part, covered by Mr. Anubhav Ghosh, drills down into the seed funding and which market segments have received the most number of seed fundings and also covers the life stage of funded startups. The third and the last part, covered by Mr. Anthony Guarnieri, covers the overall statistics and health of the startup ecosystem and gives the vital filters for investors to drill down into particular market segments and categories and know the market situation.

Summary of Coverage

In terms of the Tableau features, each individual team member has contributed certain Tableau features to give life to the visualizations. Here is a summary of the same.

Phu Le:

- ❏ Relationship
- ❏ Time Range Filter
- ❏ Actions on Dashboard
- ❏ Dual Axis Graph
- ❏ Wild Card Search
- ❏ Geographical filter by action
- ❏ Parameter in Calculated Field
- ❏ Parameter in filter
- ❏ Reference bar/trend line

Anubhav Ghosh:

- ❏ Inner Join
- ❏ Dual Axis Graph
- ❏ Multi-Select Drop Down Filter
- ❏ Parameter in Filter
- ❏ Parameter in Calculated Field
- ❏ Fixed (Calculated Field)
- ❏ Set with Parameter

- ❏ Reference Line with Parameter

Anthony Guarnieri:

- ❏ Word Cloud (Packed Bubbles)
- ❏ Wild Card Search
- ❏ Symbol Maps
- ❏ Map
- ❏ Calculated Fields
- ❏ Hierarchy
- ❏ Dynamic Filters
- ❏ Relationship
- ❏ Trend Lines / Reference Bar
- ❏ Sets with parameters

CONTRIBUTOR: PHU LE (50198027)

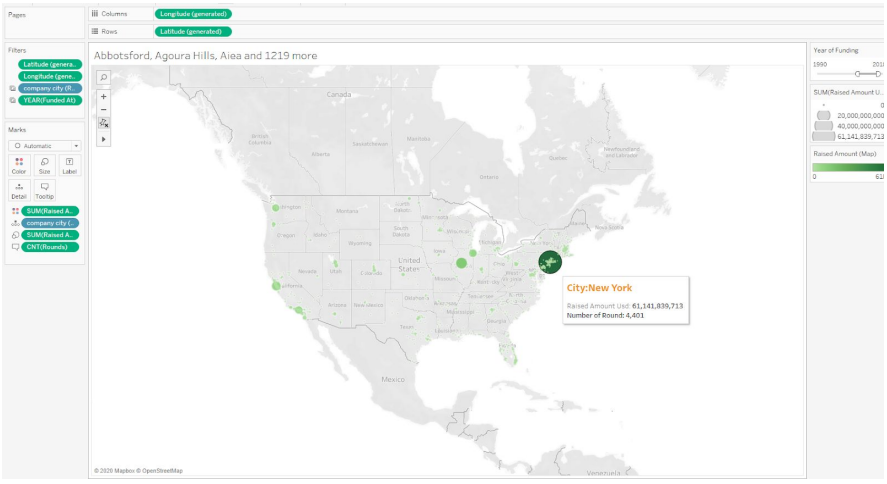
Audience: Angel investors

Purpose: We mutually agree that the audience is angel investors who look to participate in investing in potential companies but are looking into understanding of the start-up environment more in-depth and acquisition phase.

With some knowledge and understanding in a start-up environment through learning in entrepreneurship classes, watching shows such as Shark Tank, I want to visualize the audience that I will be presenting my data visualization. From my point of view, I want to create a visualization that focuses on the overview of investment type, the most popular market that trends over the history of start-up. I want to add features that enable a control over details granularity by region, time range, etc. Hence, I performed some additional practice outside of class's content to create a desired visualization. Some of those features are applied filters to another workbook, actions, parameters within a calculated field etc. The end results of the dashboard is to have 3-5 visualizations that correspond to the selected cities on the map.

Dashboard 1: Investment by market and funding type

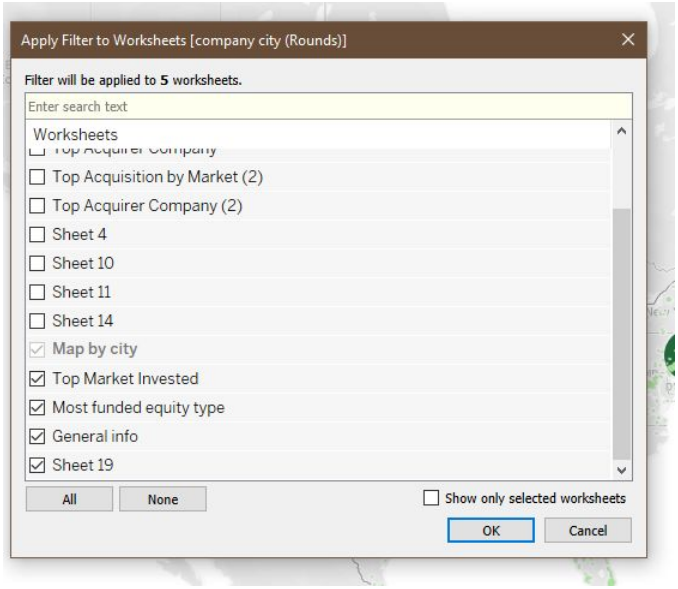
Worksheet 1: Map by City (With Total and funding rounds)



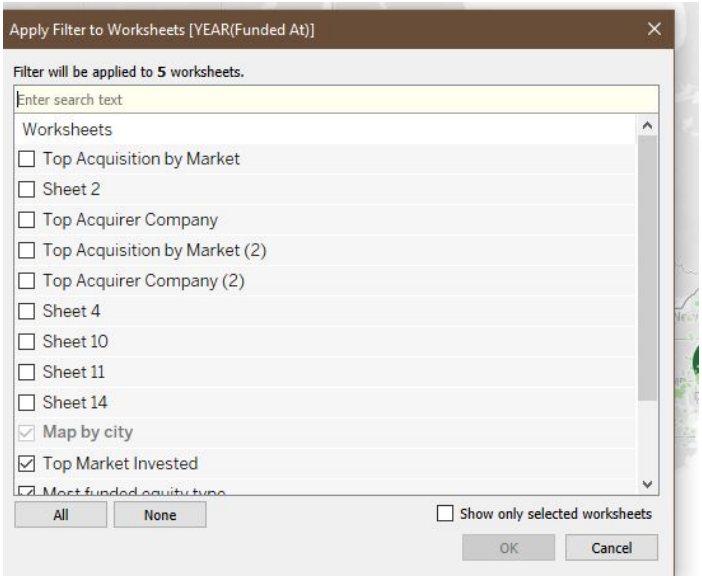
This worksheet is created with an idea in mind that I want to create an interactive dashboard that allows investors to play, explore, and control the level of details that they want to see. Some of the functions that they can use in this worksheet is to point the mouse over a specific location and it will show the city, total funding raised, and number of rounds. This visualization alone is not very powerful, however, I will combine it with 4 other visualizations to make them work together and create a powerful dashboard that extracts information from the dataset.

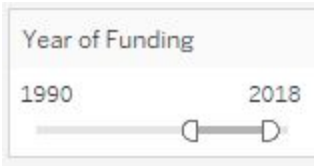
Some of the features that I use in this visualization is:

1. Applying the same filter on other visualizations.



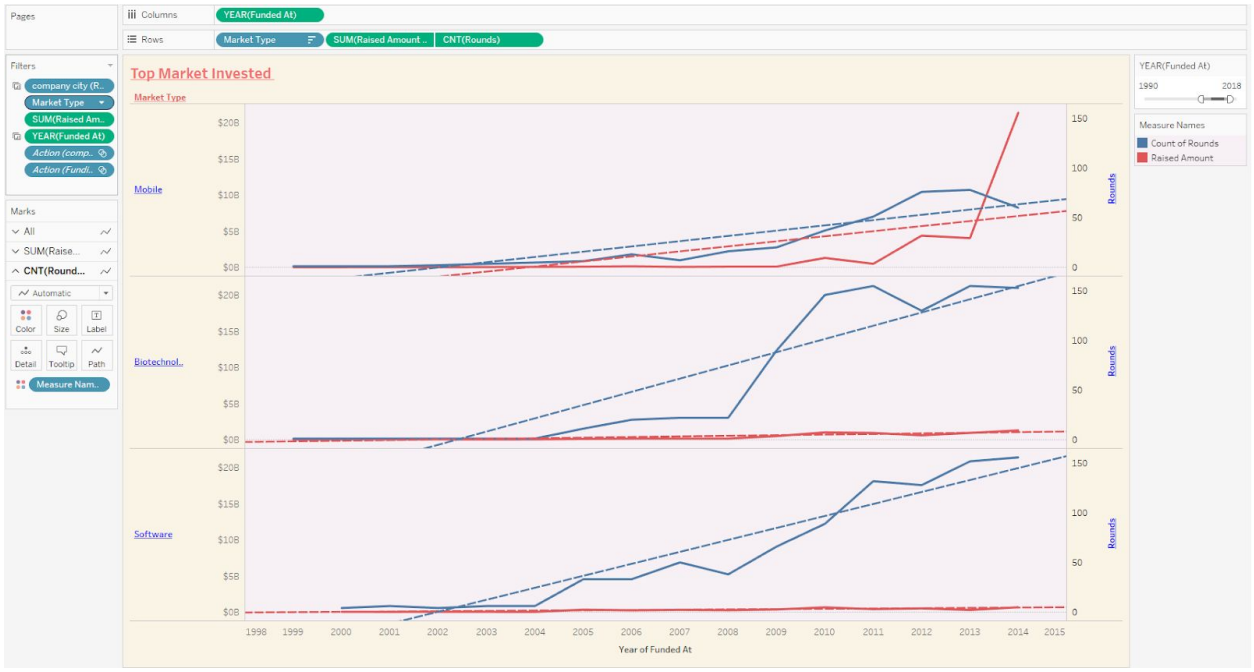
Create a filter based on time range of data

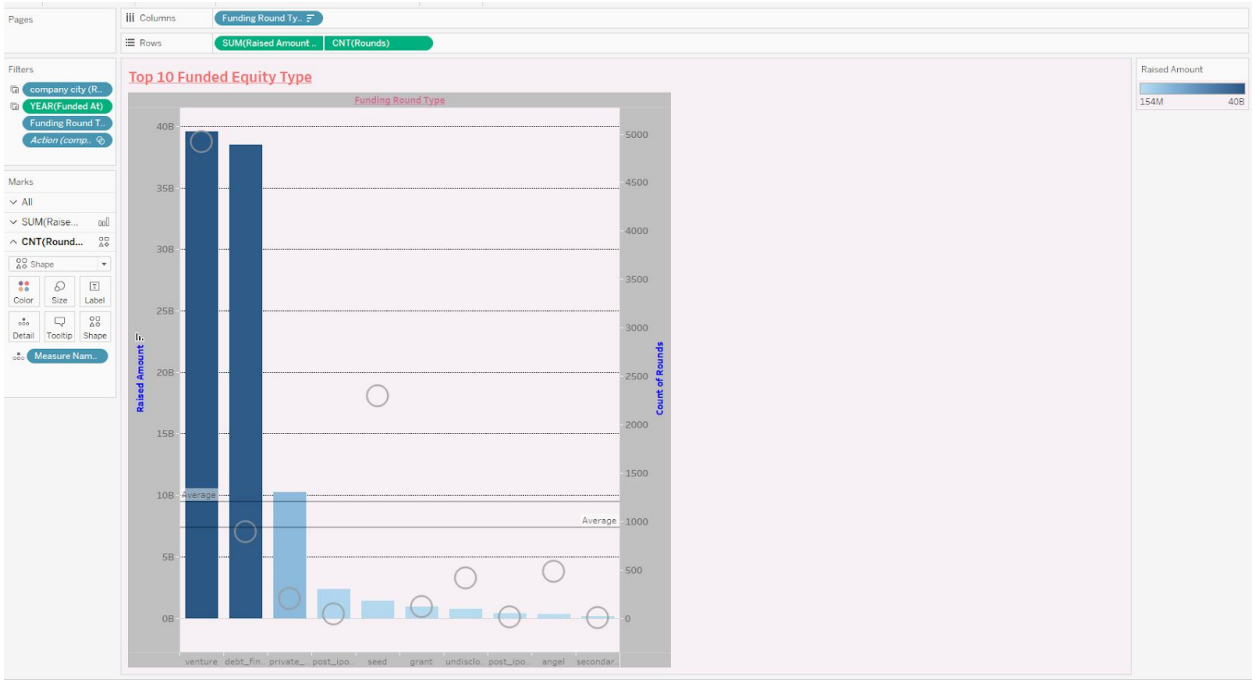




Worksheet 2, 3: Top Invested Market & Most funded equity type

Investors want to understand what are some of the top invested markets as well as the most funded investment type. Investors will be able to see both the total amount invested in each market as well as how many rounds were conducted (This is combined into a single visualization through the use of dual axis). This tool is further empowered through the use of action features.





