

Optimizing Sales Force

Gamesa

Subsidiary of Frito-Lay, PepsiCo



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Executive Summary

For our senior design project, we had the opportunity to work with Frito-Lay/Gamesa. Gamesa, which is a subsidiary of Frito-Lay, is a Mexican Cookie company, which sells its product in many different countries, including the United States. Their product, which includes different types of cookies and crackers, is targeted to the Mexican population since it is a Mexican product. They have distribution around the United States through their sales force, which consists of 38 representatives. They have divided the US territory in 16 different regions, which are divided by the different routes to market (DSD), location of warehouses and population density. Today, they dominate the Hispanic cookie market occupying 50 percent of the market.

The problem or situation that we had to resolve for Gamesa was that they wanted to know if they should have more sales representatives and where would their optimal location be. With the current economic recession and the entering of Gamesa's main competitor, Bimbo, sales have been dropping in the different regions. This resulted in Gamesa asking themselves if they needed a bigger sales force. They also wanted to know what regions could be good to add representatives in the future depending on the migration of the population or the strategy of the competition.

We used different types of data to come up with a solution. Our three main data point that we focused on were the Mexican population throughout the US, Gamesa's Sales, and the number of sales representatives per region. We had to take into account all other factors that could affect our analysis, like the economic recession or the Arizona Immigration Law that affected the Hispanic population in the south. With all these data we could correlate it to see which regions were performing or underperforming and why. We also tried some different optimization modeling to come up with a solution but since all the regions were so different and inconsistent to one another, the models did not result in any definite conclusive data.

After all of this analysis we came up with different suggestions for Gamesa, depending on the region. Most of the regions will not need any change in relation to their sales agents. In some regions we found out that there is opportunity of gaining more market share and increasing sales if a sales representative was added. For other regions, we suggest keeping an eye on them for any drastic changes in sales and in the future there may be an opportunity to add another sales representative.



Background

PepsiCo bought Gamesa, a prominent Mexican manufacturer in 1990. Gamesa's main product is cookies but they also have a variety of products like pasta, flour, cereals and other similar products. For a while now PepsiCo has been selling Gamesa cookies under the Frito-Lay Brand. Since the number of Hispanics in the United States has been growing for a while and shows no sign of stopping anytime soon, Frito-Lay has been pushing the Gamesa brand into the US market for some years. Hispanics seem to be growing, and compared to other households, Hispanics have bigger sized households. These are the perfect target market for a Mexican Cookie company to aim for.

Gamesa has been the leading brand in Hispanic cookies in the US and still is, but the competition is rising. The main competitor, another Mexican company, Bimbo Marinela, has been growing in the last couple of years. Although Gamesa still maintains higher market share overall in the United States, Bimbo has been gaining on Gamesa in some regions and managed to beat Gamesa in sales in 2 out of the 16 regions this past year.

Gamesa divides the continental United States into 16 regions and has sales representatives spread throughout the regions. These representatives help with getting new stores to sell Gamesa products and also they maintain connections with current stores to make sure everything is running smoothly with their product sales in those stores. We were tasked to identify where new sales representatives could be placed to make Gamesa increase and regain the market share Gamesa had lost. We had to see in which region a sales representative would be most useful and to forecast where in the future a sales representative could be needed in the future.



Analysis of the situation

We approached the problem in different ways before we chose the method we were going to use to come up with a solution. We first tried to come up with the different variables that were going to define if another sales representative was needed. These three variables included the Mexican population per region, the sales per region and number of sales representative each region had. The most challenging variable was the population. Since Gamesa is a product targeted to the Hispanic population, and specifically to the Mexican population, we had to find out this specific number per region. What we did was to get the total Mexican population per state, and then we divided the states per region, percentage wise. For example, if Texas had a Hispanic population of 10 million and 10 percent of the area of the state belonged to the Mountain region, we assigned 100 thousand people to that specific region. We also researched the cities that had the most Mexican population per region so that we could correlate this with the numbers we got using the other method. With this analysis we could now get an idea of the regions that had the most Mexican population density and see where the population was moving through the past years. We also had to keep in mind that this was not an exact way of calculating the Mexican population for each region and that we were limited to the information found on the 2010 Hispanic US census. Another hidden factor that we had to keep in mind was that there are many illegal immigrants that will not show up in any census.

The other variable that we used was the sales numbers of Gamesa. We had this information sent from the team helping us at Frito Lay. With this information we could get an idea where was the most sales were made through the past five years. We already had this information per region so it was easy to manipulate. We also had the sales information for Bimbo to get an idea in what regions were they increasing or decreasing their sales. The total sales of Hispanic cookies was also given to us so we were able to calculate the market share each firm had for the past five years per region. It was very interesting to see how this numbers dropped or increased depending on different variables like the population of the region.

The third variable we had to analyze was the number of representatives each region had. We had this information given to us and it was broken down by city and by region. This was very interesting information because we found out that some regions did not have any sales representative at all. We were also given when each representative started working for Gamesa. With this information we could also see what cities and stores were visited by each representative, so we could get an excellent idea of the reach of each representative has even though it varied from region depending on the area and population density.

After we had all these information broken down per region we could compare it and start to make different analysis. We wanted to come up with a way that we could

plug all these variables to a model to come up with an optimal number and location of each sales representative. We wanted to see how much a representative influenced on the sales number of each region but we had to get deeper into this analysis to make any type of conclusion. We found out that each region was different and a lot of other different variables came in play depending on the region. One of these factors was the economic climate. The recession that hit the US could be reflected on the total sales of Gamesa. With the economy, people started to buy fewer products because they could not afford it. Another factor that we had to take into account was the Immigration Arizona Law. This law that passed in 2010 had a deep impact on the Mexican population that lived in Arizona and the nearby states. The population started to migrate to other states where they could feel safer, so we had to keep that in mind. With our research we found out that states like North Carolina and South Carolina, had an increasing Mexican population, which influenced the sales of Hispanic Cookies and Gamesa's sales. Another challenge we faced is that many of the people who buy Gamesa's product are illegal immigrants, so this people would not be reflected on the census we used to determine the Mexican population.

