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Essay (40%)

1. Performance Dashboard

To begin, a dashboard is a collection of **various resources** that have been gathered for the purpose of forming an integrated visual presentation.

A performance dashboard that turns an organization's strategy into specific **objectives, KPIs, projects, and activities** for each group and people inside the organization. This dashboard can be considered a **comprehensive company information system**, as it is based on business intelligence and data integration. Performance dashboards are **different** with standard dashboards and scorecards. Performance dashboards **provide real-time insights and information** that enables businesses to **make better decisions, optimize processes and strategies, and operate more pro-actively in the future**.

Performance dashboard **also communicates strategic objectives** and **helps businesses** to quantify, monitor, and control the critical actions and processes necessary to accomplish their objectives.

The real example of performance dashboard is, as a BINUS student, we use BinusMaya, and **BinusMaya has a dashboard for the homepage**. The Binusmaya's dashboard is the example of performance dashboard.

The performance dashboard has three key functions:

- ✓ **Track essential business processes and activities** to receive notifications when performance falls short of targets.
- ✓ **Analyze problems** by looking at them from multiple angles and levels of detail.
- ✓ **Manage people and processes** to improve decisions, performance, and direction.

Performance dashboards are used **for monitoring, analysis, and management**. They all come together in one place.

- **Monitoring** → provides quick access to information.
- **Analyze** → exception conditions and drill down to specifics

- **Improve** → management alignment, coordination, and collaboration

Below are some of the **benefits** that support that dashboard performance is important:

a. Better decision Making

With performance dashboards, executives and managers may create a better decision, since It will reflect various data gathered from multiple sources and blended to generate the primary and simple overview of company operations.

b. Communicate strategy

With this performance dashboard, we can transform a company's strategy into metrics, goals, and activities that are targeted to each group inside an organization, and occasionally to each individual.

c. Refine strategy

Executives utilize performance dashboards similar to a steering wheel to continuously fine-tune corporate strategy.

d. Increase visibility

In addition to gathering timely data, performance dashboards estimate future trends based on prior activities. This helps organizations avoid unanticipated difficulties that might harm their bottom line.

e. Increase coordination

Performance dashboards encourage cross-departmental collaboration and foster dialogue between managers and employees about how to improve performance.

f. Consistent view of the business

Incorporate common definitions, rules, and metrics into performance dashboards. As a result, managers and analysts no longer have to argue over whose version of the data is “right.”

Performance dashboard is divided into three:

a. Operational Dashboards

Utilized in operational management (front-liners workers). Later on, this dashboard will be used by employees to **manage and control operational processes within the company using continuously updated data**. The operational dashboard will place a **greater emphasis on monitoring** than on analysis and management.

The data contained in the performance dashboard is also **detailed and complete and in-depth**.

Example of Operational Dashboard:

Customer Service Operational Dashboard

(Sources: <https://www.datapine.com/blog/strategic-operational-analytical-tactical-dashboards/#operational-dashboard-example>)



In this example, the operational performance dashboard is used to track the customer service team's performance against the customer service KPIs. This performance dashboard illustrates the daily and monthly performance of the customer service department in terms of calls made. Thus, daily progress monitoring can be used **to ensure that Customer services remain on track and in line with actual performance.**

Operational dashboards are critical for **ensuring that a company's performance is optimized and that employees are aware of their progress and any changes that occur in real time.**

b. Tactical Dashboards

Used in tactical-level management (Analysts). The Tactical Dashboard will assist in **monitoring and managing departmental processes and projects** that will review and compare peer group performance across the company. In addition, tactical dashboards are also commonly used to **find out the cause of a problem or event.**

The tactical dashboard will **focus more on analysis** than monitoring and management.

The data used in the tactical dashboard is **not real-time data** and contains **more comparative analysis content, patterns or trends, performance evaluations.**

Example of Tactical Dashboard:
(Sources: BinusLibrary e-Thesis)



The above tactical dashboard aims to **analyze data, perform comparisons (compare), monthly data trends, find patterns, and evaluate credit card performance.**

c. Strategic Dashboards

Used in strategic-level management (Executive). The strategic dashboard aims to **monitor the implementation of strategic objectives.** In addition, the strategic dashboard is **useful for communicating strategy and reviewing performance at monthly/periodically strategy meetings or operational reviews.** Later, it can be used to make decisions or business opportunities, predict, and provide direction for the achievement of strategic goals.

In strategic dashboard, it's more emphasis in **management** to get strategy and review rather than monitoring and analysis.

The information presented is **not detailed** but presented briefly and concisely, nor is it real-time data.

Example of Strategic Dashboard

(Sources: <https://www.datapine.com/blog/strategic-operational-analytical-tactical-dashboards/#Strategic-dashboard-example>)



The above is a strategic dashboard regarding discussions related to Revenue and Customers in the first Quarter of 2016 that will be used by company executives to carry out future company management. With this performance dashboard, we can **find out the comparison of revenue and customers compared to the previous period which will certainly be useful for making management decisions for the next period.**

Resources:

Calzon, B. (2021, September 13). *Types of Dashboards: Strategic, Operational & Analytical*. BI Blog | Data Visualization & Analytics Blog | Datapine. <https://www.datapine.com/blog/strategic-operational-analytical-tactical-dashboards/>

Eckerson, W. (2010). *Performance Dashboards: Measuring, Monitoring, and Managing Your Business*. Wiley.

insightsoftware. (2015, September 30). *Deconstructing Performance Dashboards for Analytics*. <https://insightsoftware.com/encyclopedia/performance-dashboard/#:%7E:text=Performance%20dashboards%20are%20common%20management,needed%20to%20achieve%20business%20goals.>

Performance Dashboard overview /. (n.d.). Google Cloud. <https://cloud.google.com/network-intelligence-center/docs/performance-dashboard/concepts/overview>

Sebastian, F., Valeri, V., & Christopher, S. (2021). *ANALISA DAN PERANCANGAN PERFORMANCE DASHBOARD TERHADAP DATA KARTU KREDIT DI BANK XYZ*. Bina Nusantara Univeristy.

