



MIS 584 - Business Intelligence

**Implementing Business Intelligence
At
THE GUITAR CENTER**

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1. Executive Summary

The ultimate goal line of our proposed project is to successfully implement Business Intelligence Solutions at The Guitar center. The standard BI platform will help them analyze and monitor their day-to-day retail business, since currently they lack sophisticated in-store sales & marketing interface. At present they are using a terminal-like “Green-Screen” which is completely obsolete and cannot even function on simple mouse clicks. Our motivation to consider this project originated from a casual discussion over “How small companies can scope out BI to improve business performance?”, to which one of our team members, Renee Sweeney shared her experience working as Operations Associate at one of the retail store of the Guitar Center in California. She expounded on the problem areas of the company and how the store managers struggled to keep abreast of day-to-day data, which was directly sent to the main corporate office for corporate records. The managers and associates were unaware what happens next.

She mentions about witnessing all these problems as an operations employee and realized the need of incorporating some concrete corporate solution. She described the entire company study in the following bullet points:

- The Guitar Center, has not upgraded its data warehouse since the year 2006, and has huge volumes of data to transfer without compromising its data quality.
- There is no Business Intelligence team in place, currently there is no one-stop-system to track and monitor periodical sales, product services and repairs.
- Corporate officials and local store managers have limited interactions concerning the sales and repairs, whereas the store managers do not have any knowledge about sales and marketing performance.

To eliminate these trouble spots, we have introduced ourselves as externally hired consultants to propose implementing Business Intelligence Strategies and Solutions to the Guitar Center that will provide competitive edge for the company and improve its business eventually. Above all, it will provide transparency of customer data and relevant sales throughout the retail chains. Our

proposed solutions and recommendations incorporates providing purposeful data analysis using Conjoint Analysis and Topic Modelling. We plan to build Tactical Dashboard for the store managers and Strategic Dashboards for Sales Executives and Customer Executives respectively, that would help them analyze and appreciate their overall business. We are a group of Data Scientists and Business Analysts, challenged with building an entire system for a company that needs a BI platform and standards in place. Our team proposed solutions to the Client (The Guitar Center) corresponding to every problem stated earlier, through a deliberate data analysis and utilization of dashboards.

2. Introduction:

Guitar Center is a popular American music retailer chain that sells musical instruments, recording equipment, and accessories. Currently, it has around ten thousand employees at 269 locations across the United States, shown below. Its departments include Sales (Used, Outlet, Vintage, and Platinum products), Repairs, Rentals, Lessons, and GC Pro Installation Services. The product categories are Guitars & Bass, Drums, Keyboards & MIDI, Band & Orchestra, Amps & Effects, Mics & Wireless, Recording, Live Sound, DJ, Lighting, and Accessories. For the scope of this project, we will be focusing on expanding Guitar Center's sales department to include a business intelligence team.

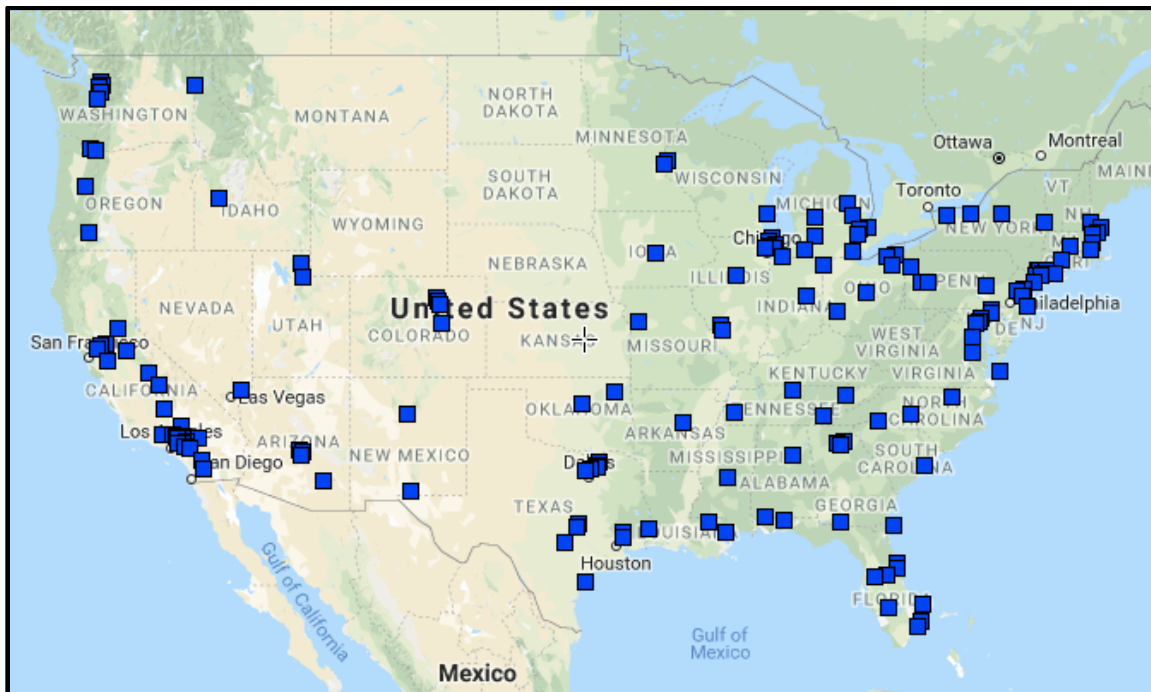


Figure 1: Guitar Center geographic distribution

According to the BI Maturity Model, Guitar Center's system is in the teenager stage. It uses the Netezza Performance Server (NPS) enterprise data warehouse, which integrates database, server, and storage platforms to perform detailed queries and analysis of large volumes of stored data with a low cost of ownership and ease of use. Although MicroStrategy and Epicor's QuantiSense are its primary analytics tools, Guitar Center does not have a dedicated BI team at the corporate level.

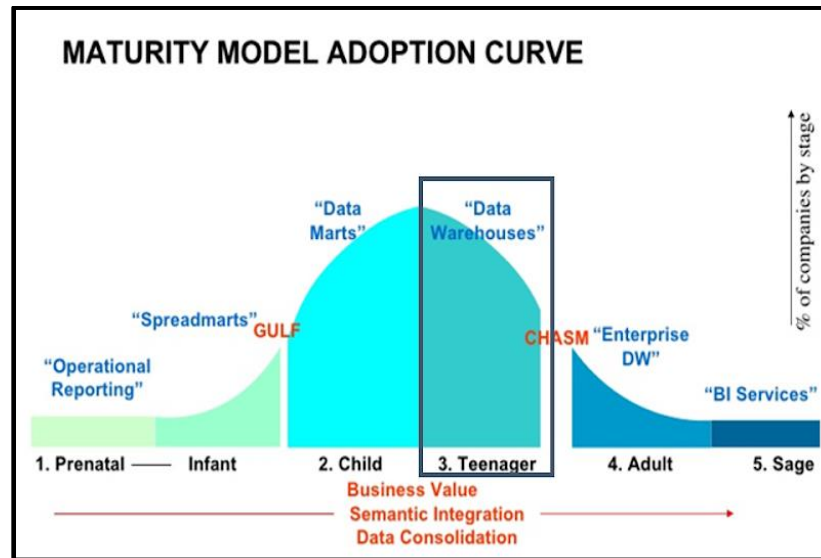


Figure 2: BI Maturity Model

3. Proposed Business Intelligence Solution:



Figure 3: BI Solution as a Service

3.1 Business Intelligence and Its Importance:

The term **Business Intelligence (BI)** refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information. The purpose of Business Intelligence is to support better business decision making, and design systems which are highly data-driven known as, Decision Support Systems (DSS). The BI systems provide historical, current, and predictive views of business operations, using data that has been gathered into a data warehouse or a data mart and from operational data. Software elements support reporting, interactive “slice-and-dice” pivot-table analyses, visualization, and statistical data mining. Applications tackle sales, production, financial, and many other sources of business data for purposes that include business performance management. Business Intelligence strategies and dashboards are either Strategic, Tactical or Operational depending upon the business needs and values it can potentially generate.

