



## Gregg County Value Proposition - Kilgore and Longview



**TEXAS A&M**  
UNIVERSITY



**GLOBAL SUPPLY CHAIN  
LABORATORY**  
TEXAS A&M UNIVERSITY

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## 1 Introduction

Several conditions impact new investment and business development opportunities. Some aspects are related to existing infrastructure, location, added-value capabilities for production, logistics factors, business support services, etc. To that end, Gregg County – Kilgore and Longview’s Economic Development Corporations, are interested in determining and improving the value proposition that can offer to their potential industry clients based on an analysis of market opportunities, supply chain integration of industry clusters, and return on investment. A value proposition based on a solid analysis will offer a more compelling reason to locate in any particular region.

An initial objective of this research project is to understand the factors that may support the sustainability of the targeted verticals in the long-term. The development of this project involves the analysis of selected industries, evaluate the structure of the market, and identify supply chain integration. Therefore, the research includes an assessment of relevant industry verticals, recommendations on the best verticals to serve, a list of potential customer firms from those verticals, services and processes to serve those verticals, and recommendations for assessing future customer opportunities.

In addition, we studied costs associated with firms making a location decision in this region. This approach serves to develop business cases. Furthermore, the assessment creates an ROI-based analysis that formulates case studies to use as marketing collateral as well as understanding targeted industries and specific customer types.

Gregg County has many great opportunities to further economic development through its competitive advantages. These advantages must be communicated appropriately to potential investors through a powerful value proposition. This study is focused on presenting the importance of assessing critical factors, and quantifies benefits by performing an analysis on the market, cluster’s formation and ROI.

This comprehensive analysis embraces the business planning perspective that must be taken into consideration when evaluating factors to determine attractiveness of a site. The analysis links the methodology of the Growth Framework model developed by Texas A&M. It also describes growth strategies and opportunities for the development of services in the existing clusters. The proposed approach will help understanding market needs thereby determining strategies to pursue defined customers and growth in targeted industry sectors.

### **1.1 Project scope**

The scope of the project includes a market assessment of industry verticals to identify high potential customer types, target industries, and specific customers. Assess location and cost factors and apply them to a ROI equation to develop multiple business cases, based and identify industry verticals that fit the analysis profile and create sustainability on the market expansion strategy. Study cases will be based on Kilgore and Longview

### **1.2 Deliverables**

The project deliverables are:

- An analysis as to which industries will achieve the highest Return on Investment (ROI).
- Market regional analysis and identification of areas of opportunity.
- Identification of “ideal” clients and potential customers.
- Procedures for economic developers to conduct an ROI analysis for potential investors.
- A written report including findings and recommendations.

### **1.3 Key Industries**

Given the requirements, verticals to study in Kilgore-Longview are:

1. Chemicals.
2. Plastics (Plastics products manufacturing).
3. Metal manufacturing (machinery/ equipment and components either machined or fabricated).
4. Distribution/Warehousing
5. Food processing

The analysis on key selected verticals is important to evaluate industry supply chains. This analysis will identify gaps in industry integration and, therefore, provide information about how Gregg County can meet those gaps. Market analysis will identify potential companies that can be targeted. An ROI analysis on individual companies will evaluate key factors in the location decision.

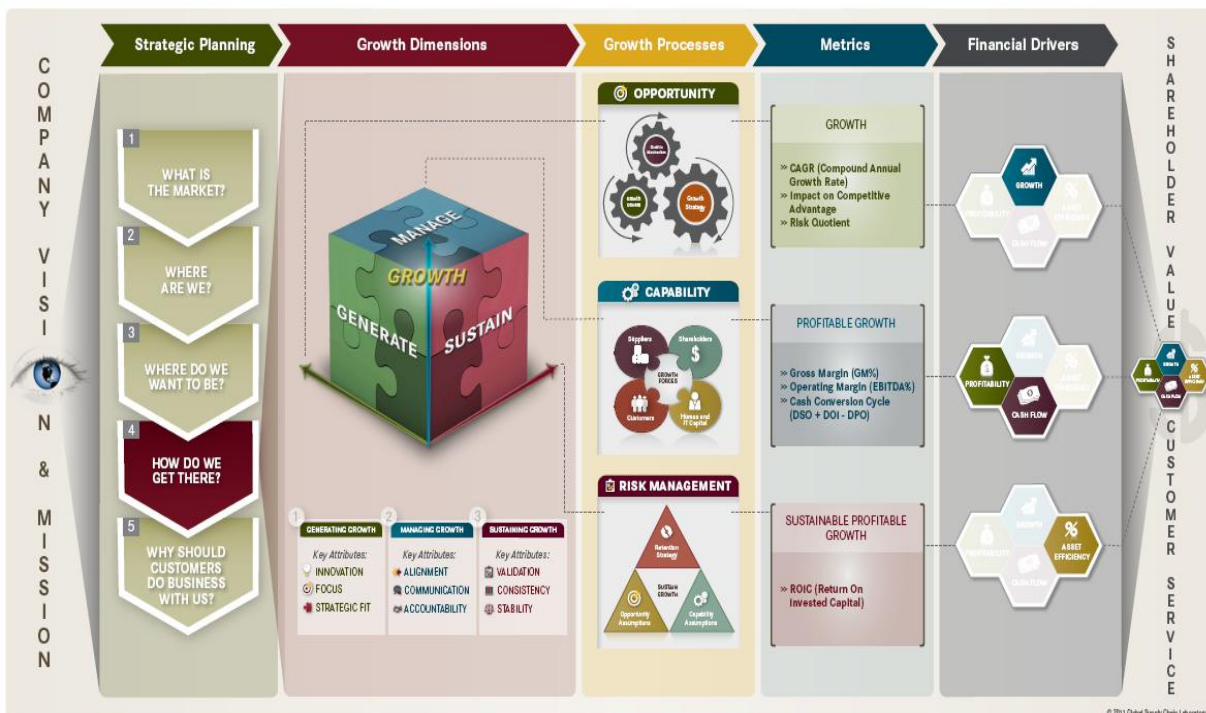
## 2 Texas A&M: Distribution Growth Framework

The primary project objective is to analyze key verticals that have the potential to locate in Gregg County. To maximize results, Gregg County must understand key factors that drive new business investment decisions, how to retain existing companies (sustainability), and how to promote growth. The Global Supply Chain Laboratory at Texas A&M University has developed a framework to explain corporate growth processes. This framework is focused in three elements: generation, managing, and sustainability. Each element is focused on different aspects of the decision making process, and the framework was created to propose strategies, drivers, and mechanisms.

In general, it is assumed that growth is all about revenue. However, this corresponds only to the growth *generation* dimension. Growth must be profitable, which corresponds to a *managing* element, and *sustainable*, meaning growth for a long period of time.

Figure 1 shows a map with these dimensions, key attributes, metrics and financial drivers.