2. Right Set of Metrics in Dashboard

A metric is **a way of measuring something** like “new customers,” “average mean time between repairs,” or “total sales.”

Some of characteristics of efficient and right metrics are: **Specific, Measurable, Attainable, Relevant, Timely**

First, we must create **KPI Team** to help the understanding about organization needs and summarizing all the metrics they need. To create a performance dashboard that fit your requirements, we must first determine the most effective metrics. We can determine the appropriate metrics for your dashboard creation needs in several ways:

a. Gathering Requirement

- Normally, in order to choose the best metric, it is necessary to conduct a search for information especially with regard to the **dashboard's requirements**. This must be done in order to **create a list of the**

requirements for creating the dashboard. Thus, you can **ascertain which metrics are required**.

- Consider that if we do not have a list of requirements (not doing requirement gathering) when creating the dashboard, what is produced **may not match what the business expects** due to the use of the **incorrect metrics**.
- For example: when we require information regarding existing sales, we can contact the sales manager directly to obtain information promptly and precisely; this is obviously more effective and efficient, and the information provided is also certain to be accurate.

b. Validating Metrics

- After gathering requirements, present the performance to be measured and provide feedback.
- Nuances
 - Measuring the nuances of a business process can be difficult. So we made a presentation to validate the metrics. Next, **we can validate existing metrics when we do presentation to experts in their fields**, those who know them best can **provide feedback**.
 - If no feedback is given after an error, it can lead to major issues.
- For example: if me, as an analyst and want to ensure about the sales metrics, I can present the metrics performance to sales manager to get the feedback from the expert, sales manager. So that, later on the metrics I use will on track with what sales dept done.

c. Standardizing Terms

- Gaining Consensus
 - The most difficult aspect of metrics is **defining the broad terms upon which they are based**.
 - The challenges of standardization increase with **the project scope and the number of departments supported**. This happens because **different departments use the same term**.
 - ✓ Similarly, "sale" in finance refers to payments received and deposited in the bank; "sale" in sales refers to buyer purchase orders; "sale" in marketing refers to credit card payments, "sale" in promotion refers specific discount on a product.
 - In this case, it is very important for an organization to use the standardized terms so that **the metrics they get are correct**.
- CEO Intervention
 - To solve the problems, we also can make a meeting with CEO to point out the standardized terms for the whole department in the organization.

d. Collecting Data

- When gathering data for the dashboard, the **team must ensure** that the data is not corrupted, redundant, inconsistent, or of poor quality.

- If the team comes across data that meets these criteria, it can begin data reconditioning or developing a new system; however, if the data is unnecessary, it can be removed from the system.

e. Setting Target

- Target shouldn't be too difficult or too easy to discourage employees.
- Setting target can be done after getting buy-in.
- For example, the **Sales Department** can establish a sales success target and a customer satisfaction score target, both of which can be measured numerically.

f. Calculating Metrics

- Some metrics are complex, combining data from multiple sources.
- Dashboards also often display metrics over time and variances.
- For example, to calculate a product's total revenue, you must combine sales (productid, purchase quantity) and product (price) data.

Example with a simple Case Study:

A sales forecast and how marketing strategy affects sales are requested by an executive. So, here's how to get the right and efficient metrics to add in the dashboard:

1. Conduct a **requirements gathering by doing interview** with staff/managers to learn about business processes and metrics. (e.g: the result of requirement the organization wanted to know the effect of marketing strategy (especially Facebook Ads) to sales in 2020-present)
2. **Make survey** distribution to get staff feedback.
3. **Prioritize the metrics** in order of importance, e.g. if we already collect 25 metrics from survey, we can prioritize from 1 – 25 and can reduce some of metrics that we think is not that important (like if some of the survey answered phone number is important for sales and marketing process, however we think that it's not important,, we can reduce it)
4. **Validate metrics** to ensure they are appropriate. Presenting or communicating to experts for feedback on the metrics used for validation. Talk to the sales head or the sales manager, and talk to marketing head or marketing manager if you want to talk about marketing.
5. **Standardize terminology**. As we all know, terminology varies between departments. To avoid confusion, it is possible to equate terminology. When customers place orders, the term sale is used, but it is used differently in marketing and promotion.
6. Gather data to support metrics. **Data collection must be flawless**, with no defects, damage, or other issues. If such data is found, the team must be able to recondition it or scrap it if it is not primary. This ensures accurate metric results for the dashboard.
7. Next, choose a target. **The KPI team can choose a target** after consulting with the staff, resulting **in a fair and objective target**. We cannot set targets of 1000 if the average current sales are 100 sales per day.

8. **Calculating metrics is possible if there is complex data from multiple sources or if periodically**, such as the total revenue generated by a sale or the average sales success of an advertisement.

So, after that we can conclude the metrics. Such as:

- The engagement of facebook ads from 2020
- The number of client buy the product from Facebook ads from 2020
- Sales rate per day start from 2020
- Etc.

Resources:

Eckerson, W. (2010). *Performance Dashboards: Measuring, Monitoring, and Managing Your Business*. Wiley.

KPIs, Dashboards and Operational Metrics: A Guideline. (n.d.). Klipfolio.Com. <https://www.klipfolio.com/resources/articles/kpi-dashboard-operational-metrics-top-10-guidelines>

Metrics Dashboard Examples. (n.d.). Inet Soft. https://www.inetsoft.com/products/metrics_dashboard_examples/

Thomas Gonzalez — BrightPoint Consulting. (2021, December 11). Dashboard Design: Key Performance Indicators and Metrics. Medium. <https://towardsdatascience.com/dashboard-design-key-performance-indicators-and-metrics-2b13745f5b2f>

3. Primary Goals and Challenge of Dashboard Design

In my point of view, Dashboard Design is about how the dashboard look and feel on intuitive to use and visually appealing. It's about what users can see and do. The goal of dashboard design is to **communicate data meaning**, not to create something pretty.

a. Goals of Dashboard Design

With a dashboard design that **allows users to quickly access relevant and actionable data**, users **can speed up decision making and take prompt action.**

Consider this: if an executive wants to track customer satisfaction with the sale of goods, but **the dashboard layout that is displayed has too many color variations and the placement is sloppy**, it will be difficult for the executive to find out. Instead of using the dashboard, the executive can take other steps to obtain that information.