3.2 Components of BI Solution:

For the Guitar Center, we suggest the company should consider an innovative Business Analysis that will look after organizational goals and at the same time maintain directness and transparency within the company at enterprise level. We aim at understanding the how the need of BI will benefit the company predominantly, it's easier but important to identify where does the company fit in the BI Maturity Model, how far has it reached in the maturity model? How many standard metrics are to be drafted across the company? Is there any need to outsource CRM or BI software for this company? All these questions are to be necessarily answered before planning to implement BI Solutions at the Guitar Center.

The foremost components of BI Solutions could be categorized after closely evaluating the following objectives:

- Data Sources,
- Data Integration & Quality
- BI Maturity Model
- Types of Dashboards
- Key Performance Indicators and metrics selection
- In-house BI readiness or Outsourcing

- Advanced Analysis
- Speed of Implementation

For a successful BI Solution, it is utmost crucial to evaluate all of the above components, ensuring all technical and organizational aspects are accountable for the BI strategy.

3.3 Value of BI at The Guitar Center:

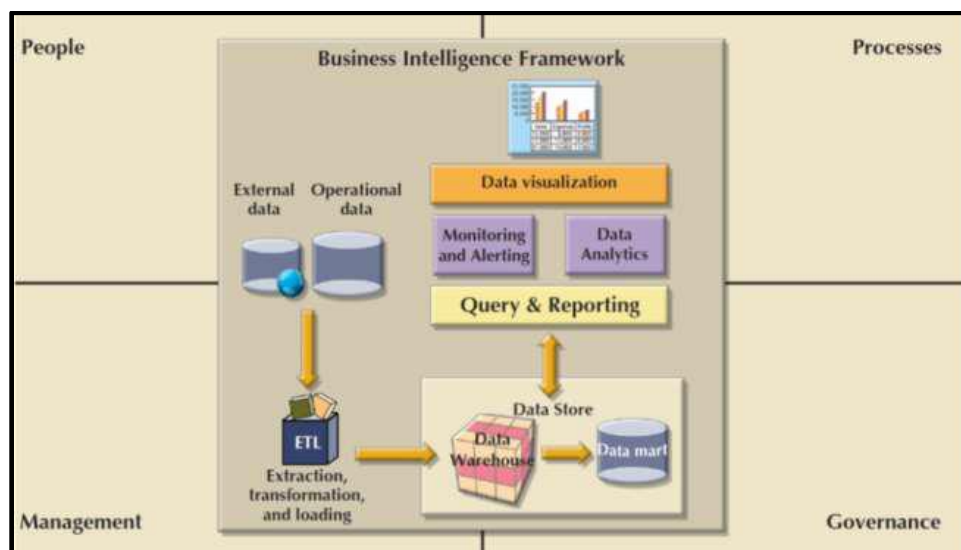


Figure 4: BI Framework

Most of the data, that companies analyze is through business intelligence and comes from a diverse type of data sources. The most common of these are:

- Databases: the record of all the sold items details that are maintained and categorized on the basis of store location.
- Flat files: the excel files that are maintained by the store managers.
- Web services: the sold data that is collected from the website of the Guitar Center.

Currently, Guitar Center uses the Netezza Performance Server for storing and exploiting the data it collects. We recommend that they migrate to the Oracle Cloud Database because it remains

flexible as the company grows. Also, it provides excellent service and easy upgradation to newer versions. For storing the data, we plan to use the star schema depicted below:

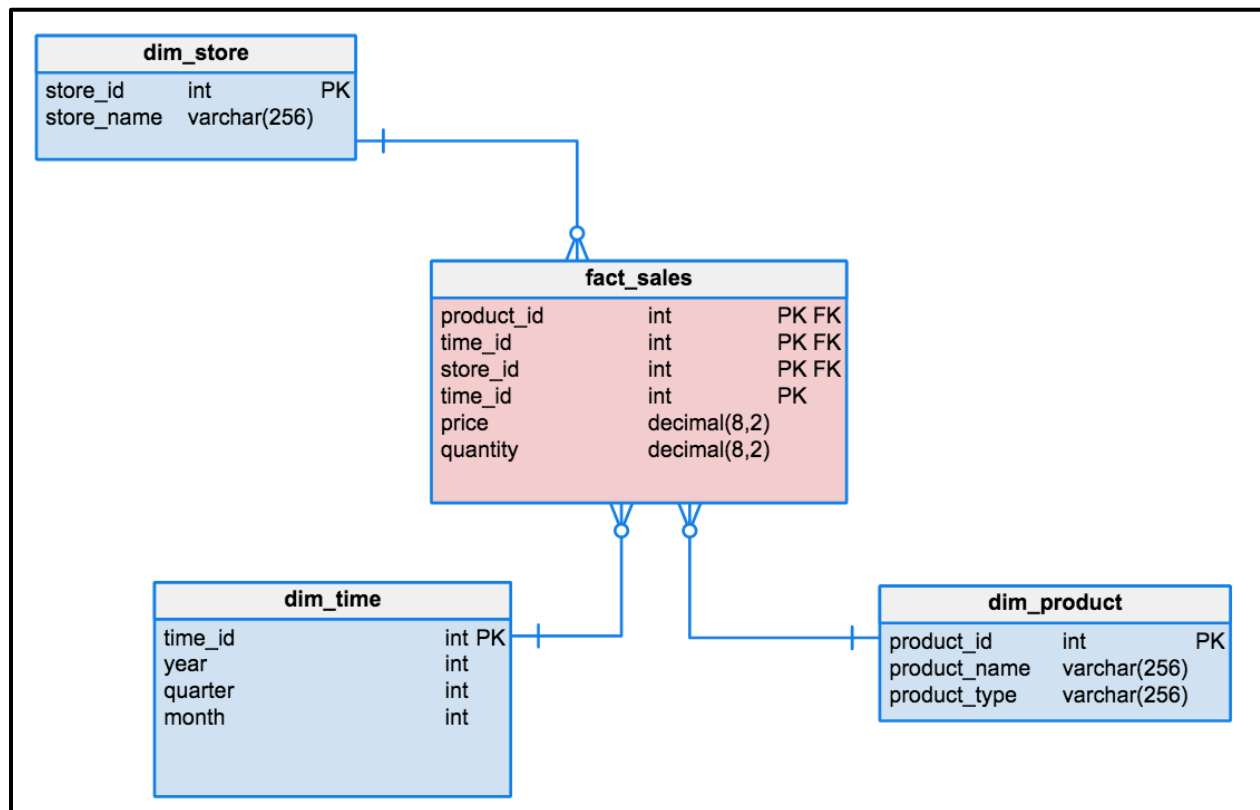


Figure 5: Star Schema Diagram

Connected to the database should be a user-friendly inventory management and point-of-sale (POS) interface so that employees can easily create and query transactions, products, and customers. Instead of “green screens,” using Oracle’s Retail Xstore Point-of-Service and Oracle Retail Store Inventory Management would greatly improve data quality and customer service.