With all these different factors taken into account, we started to work towards a solution. We wanted to correlate all these factors to see how each region was doing and if they needed more sales representatives to perform better.



Description of the Models Used

The first thing we had to do was to condense the information that we had received from Gamesa and extract the data that we considered was most valuable. We made tables and charts to show the way Gamesa's sales had been changing over the last 5 years. Examples of these charts can be found in **Appendix A**.

After getting all the information in a way that was manageable and easy to view, we looked for a model that could help us find where a sales representative made the biggest impact. The first type of model we tried was a regression model. We used a multiple linear regression model, which takes in one or more independent variable and uses it to find their relation with the dependent variable. For this model we chose the Sales per region as the dependent variables and chose for the independent variables we chose the number of sales people, the population, the number of stores and the percentage of stores in which Gamesa products are sold (all these numbers are by region). Unfortunately the model did not return the answers we were looking for. We ran the model various times; adding and subtracting different independent variables and we always got different results. Sometimes, for example, the result came out saying that if you increase sales representatives then sales increase, other times that sales would decrease for every additional sales representative. This happened with many of the variables depending on the dependent variables we input into the system. So we decided that this regression model gave us inconclusive data and that we would not use it to determine our final solution.

The second model we used to help us reach a final solution was a Data Envelopment Analysis, or DEA. This model tries to find the efficiency frontier and helps us identify which of the 16 regions are efficient and which ones are not. Again we used the same variables as before in the hopes of getting a better answer. This time the answer the model gave us was closer to the type of answer that we were looking for but it still showed some errors. Some of these errors were like telling us that in order to achieve maximum efficiency, we had to lower the population of a region. We ultimately chose to ignore what the model recommends us to do to achieve efficiency but chose to keep in mind their analysis of which regions were efficient. It showed us that 5 out of the 16 regions are efficient; these were: Texas, Southern California, Carolina, New York and Central Gulf. The inefficient regions were: Northern California, Mountain, Pacific Northwest, Heartland, Midwest South, Midwest North, Florida, Southeast, Northeast, Mid Atlantic, and Mid America. We do not completely agree with this results because take for example the Mountain region; it is the only region that has grown in sales and market share in the last year. So we accepted these results, but second-guessed every one of them. The Region with the lowest efficiency rating is Heartland, and we completely agree with this result given that this region has a large Mexican population and its sales are not keeping up.

Analysis

After using different models, we found that these models were not going to give us the results we were hoping for. They might give us an idea of how things are working but they did not show us the value of a sales representative and how much sales a new representative would add. So we decided to get as much data as we could about the different regions and come up with our own analysis for each. The following are the results we got for each region and what we recommend Gamesa should do in each:

Carolinas:

In this Region, the Sales are slightly decreasing, while Bimbo is slightly increasing. But in our analysis we decide that this region has a good control of the market share with 76%, while Bimbo, Gamesa's biggest competitor, has only 6% market share. So, we decide that in this Region, with a Mexican population of 760,705, it is not necessary to add an agent because Gamesa has a good portion of the Market. Although, we believe this region might have to be revisited in the future because of the trends in Mexican immigration.

Midwest North:

In this Region, sales for Gamesa has been decreasing while Bimbo's have been increasing. However, Gamesa still has 64% of the Market share, while Bimbo only has 24%. But, with our analysis we decided that even though there is a good Mexican population, they are spread out all over the place. The current representative Gamesa has in this region only covers 15 stores so we believe that a new representative would be more useful in another region.

Southeast:

In the Southeast region we found a really interesting point that helps us to make the decision of not adding a representative. For the last 4 years both sales, Bimbo's and Gamesa's, have been decreasing at almost the same rate. This leads us to believe that the Mexican population, or any other potential buyer is actually moving away from this region. We recommend that in the future this region be revisited to see if sales are growing after this 5-year drop.

Northeast:

In the Northeast region, we recommend to keep it as is, because of low sales from both Bimbo and Gamesa. Although, we do recommend to double check this region because there was a very inclined drop in sales from 2008 to 2010, as you can see in the Sales per years graph in **Appendix A**. We do not think a sales representative is needed in this region because of its low Mexican population but we think it is worthwhile to figure out what happened that caused that sudden drop in sales.

New York:

The New York region is one of the regions that Gamesa does not do much for Gamesa because of its low sales. Its low sales are attributed to the low Mexican population, which are the main target for Gamesa products. So, this region does not need any representative. But it is important to mention that Bimbo has 10.7% market share while Gamesa has only 7%. This is one of the two regions that Bimbo has a bigger market share than Gamesa.

Heartland:

Heartland, by our analysis, is the most appropriate region to add a sales representative. We based our decision on the DEA model results and with our own analysis. First the Data Envelopment Analysis shows that Heartland was the most inefficient region of all the Gamesa regions. Also, with our analysis we can explain that in this region Gamesa sales have flatted out while Bimbo has been growing for the past 5-years. Gamesa sales and market share has been past by Bimbo's in the past 2 years. Furthermore, this region has a good Mexican population, with around 1,558,342 Mexicans, and our Sales vs. Representatives graph in **Appendix B** shows that last time a sales representative was added to this region sales grew significantly. So, we highly recommend adding a new representative in this region to prevent losing more market share and to give more competition to Bimbo.