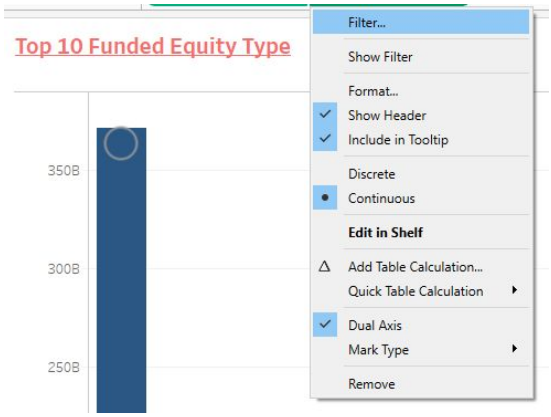
Reference Bar & Trend Line:

The trend line shows the historic trend of specific datasets. I want to show the investors how the funding has grown over the years by the market type.

For reference bars, investors will be able to see the average funding amount within that specific location.

Dual Axis: Dual axis allows investors to see the correlation between two data points. In this, I want to show the correlation between funded amount and the times that it was funded, whether by market type or investment type.

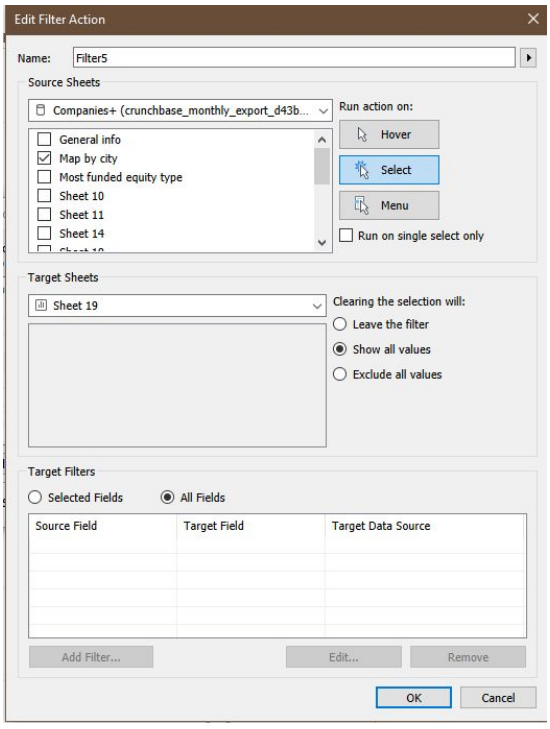
From an Investor perspective: This correlation can help the investors to decide how much they want to invest per market, per investment type.



<u>Filter Action</u>: Filter action combined with the map visualization allows me to control the data I want to see geographically.

From Investor perspective: Investors have the ability to choose which regions/cities they want to understand the market more in-depth. This can potentially help them answering some questions such as:

In these regions/cities, what are some of the most funded market and investment types from x year to date?



Worksheet 4 & 5: Detailed statistical information based on region/city selected

I created these 2 simple worksheets to add into the dashboard for more information, statistically-wise.

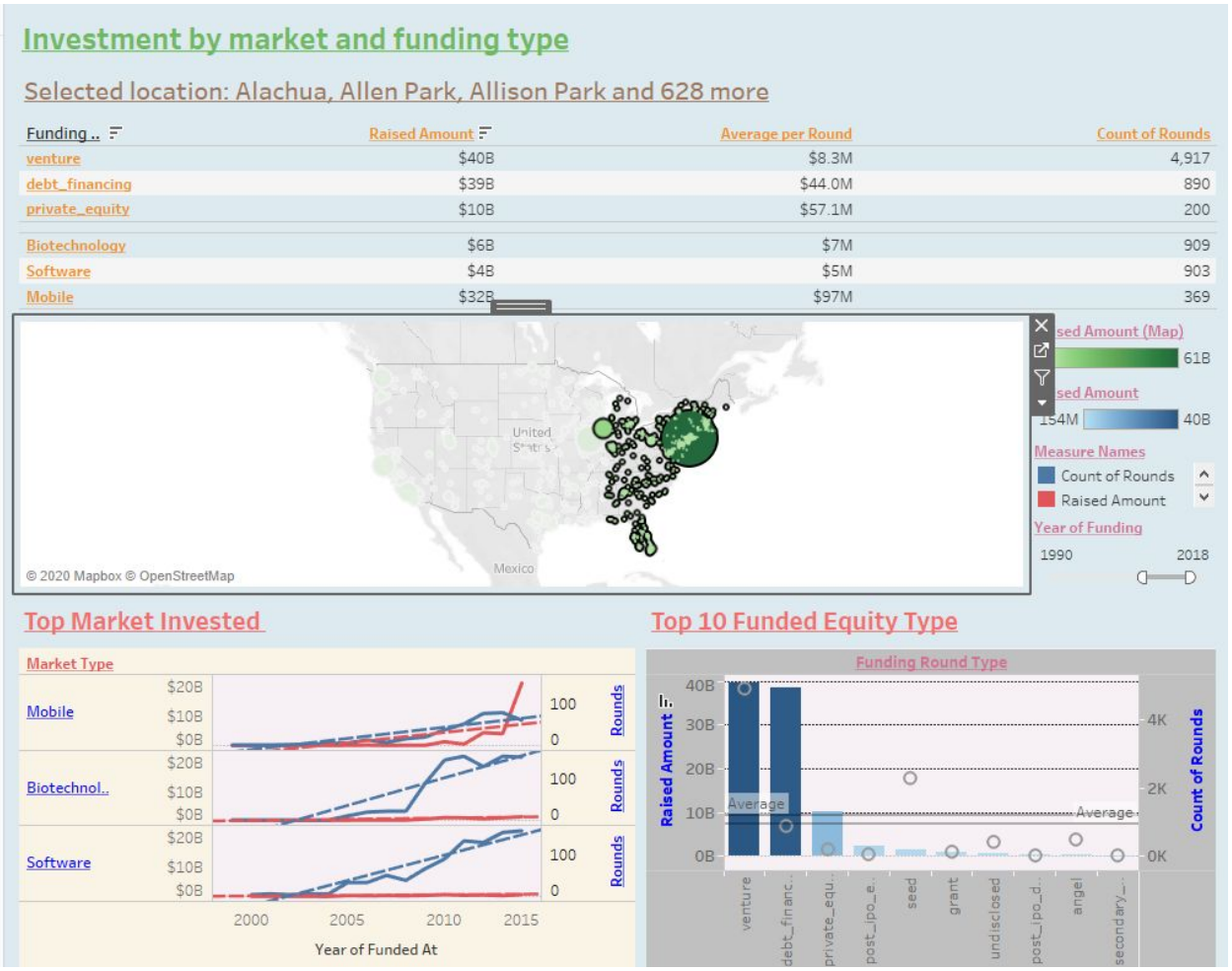
Selected location: All

Funding Round Ty..	Raised Am..	Average per Rou..	Count of Rounds
venture	$371B	$9.5M	41,730
private_equity	$102B	$62.3M	1,828
debt_financing	$93B	$16.8M	5,692

General info

Biotechnology	$73,373M	$10M	7,652
Software	$42,224M	$6M	7,629
Mobile	$49,470M	$16M	3,570

Putting all of them together, I created a powerful infographic-interactive dashboard below:



All of the visualizations within this dashboard are tied by the user's action on the map. When they choose the specific region/city, data will be automatically displayed according to that selected location.

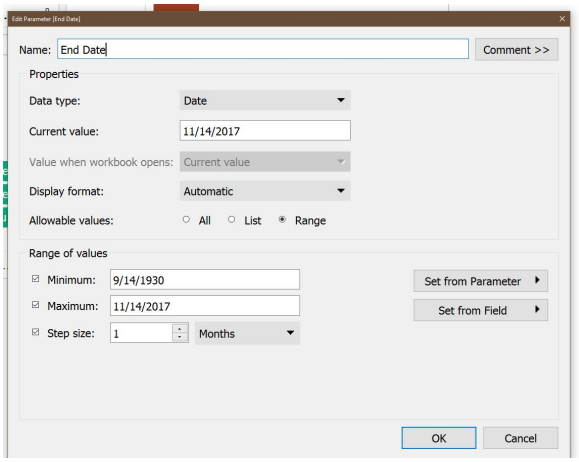
Dashboard 2: Acquisition overview

Worksheet 1 & 2: Top Market for acquisition and top acquirer's market.

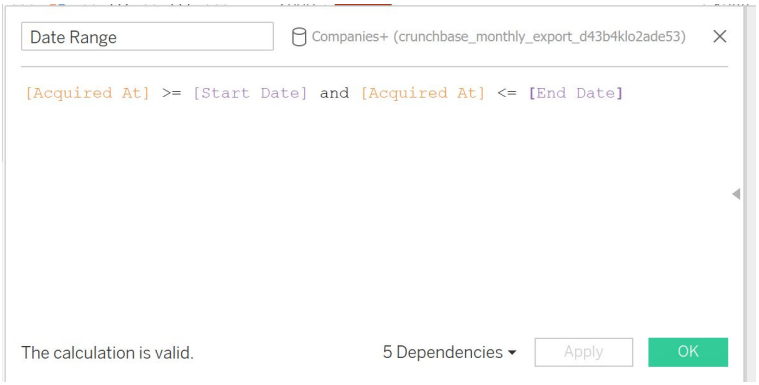
These 2 visualizations allow investors to see a general overview of acquisition made in the past 90 years.

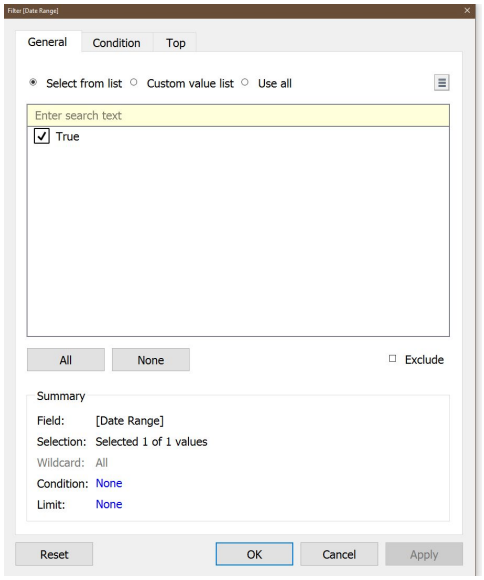
Some of the notable features are parameter, filter using calculated field with parameter within, and reference bars. This feature allows users to filter the date range that they want to see in the data.

I created 2 parameters that start with Start Date and End Date



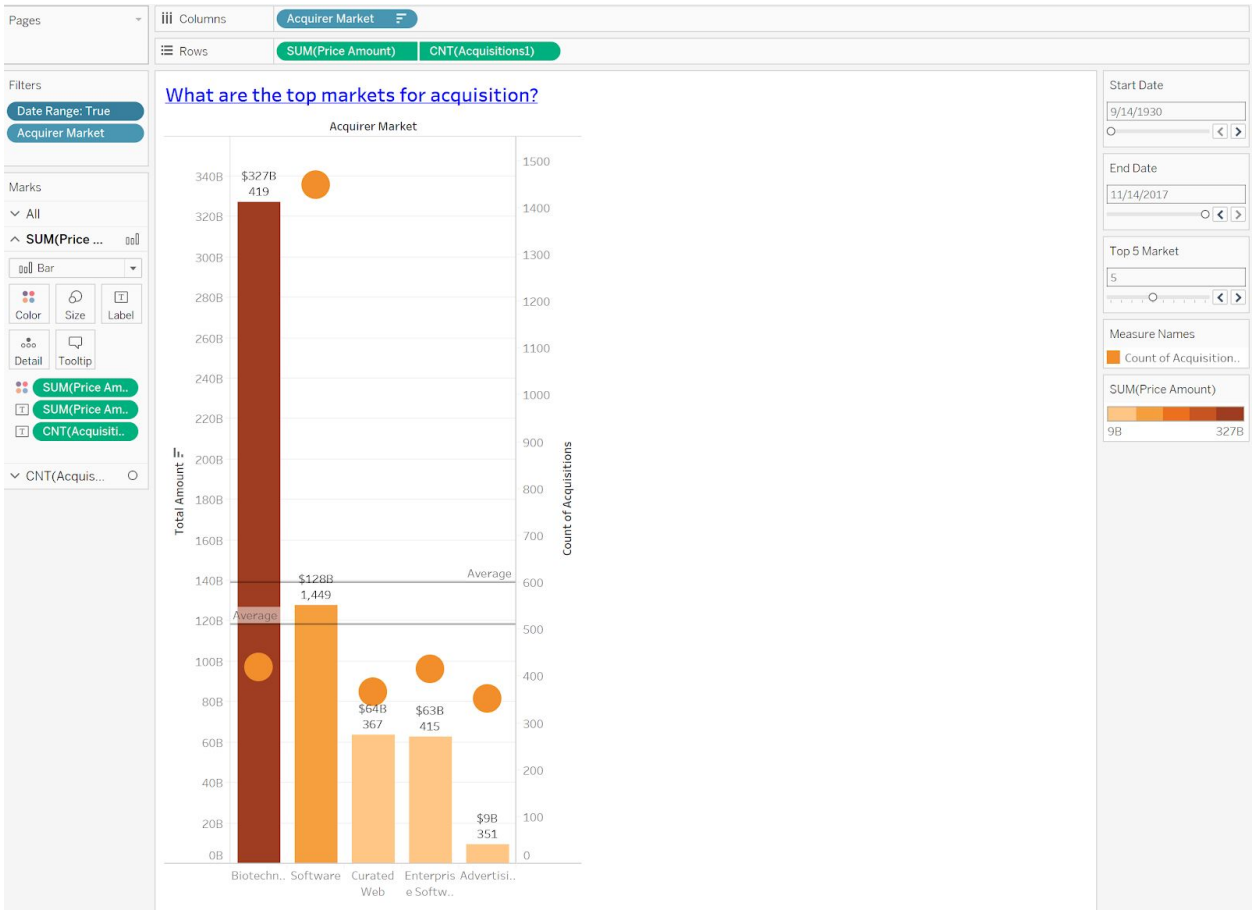
From there, a calculated field using these parameters called Date Range.