Furthermore, the goal of this dashboard design is to ensure that **all of the data in the performance dashboard is properly conveyed in order to solve business problems**. This occurs because the dashboard design will be able to lay out all of the previously visualized data into a single unit that can provide and convey one to many insights required by the company.

b. Challenges of Dashboard Design

One of its most difficult challenges is that **not all report designers have a solid understanding of design principles**. As a result, the dashboard design is based on one's own instincts, supplemented by feedback from other users. In this case, it

can be interpreted that both parties lack a strong understanding of visual design principles. Due to a lack of knowledge of good design principles, **the resulting results may fall short of expectations, such as a display that is actually complicated, cluttered, and so on.**

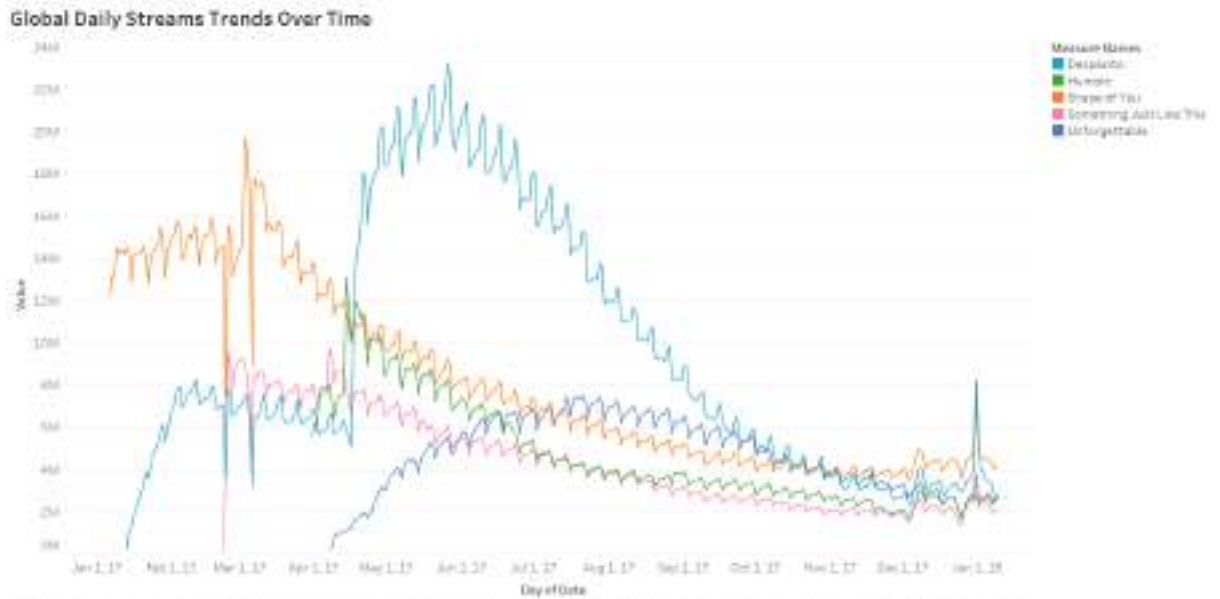
Another issue that I believe exists is the fact that **each user has different preferences.** It is undeniable that everyone has a unique sense of style or appearance. There are those who prefer the physical appearance, and those who prefer the digital display. There are those who prefer a monochrome design, while others prefer a colorful appearance. Of course, creating interactive dashboard designs that provide users with the best experience in interpreting the data in the dashboard is a challenge in and of itself.

Layout and placement of elements on the board is also a challenge in my opinion. This is due to the fact that if it is misplaced, it can lead to misinterpretation or make it difficult for the user to understand. *For example*, if the title in a sales bar chart is misplaced (near the customer satisfaction pie chart), the user may misinterpret the existing data.

Resources:

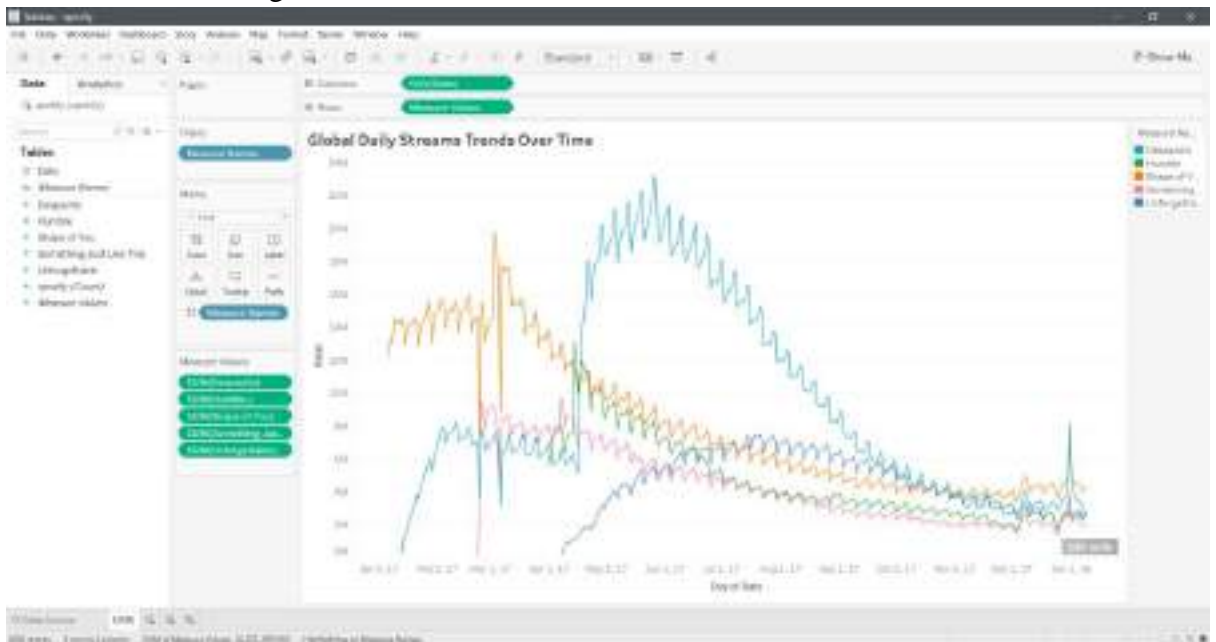
- Dashboard methodology to help you achieve your goals. (n.d.). Geckoboard.
<https://www.geckoboard.com/best-practice/methodology/>
- Eckerson, W. (2010). *Performance Dashboards: Measuring, Monitoring, and Managing Your Business*. Wiley.
- Thomas Gonzalez — BrightPoint Consulting. (2021b, December 11). Dashboard Design: Key Performance Indicators and Metrics. Medium.
<https://towardsdatascience.com/dashboard-design-key-performance-indicators-and-metrics-2b13745f5b2f>