Mountain:

In this region Gamesa has 3 sales representatives and 52% of the market share while Bimbo only has the 17%. Gamesa has a great position in this market and we recommend leaving it alone because it is the only region that has grown in both sales and market share this past year. We also believe that because of new immigration laws in border states, such as Arizona, Mexicans are likely to move north and the Mountain region is likely to profit from these events.

Mid Atlantic:

This region, with a Mexican population of around only half a million, is not relevant for the Gamesa sales because it only represent 0.9% of total Gamesa sales. We believe that Gamesa's attention is better focused on other places since this is not a heavily Mexican Hispanic population.

Central golf:

This region that has a Mexican population of 579,191, has an important fact that we found in our analysis. The information that we found is that the last year Bimbo's sales increased almost the same amount as what Gamesa decreased. Bimbo's Sales increase around \$80,000 while Gamesa's decreased about \$70,000. But Gamesa still has 56% of the market share and Bimbo has 31%. For now we believe it is not necessary to add a new agent because the total sales of Hispanic cookies is less than one million a year so it is not a large market to be worry about.

Florida:

The Florida market is a small market for the Gamesa sales. It only represents 0.4% of total Gamesa sales and this is because of the small Mexican population in comparison with the huge Hispanic market that lives in Florida. This Hispanic population might be potential buyers, but are more likely to buy food that remind them of their home country and not Gamesa products. So we recommend not adding an agent in this region.

Midwest South:

The Midwest South region has a stable market for the past four years and is holding a large part of the market share, 50.2%, while Bimbo has 30.2%. So with a Mexican population of around 726,268 and with one sale representative, we conclude that is not necessary to add another one in this region. But we do believe Gamesa should keep a close eye on this region because Bimbo's sales have been increasing in the past years.

Texas:

This region represents the biggest Gamesa sales region with 37.4% of the whole Gamesa Sales. Also, Texas has 11 sales agents and Gamesa controls 58.8% of the market share while Bimbo has 24%. Furthermore, the Gamesa sales have been increasing for the past 4 years. Therefore, we recommend keeping the region with the same number of representative for the reason that sales are increasing and market share is far from the Bimbo's market share.

North California:

The North California region has the fourth biggest sales and represents 7% of total Gamesa sales. In this region Gamesa has four agents and has 49.7% of the market share while Bimbo has 33.1%. Also, we believe that Mexicans might move north eventually so this region is a good place to add a new representative in the future. Furthermore, on the graph of sales vs. years (**Appendix A**), we can see that Bimbo is growing in sales while Gamesa is not. So, we choose North California as our second option to add a sale representative after Heartland.

South California:

The South California region represents 30% of total whole Gamesa sales and Gamesa has a market share of 50% while Bimbo has 31%. This region, as the Texas Region, has 11 sales representatives and has been stable for the past 2 years. So, we recommend keeping the 11 representative because they are doing well with the Gamesa sales in the South California Region.

Mid America:

This region does not have a relevant impact in the Gamesa sales because it represents only the 0.9% of all Gamesa sales. Also, in this region Gamesa has 50% of the market share while Bimbo has only 10%. So, we recommend in this region to keep it without representative because Gamesa has a great market position.

Pacific Northwest:

In this region Gamesa has 57% of the market share while Bimbo has 17%. It has a pretty good Mexican population and Gamesa sales have been pretty stable. Bimbo sales have also been stable so we believe Gamesa will keep dominating this region if it is left as is.



Conclusion

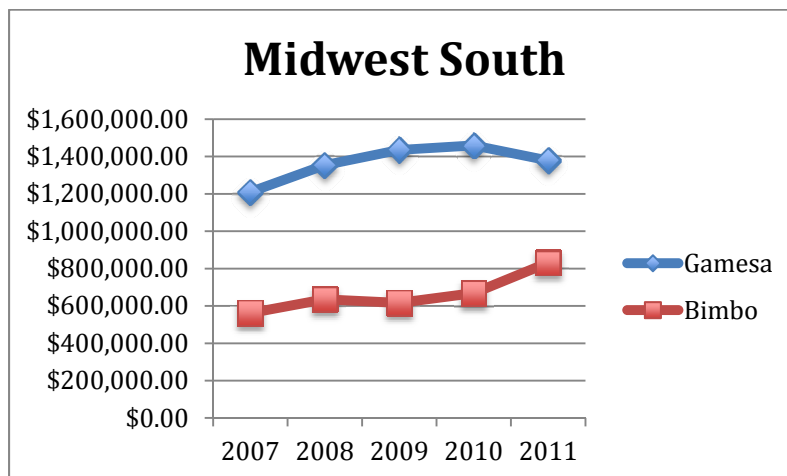
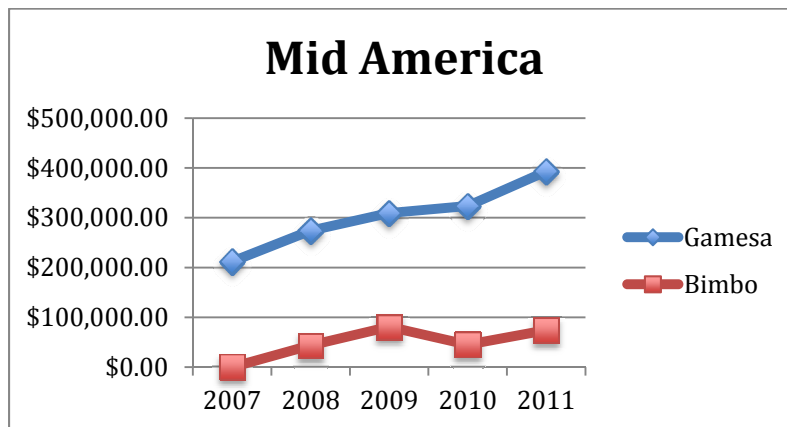
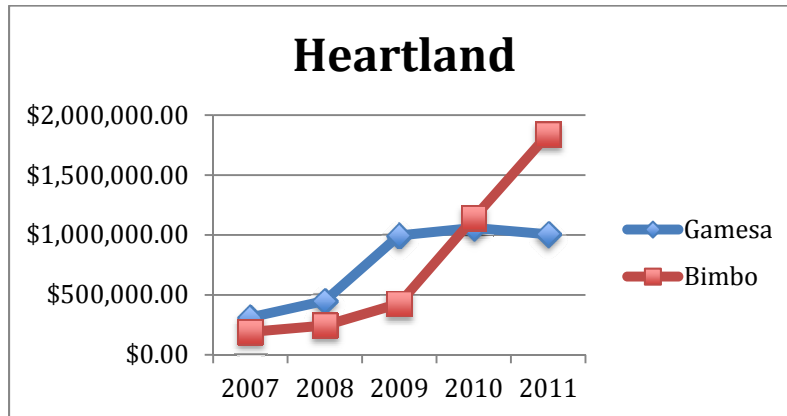
Before getting the results we wanted, we thought that a linear regression model would help us solve our problem. But when we applied these models to our problems we got very strange results. We ran the model various times with different sets of variables and we were hoping that the results would ultimately point to the same conclusion. This was not the case. Sometimes our model told us that bringing in a new sales representative would give Gamesa more sales, but other times it showed that a new representative would hurt the sales. The same was the case for a new store, more or less market share, and increase or decrease in the Mexican population. We then moved to a Data Envelopment Analysis, which would help us, figure out an efficiency frontier and show us which regions are efficient and which weren't. This model gave us a better idea than the regression models but still not the results we were hoping for. Consequently, we decided to implement a data analysis structure, which helped us to get the solution that Gamesa was asking from us. The data analysis structure that we made was based in different factors per regions, such as Mexican population, sales, market share and number of representatives. After analyzing each region we got a solution and some forecasts that we highly recommend Gamesa to implement in the future.