We also suggest using the Oracle Analytics Platform at both the store and corporate level. This way, store managers can make informed decisions from sales trends, such as adjusting product placement within the store, increasing employees’ product knowledge, and addressing customer complaints. Executives can also benefit from faster decision making in all departments. Three analytics dashboard prototypes are shown in the following sections.

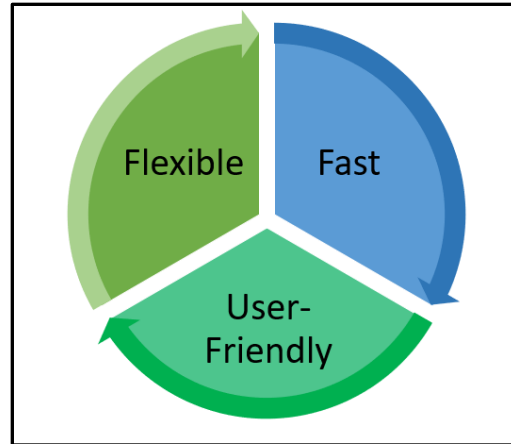


Figure 6: Three F's Solution for the BI

4. Use Cases

#	Abc	#	#	#	Abc	Abc	#	#	#	📅	#	+ #
meta_dashboa...	meta_dashboa...	meta_dashb...	meta_dashb...	meta_dashb...	meta_dashboa...	ratings_dashboa...	ratings_dashboa...	ratings_dashb...	ratings_dashbo...	ratings_dashbo...	ratings_dashbo...	Calculation
Asin	Product	Price	Cost	Profit	Brand	Reviewer ID	Asin (Ratings Das...	Rating	Timestamp	Date	Store Id	Cluster number
6428320	Six Sonatas For Two ...	17.950	8.975	8.975	null	A1YS9MDZP93857	6,428,320	3	1,394,496,000	3/11/2014	5	1
14072149	Double Concerto in D ...	18.770	9.385	9.385	null	A3TS466QB8WB9D	14,072,149	5	1,370,476,800	6/6/2013	14	1
41913574	Aida: Opera in Quattr...	49.990	24.995	24.995	null	A19K10Z0D2NTZK	41,913,574	5	1,285,200,000	9/23/2010	20	1
634029347	Hal Leonard Eric Clap...	16.190	8.095	8.095	null	A1MUVHT8BONL5K	634,029,347	2	1,129,334,400	10/15/2005	6	1
634029347	Hal Leonard Eric Clap...	16.190	8.095	8.095	null	A15GZQZWKG6KZM	634,029,347	1	1,387,584,000	12/21/2013	12	1
634029347	Hal Leonard Eric Clap...	16.190	8.095	8.095	null	A16WE7UUQ0D33D	634,029,347	5	1,128,211,200	10/2/2005	5	1
634029355	Hal Leonard Eric Clap...	13.480	6.740	6.740	null	AXMWZYP2IROMP	634,029,355	2	1,352,419,200	11/9/2012	5	1
634029355	Hal Leonard Eric Clap...	13.480	6.740	6.740	null	A1MUVHT8BONL5K	634,029,355	2	1,129,334,400	10/15/2005	12	1
634029355	Hal Leonard Eric Clap...	13.480	6.740	6.740	null	A6DCKXX4659CR	634,029,355	5	1,189,728,000	9/14/2007	17	1
634029355	Hal Leonard Eric Clap...	13.480	6.740	6.740	null	A28YJZCV43ZWQW	634,029,355	5	1,206,489,600	3/26/2008	10	1

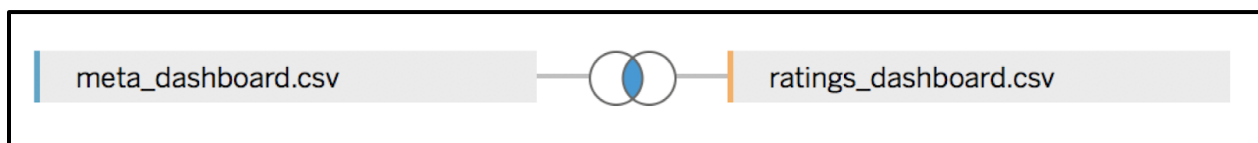


Figure 7: Dataset

The dataset we have is composed of two tables. The Asin (product ID) is their common columns. This dataset includes 13 features from 20 stores of Guitar Center. There are 2084 products in total and it has 2072 reviewers.

We have three dashboards to provide both strategic decisions for C-level Executives of the Guitar Center and tactical solutions for store managers. Two dashboards are strategic, and one is tactical. The first strategic dashboard is related to profit and marketing, and the second dashboard is related to rating and its relationship to the profit.

4.1 STRATEGIC DASHBOARD I - Sales Executive

Sales Dashboard:

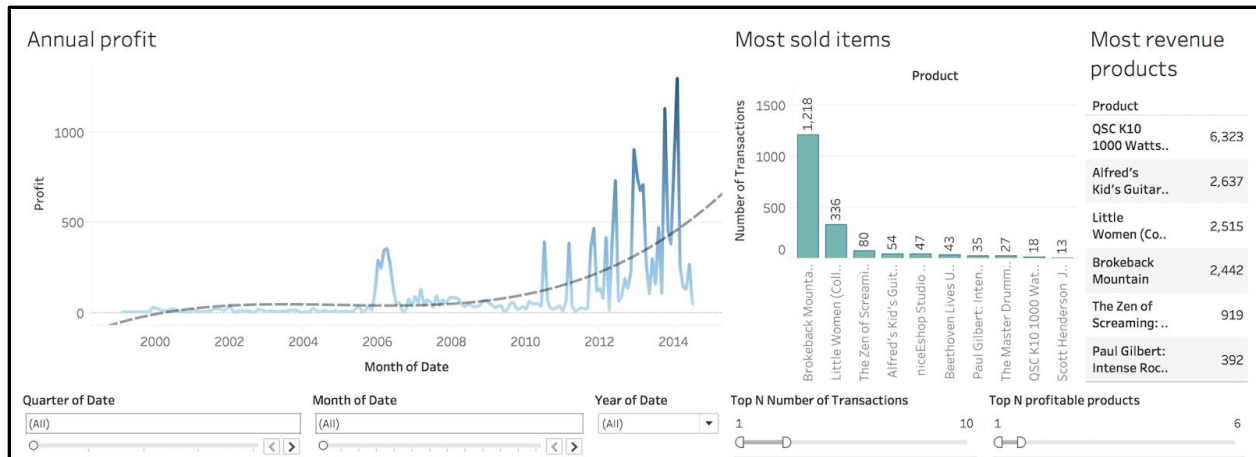
Goal: The target is to understand the profit trends of stores and products and the ranking.

KPI: Monthly profit per store, number products sold, revenue product sold.