1. Line Chart



The trends of Despacito, Humble, Shape of You, Something Just Like This and Unforgettable for July Day. Color shows details about Despacito, Humble, Shape of You, Something Just Like This and Unforgettable.

Screenshot of making on the tableau:



The above Line Chart depicts Daily Streams in five songs: Despacito, Humble, Shape of You, Something Just Like This, and Unforgettable. Because of the various song release dates, each line has a different start date.

Despacito's song reached its peak on May 26, 2017 with a total of 23,218,183 streams. This is the highest daily streaming number for the 2017/2018 season. Despite a sharp decline, Despacito was able to hold the highest peak among other songs on December 31, 2017 with a total of 8,203,454 streams.

Shape of you, on the other hand, which was the first release among the others, experienced a fairly large decline and had unstable daily streaming numbers from

around March to April. The line chart, which looks like a chasm, demonstrates this. Following that, the number of streams per day gradually decreased. However, it managed to top the most total streams per day at the end of the period, on January 9, 2018.

Humble had a large number of streams at the time of its initial release, but this only lasted a short time before decreasing.

Something Like This experienced a relatively high increase on the second day of release and tended not to experience much increase/decrease in the early months of release, but it decreased after that.

Unforgettable, experienced an increase in the number of streams per day that tended to be stable and experienced a slight decrease until the period's end.

2. Flight Delays

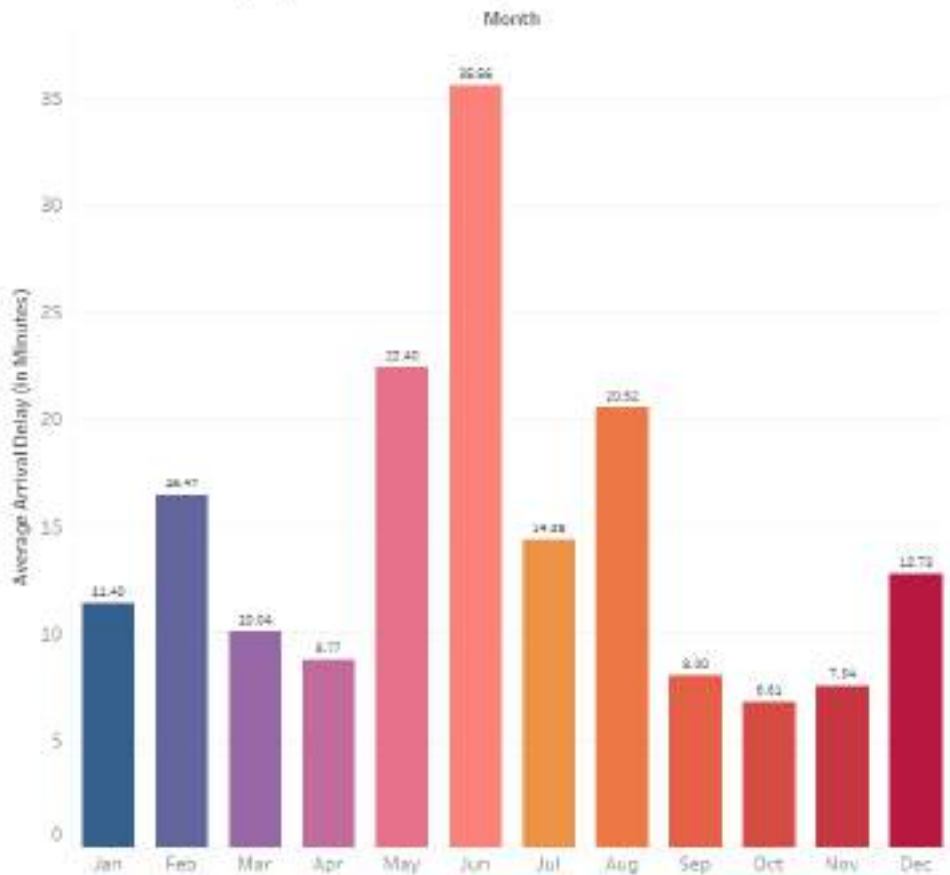
Notes: I use **avg** for the measure in this visualization. Since, from the question, it's stated that we have to visualize the average and to prevent if there's double data for the same airlines in a month.