**Figure 1: Distribution Growth Framework**



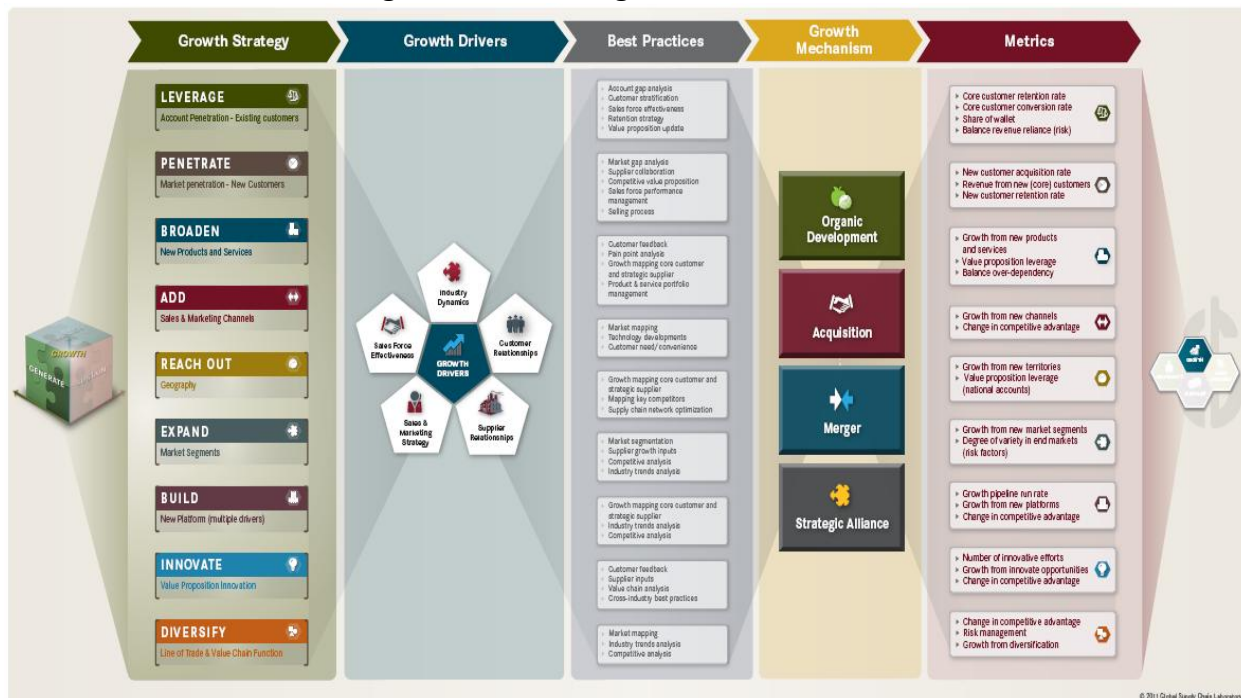
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- **Generate growth:** is composed of methods for revenue growth. Key attributes are innovation, focus, and strategic fit. These attributes suggest actions to follow. For example, penetrate a new market, move to a new region, create new products, retain existing customers, etc. Measurements include the CAGR (Compound Annual Growth Rate), the Impact on Competitive Advantage, and the Risk quotient.
- **Manage growth:** is focused on remaining profitable during growth by creating and maintaining efficient operations. Managing growth seeks to control and improve operations through selling final products, buying raw material, managing inventory, etc. Metrics are used to evaluate Gross Margin Percentage (GM %), Operating Margins (EBITDA %), and the cash conversion cycle.
- **Sustain growth:** assesses long-term efficiency through controlling risks. The key metric is a sustainable ROI.

## 2.1 Generating Growth – Best Practices

Generating growth is focused on generating revenue. The Global Supply Chain Laboratory has identified strategies to achieve this objective.

**Figure 2: Generating Growth Framework**



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Gregg County must understand company growth strategies to determine what will drive the company's decision making. Firms base their location decisions on opportunity (growth

generators), investment and cost requirements (growth management), and risk (sustaining growth). Risk, simply defined, is the chance that any component in the ROI equation turns out to be something other than what the company expected. Risk has always been a major factor in location decisions, but the Great Recession constricted cash flow and credit in ways never seen before. In the “new normal,” firms have become very sensitive to all forms of investment because they tie up cash flow.

Forecasting is an inexact science that becomes even more difficult in location decisions because no demand history is available, and the forecast must be constructed from causal factors (population, number of customers, etc.). Demand history forecasting comes off the company’s own sales data and is, therefore, more accurate than a market forecast. If the forecast is too high, some business may be missed. If too low, the target ROI will not be achieved. Most firms prefer a conservative forecast to ensure they make the ROI estimate. The firm will seek locations where the market forecast can be more accurate or where error will more likely be on the high side. To create a more accurate forecast, many firms look to places where existing customers are currently located (easier to sell to those who already buy). To guarantee missed forecasts will be on the high side, companies look for very attractive markets with tremendous upward potential. The Gregg County market has always been very vibrant with less variation during downturns (less risk of under-forecasting).

The second form of risk comes from higher than expected expenses. Major expenses include human resources, rent, utilities, transportation, etc. If a city has higher than normal expenses, it is critical that whatever the firm predicts is what happens. Higher than expected expenses in a higher than normal cost zone will reflect badly on the decision makers and if the forecast is also wrong, the firm may exit the market quickly and warn others to stay away. The two areas where estimates are most commonly missed are human resources and transportation.

Industry clusters create strong support services. A dominant industry (Gregg County’s powerful oil and gas industry is a perfect example) will typically generate a strong human resources base. Competitive firms will train many people who can switch between companies, and local universities will usually add curriculum to support the cluster. Transportation also benefits because providers will be drawn to the cluster as well. This process works well when the cluster is mature but, in its early stages, there can be critical shortages. Training costs can explode and transportation may not be available at first. Even when the cluster is growing, salaries may increase quickly (due to competition for labor) and transportation may experience capacity problems in keeping up with the growth.

Predicting asset needs is more straightforward, providing that the firm was able to accurately forecast demand. If the forecast was too high, inventory can build up until adjustments are made. If the forecast is too low, more assets may be needed quickly leading to cash flow problems. The most common problem in location decisions is asset mix. The firm must determine not only how much business they will receive but what kind. For example, a firm opening in Lafayette, Louisiana correctly predicted \$10 million in sales. However, the sales were focused in areas for which the firm had not prepared. The company had to bring in new equipment, inventory, and buy a larger building to operate. These investments destroyed the original ROI estimate. Gregg County should understand the investor's business models well enough to assist in predicting what assets will be needed for what customer base.

Risk comes from not understanding or incorrectly identifying the nature of underlying factors. All growth opportunities originate from the drivers (factors) presented in the following figure.

**Figure 3: Generating Growth Drivers**



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- **Industry dynamics:** This driver is based on the market. Who are the customers, market segments, industry trends, etc.? The industry dynamics drive companies to create new products and to innovate, to expand their target market or reduce it, to focus in a geographic region or reach out to new regions. For example, political forces have caused a great deal of uncertainty in green products. Firms are currently evaluating whether subsidies will stay in place or regulations will be rolled back. China has been aggressively subsidizing producers as well. These dynamics led to oversupply and a collapse in prices. Foreign competition, combined with easing regulations and elimination of subsidies, could result in significant ROI failures (if not more bankruptcies) in this market. All firms study trends intently. If market forces turn against a firm, disaster is sure to follow. Firms evaluating markets, like Gregg County, want solid,

quantifiable information on trends that can be used for more effective market forecasting.

- **Customer relationships:** This driver is based on the relationship between companies and their customers. A good relationship facilitates the gathering of information about customers' concerns, suggestions, needs, requirements, etc. Such information allows for better forecasting and a better understanding of projected customer needs (impacting expenses and asset requirements). If strong customer relationships exist in a new territory, risk is minimal and opportunity is great.
- **Supplier relationships:** Supplier relationships play two roles in a location decision. First is capacity: Can the local supply base meet the firm's needs? If not, the distance between strategic suppliers (70% of a firm's purchasing spend) and the proposed location will increase expenses and asset investment. A longer supply chain requires more transportation and management oversight expenses. More importantly, longer supply chains mean longer lead times, which mean more inventory, which leads to more warehouse space and personnel. Texas in general and Gregg County in particular is and will continue to benefit as more firms locate in Texas and seek to bring their supplier closer. Mexico is a major manufacturing hub, and many firms are choosing to get closer without crossing the border. Firms sourcing from China have not only experienced the problems explained above, but also find that when the economy shifts down, Chinese supply chains will have more products in the pipeline (longer pipeline), thereby exploding their inventory. When the economy expands, the Chinese suppliers need months to ramp up and get product across the ocean. The "new normal" will demand agility. Gregg County should position for this trend.
- **Sales and marketing strategy:** Firms most often base their location decisions on what will most positively impact sales. This can mean lower cost of operations; the focus for the past 30+ years. It could mean customer proximity; the most traditional reason that was trumped by the all-out rush for low cost labor. Most recently, it means product differentiation, the new mandate that requires a well-educated workforce. Product differentiation drives companies to change market segments, products, operations, suppliers, etc.
- **Sales force effectiveness:** If the reason to locate an operation is based on a local customer base, like most US based decisions, then the ability to develop an effective local sales force can be critical. The sales force often drives prices, production rates, product requirements, etc., and must be highly capable. Product differentiation is becoming very dependent on "the voice of the customer." The sales force not only delivers the customer's message but helps the customer to understand what they really need.

Corporate strategies for generating growth are: leverage, penetrate, broaden, add, reach out, expand, build, innovate, and diversify. We are going to detail them as follows.