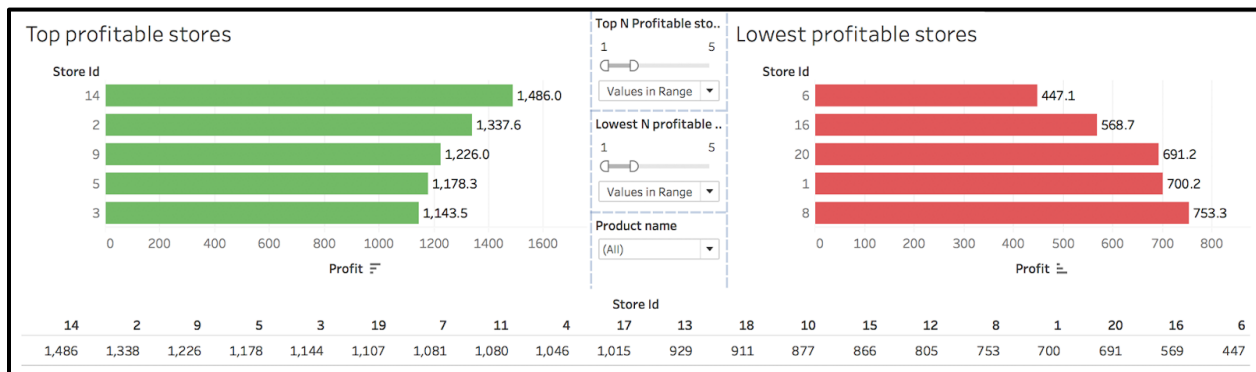


Figure 8: Strategic Dashboards for Sales Executives

The sales dashboard is a fully interactive one. By clicking any info in this dashboard, the user is able to see all Sales information related to the selected product or store. Also, a lot of filters (Year/Quarter/Month of date, Top N products, Product name) are added to this dashboard, the top executives could select their preferred time range, numbers shown and so on.



By selecting the item in the second and third sheets, the annual profit shows the performance of that certain product in all years, also, a specific year, quarter, or month could be selected. The second and the third sheets also shows the information of top N (where N is any integer number) sold and revenue products. By selecting the products the store ranking also changes based on the selected product, and it presents the store ranking of certain products. In a similar way, by clicking the stores, the three sheets on the top also changes accordingly. The most sold/revenue items show the product ranking in that store so that the CEO is able to know the signature products for each store. The annual profit can show the performance of a product in a store in a certain time range.



4.2 STRATEGIC DASHBOARD II - Customer

Ranking and Profit dashboard:

Goals: Our target is to monitor the relationship of profit and ratings of stores, products, or customer clusters.

KPI: Average product rating per store, per customer. Average store rating of certain product

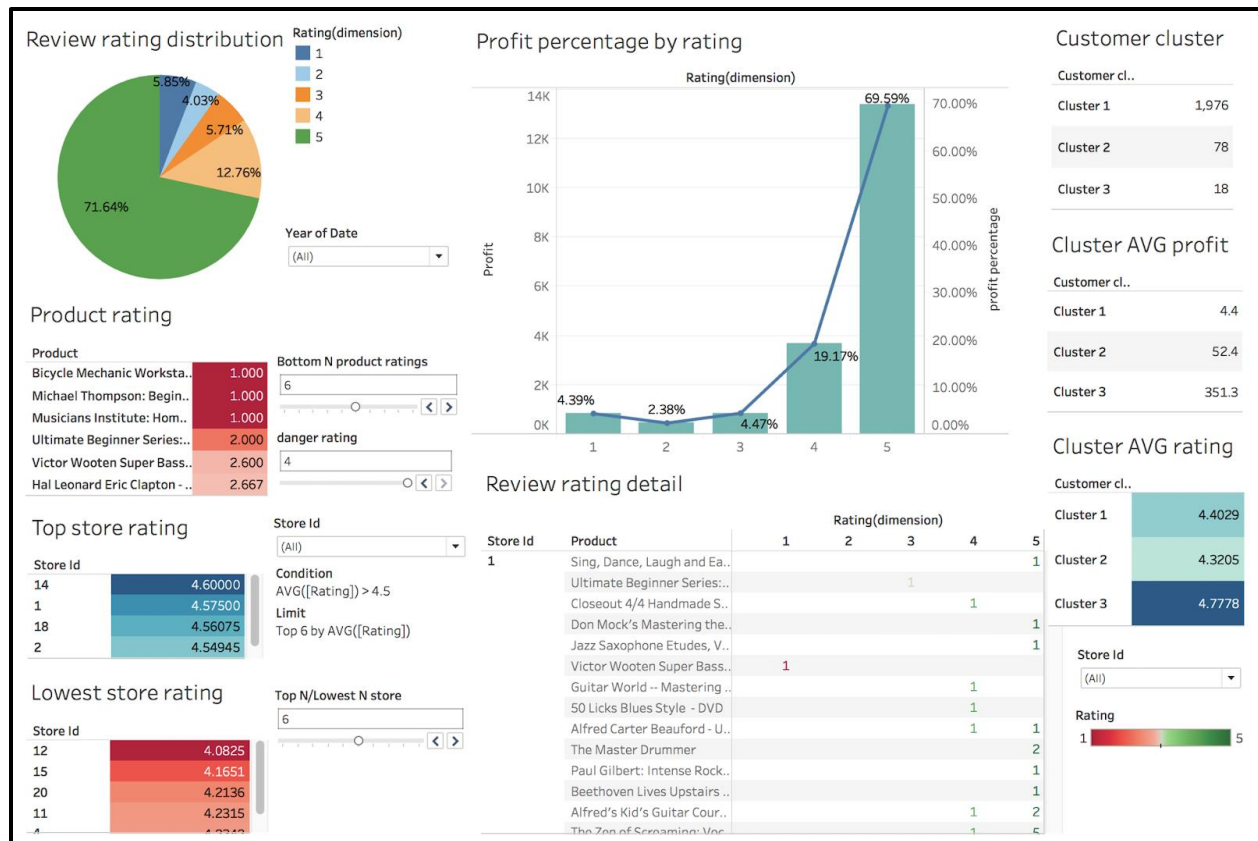
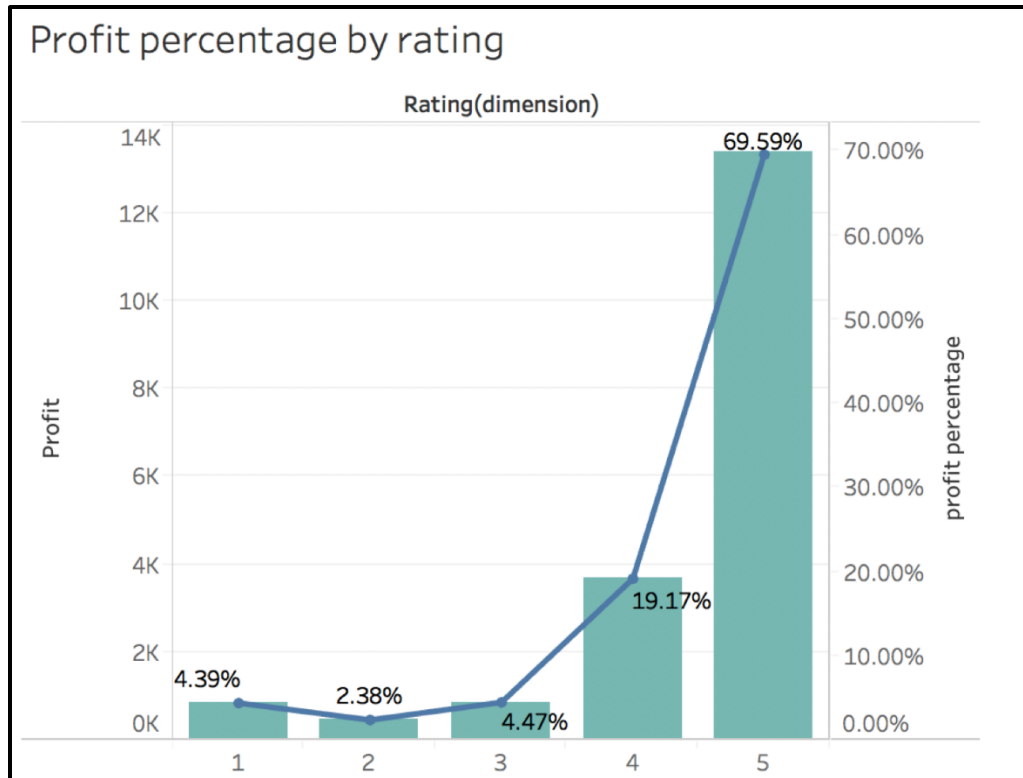


Figure 9: Strategic Dashboard for Customer

This dashboard describes the rating related information. The first table shows the rating distribution. By clicking the ratings here, the review rating detail shows the selected rating in all stores and their numbers. The CEO of Guitar Center could compare the rating of the same product in different stores. In product rating, we set a benchmark that the product should reach. If the average product rating is lower than the critical rating, it will need more attention. The benchmark we set for top store rating is their rating should be higher than 4.5. And by clicking the store id or product name, the profit percentage by rating changes according to that.