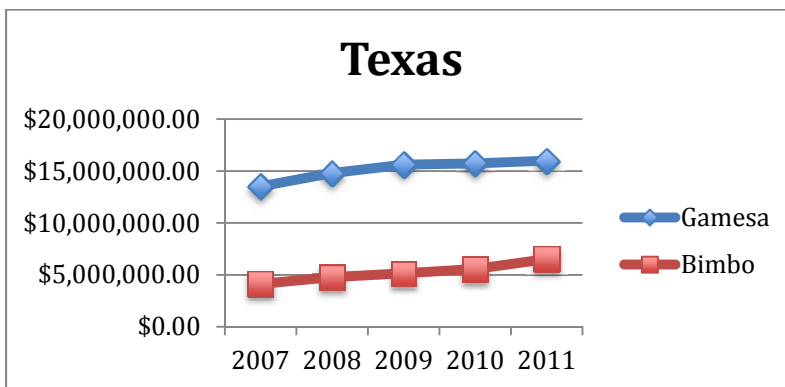
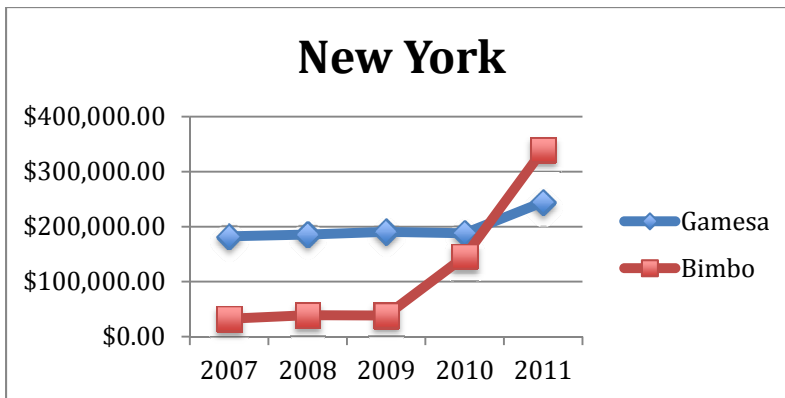
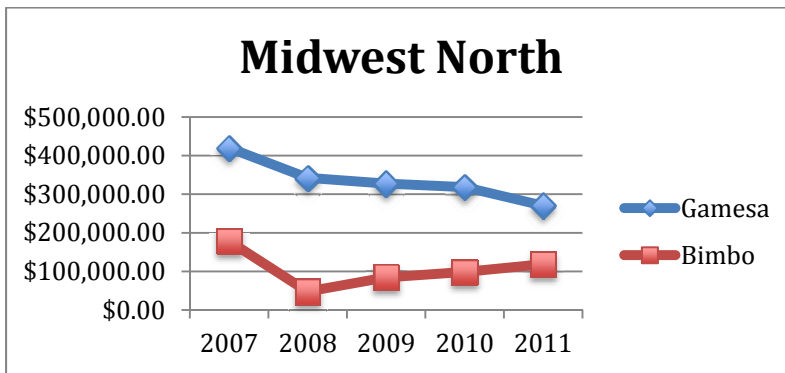
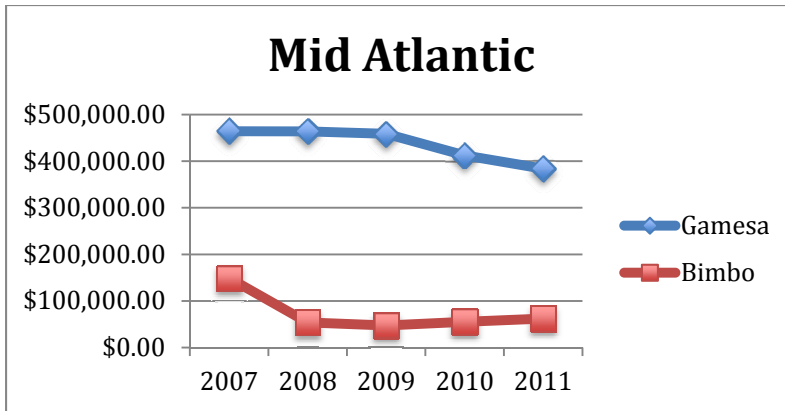
There are a few other regions which we think a closer examination is necessary, even though we do not think a sales agent will help right now. In the Midwest South region Bimbo's sales have been increasing in the past years while Gamesa's have been pretty flat. In the Northeast, there was a sudden drop in sales from 2008 to 2010. Because there is a small Mexican population we do not consider it needs another representatives but that sudden drop should be looked into. The final region that deserves a closer look is the Southeast region. In this region Gamesa's and Bimbo's sales have been falling consistently for the past 5 years. This might be recession or just people moving away from that area. Whatever it is, it should be looked into to see what can be done to stop that consistent fall in sales. Last time a representative was added sales kept falling.