### 2.1.1 Leverage

The leverage strategy is related to existing customers, how much more a company can do for its existing customers, and how much more to get from the existing customers. These two objectives are driven by the relationship with your customers, how to receive information about their challenges, suggestions to improve their business, needs, etc. Location decisions are often driven by customer relationships because the inability to serve the customer in all markets gives competitors a “foot in the door” that can lead to the loss of business in your existing markets as well. Some location decisions are defensive in nature, following customers to keep competitors away; others may be offensive where the firm is interested in the market strictly to seize more business. Gregg County’s strategy will differ based on the firm’s priorities. In the former, the city “facilitates” the move helping the firm to establish a base at the lowest possible cost. In the latter, the city partners with the firm in seizing market share.

The firm’s sales and marketing strategy establishes how the firm will pursue business in the target market. The tools can include advertising, promotions, and media campaigns. These processes are connected to sales force or storefront activities as well. The balance between these processes will determine facilities, local inventory, equipment, and human resources needs. The cost of facilities and level of investment will be key decision variables. If the firm misestimates the cost or magnitude of these variables, risk will escalate. An effective sales force and a well-trained operations workforce will be critical to control risk and hold down training expenses.

**Figure 4: Leverage Strategy – Growth Drivers**



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To implement the leverage strategy, the following best practices are recommended:

- **Account gap analysis:** This practice consists of new product sales to existing customers. It identifies potential opportunities and customers' needs, and tries to satisfy them with new products. For example, if a company produces products A and B, and a customer only buys product A, account gap analysis identifies the opportunity to sell product B to this customer.
- **Customer stratification:** Companies should identify their key (core) customers and try to make them more loyal to the company through a powerful value proposition. The strategy is to make it difficult for customers to move to another company. Core customers are 5 to 10% of the average firm's customers and account for 80% of sales and 90% of net margins. Without the core customer, no firm can survive. Companies do their utmost to protect these customers from the competition. Core customers are the primary reason for most location decisions based on market opportunity. In addition to driving sales, a large number of core customers reduce the risk of over forecasting (a major risk driver). Gregg County must understand the investor's core customers and their presence in markets accessible from the Gregg County area. Economic developers often interpret these decisions based upon logistics capability (quality of roads, 3PL facilities, etc.). While logistics facilitates market access, the primary driver is the customer's proximity not the transportation network.
- **Sales force effectiveness:** Best practice firms measure sales force performance. An effective sales force is primarily a training issue. Gregg County should provide a highly educated workforce necessary for creating an effective sales force.
- **Retention strategy:** Best practice firms track why the company loses customers, and develops a retention strategy to keep them. A growing, dynamic market like Gregg County should be able to argue in favor of core customer retention. Most firms watch these business cycle trends closely and factor them into their location decisions.
- **Value proposition update:** Customers' needs and preferences change through time, and companies evolve to satisfy those needs. An example is when Apple added new features to the iPhone because the market had changed and the initial characteristics of the product were no longer attractive to customers. Service model updates are even more common and often require a highly flexible sales force.

The generating growth framework identifies four mechanisms: organic development (investing more in your existing resources), acquisition (buy a new location, or buy another company), merge mechanism (merging with another company and joining forces to increase revenue), and establish strategic alliances (making alliances with your suppliers or outsourced services to facilitate operations). The most important mechanism for economic development is organic development.

Finally, the company has to decide how it is going to measure the effectiveness of the selected best practices and mechanisms. The usual metrics are customer retention rate, customer conversion rate, share of the wallet, and the balance of revenue reliance. These metrics

measure the percentage of customers a company can retain, or how many new customers the company can attract, the expenses that company incurs, and risk.

Leverage is important to this project because it is related to existing customers and existing infrastructure. This connection can be analyzed through Gregg County's existing infrastructure and market to find potential opportunities and customers.

### 2.1.2 Penetrate

The primary driver for the penetration strategy is to attract new customers. The focus is on new products, services, and locations. In contrast to the leverage strategy, the penetration strategy focuses on supplier relationships and industry dynamics.

Suppliers are the key to this strategy because they often encourage or discourage supply chain partners to locate in an area. If a supplier would like to penetrate a market, they will often partner with distributors or retailers and encourage them to locate there.

**Figure 5: Penetration Strategy - Growth Drivers**



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Some of the best practices recommended are:

- **Market gap analysis:** Identify potential new customers, assess their needs, and determine how to satisfy them.
- **Supplier collaboration:** Collaborate with the suppliers to create or introduce new products.
- **Selling process:** Offer and sell products to new customers.

Companies seeking to penetrate new markets typically conduct a thorough analysis first. This analysis should detail the size and structure of the market, the competition, products and services already offered, and opportunities for the firm's offerings.

To find which companies could be relocated at Gregg County, it is necessary to analyze the market. The market analysis section presents this analysis and results.

### 2.1.3 Broaden

Broaden is the creation of new products and services. Firms will often seek out new territories to broaden their offering. Existing processes at a firm can make it difficult for new products or services to develop. Firms looking to diversify their offerings often seek sometimes find it easier to "start fresh" in a new market where existing operations are not competing with it for resources.

This strategy is driven by the industry dynamics; companies cannot produce a new product if they do not perform a market analysis and identify possible opportunities, target market, or industry trends. In addition to eliminating internal competition, new markets may be better suited to the offering.

Broaden is strongly connected with the leverage and penetrate strategies. It is only possible to implement the broaden strategy after the company understands how it can be offered to existing and new customers. It is not possible to produce new products without the right supply chain.

**Figure 6: Broaden - Growth Drivers**



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Finally, new products need a marketing campaign to attract customers, even before the product has been released.

The best practices recommended to implement this strategy are:

- **Customer feedback:** Any company should have information about customers' needs or industry trends before creating a new product or service.
- **Pain point analysis:** What are the customer's needs? What new products do the customers expect? What value can the company offer? The pain point analysis examines customer needs. What are the factors that drive customers to look for new products or alternatives?

Gregg County can attract companies into the region by offering a market where the companies can penetrate with new products or services.

#### **2.1.4 Add**

The add strategy suggests the addition of new sales and marketing channels. This means, the company should add new ways to promote and sell their products. For example, using the Internet to advertise products, shipping products directly to customers, selling through another company, etc.

Sales and marketing strategies are the primary drivers; they should help identify new potential channels for selling and marketing. The sales force has to effectively show the value added by these new channels and motivate customers to use them. In the customer relationship, it is important to understand customer expectations, and, with the proper information, to design the correct sales and marketing strategy to satisfy the customer expectations.

**Figure 7: Add - Growth Drivers**

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The strategy also suggests some of the following best practices:

- **Technology developments:** Develop new technologies to create new sales and marketing channels. For example, if the company does not have a webpage, the creation of one is a new channel for promoting products through the Internet, and moreover, selling products through the web.
- **Customer need/convenience:** Identify the customer needs that create opportunity to use a different sales channel; customers' convenience can also suggest these opportunities. For example, a company identifies that for specific customers it is convenient if they receive products at their home instead of going to the store to pick up the product. The company can decide to create a system that offers customers the possibility of ordering from home so they can receive the products by mail.

This strategy drives companies to seek the least expensive manufacturing site that has the strongest logistics capability. Gregg County should focus on firms that sell products requiring a highly capable workforce under this strategy.

### **2.1.5 Reach out**

This strategy applies to any new geographical location and is, therefore, critical to economic developers.

The strategy calls for the understanding of the industry dynamics in the targeted region. Is the new region a market for company products? Can the new region be connected through the existing infrastructure? Can the supply chain be integrated?

**Figure 8: Reach Out - Growth Drivers**



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Best practices used in this strategy are:

- **Growth mapping core customers and strategic suppliers:** As discussed above, mapping core customers and key suppliers determines whether they are located in the new region or can be reached out from there.
- **Mapping key competitors:** Determines what regions are value markets to our competitors, and how the expansion of operations can facilitate access to the new market.
- **Supply chain network optimization:** Evaluates whether the supply chain can support the new region and if distribution costs are effective.

Gregg County should offer an attractive market with a solid infrastructure to attract companies and investments to the region. The market analysis and the supply chain of key selected verticals are presented in this document.

### **2.1.6 Expand**

Expand focuses on new market segments the company could capitalize on.

This strategy depends on the analysis of industry dynamics, market segments, and potential customers. Firms create an action plan and a market strategy to detail the production of new products, or the changes in the existing products to satisfy the preferences new market segments. The action plan is presented to suppliers to make sure they can support new products.