The sheet illustrates the relationship of the rating and the profit of Guitar center. The Executives can see ‘do their products have positive reviews?’. In all stores, 70% percent of their profit have a rating of 5. They could select different stores the see when their profit exceeds overall evaluation.

Customer cluster		Cluster AVG profit		Cluster AVG rating	
Customer cl..		Customer cl..		Customer cl..	
Cluster 1	1,976	Cluster 1	4.4	Cluster 1	4.4029
Cluster 2	78	Cluster 2	52.4	Cluster 2	4.3205
Cluster 3	18	Cluster 3	351.3	Cluster 3	4.7778

The rating dashboards also show the customer cluster based on their average profit they bring. The Executives could provide platinum card to top customers to award their loyalty and give gold cards to cluster2 to encourage more consumption. By clicking the customer clusters, they could also see the product ratings, store ratings of that cluster.

4.3 TACTICAL DASHBOARD - Sales Manager

Store Tactical Dashboard:

Goal: The target is to help store managers to define their good/bad products. And identify their most profitable customers.

KPI: Monthly profit, number of products sold, average product rating.

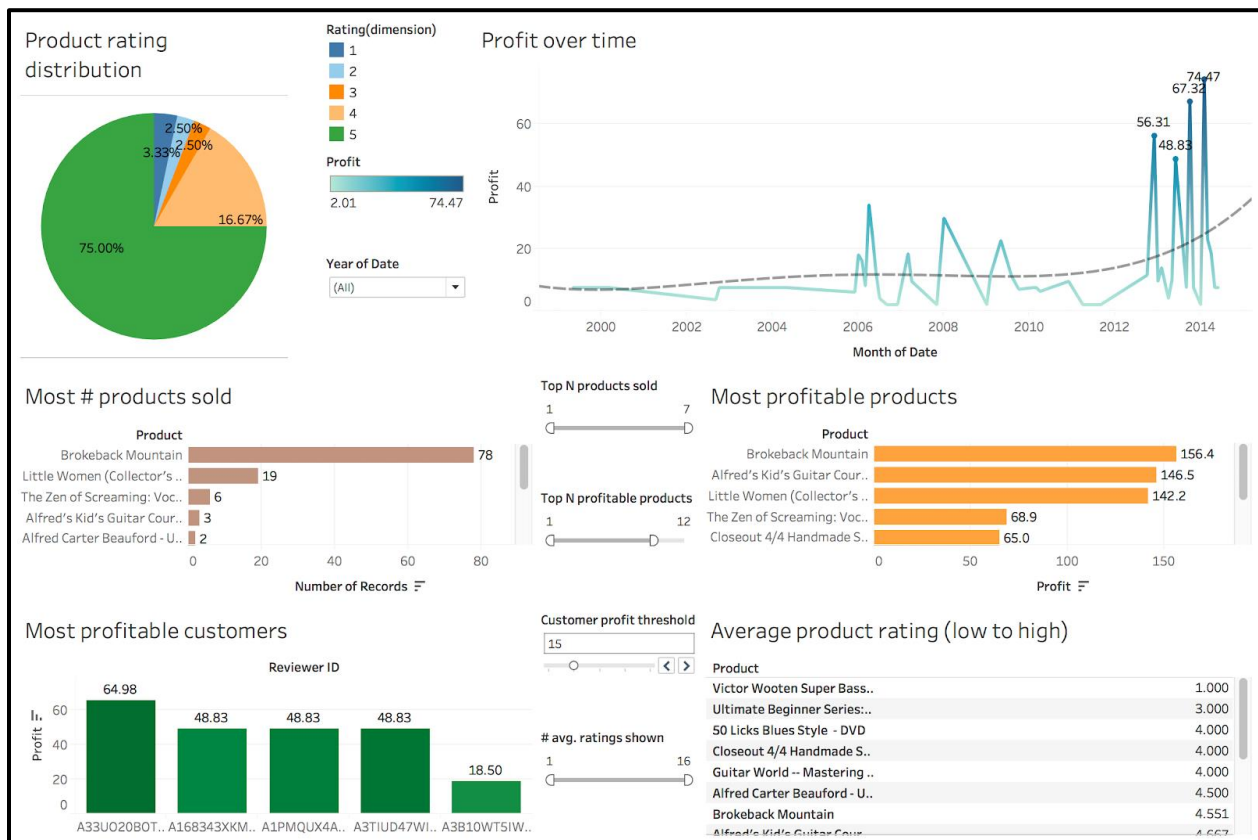
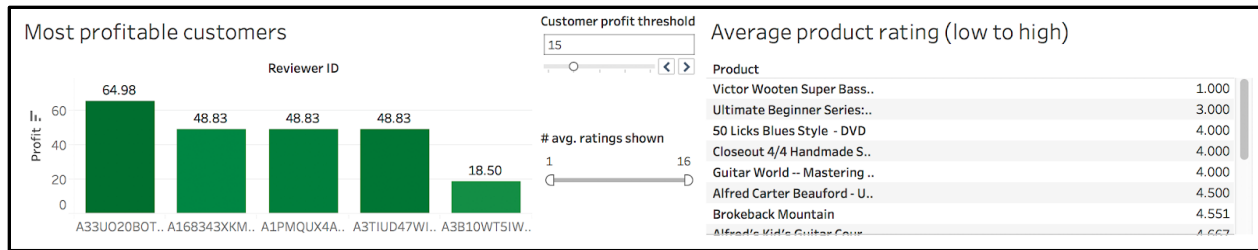


Figure 10: Tactical Dashboard for Sales Manager

The features of this dashboard will give store managers insights on all related information in that store, like the number of product sold, the average product rating, monthly profit, and most profitable customers. The store manager is able to select the specific year he wants to see. By selecting the products, the monthly sales show the profit trend of that product. The manager is able to know what time this product sells good or not. We set a threshold for the most profitable customers, and the money they spend should be above that value. The product rating is from lowest to highest. The store managers can easily target the product they think that does not have good performance.



Because every store manager wants to figure out who spends the highest money in his store and build up relationship with him, the graph will show the top customers who spend more than the threshold. And by listing the products which have lowest ratings, the top manager could decide which product should have further review.

It is important to note that our tactical and strategic dashboards are very similar due to our limited data. With the right data, the strategic dashboard could be expanded to include key performance indicators for rentals, repairs, lessons, installation services, employee satisfaction, and website activity.

4.4 Data Analysis

4.4.1 Understanding customer's bad reviews:

Problem: The guitar center is in the teenager stage, but they just have the data warehouses for storing the data. As a result, they haven't had a solution in understanding customer feedback. While understanding customer feedback is very important in making profit for guitar center, in this part, we want to build a data analytical solution so that customer executives in guitar center can use to see how customers responded to the guitar center's products in all stores or a particular store. We note that store managers can also use this analytical solution to see how customers reacted to the products in the store he is managing. Our goal is that by applying this data analytical solution, the customer executives/store managers in the guitar center can understand what kind of product aspects customers did not satisfy, which in turn increase user's satisfaction and bring more profit for the guitar center.