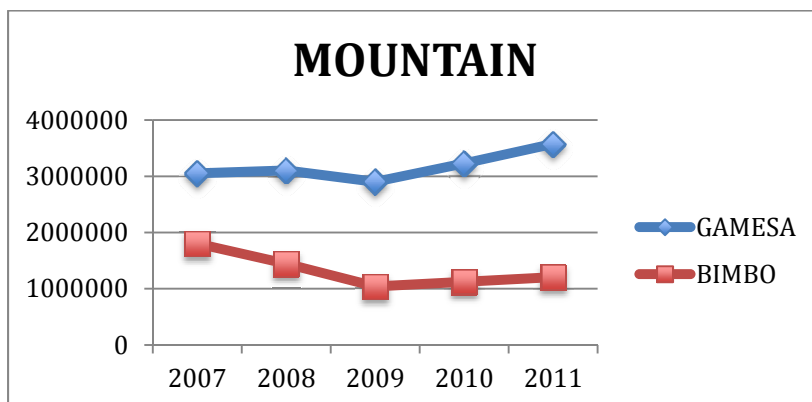
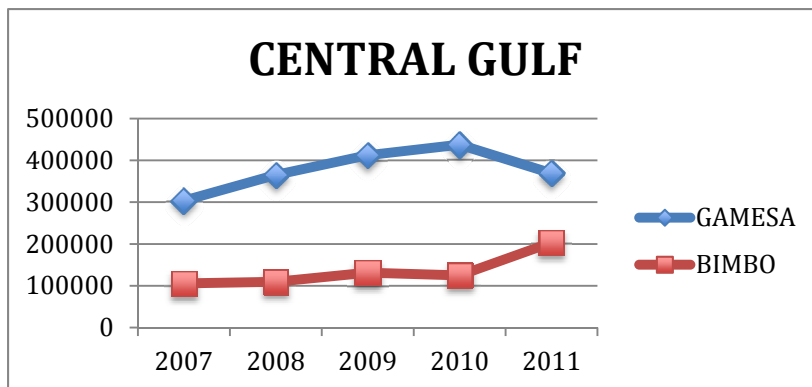
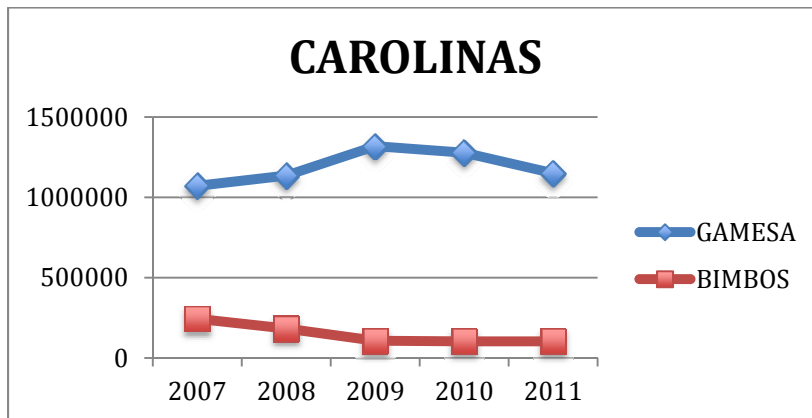
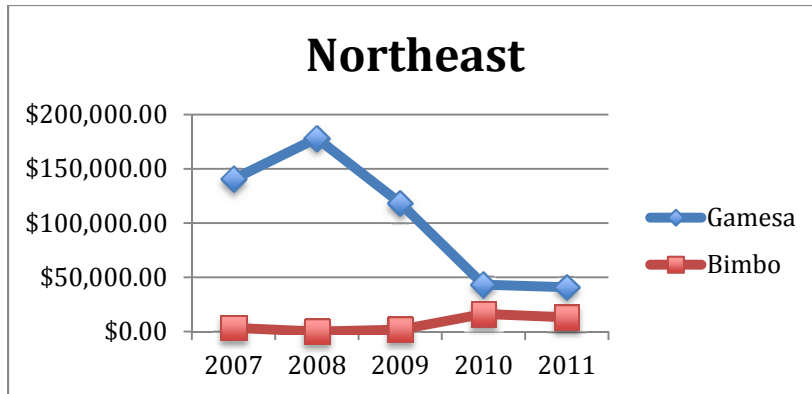
The first recommendation is to add a representative to the Heartland region. We support this decision with some main points. The first reason was that Bimbo has surpassed Gamesa in sales the last 2 years. The second reason is that last time a sales representative was added to this region the sales grew significantly. Lastly, the Heartland region has a large potential market in terms of Mexican population.