However, in my opinion, we also can use sum for the measure for this case, as the question already stated that all the data already the average of arrival delays for each airline in different month (so it's doesn't really matter either we use avg or sum since only 1 data for ea airlines in every month)

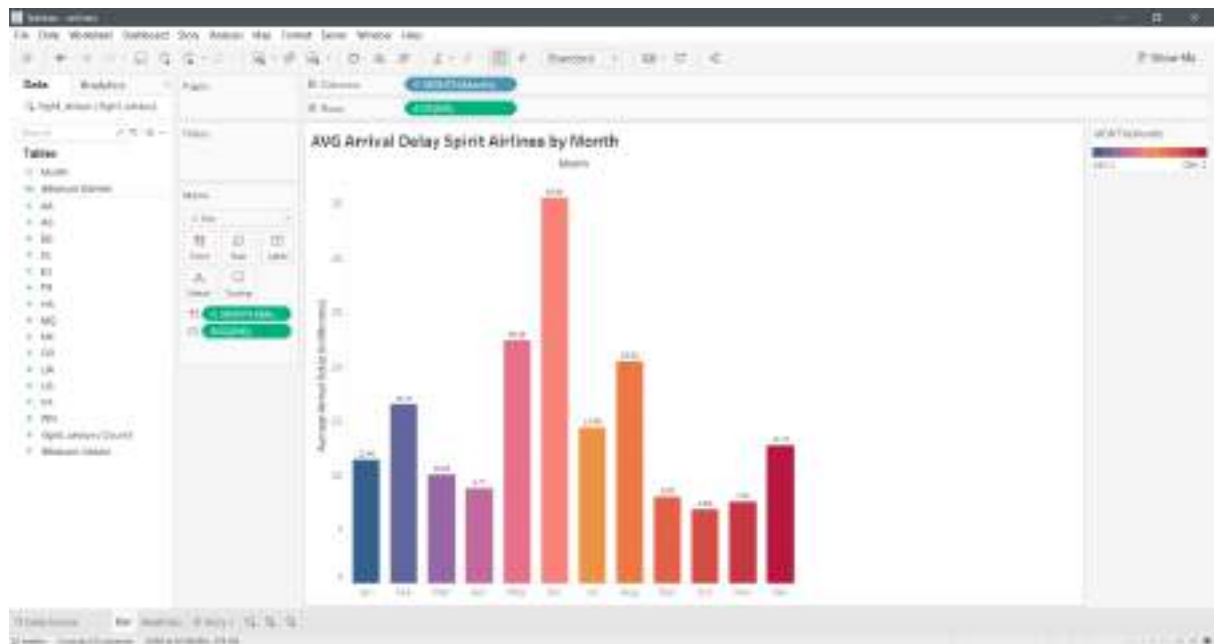
I also change the month data type (from integer) to Date because it's more correct if we use Date. Month is represented as date, if we use Date we can change the format to month name (full/short name) etc.

a. Bar Chart

AVG Arrival Delay Spirit Airlines by Month



Screenshot of making on the tableau:



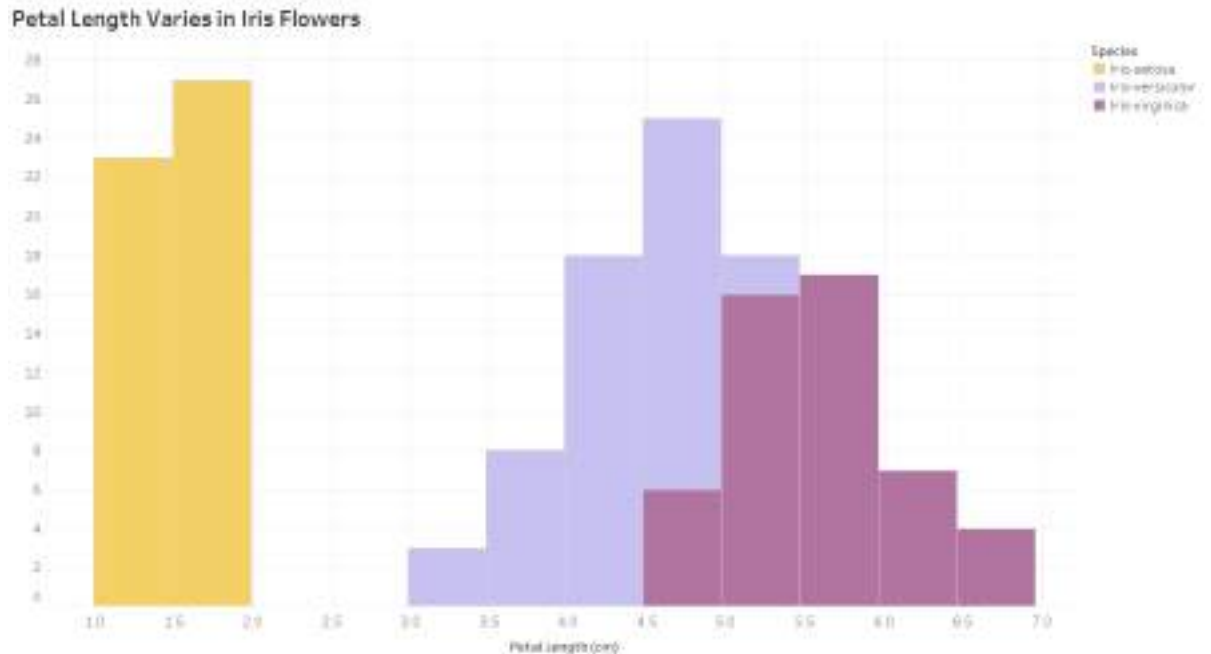
According to this bar chart, the month of **June** had the **highest average arrival delay, which was 35.56 minutes** on average. In addition, the month of **October** had the **shortest time, 6.81 minutes**. Additionally, it can be seen that NK experiences arrival delays on a monthly basis, with an average delay of more than 5 minutes.