There are two problems that we need to solve here:

- **Problem 1:** How to extract/see the keywords in user's bad reviews. Particularly, what are the words that mostly appear in bad reviews?
- **Problem 2:** How to understand the topics of bad reviews? Or can we cluster bad reviews into some clusters where similar reviews belong to the same cluster?

Solution for problem 1: Summarizing bad reviews with word cloud:

To build a data analytical solution for understanding customer's bad reviews, we first look at the available data. Since shopping instrumental equipment on Amazon can be seen as similar as shopping at guitar center, we use the Amazon **instrumental review** dataset to conduct a sample solution for this task. First, we have a look on the dataset.

The Amazon instrumental review dataset has 10,261 reviews in total. Its format is: [reviewerID, asin, reviewerName, rating, reviewTime, storeID], where reviewerID is the ID of the reviewer, asin is the product ID, reviewerName is the name of the reviewer, rating is the rating score the user gave on a particular product, reviewTime is the review time with format month-day-year, and storeID is the guitar center store ID. In each review, the customer can give a rating score between [1, 5]. In all 10,261 reviews, there are 6,938 reviews rated with 5 scores, 2,084 reviews rated with 4 scores, 772 reviews rated with 3 scores, 250 reviews rated with 2 score, and 217 reviews rated with 1 score. The data is summarized in table below:

Number of reviews with 5 scores	6,938
Number of reviews with 4 scores	2,084
Number of reviews with 3 scores	772
Number of reviews with 2 scores	250
Number of reviews with 1 score	217
Total	10,261

Table 1: Amazon Review Dataset summary

Next, we consider a bad review as a review rated less than or equal to 3. This gives us 1,239 bad reviews. Now we are interested in understanding what are the keywords mostly appear in the customer bad reviews.

Since the bad review data is the text data, we standardize the input bad review by performing the below steps:

- Converting all characters in the text into lower cases.
- Removing non-alphabet characters. In another word, we keep only words and remove all non-words such as digits, punctuations, ...
- Next, we remove all English stop words in the text. In here, it is worth to note that the Amazon reviews dataset is in English.

After preprocessing the bad reviews, we use the standardized bad reviews and draw a word cloud. The figure below shows our result:

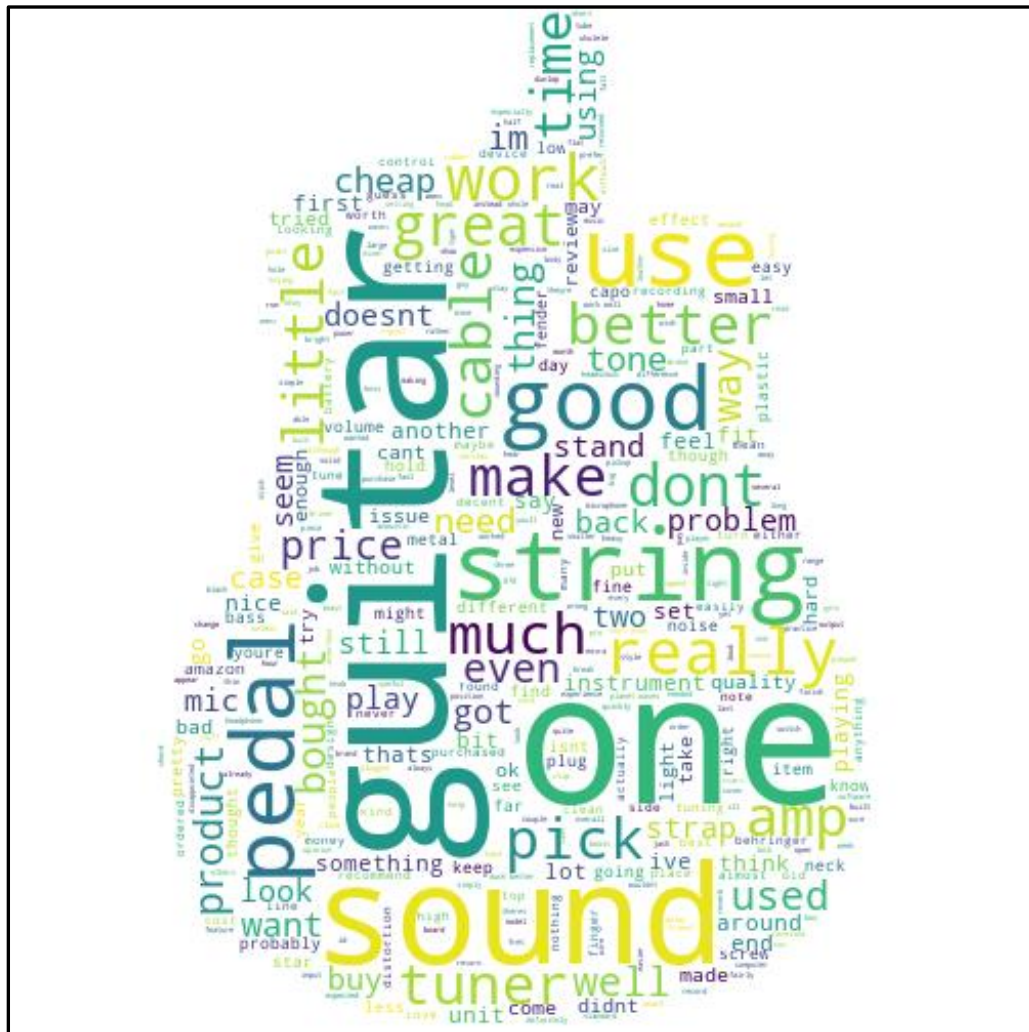


Figure 11 : word cloud of the sampled bad reviews

From the word cloud figure above, the customer executives/store managers can get a summary of the bad reviews. For example, in this figure, we can see that the keywords that mostly appear in the word cloud are: guitar, sound, string, cable, pedal, tuner, problem, price, ... This suggests that the customers mostly complained about guitar products, together with their string, cable, pedal, tuner problems, and price as well.

Solution for problem 2: Understanding topics of the bad reviews:

So far, we summarized the keywords in bad reviews using word cloud so that customer executives/store managers can have an overview about what the complaint are about. However, the word cloud is too general to detect what kind of problems the guitar center currently faces. In another word, we want to know deeper that what kinds of issues customers are complaining about the guitar center's products?

To deal with the task, our BI solution integrates a topic modelling approach for this task. The idea of topic modelling is to find the abstract topics of given bad reviews. To do topic modelling, we follow below steps:

- We extract only bad reviews. As similar to the word cloud task, we select only reviews with rating score less than or equal to 3. This leads to 1,239 bad reviews.
- Then, we preprocess the bad reviews by: lower all characters, removing non-alphabet characters, removing stop words.
- Next, we use lda2vec as the approach to perform the topic modelling.