From there, I apply a filter using the Date Range calculated field and enable parameter setting for the graph. From there, I have the control over the date range of data that I want to see.

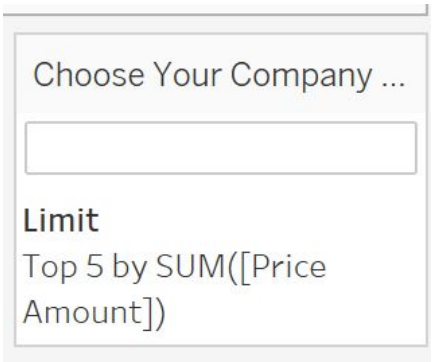
I also created another parameter that allows me to see N number of markets. This allows me to limit to the top 5 markets that I want to show the investor.

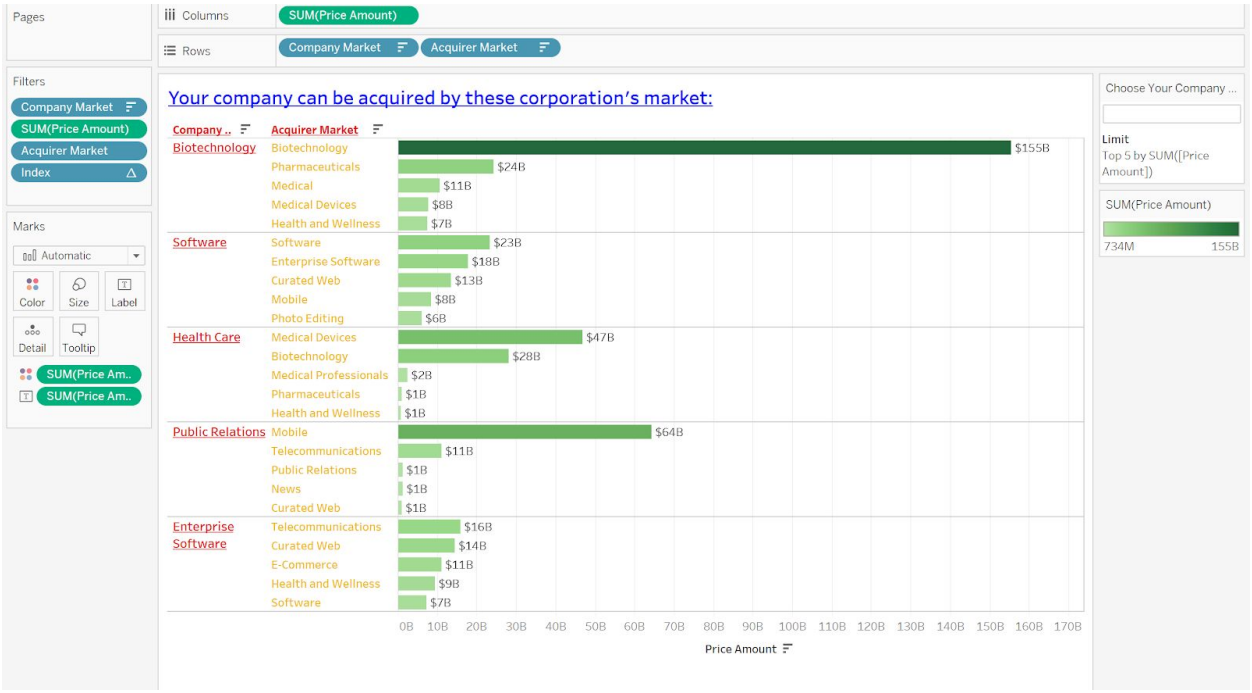


Worksheet 3: Wildcard search that allows you to see what markets will acquire your company.

Often lots of start-ups are acquired by big corporations, this in turn is one of the big benefits because such companies will be given apple resources for research and development. Hence, I want to answer the investor's question such as "If I invest in this market, what are some of the potential acquirer's markets for my company?"

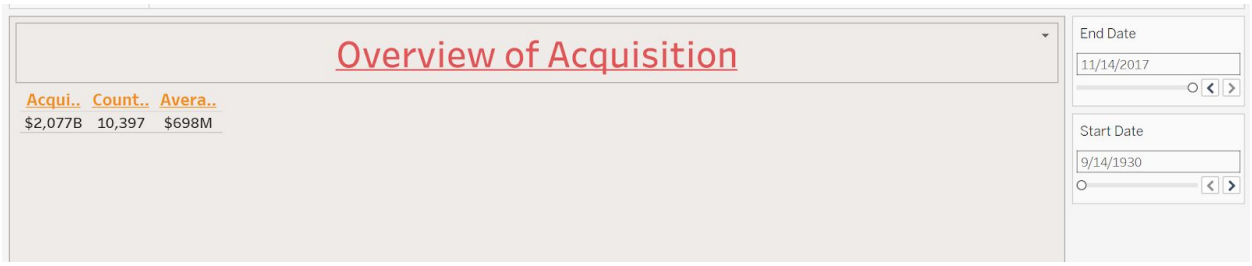
In this visualization, I want to use the wildcard filter function for the company's market.



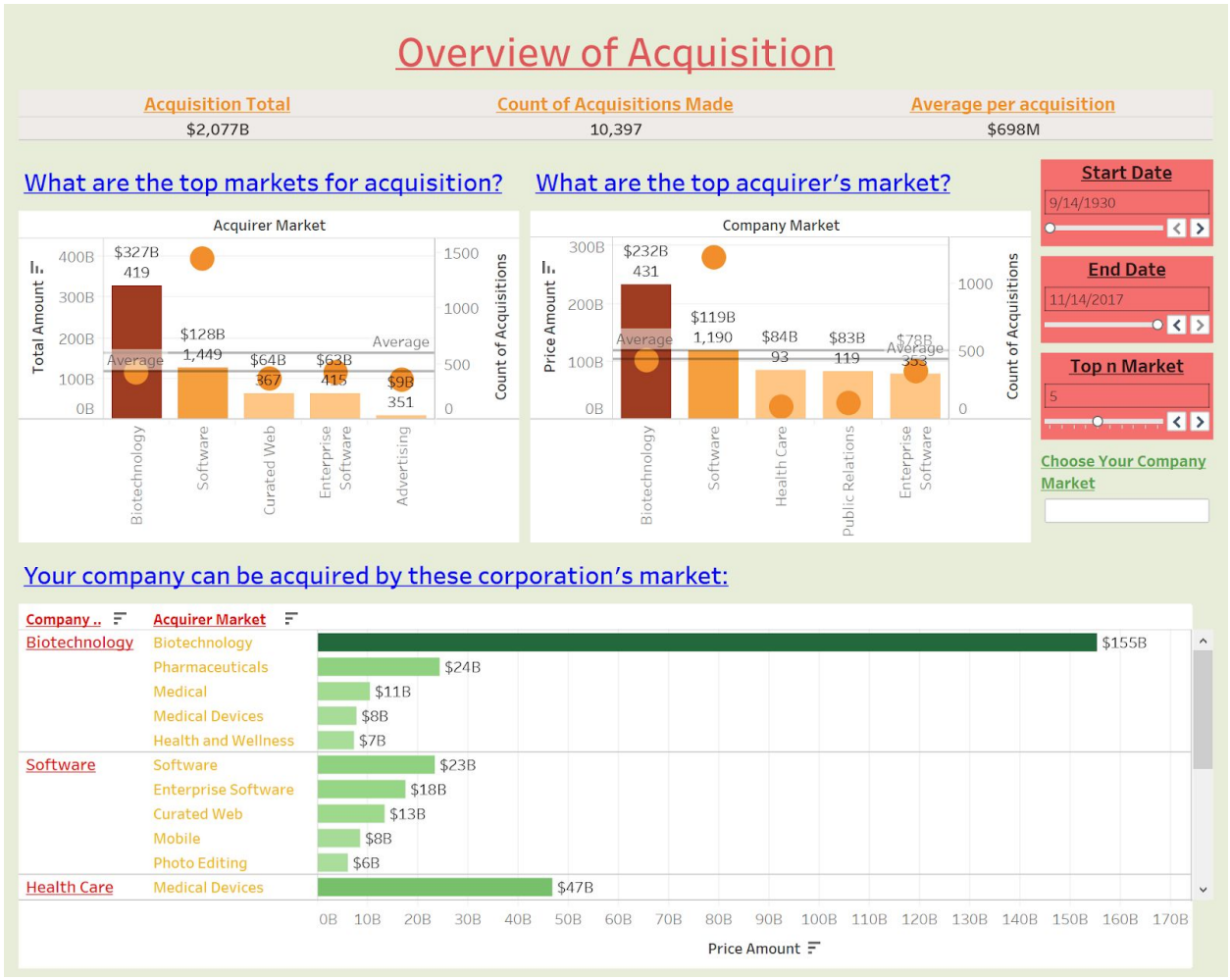


Worksheet 4: General information

I want to provide the investors some general statistics about the history of acquisitions made in start-up environment.



Dashboard: Overview of Acquisition

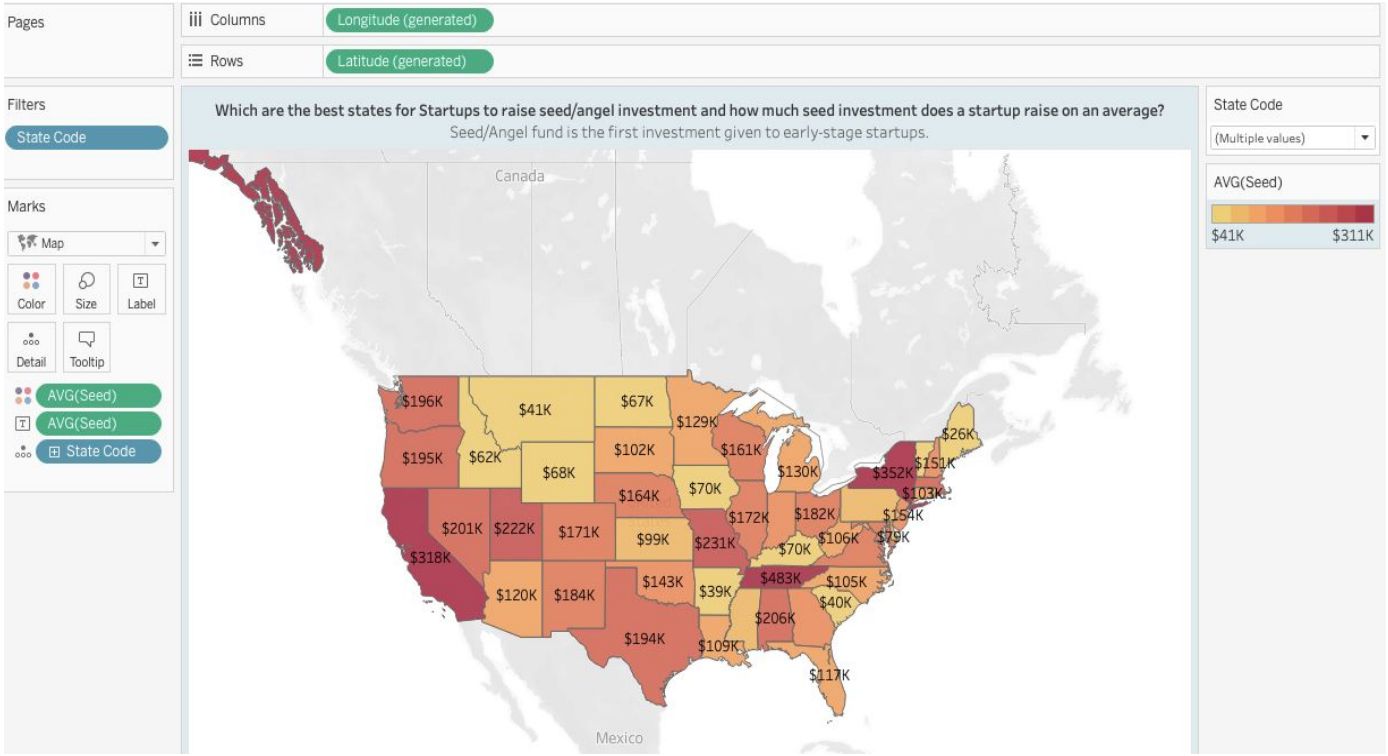


CONTRIBUTOR NAME: ANUBHAV GHOSH (50336902)

Audience: Angel Investors
Target: Help Angel Investors get insights about the trends, parameters and outcomes of seed fundings in startups across the U.S.