b. Heatmap

Heatmap references: <https://datavizproject.com/data-type/heat-map/>

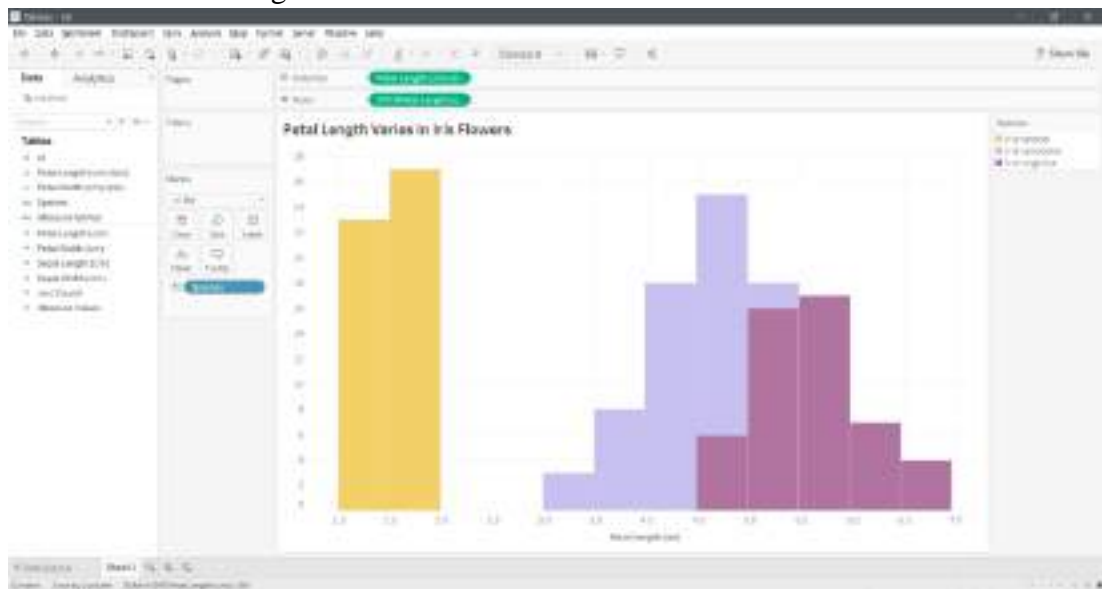


If I use the **default BIN (no edit size)**, here's the result (dibedakan warna per spesiesnya):

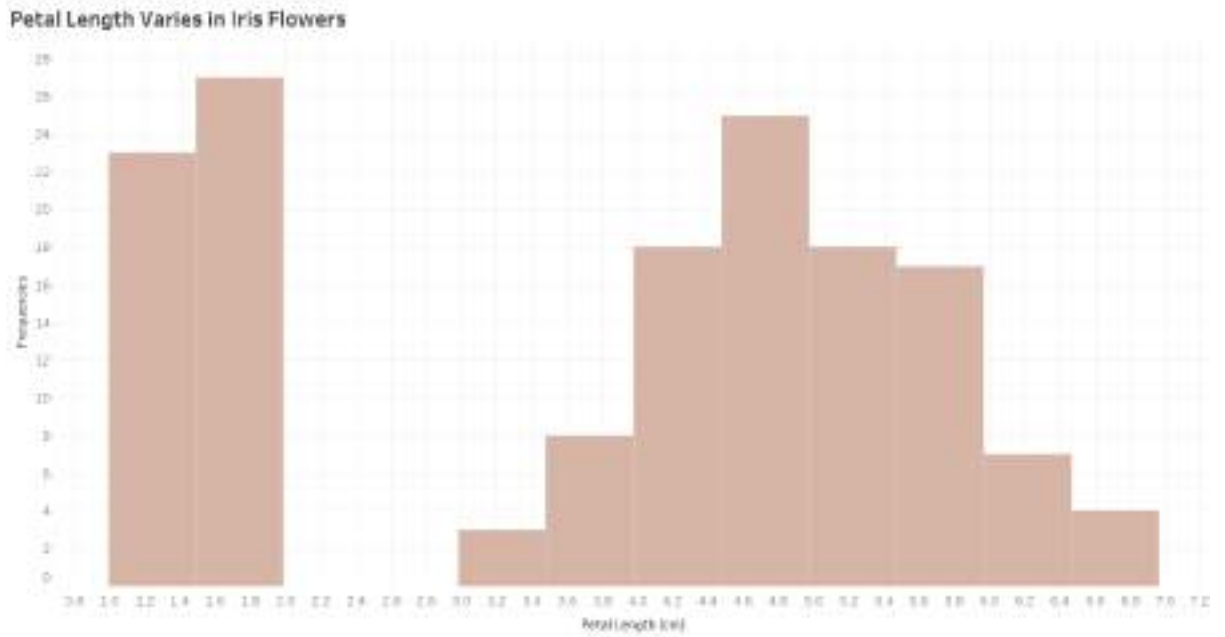


The plot of count of Petal Length (cm) for Petal Length (cm) (Bin). Color shows details about Species.

Screenshot of making on the tableau:

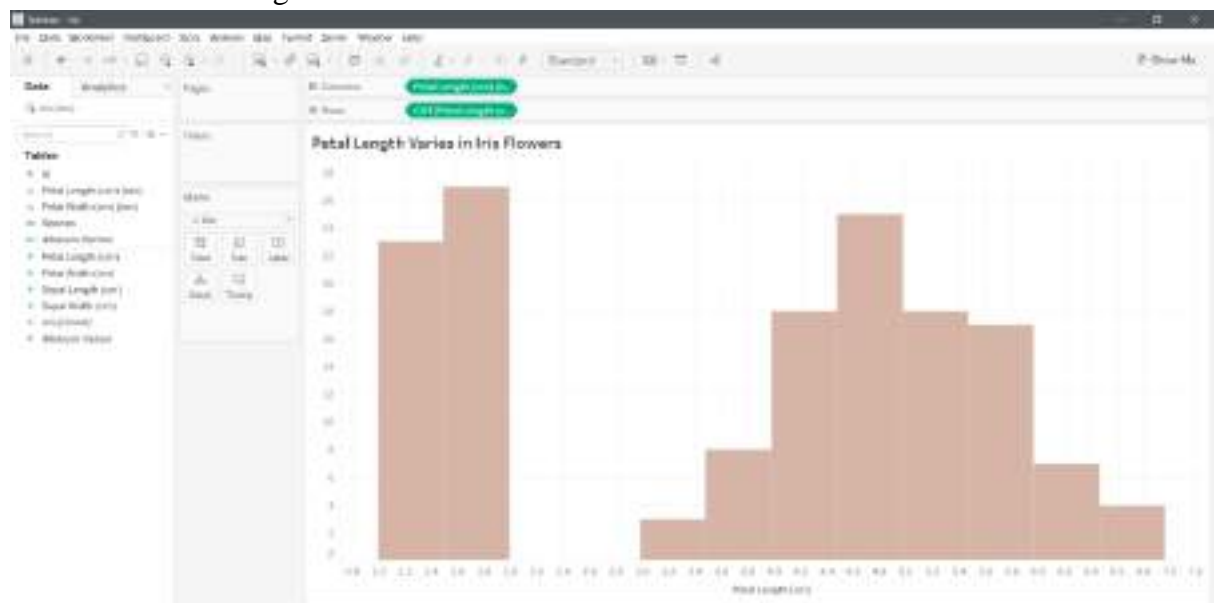


If I use the **default BIN (no edit size)**, here's the result (secara keseluruhan, tanpa membedakan warna untuk spesiesnya):

