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Data 6560: Sports Analytics

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Checkpoint #8

Analysis of NFL Quarterback's Success Indicators and the Correlation to Team Success

Title & Stakeholder: An Analysis of NFL Quarterback's Success Indicators and the Correlation to Team Success, prepared by Luke Maloney and Paul Tortora, aims to break down recent NFL quarterback passing statistics and show how impactful this is towards a team's winning totals. The results are driven towards the primary stakeholders of players, coaches, front office members and of course fans. These indicators should help identify positive and negative traits and trends to better help team's, players and even fans, strategize towards more wins in a given year.

Problem & Decision: How relevant are QB passing stats towards actual wins; i.e. how many additional wins do each of these statistics provide for a given team in a given year. By analyzing our findings we will be able to then help stakeholders make a better decision towards quarterback play strategy. Or in other words, they can see that having a higher QBR or yards per attempt is actually more impactful than passer rating.

Data in One Line: In the snippet below we can provide a look at some findings. For the 2020-2021 season, we see each row representing a single QB's performance of that year. Each column distinguishes the individual stats we analyzed and at the right we can see the total R-squared values for each stat for all the QB's that year. In this we can see that the most impactful stat was Passer Rating.

| Player | Team | Cmp% | Y/A | Rate | QBR | W | Category | R2 |
|-------------------|------|------|-----|-------|------|----|----------|------|
| Matt Ryan | ATL | 65 | 7.3 | 93.3 | 59.8 | 4 | WAS | 7 |
| Kyler Murray | AZ | 67.2 | 7.1 | 94.3 | 61.9 | 8 | | 0.05 |
| Lamar Jackson | BAL | 64.4 | 7.3 | 99.3 | 67.3 | 11 | | 0.03 |
| Josh Allen | BUF | 69.2 | 7.9 | 107.2 | 76.6 | 13 | | 0.15 |
| Teddy Bridgewater | CAR | 69.1 | 7.6 | 92.1 | 56.8 | 5 | | 0.25 |
| Mitchell Trubisky | CHI | 67 | 6.9 | 93.5 | 53.8 | 8 | | |
| Joe Burrow | CIN | 65.3 | 6.7 | 89.8 | 48.5 | 4 | | |
| Baker Mayfield | CLE | 62.8 | 7.3 | 95.9 | 65.5 | 11 | | |

Approach in

One Line:

During CP6 & CP7 we decided to focus on linear regressions to look at each year by year QB performance and how that correlated to an additional win; or for underperformers how many wins they didn't achieve. We predicted that these stats would in fact be a bit more relevant than they seem to show, however, it did also help emphasize our previous thoughts in that QB passing stats are indeed relevant but there are additional performance stats, mainly team ones, that aren't included that are also impactful towards team wins and overall performance.

Key Result:

In the table below we can see the compiled results, formatted via a heat map as well, that shows that the most relevant QB statistic as it relates to team wins is in fact QBR! With both Y/A and Comp% being equally relevant but the least impactful. Overall, if teams want to win more then make sure your QBR is as high as possible.

| Annual R2 Per QB Passing Category | | | | |
|-----------------------------------|--------|------|------|------|
| Year | Comp % | Y/A | Rate | QBR |
| 2015 | 0.00 | 0.10 | 0.06 | 0.22 |
| 2016 | 0.23 | 0.15 | 0.31 | 0.40 |
| 2017 | 0.17 | 0.01 | 0.08 | 0.15 |
| 2018 | 0.14 | 0.07 | 0.25 | 0.35 |
| 2019 | 0.15 | 0.08 | 0.30 | 0.21 |
| 2020 | 0.05 | 0.03 | 0.15 | 0.25 |
| 2021 | 0.24 | 0.27 | 0.44 | 0.59 |
| 2022 | 0.14 | 0.14 | 0.30 | 0.21 |
| 2023 | 0.26 | 0.50 | 0.48 | 0.43 |
| 2024 | 0.23 | 0.21 | 0.35 | 0.25 |
| AVG | 0.16 | 0.16 | 0.27 | 0.31 |

One Key Exhibit:

In the table below, we are able to exemplify our findings in both the consistencies and outliers. We see that when looking at last year's statistics organized by QBR, the resounding trend is that the team's with the highest QBR also have the highest wins, with some as high as 15 in a regular season! If team's focus on QBR, more wins should come.

| Player | Team | Cmp% | Y/A | Rate | QBR | Team | W |
|----------------|------|------|-----|-------|------|------|----|
| Lamar Jackson | BAL | 66.7 | 8.8 | 119.6 | 74.8 | BAL | 12 |
| Josh Allen | BUF | 63.6 | 7.7 | 101.4 | 74.8 | BUF | 13 |
| Joe Burrow | CIN | 70.6 | 7.5 | 108.5 | 72.1 | CIN | 9 |
| Jayden Daniels | WAS | 69 | 7.4 | 100.1 | 67.7 | WAS | 12 |
| Jordan Love | GB | 63.1 | 8 | 96.7 | 66.3 | GB | 11 |
| Jared Goff | DET | 72.4 | 8.6 | 111.8 | 65.4 | DET | 15 |
| Brock Purdy | SF | 65.9 | 8.5 | 96.1 | 64.8 | SF | 6 |

Recommendation:

If a team wants to increase their chances of winning and possibly reaching and taking home the Superbowl, they should focus on increasing their QBR, as that statistic is most directly tied towards a team's overall number of wins.

Risks and Limits:

In terms of this study, there are a few risks and limitations that should be known. In some rare cases, there were teams with two quarterbacks in the top 32, and there were teams with none. Because of that, some teams were overrepresented, and some teams were underrepresented. On top of that, there are also several other factors that might affect a QB's play. These factors include, but are not limited to, a QB's: wide receivers, running backs, offensive line, and coaches. Although a QB's performance does have a lot to do with how many wins a team has, there are other factors that also impact the QB. At the end of the day, it truly is interesting to see all the different variables that go into not just a QB's performance, but a team winning a game as well.

Next Steps:

In terms of next steps, it is very important to have our GitHub and README organized so it can properly tell our story. Checkpoints need to have a consistent name, they need to be in order, and any Excel files that were used need to be included as well. After all documents and spreadsheets are gathered, they should be double checked and cleaned one more time for grammar, accuracy, flow, correlation, and professionalism. On top of that, we need to make sure our original questions/problems are answered in our final product. After gathering all the final essentials and cleaning them, the portfolio should be good to go for Professor Gadze's review!