The result we got given the 1,239 bad reviews we extracted is as followings:

Topic Id	Topic keywords	inferred topic	Percentage (%)
1	leather help pick finger strap damage fact pop attach software	strap problem	18.9
2	finger strap leather ill finish hole receive capo order simply	capo problem	11.5
3	order pop away right hole mean deal clean look way	order problem	5.8
4	headstock damage finger strat finish leather receive tuner fret old	headstock, tuner problem	22.1
5	recording device function defective level mic decide microphone lot quickly	recording device problem	23.9
6	big break sure read headphone build easy sound noise expect'	headphone problem	17.8

Table 2: topic modelling result using lda2vec

In here, we set 6 as the number of output topics. The lda2vec topic modelling approach outputs 10 keywords for each of 6 topics. Based on those keywords and the example bad reviews that belong to each topic, we can draw some inferred topics. For example, as shown in the table, the first topic is about strap problem, the second topic is about capo problem, the third topic is about order problem, the fourth topic is about headstock, tuner, the fifth topic is about recording device issues, and the sixth topic is about headphone problem. We also show the number of bad reviews (in percentage) that belong to each topic. Based on this result, customer executives/store managers can understand what topics customers are complaining about, as well as how many percentage of customers having a particular problem. By knowing this analytical result, customer executives/store managers and make some improvement regarding product quality or services to enhance customer rating/satisfaction. This will, in turn, bring more profit for the guitar center.

4.4.2 Conjoint Analysis

Problem: Customer value of product specifications

To further explore customer ratings, we perform conjoint analysis on a subset of the data to see which specifications of certain products have the most impact. Conjoint analysis uses a statistical model called multiple linear regression to capture customer preferences, which when extended to different types of products, can give Guitar Center useful marketing insights. The retailer can discover the bestselling points for products, stock up on the ones with preferred specifications, downplay less popular preferences, and reduce stock for low-rated products. Although this analytics technique requires some manual tuning to reduce the dimensions to useful attributes, it is extremely beneficial from a customer satisfaction standpoint, since musical equipment purchases, and ratings are based heavily on personal preference.

Solution:

The chosen product for our toy conjoint analysis is guitars, and the preferences are as follows: acoustic versus electric guitars, bass versus regular guitars, vintage versus contemporary guitars, and rosewood guitars versus those made with more expensive wood. Respectively, all the latter attributes are treated as baselines, and the former attributes are used as independent variables in the linear regression equation. The p-values of the F-statistic and each variable's coefficient are statistically significant (< 0.05), meaning that individually and altogether, these guitar specifications have an impact on the rating. The adjusted r^2 is 0.765, so 76.5% of the variation in the rating is explained by the variation in the chosen attributes, while the remaining 23.5% is from noise or other unknown attributes. We choose to focus on adjusted r^2 since our model has more than one independent variable.

Looking at the coefficients, it is evident that vintage guitars are much more popular than modern ones, acoustic is preferred over electric, and bass guitars have slightly higher ratings than regular guitars. Customers also seem to rate rosewood guitars highly despite them being inexpensive,

which indicates that getting decent quality for a low price is important to the majority of guitarists.

OLS Regression Results						
Dep. Variable:	rating	R-squared:	0.795			
Model:	OLS	Adj. R-squared:	0.765			
Method:	Least Squares	F-statistic:	27.10			
Date:	Sun, 15 Apr 2018	Prob (F-statistic):	2.86e-09			
Time:	19:53:58	Log-Likelihood:	-66.676			
No. Observations:	32	AIC:	141.4			
Df Residuals:	28	BIC:	147.2			
Df Model:	4					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
acoustic	1.7012	0.226	7.512	0.000	1.237	2.165
bass	0.6111	0.200	3.056	0.005	0.202	1.021
vintage	3.2040	0.966	3.317	0.003	1.225	5.183
rosewood	1.4899	0.660	2.259	0.032	0.139	2.841

Figure 12: Conjoint Analysis Results

By standardizing the ranges of the coefficients (in this case, the coefficients themselves since they were all compared to a baseline of 0), we calculate the impact ratios of guitar specifications on product ratings, shown as a percentage in the table below. Vintage versus modern have the most impact, followed by electric versus acoustic, then wood type, and finally regular versus bass guitar.

Types of Guitar	Coefficient	Impact on Ratings
Electric vs. acoustic	1.7012	24.3%
Regular vs. bass	0.6111	8.7%
Modern vs. vintage	3.204	45.7%
Expensive wood vs. rosewood	1.4899	21.3%

Table 3: Comparisons from Conjoint Analysis

4.4.3 Recommendations

Problem: Product recommendation

Product recommendation is one of the crucial parts in the business process at Guitar center. The benefits of product recommendation can be characterized into 2 aspects. First, by building a good product recommendation, Guitar center can send relevant coupons, advertisements to right

customers. Second, Guitar center can use recommendation model we integrated in our BI solution for online shopping, which suggests users to buy some more relevant products when they login or already purchased some products. Third, store managers can also use recommendation tool to re-organize related products so that the related products are nearby each other. This is similar to when we go shopping for beers in Walmart, we observe that chips are placed closed to beers so that when customers buy beers, they can also pick chips.

Solution:

Before discussing about the solution for product recommendation task, we first look at our available dataset. Again, we use the **Amazon instrumental products rating dataset**, called as **rating dataset** for short. The format of the dataset is: userID, asinID, rating, timestamp. There are 500, 176 ratings created by 339,221 users on 83,046 products. The density of the dataset is very small, only 0.0018%.

Since the rating dataset is large and very sparse, building recommendation model on this dataset takes long time. Hence, we subsample the dataset. We sort the all the data instances by increasing order of timestamp. Next, we sample the first 100,000 ratings. This remains 62,454 users with 25,925 products, and density of 0.0062%. The table below summarizes the dataset information:

	Original Dataset	After Sampling
Number of Users	339,231	62,454
Number of Products	83,046	25,925
Number of Ratings	500,175	100,000
ty	0.0018%	0.0062%

Table 4: Rating Dataset statistics for recommendation task

Then we use this sampled dataset for recommendation task. To build a recommender, we examine two models: Bayesian Personalized Ranking (BPR), and Weighted Approximate-Rank Pairwise

(WARP). The two models BPR and WARP are two common approaches that are widely used in recommendation system.

To evaluate how well the recommenders work, , we split the sampled rating dataset into 80% training and 20% for testing. Then, we measure the two models by Area Under the Curve (AUC) metric. So, what is AUC? Basically, the accuracy of the model depends on how well it separates the input products into relevant items (or truly preferred) and irrelevant items (or not preferred) for customers. The accuracy is measured by the area under the curve. The figure below denotes a sense how the AUC is.

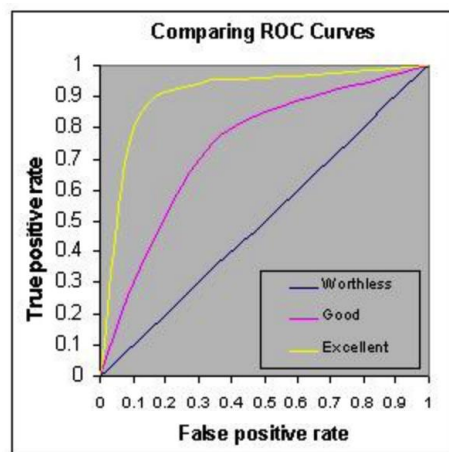


Figure 13: An example of AUC

The AUC score is between 0.0 and 1.0. An AUC score from 0.9 to 1.0 represents an excellent model, an AUC score from 0.8 to 0.9 represents a good model, an AUC score from 0.7 to 0.8 indicates a fair model, and an AUC score from 0.5 to 0.7 shows a poor and failed model.

We next apply BPR and WARP on the sampled rating dataset. As a result, WARP gains an AUC score of 0.733 while BPR achieves only 0.494, which is very poor result. Since WARP gains quite a fair result, we use this model to solve the recommendation task in Guitar center. The table below shows the brief result of two recommenders:

Model	AUC
BPR	0.494
WARP	0.733

5. Implementation

The BI implementations signify the technical and the managerial aspects of the project to be well-thought-out and measured when implementing the BI proposal into the existing organizational environment. In the proposed implementation strategies, we want to employ an advanced cloud architecture in near future once the Company is successful with our proposed BI Solution. We have discussed about the conversion strategy to showcase the technical implementations of this project. Furthermore, from the managerial point of view we have displayed Kotter's Eight Step principle as a part of successful roadmap to implementation.