WORKSHEET 1:

Which are the best states for Startups to raise seed/angel investment and how much seed investment does a startup raise on an average?
(Seed/Angel fund is the first investment given to early-stage startups.)

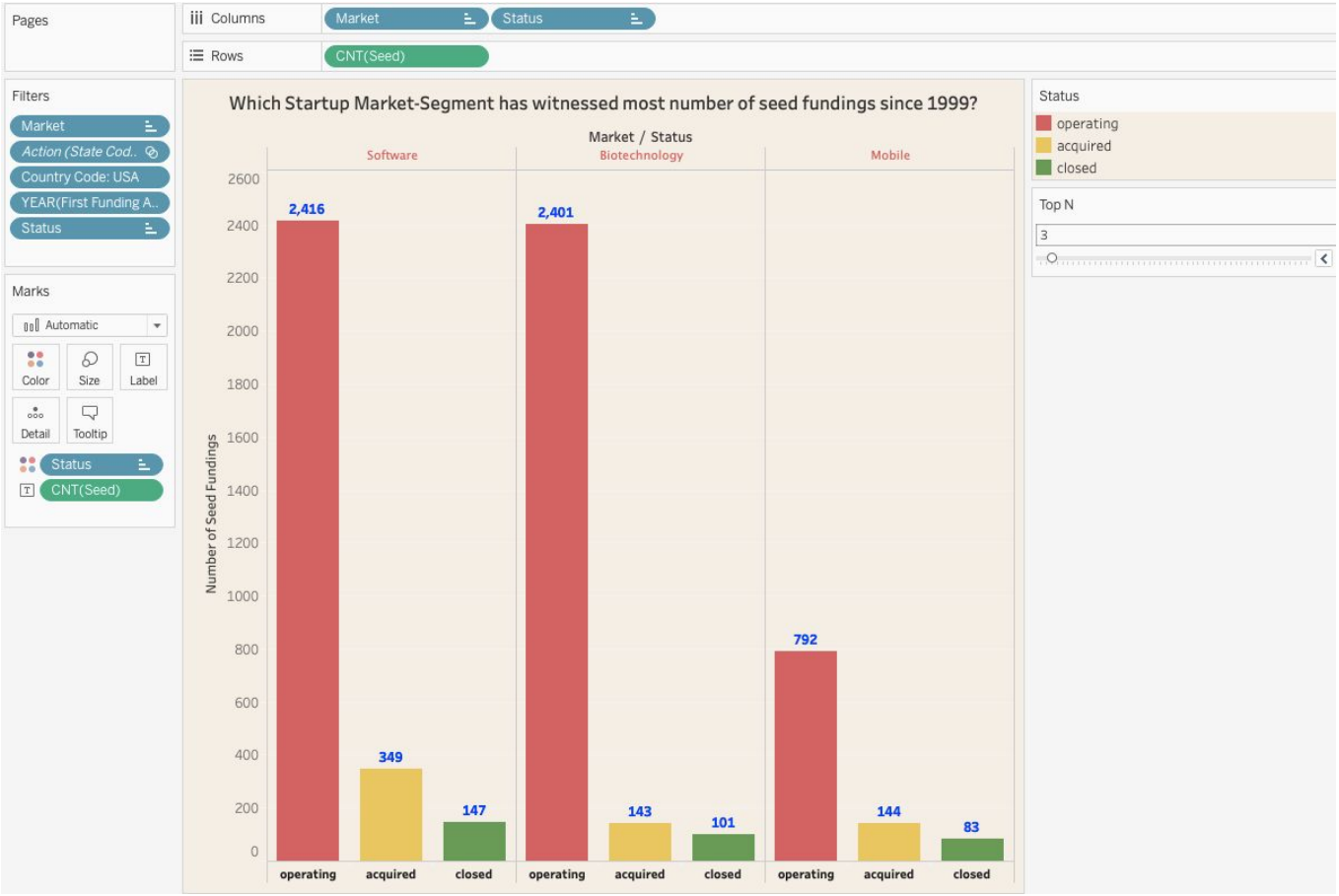


This visualization helps the investors (primarily the Angel Investors) to get an insight about the average seed funds raised by Startups in various states of the US. **This helps an investor understand what is a good state to invest and what is a ballpark figure for seed round investment.**

Technologically, this worksheet includes a **Multi-Select Drop Down Filter** which allows you to choose the states on which you want to focus.

WORKSHEET 2:

Which Startup Market-Segment has witnessed the most number of seed fundings since 1999?



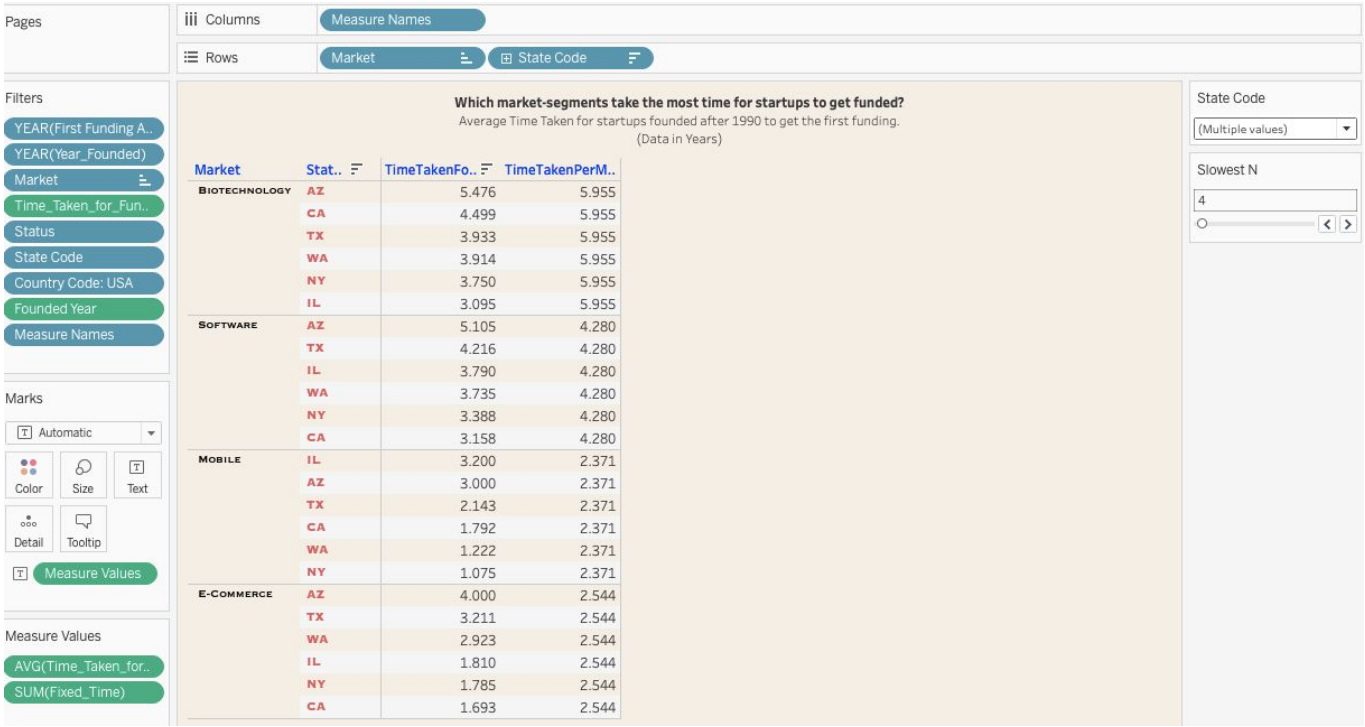
This visualization gives insights to the Angel Investors to know that over the last two decades, which market segment of the startups has witnessed the most number of seed fundings. It gives granular details of how many startups who received funding are still operational, are closed or have been acquired.

Technologically, this worksheet includes a **parameter within the filter** which makes it dynamic to include the top N (N being dynamically chosen as an integer from the slider) in the visualization.

WORKSHEET 3:

Which market-segments take the most time for startups to get funded?

Average Time Taken by startups founded after 1990 to get the first funding.
(Data in Years)



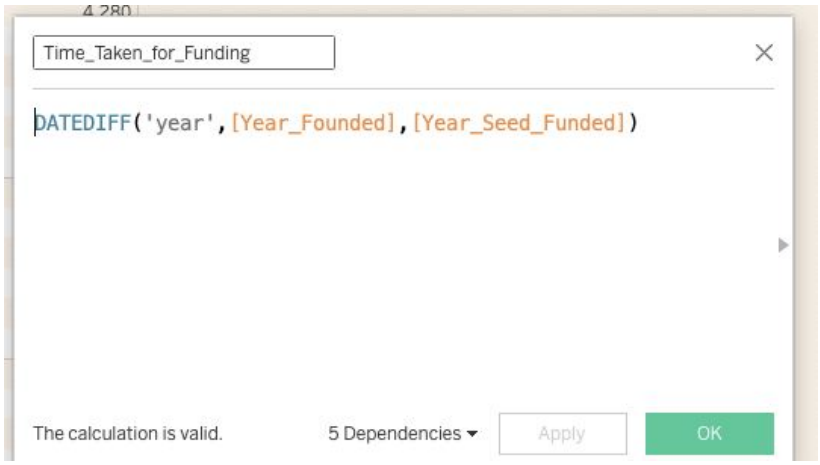
Market	Stat..	TimeTakenFo..	TimeTakenPerM..
BIOTECHNOLOGY	AZ	5.476	5.955
	CA	4.499	5.955
	TX	3.933	5.955
	WA	3.914	5.955
	NY	3.750	5.955
	IL	3.095	5.955
SOFTWARE	AZ	5.105	4.280
	TX	4.216	4.280
	IL	3.790	4.280
	WA	3.735	4.280
	NY	3.388	4.280
	CA	3.158	4.280
MOBILE	IL	3.200	2.371
	AZ	3.000	2.371
	TX	2.143	2.371
	CA	1.792	2.371
	WA	1.222	2.371
	NY	1.075	2.371
E-COMMERCE	AZ	4.000	2.544
	TX	3.211	2.544
	WA	2.923	2.544
	IL	1.810	2.544
	NY	1.785	2.544
	CA	1.693	2.544

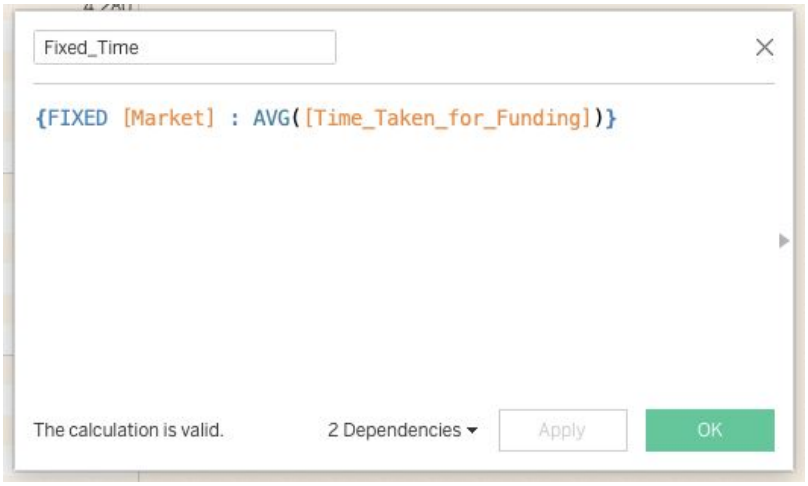
This visualization helps the investors understand the average Time Taken to raise the first funds since being founded. The Parameter used and shown here helps to select the slowest N market segments based on the Time Taken (This itself is a Calculated field).

