Six Sigma Evaluation of Ritz Theater

Group 10

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# Introduction

## History and Requirements

The Ritz Theatre was first established in 1925 and is located in downtown Winter Haven. The original name of the establishment was “Williamson” before it changed ownership and was then renamed to “The Ritz.”

The Ritz Theatre management aims to find the baseline metrics of the venue’s performance during the year of 2017 to help initiate a series of improvements to preserve the historic theater. As a Six Sigma team, we will be analyzing the revenue data given to us along with other variables to see how they are affecting these numbers. We can then determine what data is relevant to the business and how they can improve upon the process.

## Project Charter

* Project Details and Personnel
  + Project Leader: Isaiah Sarria
  + Project Champion: Owen Telis
  + Process Owner: General Manager of the Ritz
  + Location: Ritz Theater, Winter Haven
  + Project Number: JAN2018\_RITZ
  + Sponsor: Mayor and Chamber of Commerce of Winter Haven
  + Mentor: Sravani Vadlamani
  + Additional Resources: Coke supplier, Pepsi supplier, popcorn supplier, performers, film distributors, Social Media Manager
* Business Unit or Process
  + The venue hosts live performances or films and sells food and beverages for guests as they enjoy the ongoing entertainment.
* Problem Statement
  + The theater needs aid in the decision-making process of whether they should host live performances or films to sustain and increase guests purchasing tickets. We need to determine which of these variables are statistically important to total revenue: temperature, weather, popcorn revenue, beverage revenue, beverage type, day, month, and show type.
* Project Scope
  + From 2017 and onward this will be a continuous effort to improve and ensure sustainability at the historic venue of the Ritz Theater in Winter Haven, FL.
* Project Benefits
  + Sales revenue may be increased, initiate improvements to secure sustainability, and more people will be introduced to the valuable culture and history of the venue via the entertainment provided.

## Communication Plan

* Program Update - Leadership
  + Consists of a weekly meeting with the Six Sigma team, mayor of Winter Haven, Chamber of Commerce of Winter Haven representative, and the General Manager of the Ritz via in person and is also complemented with emails. Every Tuesday at 7:00am EST, we will meet to discuss program status on active projects and keep the team updated on the funding, task at hand and prioritize tasks.
* Supplier Meetings
  + Consists of meetings scheduled as needed with the suppliers of Coke, Pepsi, and concessions (popcorn) via phone conferences and is also complemented with emails. Needed when the General Manager takes inventory of supplies and makes sure that the supplies are always stocked.
* Entertainment Planning
  + A bi-weekly series of email exchanges with film distributors and performers for scheduling current and future event times.
* Community Updates
  + Done by the Social Media Manager via the website, newsletter, and social media top reach out to potential visitors and customers by informing the community on current improvements, events and other news happening at the Ritz.

## Stakeholder Assessment

The stakeholder assessment lists stakeholders and their roles in the process as well as gauges their level of commitment to assuring the process is a success.



Methodology and Six Sigma Tools Used

The type of test we used was hypothesis test, 2 sample T test, capability analysis, descriptive statistics, run chart, and a line graph.

If the p-value is less than 0.05, we reject the null hypothesis that there's no difference between the means then we conclude that a significant difference does exist. If the p-value is larger than 0.05, we cannot conclude that a significant difference exists.

A descriptive statistic is a summary statistic that quantitatively describes or summarizes features from a collection of information.

A hypothesis test (T-Test) evaluates two mutually exclusive statements about a population to determine which statement is best supported by the sample data.

A Capability analysis is a set of calculations used to assess whether a system is statistically able to meet a set of specifications or requirements.

A Two-sample t-test is used to analyze the results from two samples.

A run chart is a line graph of data plotted over time. By collecting and charting data over time, you can find trends or patterns in the process.

The Six Sigma method used was the DMAIC method. Define, Measure, Analyze, Improve and Control Process. Where Define was completed under the Project Charter and the Measure step was completed via given data.

# Analysis of the 2017 Data

## Significance of beverage and popcorn sales

Using a 2 sample T-Test, we found there is a difference in revenue between popcorn and beverages due to the P-Value being less than .05. On average, popcorn brings in more revenue, but without knowing the costs of either item, we cannot confidently suggest changes.

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## Key Variables to predict Total Revenue

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Using the above regression and judging by P-values that are less than .05 which indicate significance, we found that the key variables that the general manager should focus on are:

* Revenue of Tickets
* Show Type
* Beverage Sales
* Popcorn Sales

These variables should be monitored to confidently predict the total revenue for their theater.

## Revenue Performance and Targets (Six Sigma Levels)

Chart, histogram

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The process capability report demonstrates how daily average revenues per month compare to the target monthly average revenue of $5800. There was only one instance of the theater not meeting that target, but other than that revenue numbers follow a stable, normal distribution that tends to be stable in its overachievements. The small standard deviation of $336.36 is another indication of stability because it shows that an observed revenue inflow tends to not stray too far from the mean of $6570.4.

## Six Sigma Level of the Process

To find out the six-sigma level we used the Z Score formula. This allows us to find out the number of defects when it dropped below $5800.

The Z score formula is the sample mean minus the target value divided by the standard deviation: (6570.4-5800)/(364.4) = 2.22 sigma. A 2.22 sigma is associated with about 308,537 defects per million, meaning that if one million observations (of months where revenue is generated) were to take place, about 308,537 would be under the $5800 target. It could use some work, as most would prefer at least a sigma level of 4 with about 6,210 defects per million.

## Run Chart and Line Chart

Chart, scatter chart

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Chart, line chart

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Both above images are control charts to see where there is any deviation. The first image are daily revenues from ticker purchases (excluding concessions), and there seems to be mostly stable compared to the outliers. The image below is another control chart that is easier to read and has the monthly revenue averages for the year 2017. We’re interested in any process changes in June and July. After some initial revenue increase, June gradually became the worst performing and then the two next months were our best in July and August.

The revenue is roughly stable, with most of the points being between $4000 and $5000, while the mean is $4500.

## Live Performance vs Films

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There is a statistical difference between showing films and showing live performances. Live performance brings in slightly more revenue, but it is not to chance.

As for the ticket sales method, the p-value indicates they are not statistically different, the method of sale does not matter.

## Goal to Increase revenue to $6550 from 2016 to 2017

A picture containing table

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If average daily total revenue was $6,550 in 2016, did the GM achieve her goal in 2017?

No, The GM did not achieve their goal. There is a P-Value of 0.261 which means we fail to reject the null hypothesis that the average daily revenue is $6550. This means that there was not a significant increase in the average daily total revenue.

# Conclusion

The Ritz’ competitors are local movie theaters and other venues for live performances. Given that there are not many other venues hosting live performances like stand-up comedy sets, plays or musicals in comparison to movie theaters in the area, it could come to no surprise that live performances bring in more revenue.

Additionally, we must note that June is the most underperforming month when it could be a better performing month, considering it is during summer break when students of different ages have more availability for leisure. We can use this information to capitalize on the preference of live performances to improve overall revenue as well as investigate what other factors are affecting June lower revenue while potentially catering to a younger audience.