**COMPARISON OF VIZ ENGINES:**

1. **Bokeh:**

It is open source software. Its license is Apache 2.0. According to the website: <https://bokeh.pydata.org/en/latest/>, its focus is *“to provide elegant, concise construction of versatile graphics, and to extend this capability with high-performance interactivity over very large or streaming datasets. Bokeh can help anyone who would like to quickly and easily create interactive plots, dashboards, and data applications.”.* Bokeh also has easy interactivity, as it is well known for interactive data visualisation.

**POSITIVES:**

* People can easily visualize data in an aesthetic, clear presentation with bokeh.
* You can create many complex, statistical plots via simple commands which adds to the easy interactivity.
* The results can be presented through various medium such as: html, notebook and server.
* It has the ability to easily and quickly transform visualization written in other libraries such as matplotlib, seaborn and ggplot.
* It is flexible enough in order to use interaction, layouts and various, numerous styling options to visualization.

**NEGATIVES:**

* It is still currently being developed upon and therefore, is constantly being improved. Therefore, despite writing code using the bokeh software now, in the future, in a couple of years, the code may not be reusable.
* When compared to other options such as D3.js, it appears to have relatively less visualization options.

1. **D3.js**

It is open source software. According to this website: <https://d3js.org>, *“D3.js is a JavaScript library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG, and CSS. D3’s emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.”.* D3.js, like Bokeh, has relatively easy interactivity, and it is also well known for powerful, interactive data visualisation.

**POSITIVES:**

* One of the advantages is that it functions on the web, and therefore many people can access and view the visualisations on the internet.
* Another advantage is the flexibility of the software, because it works flawlessly with already present web technologies and it also takes into account the built-in functionality which the browser already contains, and therefore this clearly makes the developer’s job easier, especially for interaction via the mouse.
* Furthermore, due to Mike Bostock’s really useful documentation, examples, community, etc. D3.js was easy to understand and use, or else many would have found it difficult and would’ve taken longer to get used to.

**NEGATIVES:**

* Older browsers aren’t always necessarily supported by D3.js and so sometimes the visualisations may not load properly.
* It has some limitations with data-source.
* It is hard for D3.js to try to hide the original data and therefore, it can be difficult to use if you don’t want others to view or share your original data.

1. **Idyll**

It is free and open source software. According to this website: <https://idyll-lang.org>, *“****Idyll****is a mark-up language and toolkit for writing interactive articles.’…‘Idyll uses web standards to produce output that will load quickly in any web browser and is fully extensible. Idyll enables collaboration between programmers and journalists, researchers and designers. Those familiar with JavaScript can write custom components using tools like D3 or React.”.* Like the other viz engines above, it has good, and easy interactivity.

**POSITIVES:**

* Since Idyll uses the same principles as markdown, which many may be familiar with, people will find it easy to use the same syntax.
* Furthermore, JavaScript can be used to improve the writing since special syntax gives you the opportunity to embed JavaScript in the text.
* It is easy for Idyll to easily control and show variables.

**NEGATIVES:**

* It is still being improved and developed on so therefore, the code written now, may not be reusable in a few years.
* Lack of tech/customer support, so issues may be hard to resolve immediately.

**Therefore all the above viz engines will make it easy to plot scatter plots due to the easy interactivity of each of the machines.**