Technically, there are two **4 Calculated Fields** used here along with **Parameter.**


Year_Seed_Funded
DATE(DATETRUNC('year', [First Funding At]))
The calculation is valid.
6 Dependencies
Apply
OK


Year_Founded
DATE([Founded At])
The calculation is valid.
6 Dependencies
Apply
OK


Time_Taken_for_Funding
DATEDIFF('year',[Year_Founded],[Year_Seed_Funded])
The calculation is valid.
5 Dependencies
Apply
OK


Fixed_Time
{FIXED [Market] : AVG([Time_Taken_for_Funding])}
The calculation is valid.
2 Dependencies
Apply
OK

WORKSHEET 4:

State Wise which Market-Segment has generated most startups since 1999?

Note the UNDERDOG: BioTech has beaten the most touted software industry in several states and has consistently stood up in top 3.

This visualization helps the Angel Investors to understand the market-segments statewise. This gives a granular information about the number of startups in top N (chosen dynamically) market segments that have raised seed funds. It goes even more granular by showing how many of those are still operating, are closed or have been acquired.

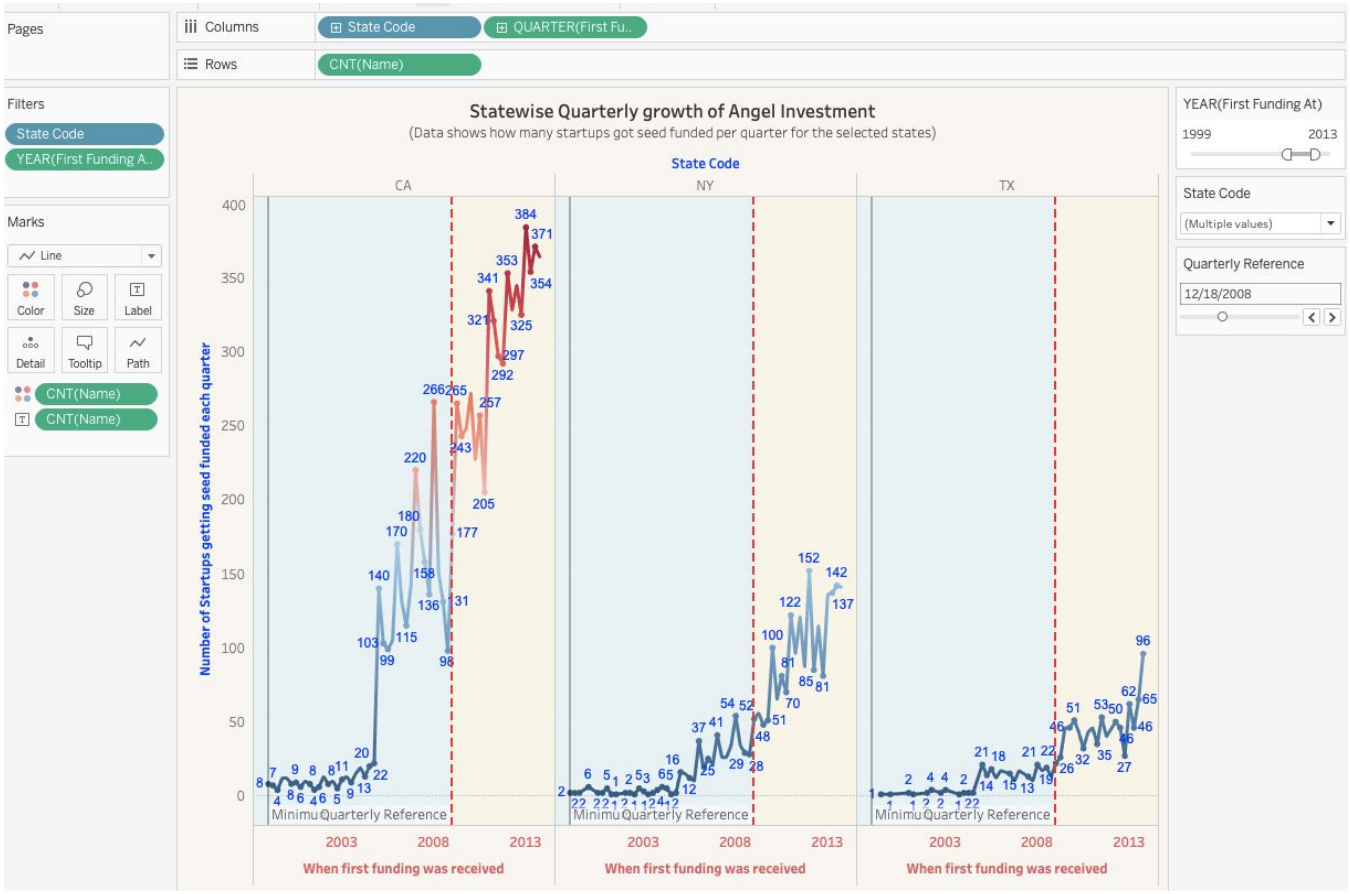
For example, In Massachusetts, Biotechnology is the leading market-segment and most startups of this segment have been successful in getting funded. Even in a state like California, this is the second-ranking market segment, ahead of Mobile and E-Commerce. Moreover, the proportion of closed startups vs operating start-ups seems quite less in the Biotechnology market-segment.

Technologically, **parameter** has been used within **filter.**

WORKSHEET 5:

State-Wise Quarterly growth of Angel Investment

(Data shows how many startups got seed funded per quarter for the selected states)



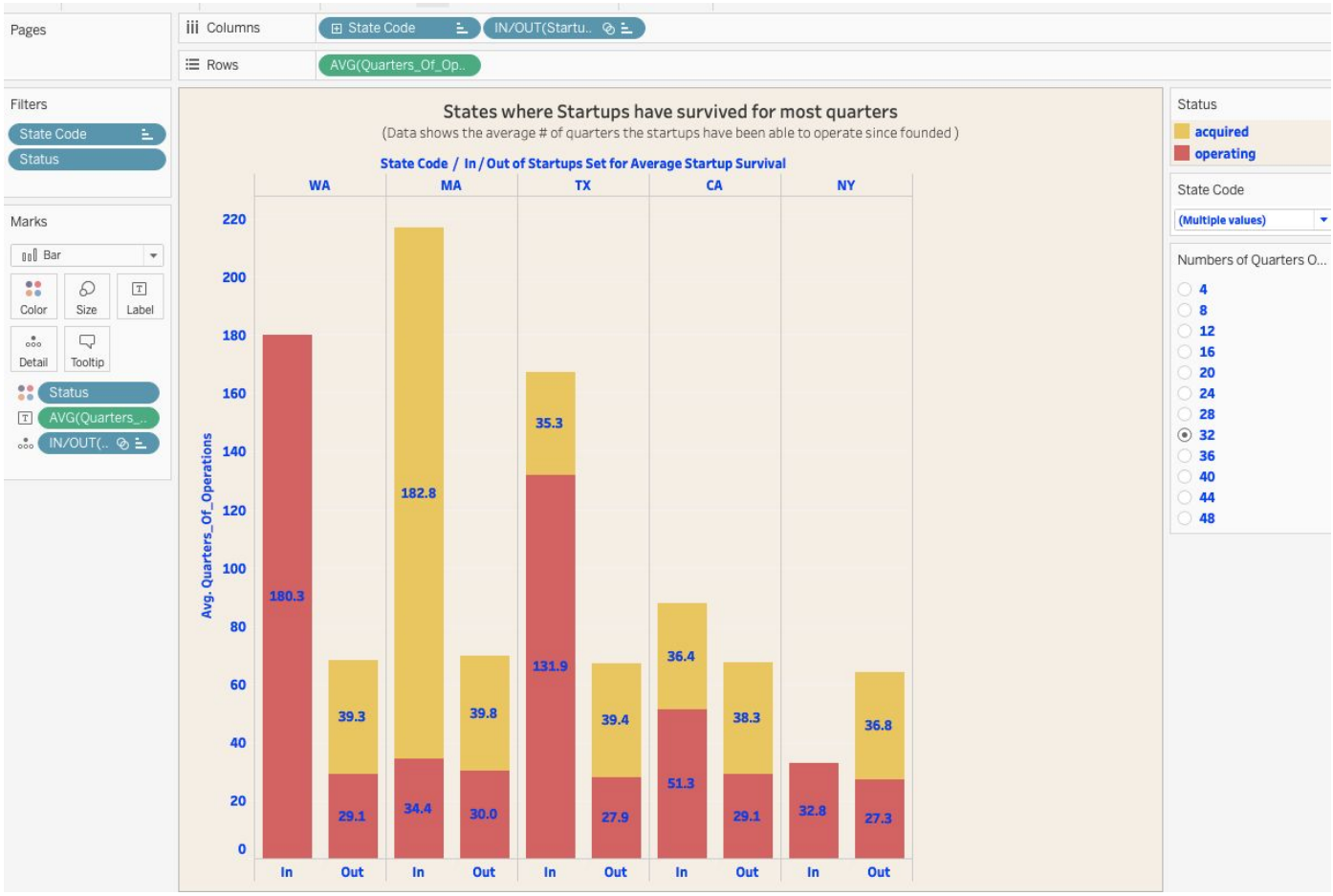
This visualization enables angel investors to know the Quarter on Quarter rate of growth of seed fundings in selected states.

Technically, this has a **Reference Line with a Parameter, Multiselect Dropdown Picklist** and a **Range Filter.**

WORKSHEET 6:

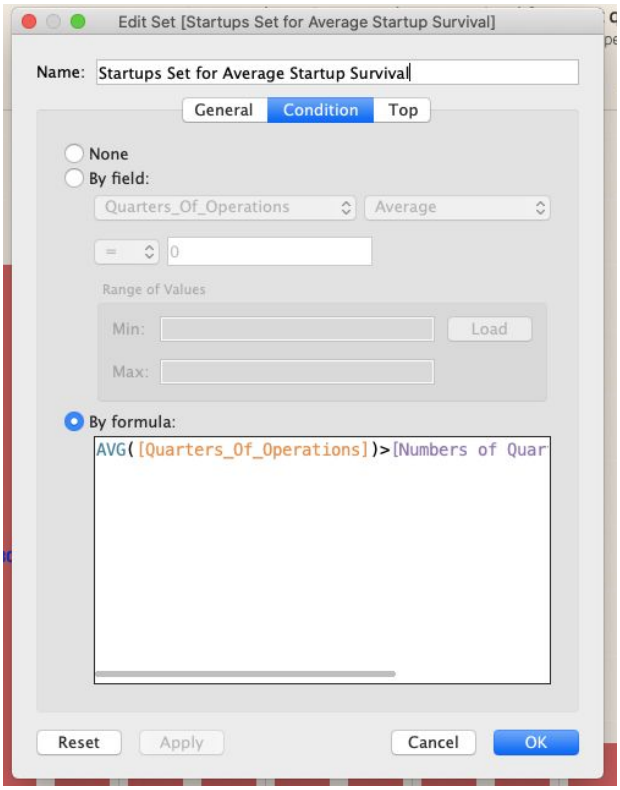
States where Startups have survived for most quarters

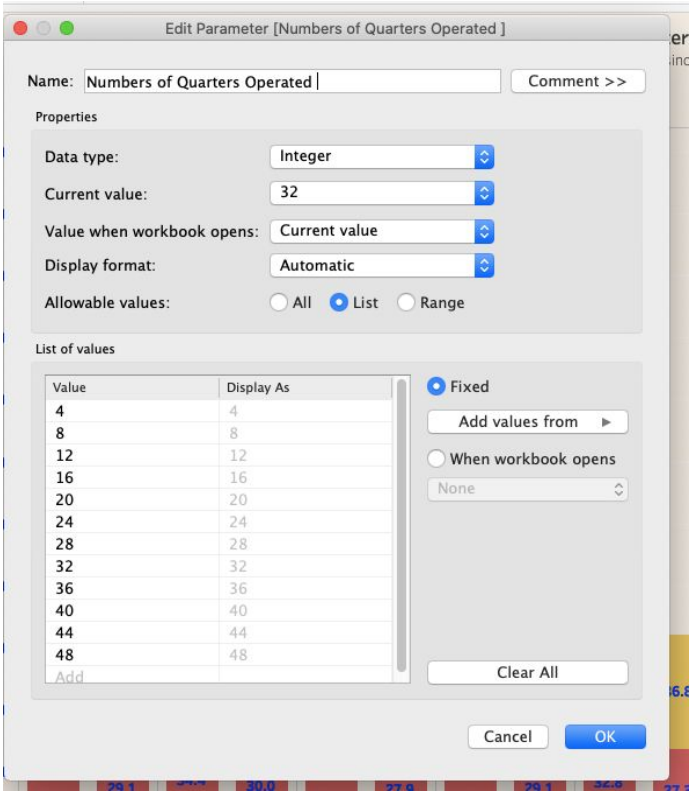
(Data shows the average # of quarters the startups have been able to operate since founded)



This visualization qualifies startups in Sets of IN and OUT where IN is classified as a set of startups whose average working quarters of operation since being founded is greater than the number of quarters chosen through the parameter on screen.