**Figure 9: Expand Strategy - Growth Drivers**



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The best practices recommended to implement this strategy are:

- **Market segmentation:** Defines different market segments, identifies the requirements and preferences of each, and determines how it is possible to satisfy each segment.
- **Supplier growth inputs:** Suppliers usually work with more than one company, and so, their products must comply with requirements. It is possible to understand the industry dynamics by analyzing supplier growth.
- **Competitive analysis:** An analysis about other competitors' offerings and segments.
- **Industry trends analysis:** Identifies market trends.

For this strategy the metrics recommended are: growth of new markets segments, and the degree and variety of end markets.

This strategy is crucial in this project because a main objective is to assess the expansion of the market, the identification of new opportunities, and the evaluation of possibilities for the creation of new jobs.

### **2.1.7 Build**

Build is the creation of new platforms to generate growth. This strategy is based on the use of at least one of the previous strategies.

More often, the strategy represents a combination of different strategies. For example, targeting a new market segment (*expand*) in a different geographic place (*reach out*); also reaching that market by the use of sales through Internet (*add*).

There are no direct drivers for this strategy. This strategy is driven by the corresponding drivers of the selected strategies.

The companies that can be relocated in Gregg County could be following this strategy because they are going to target a new region, and also because they are going to penetrate a new market. It is important for these companies to evaluate other strategies like adding new sales and market channels or offering new products and services.

### 2.1.8 Innovate

Innovation is the creation of new products and services combinations that leads to a new value proposition for the firm. The value proposition consists of the combination of products and services offered and how that combination creates value for the customer. Conventional wisdom states that those who do not innovate, die.

The main drivers are the industry dynamics and customer relationship. The first driver provides insights into what competitors are doing and industry trends. The second driver gives information about customers' needs that are not satisfied yet.

**Figure 10: Innovate - Growth Drivers**



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Some of the best practices the innovate strategy suggest are:

- **Customer feedback:** A company should have information about customer needs or industry trends before they decide to produce a new product or introduce a new service. Otherwise, the new products would not have an attractive market or would not satisfy the customers' expectations.
- **Value chain analysis:** What are the company's strengths? What are their suppliers? What is their market? How do they operate? What product do they offer? It is important to analyze the activities of the company to understand what the opportunities to produce new products are, and how this is going to affect the production and structure of the company.

### 2.1.9 Diversify

This strategy is focused on changing the firm's role in the supply chain. One method is to enter a new industry to capture new business and/or capture a larger share of the core customer's business. For example, DXP has been one of the fastest growing firms in the past 10 years due to diversification. DXP acquired firms in other industry vertical primarily to capture more business with existing customers. DXP started in Pipe Valve Fitting (PVF), then moved into power transmission, and other complementary verticals (serving the same customer set). The result has been dramatic growth and stronger customer relationships.

Another method is to expand the firm's role in the supply chain by taking over activities formerly carried out by suppliers and customers. Vendor Managed Inventory (VMI) is one common model in taking over customer roles. The supplier takes over the process of replenishment of inventory all the way up to owning inventory until the customer consumes it. Outsourcing manufacturing is another common process where the firm takes over supplier processes. Postponement is the process of delaying final value adds until the product is closer to the customer. Many manufacturers will allow distributors or logistics companies to perform the value add to products. The process reduces supply chain inventory and allows for greater flexibility in meeting customer needs. Postponement is one of the fastest growing processes that economic developers need to address because it offers opportunities to bring manufacturing, albeit on smaller scale, into their markets.

**Figure 11: Diversify Strategy - Growth Drivers**

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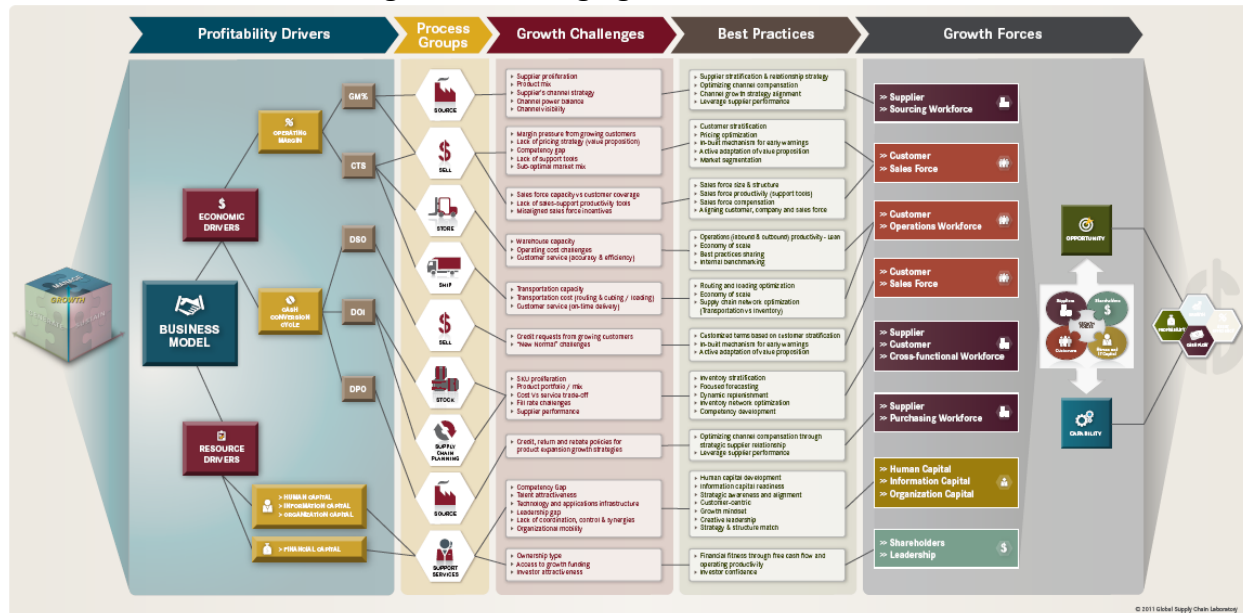
The best practices for this strategy are market mapping, industry trend analysis, and competitive analysis.

This strategy represents value in this project because it calls for the analysis that existing companies, already located in Gregg County, could do if they were to identify opportunities to offer new products or support industry clusters. In the market and industry vertical analysis we address this topic.

## **2.2 Managing Growth Framework**

The Managing Growth Framework is about understanding profitability. The companies' objective is not only to generate revenue, but profitability. To achieve this, any company should focus on the economic and resource drivers (see Figure 12).

The economic drivers are economic elements related with costs, revenue, supply chain, labor, machinery, inventory, etc.; while resource drivers are focused on human capital, information and organization capital components.

**Figure 12: Managing Growth Framework**

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The economic drivers are driven primarily by Gross Margin percentage (GM %) which is driven by the Cost to Serve (CTS) or Cost of Goods Sold (COGS). The GM is a percentage that measures the effectiveness of turning raw material and services into income. See Equation 1.

$$GM\% = \frac{\text{Revenues} - COGS \text{ (or CTS)}}{\text{Revenues}} * 100\%$$

**Equation 1: Gross Margin Percentage Equation**

The CTS calculates the profitability of a customer based on how much it cost to serve that customer. The principal factors that affect CTS are: the selling process, which shows how much the company is spending on market strategies like advertising, for example. The storage process, how much the company spends maintaining inventory, in order to serve the customer. The production processes or how much it costs to produce a product. And the shipping process, how much it cost to distribute products.

To grow, firms must understand and maintain the cash conversion cycle (CCC). The CCC consists of Days Sales Outstanding (DSO), Days of Inventory (DOI), and Days Payable Outstanding (DPO). These three elements refer to how much the customers have to pay you

(DOS), how much inventory you have (DOI), and how much you have to pay to your suppliers (DPO). The equation:  $DSO + DOI - DPO$  equals the amount of investment the firm has in doing business. Since all firms have a limited amount of investment capital, when DSO and DOI are running far ahead of DPO (very common) the firm can run out of money and growth must stop.

The math is simple. If more is to be invested, the ROI must be higher than competing opportunities. Gregg County should seek to demonstrate that investment (DSO, DOI, plant, property, and equipment) will be low or that GM% will be high. This is only possible by understanding and communicating in terms the company understands. Gregg County can make a powerful ROI argument through its superior market (large enough to support segments willing to pay superior GM%), strong customer base (able to pay on time, low DSO), access to markets (low inventory, DOI), highly trained workforce (lower training costs), and lower cost of plant, property and equipment (PPE). Most economic developers and interested investors only focus on the last part (PPE). Over a long-term investment, this variable is often the least important.