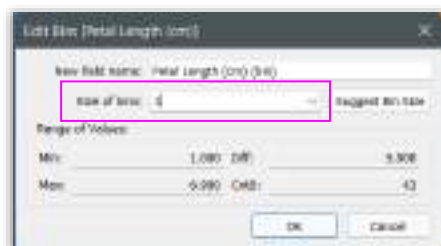


The bin count of Petal Length for Petal Length (cm).

Screenshot of making on the tableau:



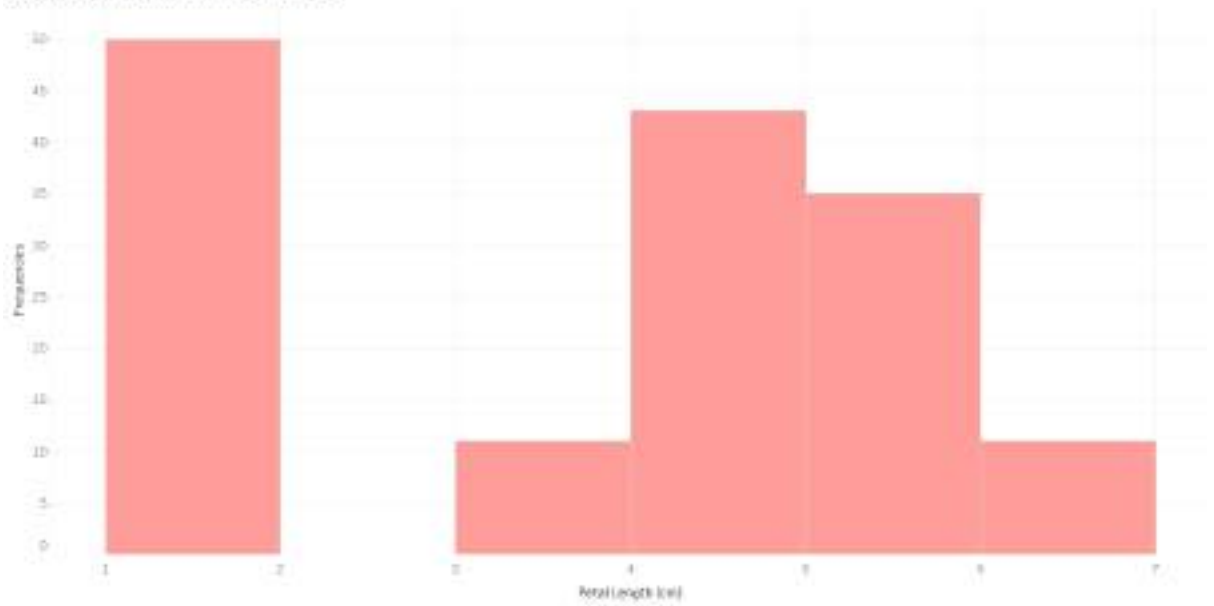
Then, for the bin, you can choose the desired size of bins by right-clicking on the bin dimension, selecting edit, and then changing the setting to "Size of Bins."



As a result, here's the histogram with range of 1 (pembulatan dilakukan ke bawah, apabila 1.9 maka masuk ke 1):

(disamakan semua spesies jadi 1)

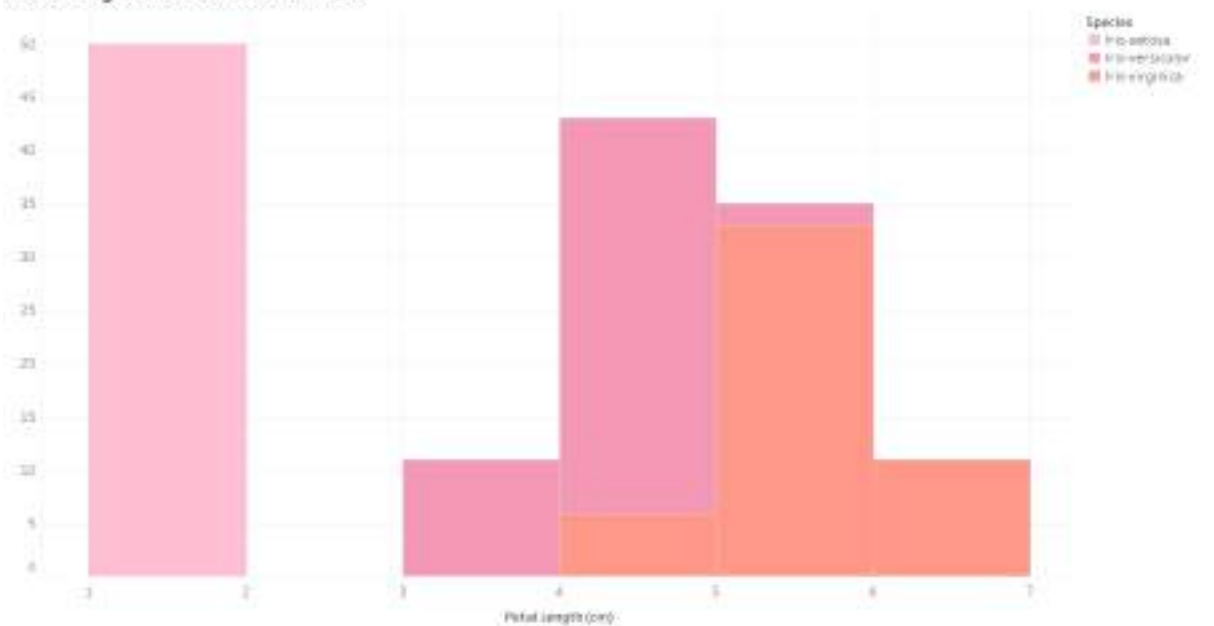
Petal Length Varies in Iris Flowers



The transformation of Petal Length for Petal Length (cm).