In our pursuit to come up with best help for the company bottlenecks and problems using the available data, we faced ample of challenges with abnormality when dealing with this data. Apparently, we never had a chance to communicate with the IT team, however we received some relevant data from Amazon API review data. The question with data was that there was data in abundance in the data marts at the Guitar Center, but limited data to analyze. At the store level, nobody had an overview of the data they reported to the corporate. Moreover, the available data has so many redundancies, and missing values and data was not enough to achieve high accuracy. This was resolved by segregating data based on the desired analysis, i.e. separate review data from the ratings, etc. Running through various techniques we were able to make the data consistent enough to be put to the right usage.

5.1 Conversion Strategy:

Conversion strategy determines how the transition from one system to the other will take place. It can be determined on the basis of cost, the risk associated with it and time. Considering these factors, we have come up with the following suggestions:

- **Conversion style: Parallel Conversion**

Parallel conversion method is transitioning from old system to the new keeping both the systems running for a stipulated time. We recommend using this strategy because the risk associated with it is low although there is a cost and time factor. We need parallel transitioning because the current staff will take some time to get acquainted with the new system.

- **Conversion location: Phased conversion**

We recommend using the phased conversion method by implementing the tactical dashboards in stores and then moving with operational dashboards. Phased conversion will provide us to study the implications of the implementation and based on the result we can incrementally continue with the transition. The risk associated with it is medium however the time duration is bit longer but it is a safe bet.

- **Conversion module: Modular**

We recommend using the modular conversion strategy because this conversion reduces the amount of training needed for people to begin using the new system, since users need to be trained only for the new module being implemented. The risk associated with is low.

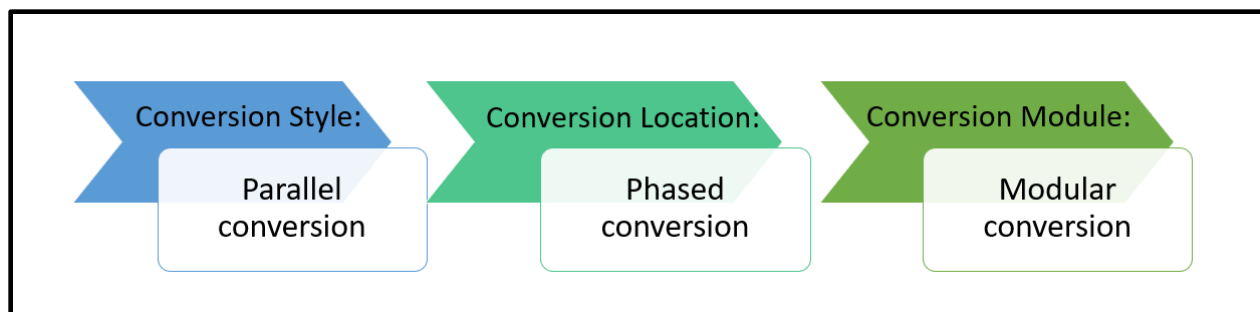


Figure 14: Conversion Strategy

5.2 Kotter's Eight Step



Figure 15: Kotter's Eight Step Model

Kotter's eight step model of change was developed to improve an organization's ability to change and to increase its chances of success. By following this step plan, organizations can avoid failure and become proficient at implementing change. As a result, organizations no longer need to adjust the changes and they will increase their chances of success. To bring upon any change, it is equally important to see if it helps if the entire company and is the change really needed.

- **Create a sense of urgency:** This first step of Step Change Model is the most major one, by creating awareness of the need and urgency for change, that will create support for the company. This could be accomplished by talking about potential threats or by discussing practical solutions. As discussed earlier the company has to build its own BI team, to monitor its business and customers in such a competitive market.
- **Create a guiding coalition:** To develop a concrete stand and outplay successfully in the market the top management needs to be convinced that change is necessary and managing change isn't just enough. Lead the change, undertake the ground protocols, bolster the

company needs, encourage the employees, the company needs to bring together an alliance, or team, of significant people whose power comes from a variety of status, expertise, and political importance. This is where multiple department managers can take the charge and needs to work as a team, continuing to build urgency and momentum around the need for change.

- **Create a vision:** Prima-facie, thing, the Guitar Center Corporate team needs to have a clear vision that can help its subsidiaries or smaller retail chains understand why they are willing to bring forth this enterprise level change. It is important to make them understand how the potential BI Strategy will help them view their business at one go, understand their product purchase patterns, sales, number of repairs, open-defects, many other things. When people see for themselves what you're trying to achieve, then the instructions given tend to make more sense.
- **Communicate the vision:** To communicate the vision effectively, the leader must talk about change vision, address people's' concerns honestly. Define short term goals aligned with the vision, helps to keep motivated.
- **Remove obstacles:** Another in trend part of the ongoing process is obstacles. Right from the initial stage we expect errors and obstacles along the way to change. We strongly believe an effective leader and pioneer would put in place the structure for change, and continually check for blockades to it. Removing obstacles is necessary, whereas the overall process of removing obstacles is a learning phase it can empower the people you need to execute your vision, and it can help the change move forward.
- **Create short term wins:** Nothing motivates more than success. Create short-term goals so that the management and employees have a clear idea of what is going on. When the goals have been met, the employees will be motivated to fine tune and expand the change. By acknowledging and rewarding employees who are closely involved in the change process, it will be clear across the board that the company is changing course. The team

can follow good SDLC protocols like: RAD or agile methodology and create short-term targets – not just one long-term goal. The team may have to work very hard but the outcomes and victories can further motivate the everyone.

- **Consolidate Improvements:** Many change trajectories tend to fail because success is identified and announced too early. However, change is a gradual process and must be driven into the overall corporate culture. continuous efforts to ensure that the change is seen in every aspect of your organization. Thus, strive on looking out for scope of improvements and try and fix them. Only after multiple successes have been achieved, company's leaders should continue to support the change. Keep people and staff hand-in-hand to witness the changes and victories.
- **Anchor the Changes:** Definitely a change will only become part of the corporate when it has become a part of the core of the organization. Values and standards must agree with the new vision and the employees' behavior must provide a seamless match. Employees must continue to support the change. Regular evaluation and discussions about advancements can help consolidate the change.

6. Conclusion

To conclude the implementation of the BI solution at guitar center proves to be a deal that can generate revenue as these are the few areas that Guitar center has not yet exploited. Also in the long run it will outweigh the cost and would be very beneficial to the company. The predictive analysis that we have suggested can provide guitar center with the opportunity to recommend better products to its customers and the word cloud and topic modelling can help the executives and store managers to understand the reviews in a much better way and draw more meaningful conclusions from them for the improvements. These dashboards along with the predictive analysis techniques can be instrumental in generating more revenues for the guitar center.

The implementation of the Tactical Dashboards at the Guitar Centre stores will empower the store managers to draw conclusions based on the sales and the reviews provided by the customers. It

will also enable them to better manage the inventory and the store thus giving them more control of the store. On the other hand, the Strategic Dashboards will provide the top level executives to have a bird's eye view of all the stores and take actions accordingly. It will also enable them to have better control of the inventory that has to be maintained. Thus, we believe by having access to the quality data, reviews of customers and ratings will definitely help influence the company's ROI.

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