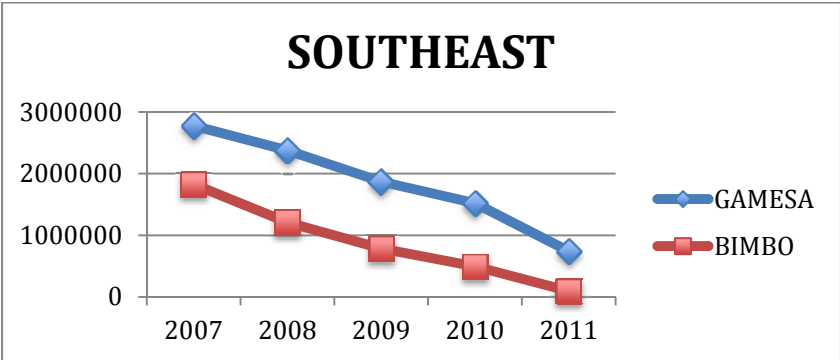
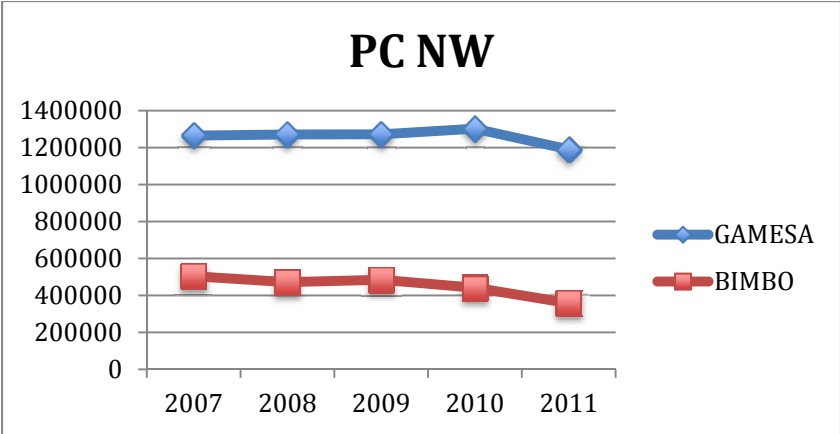
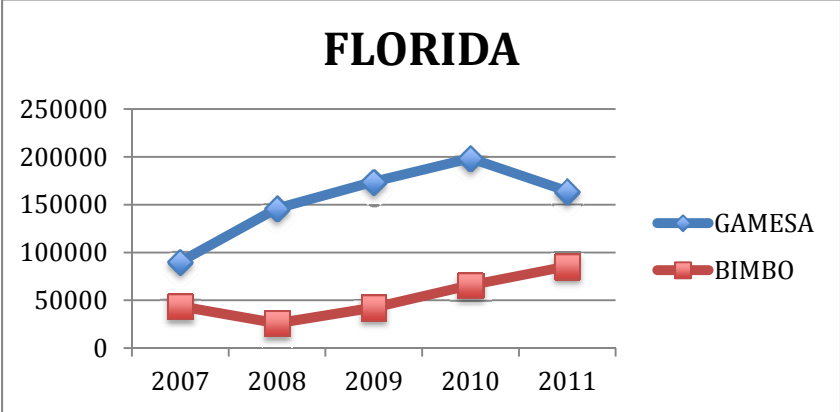
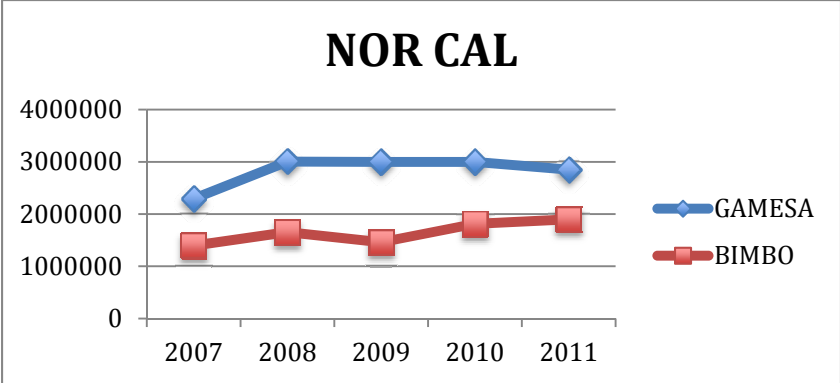
The other region that we recommend to add a representative, but not as highly recommended as in Heartland, is in North California. The North California region has a large growing Mexican market and only four agents represent it. So for the future we recommend to take this region in consideration for adding more representatives, since the Mexican population is likely to grow.

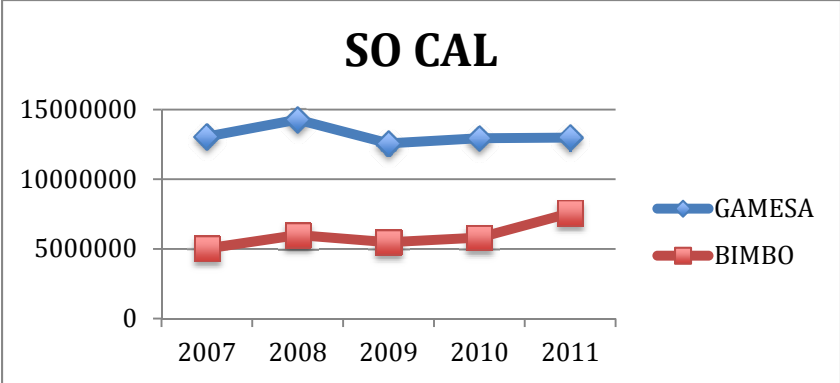
Appendix A. Gamesa vs. Bimbo sales per Region