Technically, this uses a **Set with Parameter.**
(Screenshots below show the set elements)


Edit Set [Startups Set for Average Startup Survival]
Name: Startups Set for Average Startup Survival
General
Condition
Top
None
By field:
Quarters_Of_Operations
Average
=
0
Range of Values
Min:
Load
Max:
By formula:
AVG([Quarters_Of_Operations])>[Numbers of Quar
Reset
Apply
Cancel
OK


Edit Parameter [Numbers of Quarters Operated]
Name: Numbers of Quarters Operated
Comment >>
Properties
Data type: Integer
Current value: 32
Value when workbook opens: Current value
Display format: Automatic
Allowable values: All List Range
List of values
Value
Display As
4
8
12
16
20
24
28
32
36
40
44
48
Add
Fixed
Add values from
When workbook opens
None
Clear All
Cancel
OK

WORKSHEET 7:

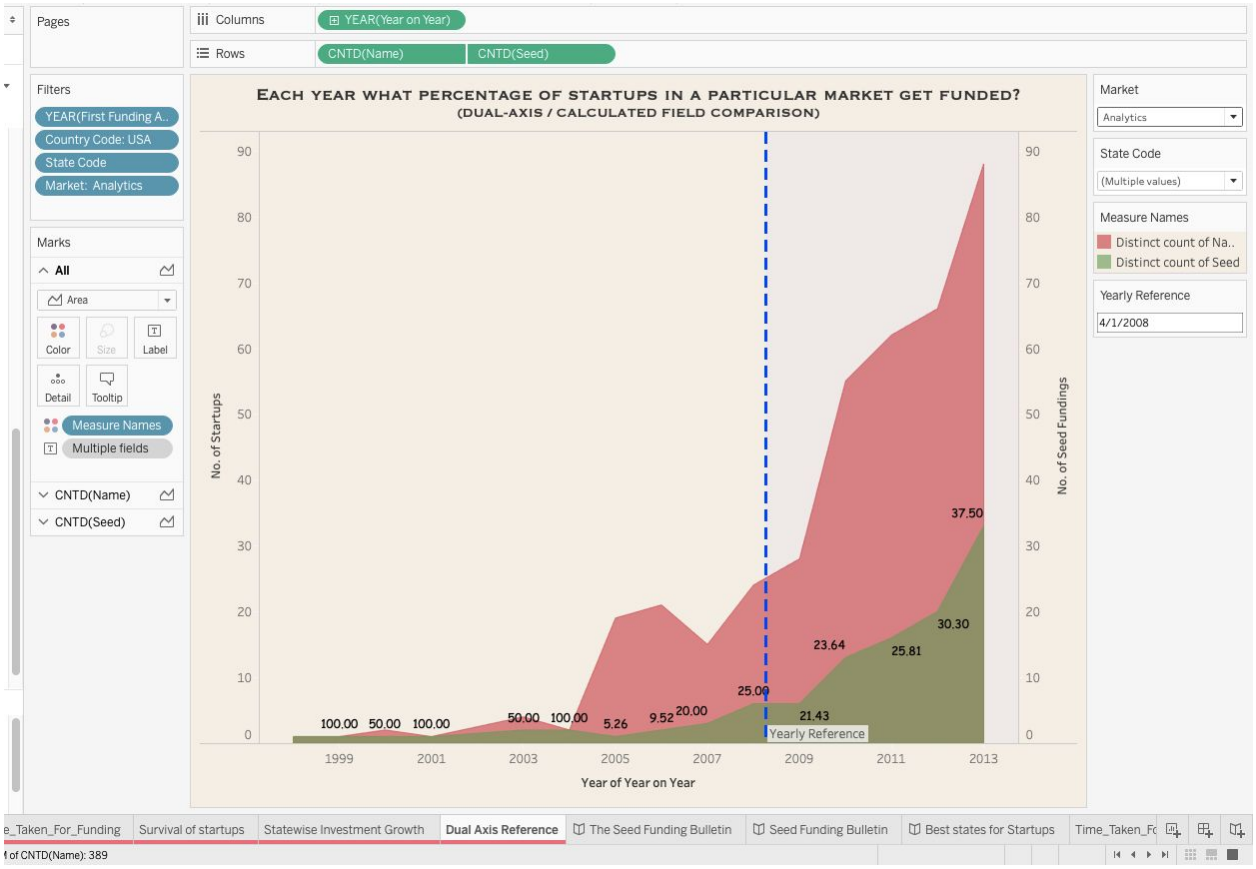
What has been the trend of closure or acquisition of startups since 1999?

Over the years, numerous startups get funded and yet end up being closed or being acquired by competitors. This visualisation gives an insight of the trend.

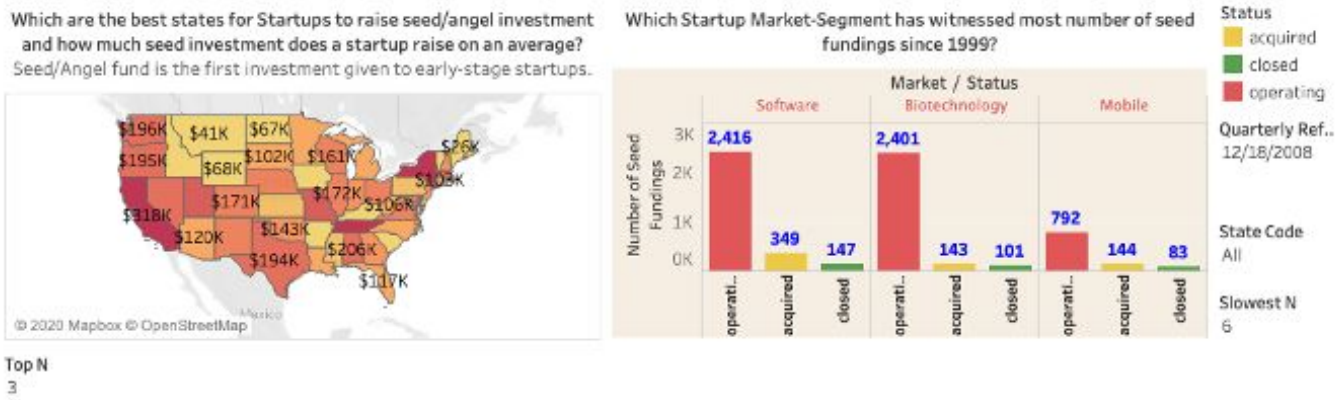
WORKSHEET 8:

Dual Axis and 2 Calculated fields

(This is not available in the .twbx as it could not be saved).



DASHBOARD 1 AND DASHBOARD 2



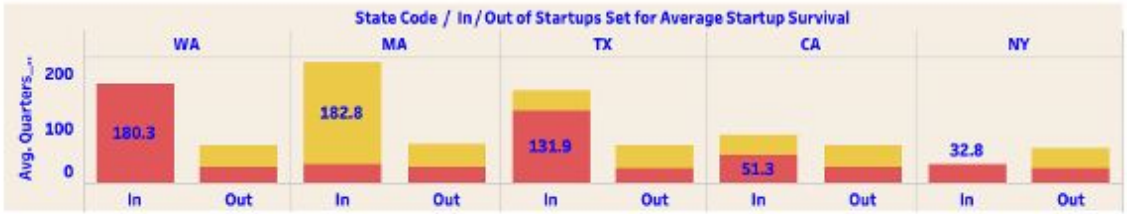
Which market-segments take the most time for startups to get funded?

Average Time Taken for startups founded after 1990 to get the first funding.
(Data in Years)

Market	State Code	TimeTakenForF..	TimeTakenPerM..
BIOTECHNOLOGY	AK	6.00	5.95
	AL	6.08	5.95
	AR	5.67	5.95
	AZ	5.48	5.95
	CA	4.50	5.95
	CO	5.04	5.95
	CT	3.35	5.95
	DC	6.00	5.95
	DE	5.00	5.95
	FL	4.88	5.95
	GA	7.37	5.95
	HI	5.00	5.95
	IA	4.00	5.95
	ID	0.00	5.95
	IL	3.10	5.95
	IN	3.05	5.95

States where Startups have survived for most quarters

(Data shows the average # of quarters the startups have been able to operate since founded)



Numbers of Quarters ..
4
8
12
16
20
24
28
32
36
40
44
48

Statewise Quarterly growth of Angel Investment

(Data shows how many startups got seed funded per quarter for the selected states)

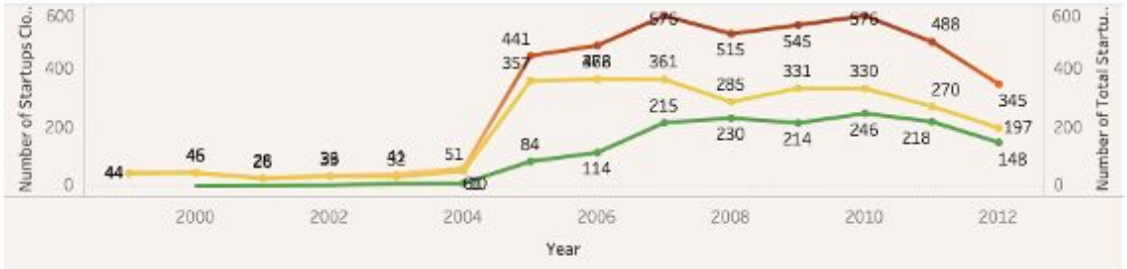
Status
acquired
operating

State Code
Multiple values

State Code
Multiple values

Quarterly Reference
12/18/2008

What has been the trend of closure or acquisition of startups since 1999?