Each of the profitability drivers (economic and resource) is related with some process in the company. The framework presented in Figure 12 shows the process group and which processes affect each of the profitability drivers. For example, the framework shows that the GM percentage is related with the source process and the selling process. The selling process manages the revenue and how the company generates it. The source process is about all the resources needed to produce. Given the resources, it is possible to determine the cost to serve, and, therefore, the elements to calculate the GM percentage.

The framework also presents the growth challenges that companies have to deal with in order to be profitable. This includes market constraints, infrastructure limitations, etc. In addition, the framework includes best practices that help to minimize the effects of the challenges. For example, a challenge for the sources process is supplier proliferation. The practice recommended is supplier stratification and supplier relationship management strategies.

In addition, the framework presents the growth forces related to each practice. The growth forces are the factors that can help the company to implement best practices and therefore minimize the effects of growth challenges.

**Figure 13: Managing profitability - GM%**

Source: © 2011 All Rights Reserved • Texas A&M University • Global Supply Chain Lab

Resource drivers are strongly related to support services. It is possible to manage the four types of capital that a company needs: human, process, organization, and information capital.

**Figure 14: Organization Capabilities**

Source: © 2011 All Rights Reserved • Texas A&M University • Global Supply Chain Lab

- Human capital refers to personnel.
- Process capital refers to all production processes.
- Organization capital refers to the effectiveness of the firm's structure.
- Information capital is all the information the company can manage, customer information, financial information, etc.

**Figure 15: Managing profitability – Resource Drivers**

Source: © 2011 All Rights Reserved • Texas A&M University • Global Supply Chain Lab

Companies seek to develop capabilities in the three main growth forces in order to improve the use of resources and, therefore, generate more profit. The next figure presents some of the capabilities.

**Figure 16: Developing Capabilities**

Source: © 2011 All Rights Reserved • Texas A&M University • Global Supply Chain Lab

The managing growth framework is related with the *Return on Investment (ROI)* analysis, which is presented in later sections. The ROI is mainly an analysis of the effectiveness of the investment. This is strongly related with the profitability.

## 2.3 Sustaining Growth Framework

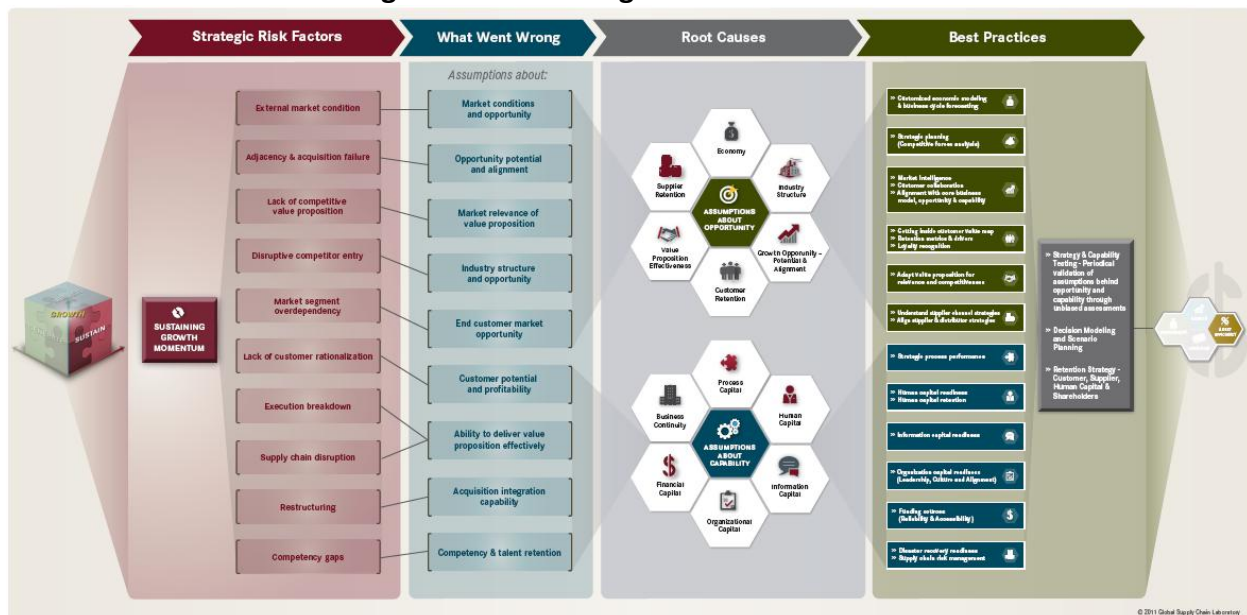
Sustaining growth is equally important to make growth effective in the long term by managing risk factors.

In order to maintain long-term growth, it is necessary to understand what things could happen by identifying the risks and what could go wrong. Once the risks are identified, it is important to

focus on the root causes. This section focuses on two risk areas: assumptions about opportunity and assumptions about capability.

Assumptions about opportunity are assumptions companies made when they made an investment. For example, a company assumes the industry dynamic is going to follow a constant trend, but instead the trend takes a negative change. The assumed opportunities could be about the economy, the industry structure, growth opportunity potential, value proposition effectiveness, and supplier retention. These factors are often beyond the company's control. The firm may try to reduce the probability that something goes wrong or may try to minimize the impact. The framework presents some actions to reduce these risks, for example, creating a forecast or by establishing alliances.

**Figure 17: Sustaining Growth Framework**



Source: © 2011 All Rights Reserved • Texas A&M University • Global Supply Chain Lab

The second type of assumption is about the company's capabilities. The firm may assume it is capable of hiring and training employees in a region at one level of cost only to discover the local workforce requires more training than anticipated. The increased training cost along with operational delays escalates costs and delay profits. The result is reduced profitability leading to reduced ROI.

Sustaining growth validates the success of the strategies used for managing growth. In order to generate growth, a company decides to expand the offering, which requires support from suppliers. Also, the company needs to manage risk when generating growth.

This project validates the market and supply chain analysis by adding an ROI analysis. The ROI (explained in detail in section 7) presents some examples on ROI of companies (based on NAICS

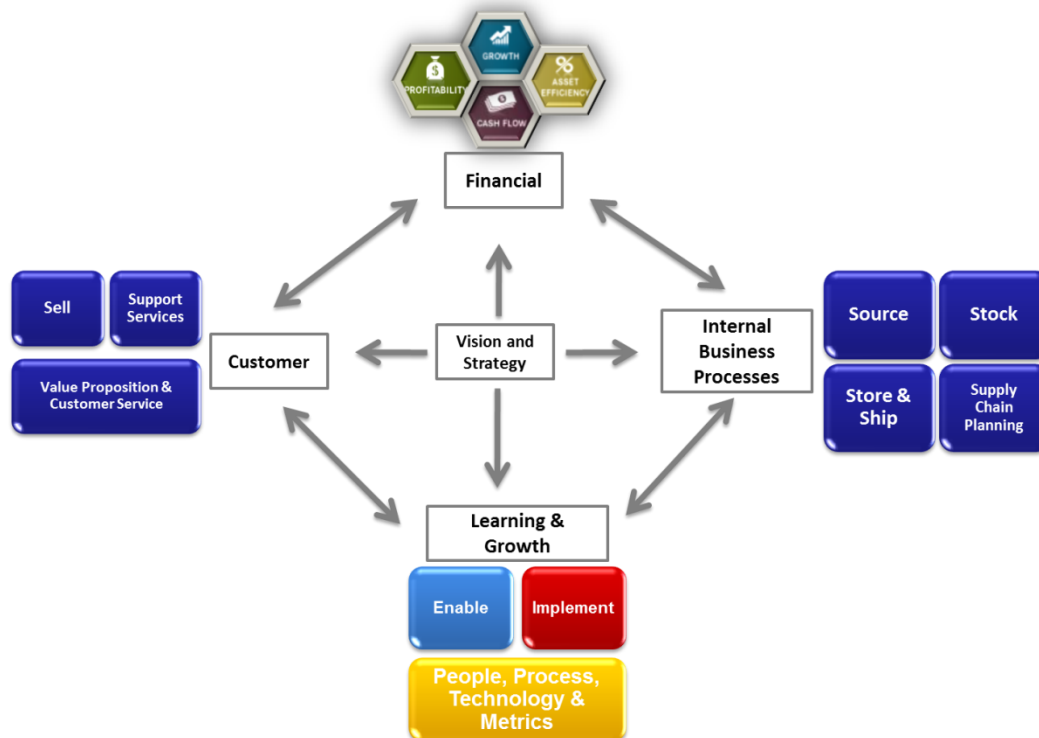
codes). The ROI analysis identifies what industries have better opportunities based on cost factors.