(dibedakan warna perspesies)

Petal Length Varies in Iris Flowers

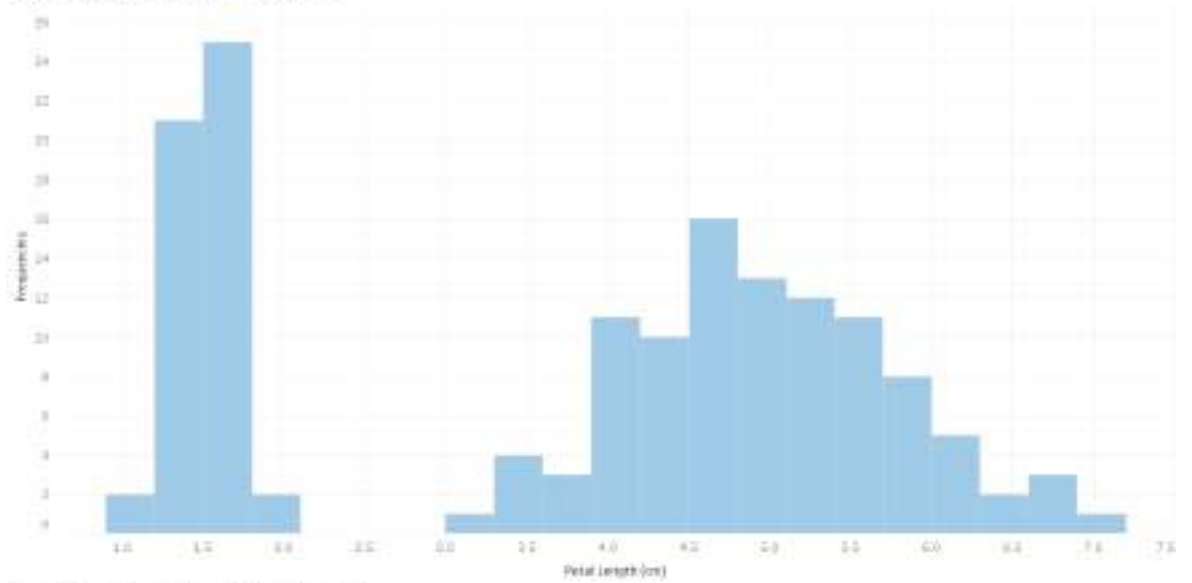


The plot of count of Petal Length (cm) for Petal Length (cm) (cm). Color shows details about Species.

If the size of bins is reduced, 0.3 then the result is:

(disamakan semua spesies jadi 1)

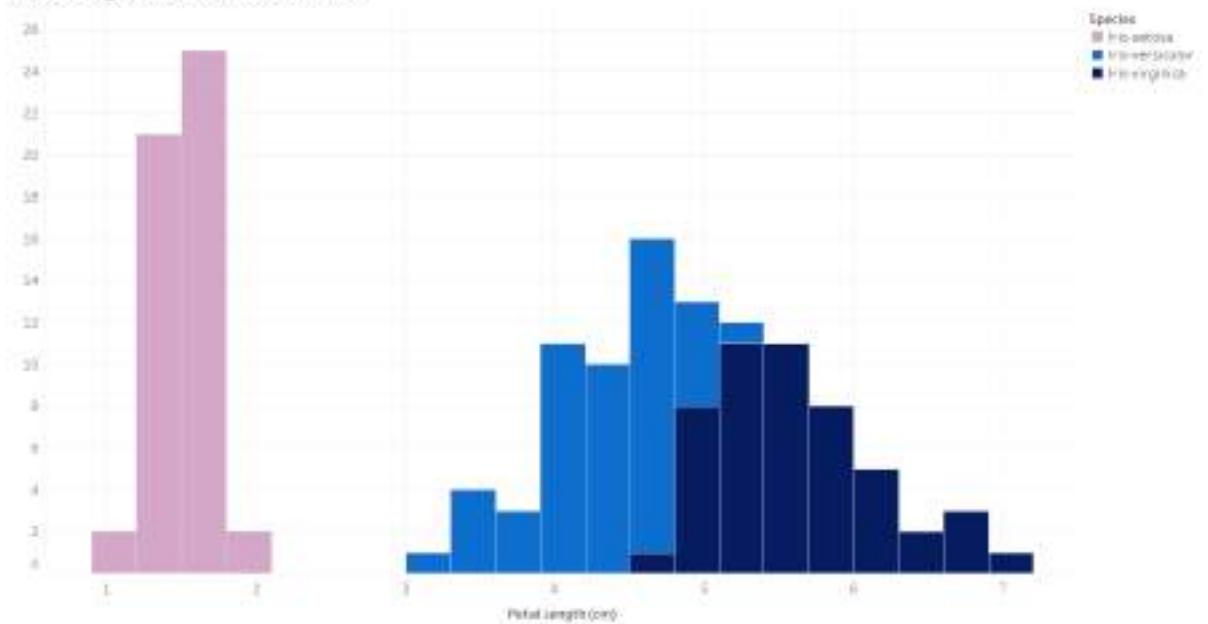
Petal Length Varies in Iris Flowers



The trend (counts) of Petal Length (cm) for Petal Length (cm) >= 0.

(dibedakan warna perspecies)

Petal Length Varies in Iris Flowers



The plot of count of Petal Length (cm) for Petal Length (cm) >= 0. Color shows details about Species.