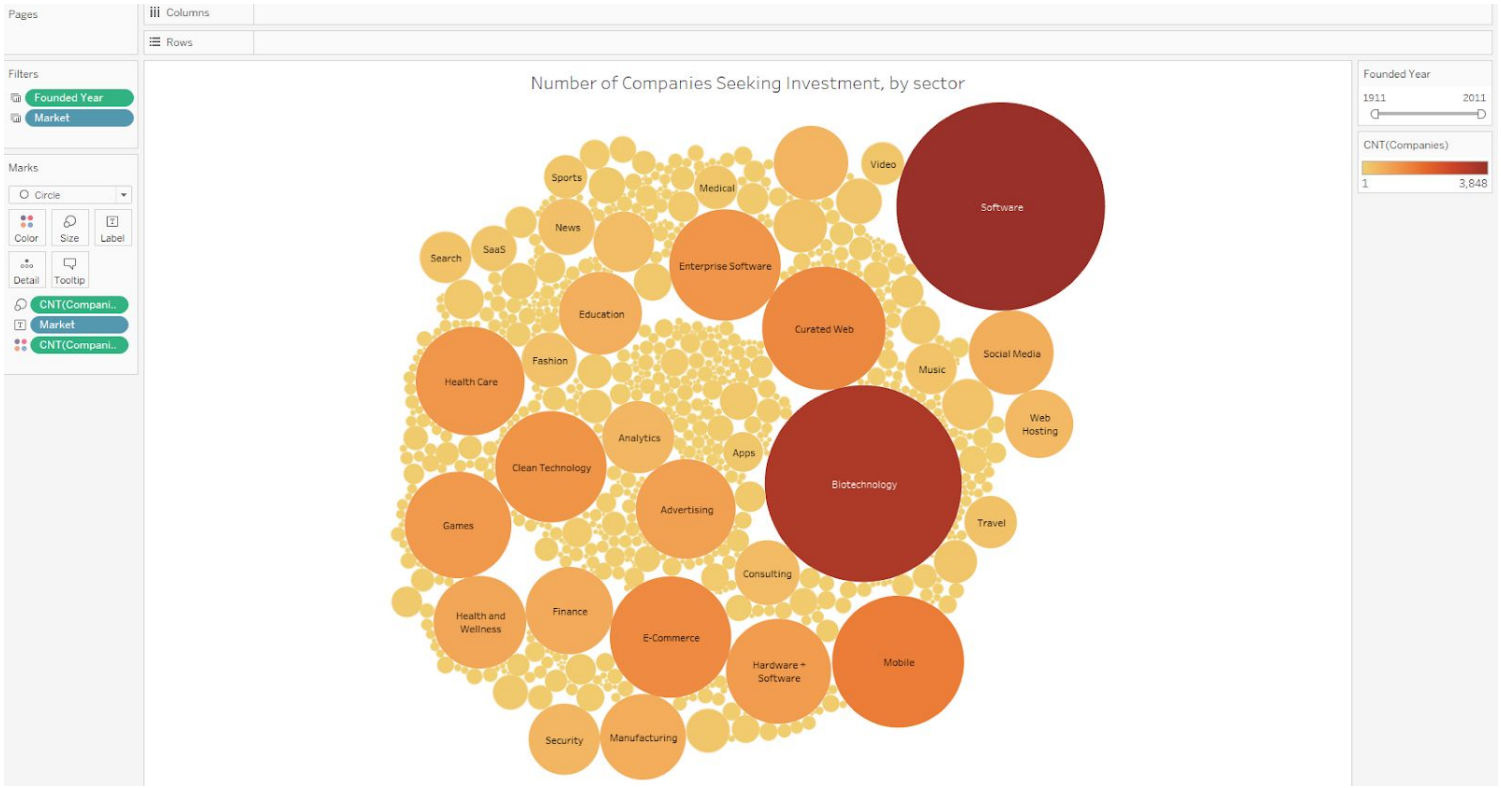


CONTRIBUTOR NAME: Anthony Guarnieri (50178491)

Audience: Investors, Start ups

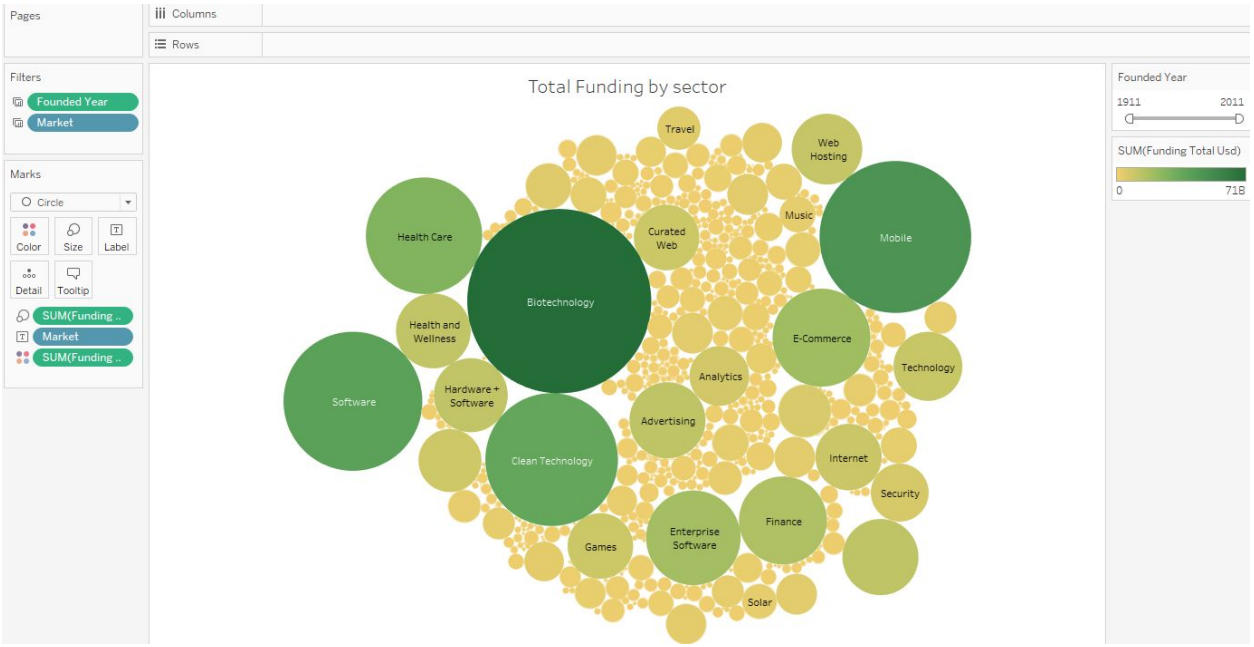
Target: Paint a picture of the landscape within different market segments regarding start up funding.

Sheet 1: *Number of Companies Seeking Investment, By Sector*



In this visualization I have used packed bubbles to illustrate the size of each industry. I chose to use packed bubbles for the first two visualizations because they are easy to understand and allow the viewer to easily compare the sizes of different segments.

Sheet 2: *Number of Companies Seeking Investment, By Sector*



This packed bubble graph is used to allow users to visualize the amount of funding other companies in a given industry are able to secure. This visualization is shown alongside the previous packed bubble graph in order to provide a comparison between the number of competitors and the amount of financial backing in those industries. We can conclude that the number of companies in an industry does not indicate the amount of funding in that industry.

Sheet 3: *Start-up Growth by Industry (# of Companies & Total Funding)*

This visualization is intended to allow investors to gauge the total amount of funding being awarded to start up companies in certain industries. You can filter by using the date range and wildcard search, or after searching you can select a single industry from the list of "markets" below.

The "Years" set is used to exclude companies which reported incorrect or null "Founded Years"
The "Market" set is used to exclude markets which do not have any recorded funding over the selected period.

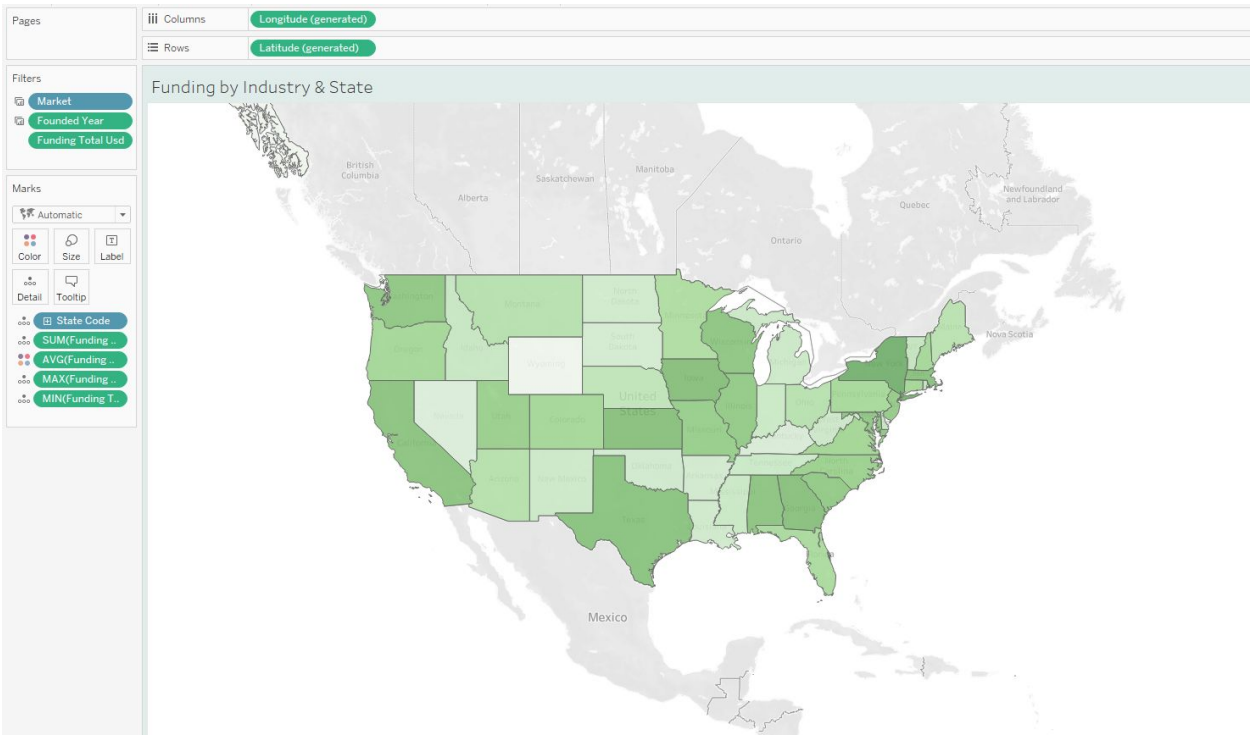
Sheet 4: *Years between Inception(Company Founded Date) and Funding Date*

This visualization is used to show the Maximum, Minimum and Average amount of time it takes a start up company to secure funding. The purpose of this visualization is to show investors the best times to invest in start-ups. They can use the **wildcard search feature** to filter by specific categories. We can also compare these figures to the likelihood of success in Phu's visualizations to find the optimal point in time to invest, or to seek funding.

The formula used to derive the number of years is:

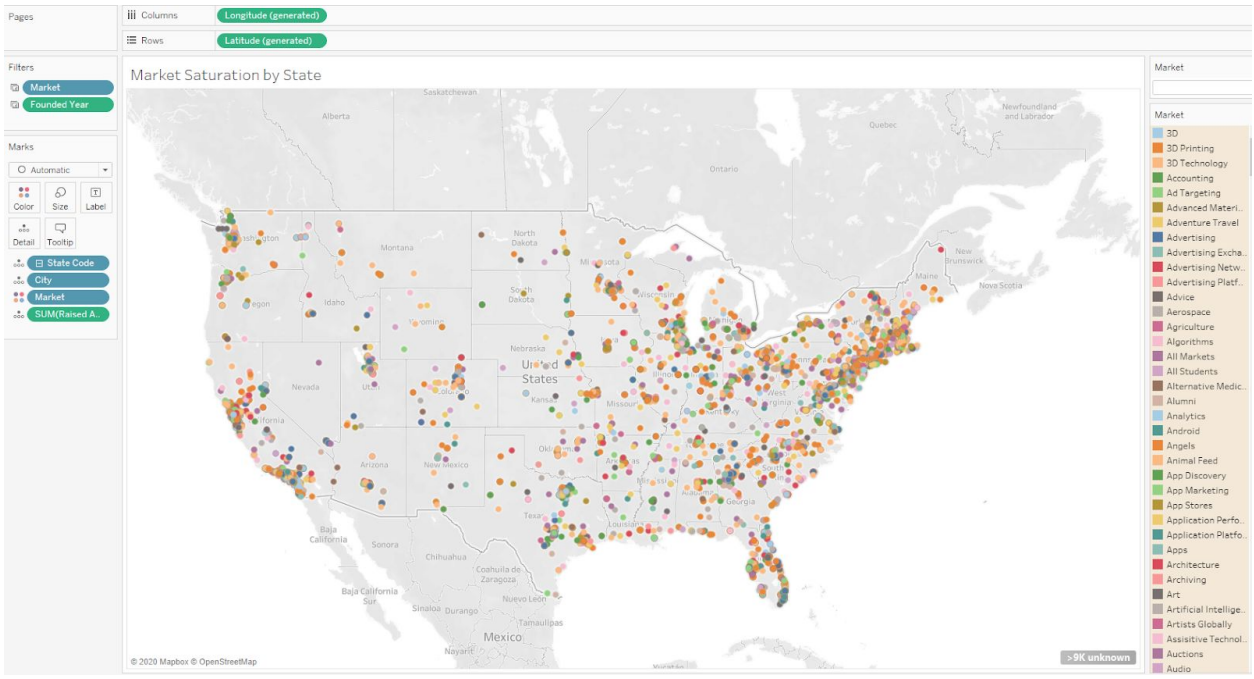
DATEPART('year', [First Funding At])-[Founded Year]

Sheet 5: *Funding by Industry & State*



This map is intended to show investors the typical amount invested in a specific industry in a different geographical area. This sheet is filtered by the wildcard search which is applied to all related pages. We can see the Average, Minimum, Maximum and Total funding for a specific industry in each state.