## **2.4 Balanced Scorecard**

The balanced scorecard is a strategic planning and management system that is used extensively in business and industry to align all the activities to the vision and strategy of the organization. Dr. Robert Kaplan and David Norton developed the balance scorecard as a performance measurement framework (Kaplan & Norton, 1992).

In general, the balanced scorecard indicates that it is not possible for a company to look at all the activities in isolation; everything has to be evaluated together. Strategies should be aligned with financial aspects, or otherwise it may not be possible to implement those strategies due to financial inconsistency. In addition, the strategy should be aligned with your customers; for example, modifications on existing products should focus on satisfying customers' needs or adding value to the customer.

Following this, any strategy should be aligned with the internal business process because it drives what the company can do. Finally, strategies should be aligned with learning and growth processes, that is, how companies continuously learn from business, customers, operations, and how the company uses this learning for self-improvement. Gregg County should pay special attention to this module. The baseline education is where the company's training costs begin.

**Figure 18: Balanced scorecard framework**

Source: Adapted from Kaplan and Norton's Balanced Scorecard

The balanced scorecard is strongly related to the distribution framework. First of all, because the distribution framework proposes strategies for growth, the strategy is the key factor on the balanced scorecard.

Second, elements in the customer related activities are elements related with strategies in growth generation and with some processes in managing growth. The same reasoning follows for internal business processes. At last, learning and growth in the balanced scorecard represent the analysis and implementation of the different elements of growth.

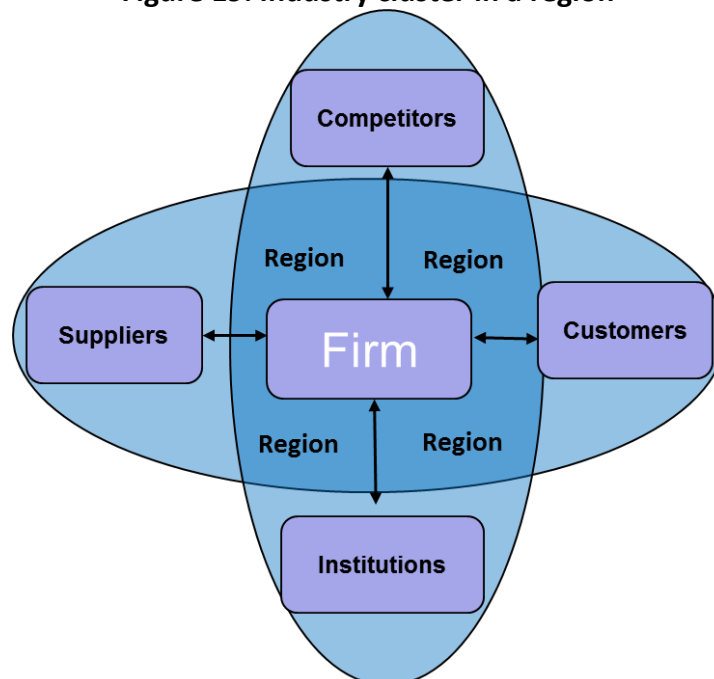
The balanced scorecard demonstrates that to move to Gregg County, the decision should be aligned with all activities. This project presents a market analysis of customer activities for companies located in Texas; an industry analysis of the supply chain structure of companies in Gregg County, and an ROI analysis of the financial aspects of the industry and companies in the region. Finally, companies should decide which strategy fits them based on their own structure, learning, and vision.

### 3 Industry Clusters

#### 3.1 Definition

An industry cluster is defined as a geographic concentration of competing, complementary, or interdependent firms that do business, cooperate and compete between each other. These firms and industries have a common market, products, suppliers, needs or opportunities (Porter M. , 2000).

**Figure 19: Industry cluster in a region**



Source: Location, location: the geography of industry clusters, Schiele (2008)

Clusters incorporate other industries and other entities important to the development, operation and growth of the whole sector. Examples of such other entities are the Government, economic development departments, universities, research institutions and training providers. Government and economic development departments play the role of moderator and regulator of the region; the universities and research institutions provide trained workforce and do research on new technologies.

One industry sector needs from other sectors to get supplies, transportation, outsource work, etc. Indeed, the supply chain is part of the infrastructure and a main factor condition that a region can offer. Other industry clusters, companies, industry sectors or institutions establish

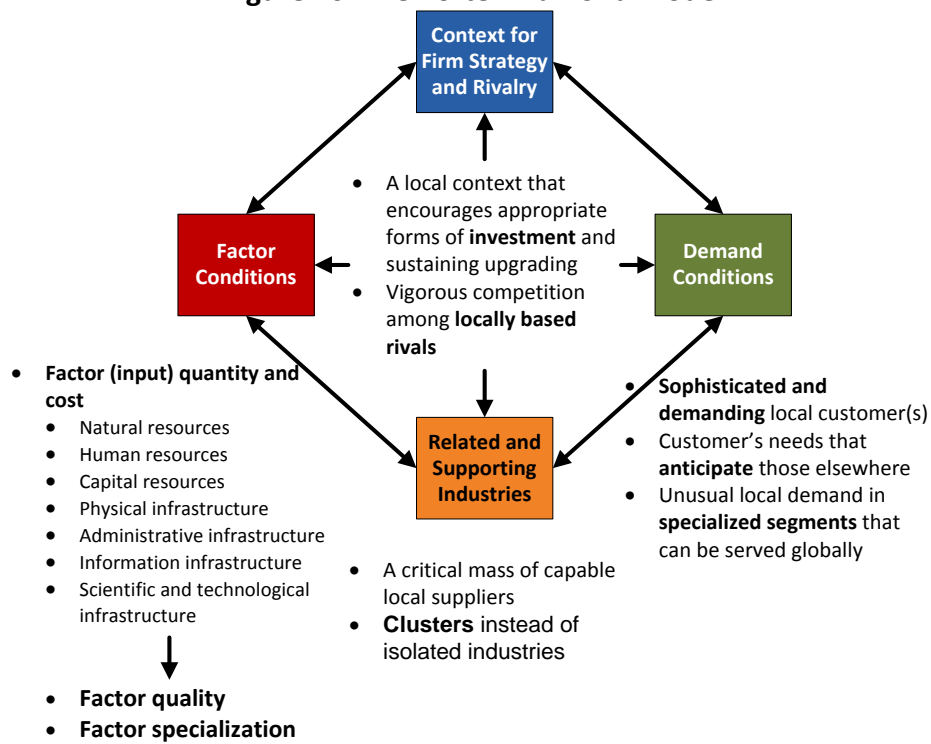
the integration of the supply chain. Clusters may include foreign firms if they make permanent investments and have significant presence into the region (Porter M. , 2000).

Industry clusters are important in a region because they lead to economic growth and production efficiencies. Economic growth is reflected in more job opportunities, increasing in wages, more infrastructure resources such as education and improvements in quality life styles in the region. The production efficiencies permit the reduction of costs, improvement in the production and innovation.

The importance of a cluster in terms of analysis is that it permits to capture more information than other types of analysis, for example industry categorization. A cluster exposes important linkages between companies and industries, competitions and collaborations, opportunities and gaps of the region. These are important factors to attract companies to the region. Regions can attract companies by offering a strong supply chain, collaboration, competition and market opportunities, or by showing the gaps that can be still be fulfill.

Porter, professor at Harvard Business School, created a diamond model that offers insights of industry clusters and competitiveness (Porter M. , 2000).