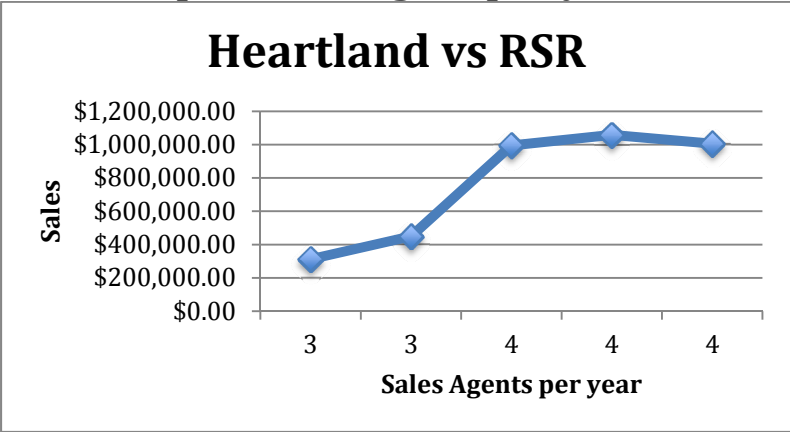




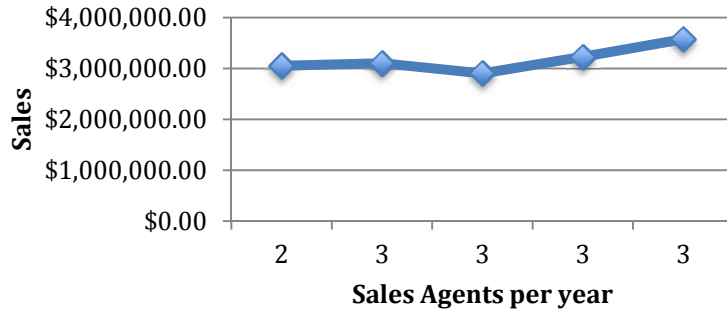




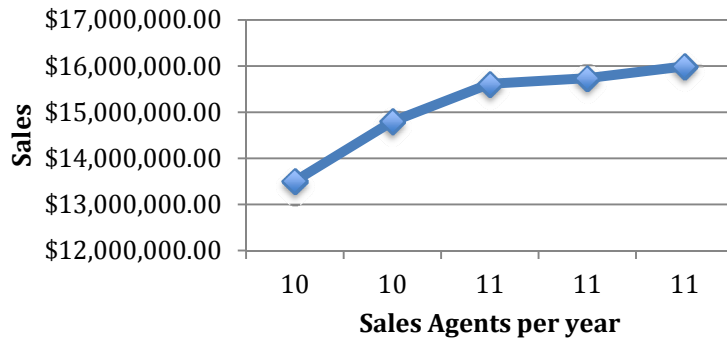
Appendix B. Sales per Sales Agent per year



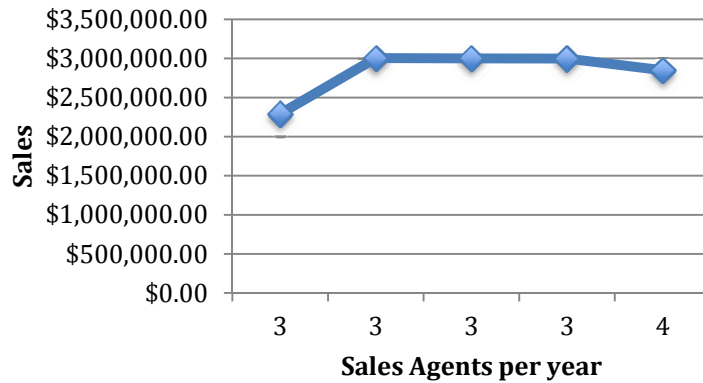
Mountain vs RSR

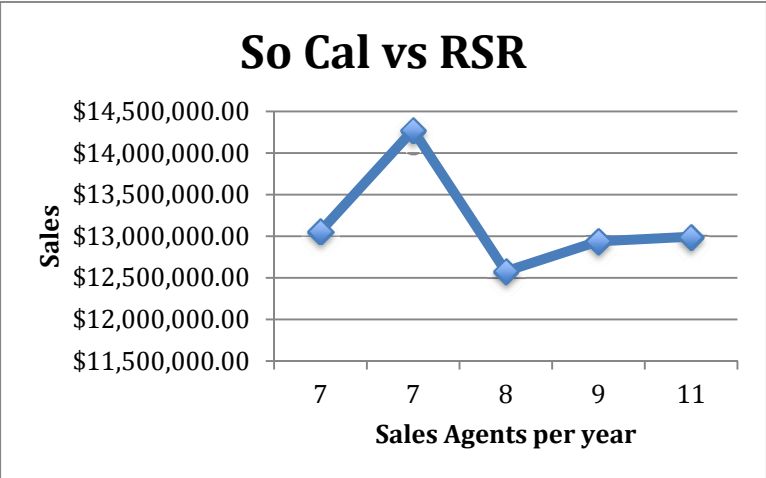
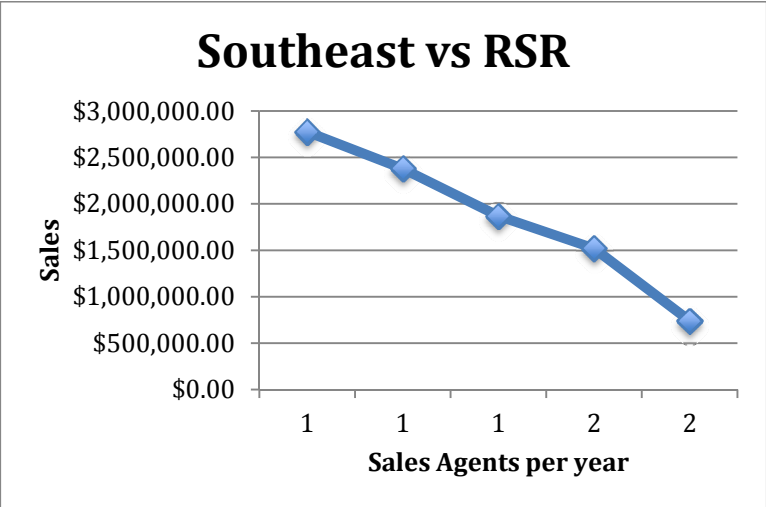
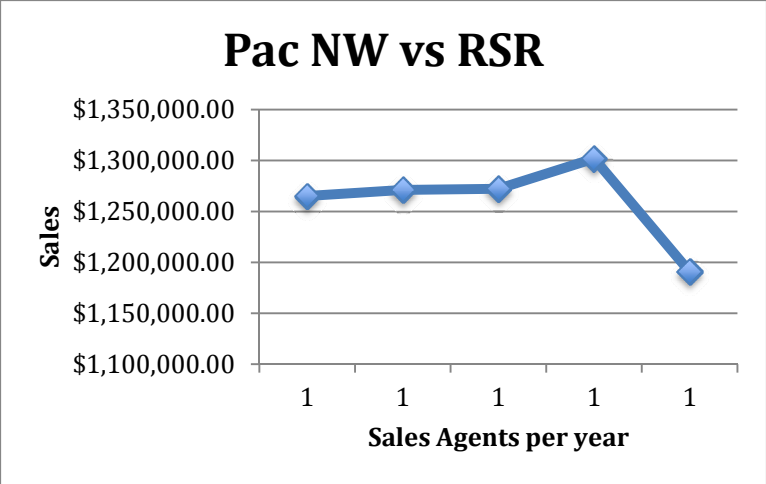