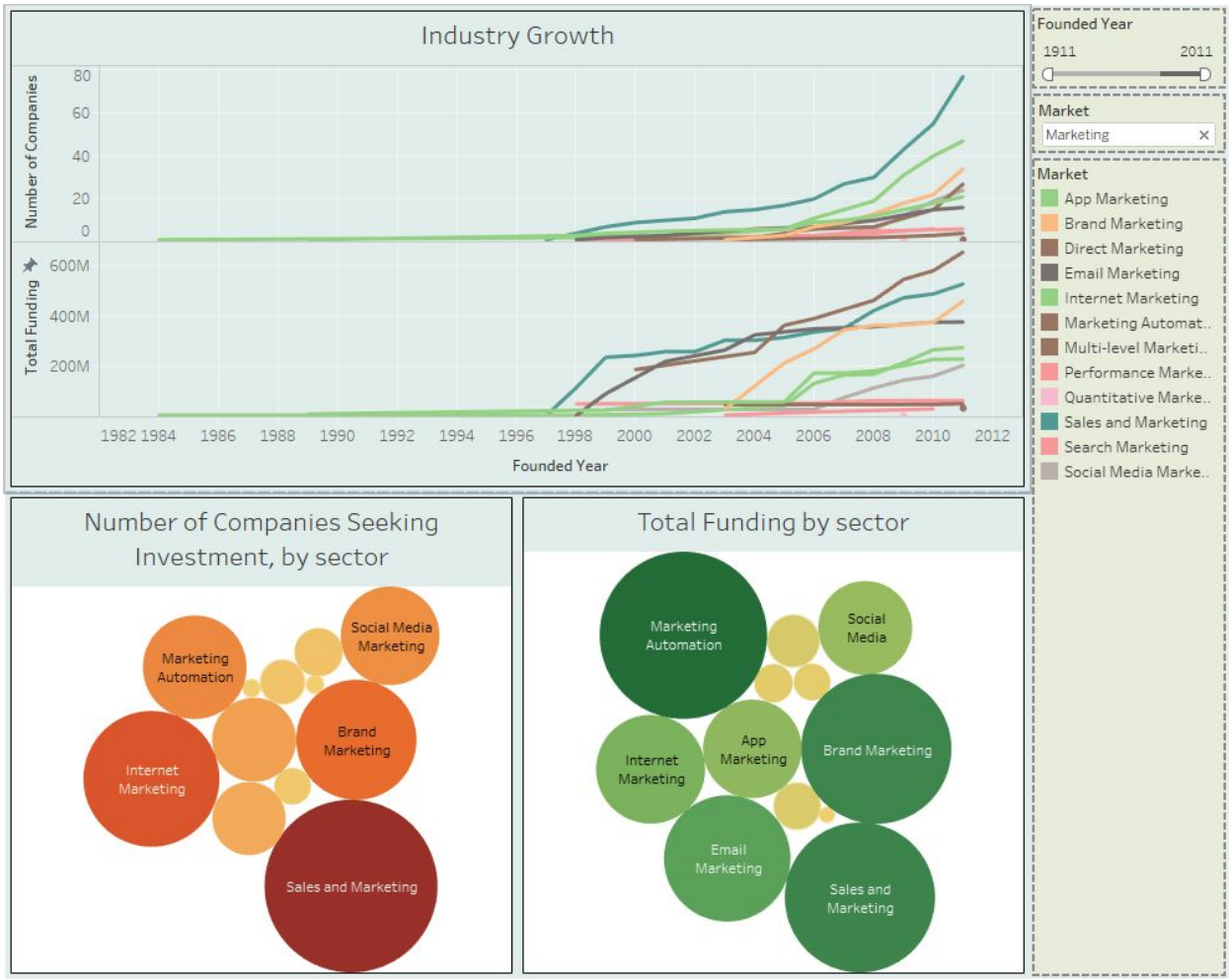
Sheet 6: *Market Saturation by State*



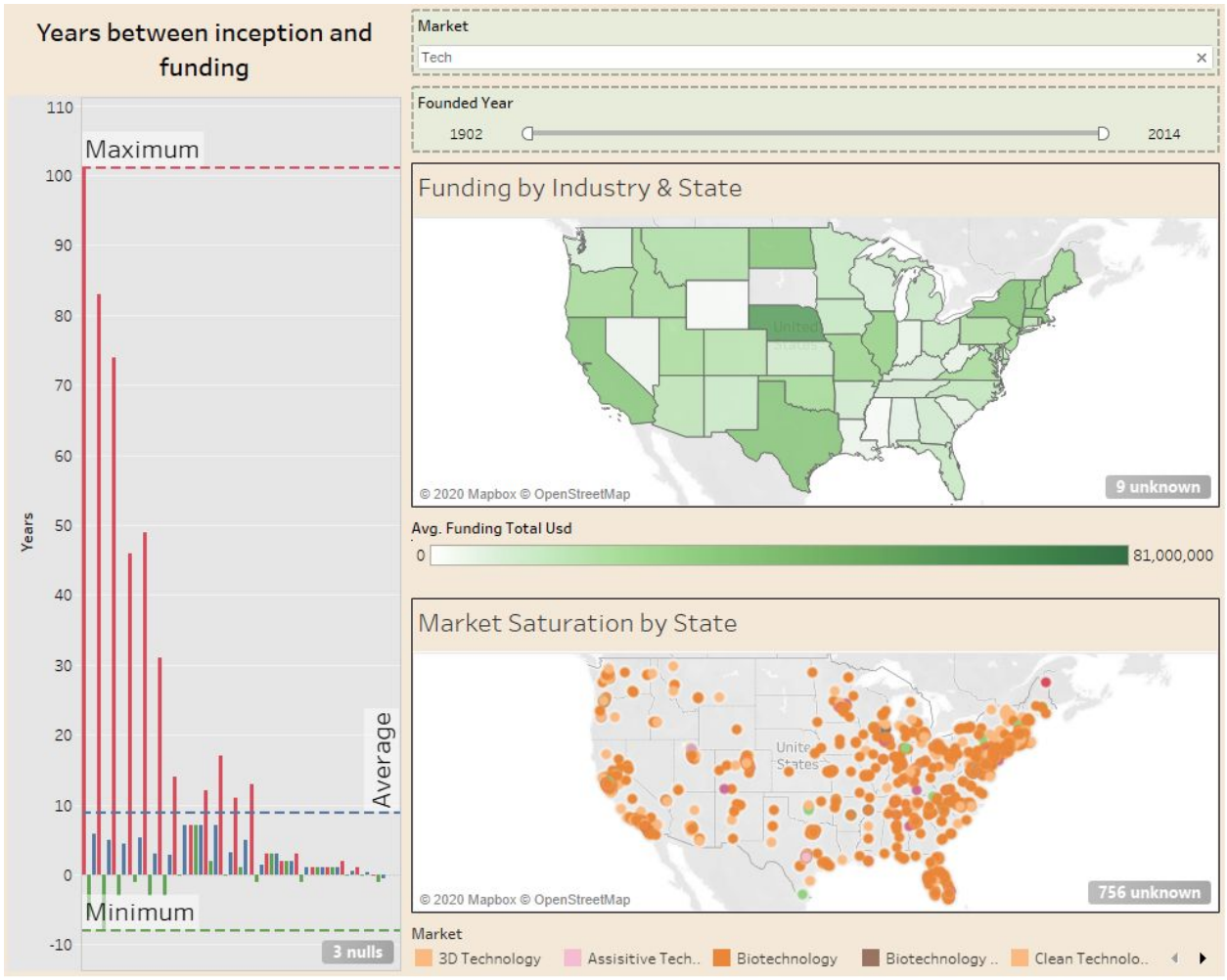
In this visualization we can look at competing start-up companies by geographical area, we can see how much funding these companies were able to receive in funding. This is particularly important to industries which provide services or have brick and mortar locations.

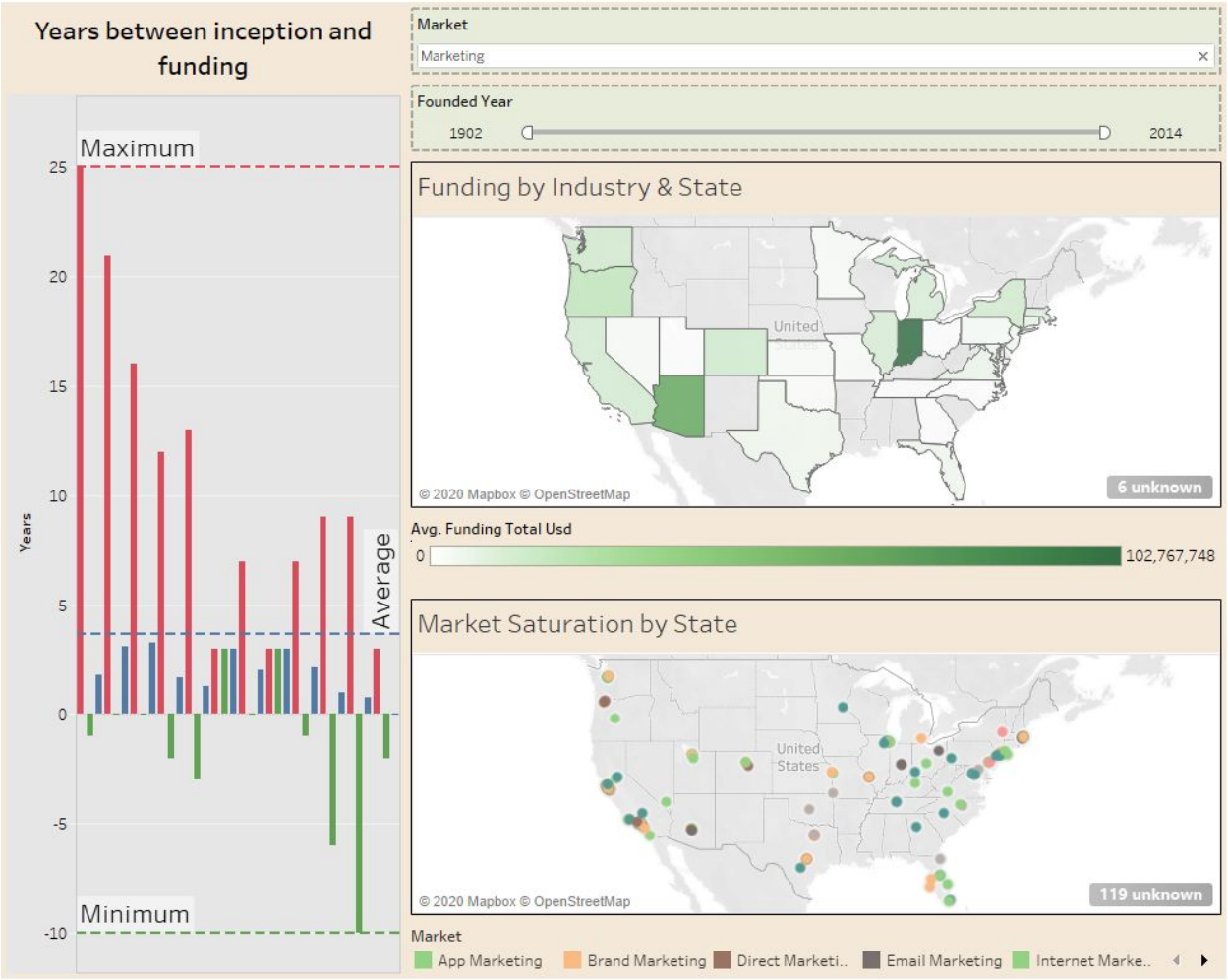
These sheets have been combined into two dashboards, which are then combined into a storyboard.

Dashboard 1: *Showing "Tech" companies only and then "Marketing" only.*


Industry Growth
Number of Companies
80
60
40
20
0
Total Funding
600M
400M
200M
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012
Founded Year
Founded Year
1911
2011
Market
Marketing
Market
App Marketing
Brand Marketing
Direct Marketing
Email Marketing
Internet Marketing
Marketing Automat..
Multi-level Marketi..
Performance Marke..
Quantitative Marke..
Sales and Marketing
Search Marketing
Social Media Marke..
Number of Companies Seeking Investment, by sector
Social Media Marketing
Marketing Automation
Brand Marketing
Internet Marketing
Sales and Marketing
Total Funding by sector
Marketing Automation
Social Media
Internet Marketing
App Marketing
Brand Marketing
Email Marketing
Sales and Marketing

Dashboard 2 : *Showing "Tech" companies only and then "Marketing" only*




Years between inception and funding
Maximum
Average
Minimum
Years
25
20
15
10
5
0
-5
-10
Market
Marketing
Founded Year
1902
2014
Funding by Industry & State
United States
© 2020 Mapbox © OpenStreetMap
6 unknown
Avg. Funding Total Usd
0
102,767,748
Market Saturation by State
United States
© 2020 Mapbox © OpenStreetMap
119 unknown
Market
App Marketing
Brand Marketing
Direct Marketi..
Email Marketing
Internet Marke..