**Figure 20: The Porter Diamond Model**



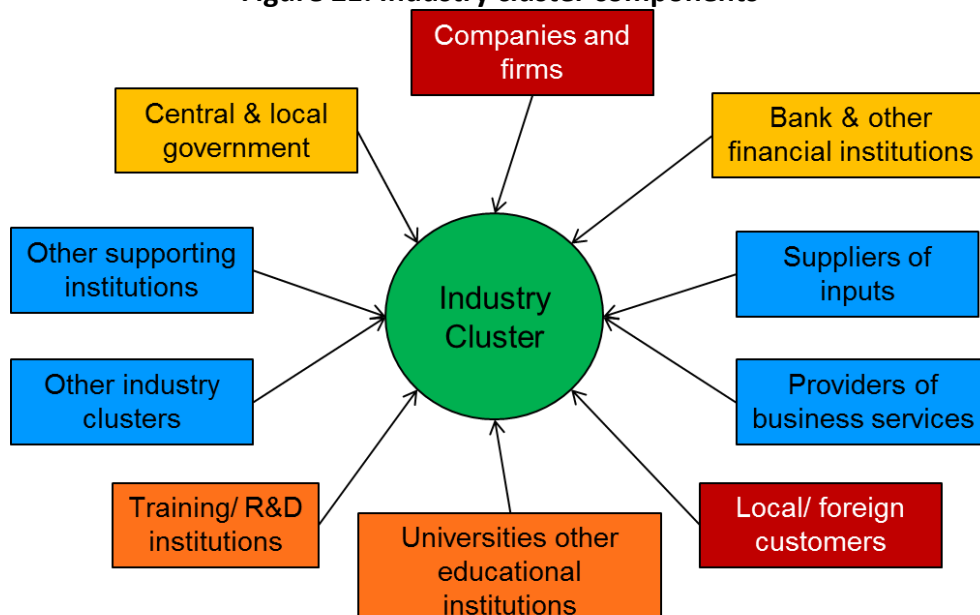
Source: Michael Porter, Institute for Strategy and Competitiveness, Harvard Business School. See Porter (2000)

Porter's model considers four important factors in an industry cluster.

- **Factor conditions offered by the specific region:** These are the resources and infrastructure the region offers and may become the strengths or threats for companies. Strong supply chains could be an example of what makes a region attractive for a company. For example, labor force is an important factor for companies and regions may establish educational and training infrastructure in order to provide skilled labor force.
- **Demand conditions offered by the region:** These are the local customers, size of the market, customer's needs, etc. All the needs that companies need to satisfy.
- **Relation and support with other industries and firms:** This is how companies interact to collaborate and compete for the key factors and demand conditions.
- **Context of strategy and rivalry between firms in the region:** Shows how companies take advantages of the factor conditions. Also, how they respond to threats and rivalry with other firms. Competition is an important factor generated by the existence of industry clusters.

As aforementioned, industry clusters are formed by different components; each component support and contribute to the development of the industry cluster. Next figure presents a summary of these components.

**Figure 21: Industry cluster components**



Source: Produced by T-MEX, Texas A&M University adapted from Tambunan (2009).

- **Central and local government:** They refer to different institutions focused on economy development. Their main role is to provide incentives and regulations to attract new companies and firms. Additionally, central and local governments are in charge of enhancing the infrastructure of the region. Finally, they should promote and support educational, research and training institutions.
- **Bank and other financial institutions:** They provide the financial resources for investments. In the same time, they should stimulate investments into the region by offering easy access to financial resources.
- **Supplier of inputs and providers of business services:** These components consist of companies that provide materials and services that firms in the cluster need in order to produce. They constitute the supply chain infrastructure.
- **Other supporting institutions and other industry clusters:** Other industry clusters and other institutions that support firms business. In the same way, different industry clusters collaborate among them.
- **Training/R&D institutions, universities and other educational institutions:** These institutions provide the training, knowledge, education and skills required by the industry cluster. Some industry clusters require specific training or skill levels..

### 3.1.1 Industry clusters and competition

One of the factors considered by Porter in his diagram is the rivalry between firms in the region. This rivalry leads to companies compete for the resources and the market. In the context of economy and production growth competition has several advantages.

#### 3.1.1.1 Increase productivity

Competition leads to increase productivity. Companies need to produce more in order to satisfy the whole market and so some companies cannot take advantage of the unsatisfied demand. Additionally, competition in the context of industry clusters facilitates the productivity by providing access to specialized inputs and employees. With existence of industry clusters, adequate labor force is much easier to find in the region as well as specialized inputs and suppliers.

Industry clusters lead to the development of research and information infrastructure in a specific region. The research and information facilitates for companies the development of new production techniques to increase the productivity. Industry clusters also facilitate the access to complementarities such as better living opportunities for employees, access to marketing resources, etc.

Incentives and access to institutions and public goods are factors that lead to increases in productivity. Governments usually provide better incentives to companies with better production rates; this allows companies not only to produce to satisfy the demand, but also to receive better growing opportunities. Additionally, is more feasible for companies to recruit employees already trained by public institutions supported by the government. This may reduce the expenses and time required to train employees.

#### *3.1.1.2 Increase innovation*

Industry clusters provide a clear perception of new customer needs. For companies is easier to get detail information about what customers are requiring, then they should be able to provide a quick response to such needs.

Similarly, companies integrated in an industry cluster may have access to new technological, operating and delivering possibilities. These new resources open opportunities for companies to develop innovative products. Finally, using cluster analysis is useful to identify gaps in the supply chains and so, companies may cover these gaps by innovating their products and services.

#### *3.1.1.3 Stimulate new business formation*

The existence of an industry cluster in a region may be a sign of a healthy economy and abundance of resources. New businesses are attracted by these factors because they are looking for a market to serve and resources that may facilitate the business formation. The cluster analysis identifies gaps in services or products that new companies can cover. These gaps represent the market that new companies need.

Financial resources are more abundant in regions where industry clusters exists. New companies also may have support and incentives from local government to start new business.

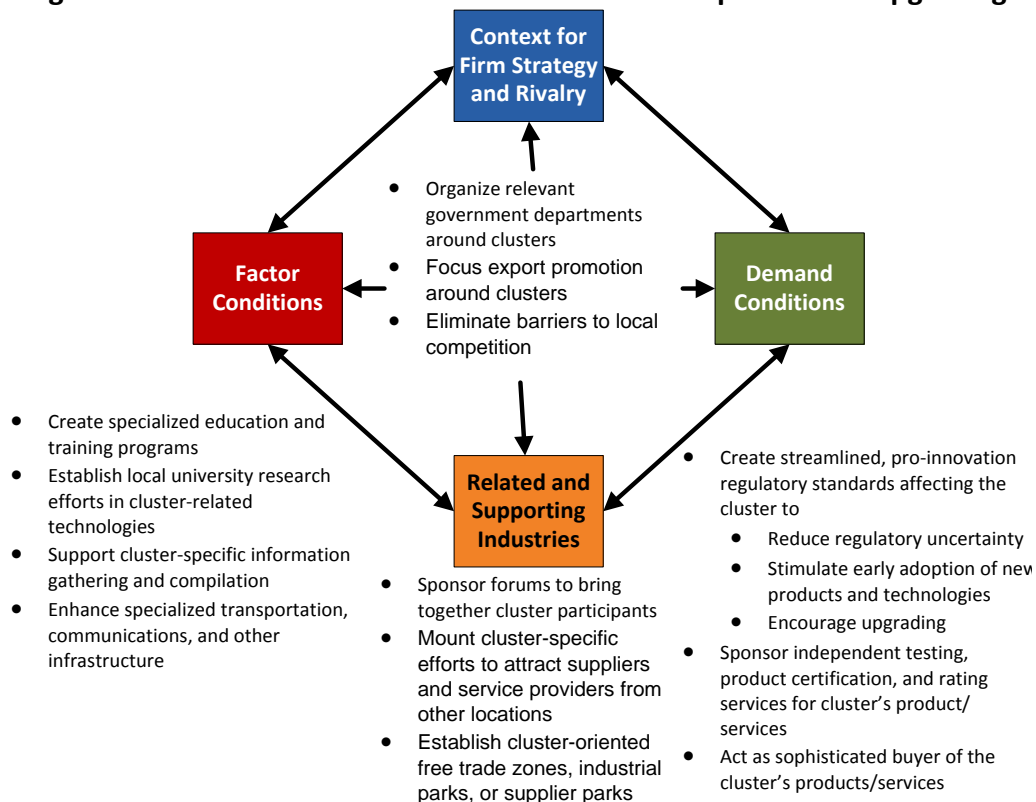
### **3.1.2 The Role of Government**

Government and other institutions (such as an economic developers, utilities department, etc.) play the role of mediators among companies, suppliers, and other parties. Similarly, they are the main facilitators to attract and develop industry clusters. They provide the infrastructure, incentives and regulations to achieve economic growth.

The process of creating and sustaining an industry cluster starts with government and economic developers recognizing that a cluster is present and then focusing on strengthening the cluster by supporting the infrastructure underlying the cluster. This might include remove regulations, offer opportunities, eliminate inefficiencies and relaxing constraints that impede the growth and sustainability of the cluster (Porter M. , 2000). It is essential that regional leaders, local economic developers and government institutions understand that certain group of companies that perform well in the region might improve the local economy as well.