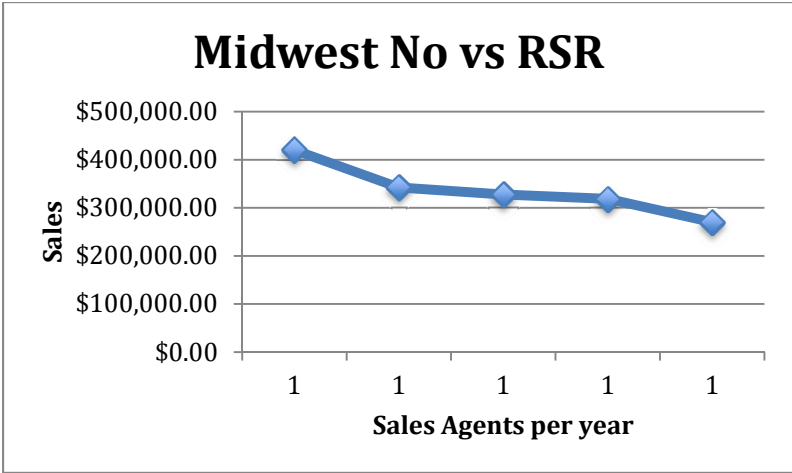
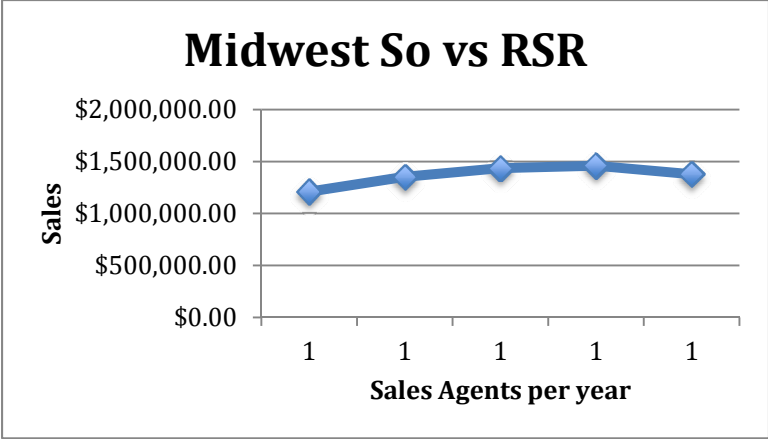
Texas vs RSR



No Cal vs RSR







Appendix C

Region	Population	Reps	ACV Gamesa	1/ACV Bimbo	Rep stores	Sales
TEXAS	7,061,160	11	0.92	1.75	803	\$ 15,992,704.76
NOR CAL	6,760,669	4	0.77	5.26	488	\$ 2,850,268.33
SO CAL	4,253,613	11	0.72	3.57	1081	\$ 12,994,441.93
MOUNTAIN	4,180,871	3	0.77	8.33	273	\$ 3,577,220.64
PAC NW	1,976,601	1	0.65	12.50	87	\$ 1,190,867.73
HEARTLAND	1,558,342	4	0.48	12.50	285	\$ 1,005,658.63
MIDWEST NORTH	932,903	1	0.43	20.00	15	\$ 270,217.02
CAROLINAS	760,705	0	0.56	100.00	0	\$ 1,150,014.94
MIDWEST SOUTH	726,268	1	0.39	12.50	60	\$ 1,378,599.30
FLORIDA	695,008	0	0.17	20.00	0	\$ 164,132.52
SOUTHEAST	635,312	2	0.64	33.33	148	\$ 740,983.56
CENTRAL GULF	579,191	0	0.39	16.67	0	\$ 369,242.33
NORTHEAST	544,687	0	0.04	999.00	0	\$ 40,813.74
MID ATLANTIC	502,512	0	0.33	100.00	0	\$ 383,862.05
MID AMERICA	484,658	0	0.52	100.00	0	\$ 392,899.26
NEW YORK	88,699	0	0.18	16.67	0	\$ 244,539.85