The next figure shows some specifics roles of the government and how supports industry clusters into the region.

**Figure 22: Government Influences on Cluster Development and Upgrading**



Source: Michael Porter, Institute for Strategy and Competitiveness, Harvard Business School. See Porter (2000)

- Factor conditions:** These are the infrastructure and the resources the government can offer to support an industry cluster. Government has to create, facilitate or enhance the creation of infrastructure and resources. There are several factor conditions that can be improved in order to facilitate the success of an industry cluster. For example, supply of appropriate trained personnel, promote and support the local research, creation of

physical infrastructure matched with cluster needs, and facilitate the flow of information.

- **Demand conditions offered by the region:** Government can support the demand conditions by offering the regulatory standards that improve the quality of the products and services and stimulate the innovation and creation of new products.
- **Relation and support with other industries and firms:** Government may facilitate the communication, share of information and support industry programs to attract suppliers. The creation of industrial parks is a good example of the support to industry and attraction of suppliers.
- **Context of strategy and rivalry between firms in the region:** Government should facilitate the competition between companies, creating classification and incentives for them.

### 3.1.3 Analysis of Potential Clusters

The economic development strategy has as main objective the retention, expansion and attraction of companies and firms in selected industry clusters. This section presents the strategies to identify potential industry clusters for a specific region (see Figure 23).

The first step is an analysis of the economic structure and economic dynamic. The economic structure includes the analysis of different industry sectors and subsectors. The economic dynamic includes suppliers, customers, etc. This two analysis combined are represented by a market analysis. A market analysis identifies the industries, customers, market opportunities, required supplies, etc.

Once the industry sectors have been identified, the next step is to do a classification by their economic weight. Factors for this classification are: total employment, total revenue, average/median salary, total production and total exports. Next, industries are classified by specialization and competitiveness; the location quotients are used in the first classification and the shift-share for the second one.

Location quotients are quantitative tools used to determine which industries have strong or small presence in a region. Location quotients also show how local industries compare within the regional or national average. They provide insights to understand local economy strengths and competitive advantages.

Shift-share is another tool used for local economy analysis. It is primarily used to decompose changes in local employment over a given time period. Although is used also to analyze total

revenue or total production through certain period of time. It decomposes the analysis into three contributing factors: national growth share, industrial mix employment and local or competitive share.

The shift-share analysis does not explain why an industry has specific changes however, it permits to separate local growth factors for national ones and determine which industries are competitive in the region.

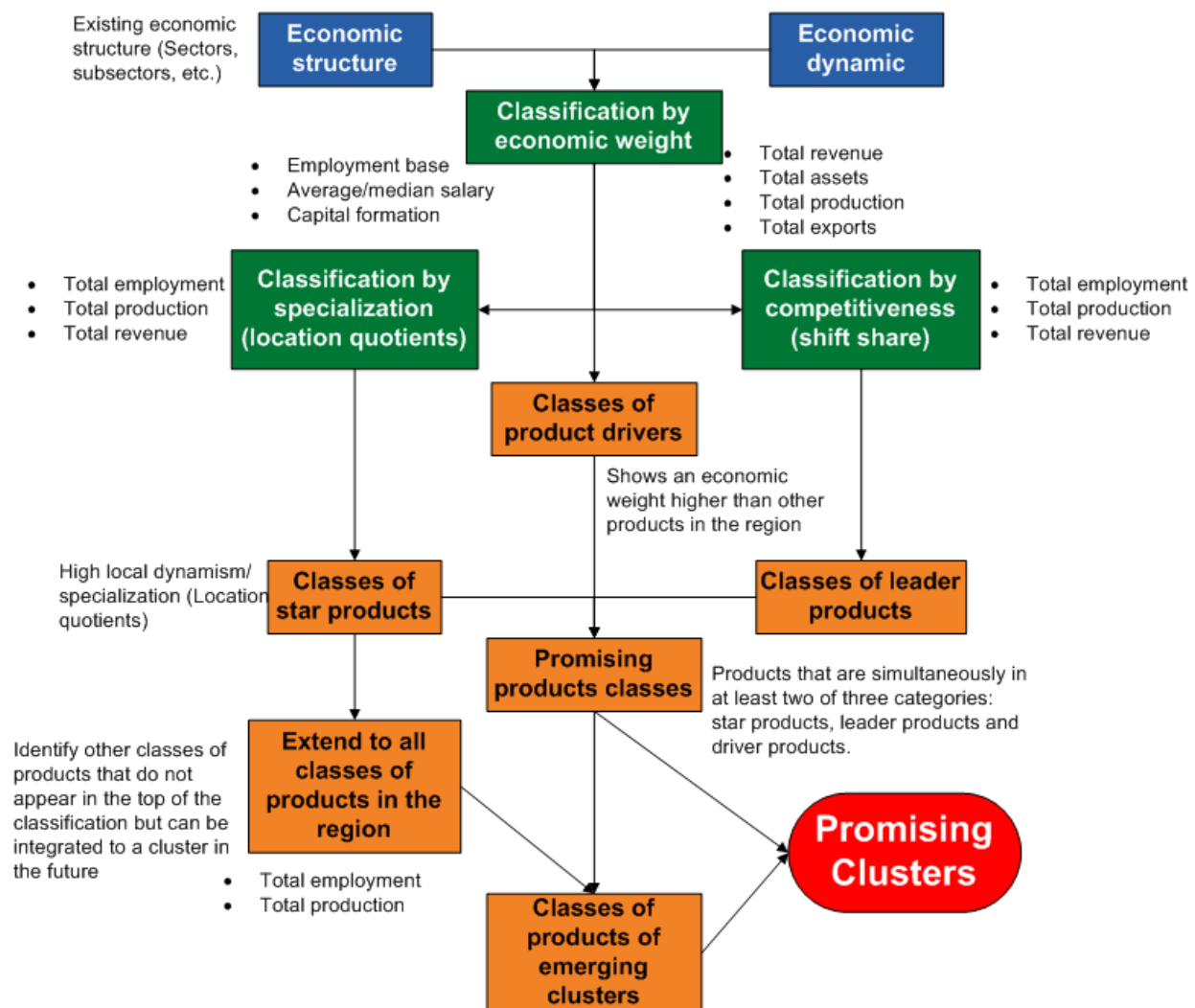
After the classification by specialization and competitiveness, products (industry sectors) are divided in classes with different characteristics (see Figure 23). Each class is defined as follows:

- **Classes of product drivers:** These classes contain products that show higher economic weight than other products in the region. Even when regions are trying to attract industries in these classes, at this point this doesn't consider other factors such as total employment or salary. For example, distribution industry in Gregg County. This industry shows higher economic weight; however the salaries in the distribution industry are lower than other industries, such as oil and gas.
- **Classes of star products:** These classes contain products with high dynamism or specialization in the region based on location quotients. Industries in this sector have more presence in the region than the national or regional average. A good example is the truck, tractor and trailer manufacturing. Gregg County possesses a high presence of firms in this industry rather than Texas (see Figure 57).
- **Classes of leader products:** These classes contain products with high national competitiveness based on the shift-share. Shift-share identifies industries in the region that are highly competitive compare with the national level. These industries have better opportunities to growth than other industries less competitive. The oil and gas industry in Gregg County is highly competitive in comparison with the national level.
- **Promising product classes:** These classes contain products in the intersection of at least two of the previous classes. This means, products that are competitive, with high specialization factor or high economic weight. Such is the case of the metal manufacturing industry. The metal manufacturing industry shows a high economic weight and high level of specialization in Gregg County. Such specialization is focus in two subsectors; 1) truck, tractor and machinery manufacturing; 2) machinery and equipment for oil and gas extraction.

In addition to the previous four classes, the analysis should identify industries or products that even when they do not appear in the top of the previous classifications, they can be integrated into a cluster in the future.

Finally, with the previous classifications is possible to identify classes of products of emerging clusters. These classes contain products in the promising classes and those that can be integrated in the future. Products in these classes constitute the promising industry clusters to the region. For example, we can mention the metal distribution facility industry. Metal manufacturing industry is the present promising industry for Gregg County; in the future the metal distribution industry would be an important supporting industry for metal manufacturing in order to expand the its market to other regions.

**Figure 23: Identifying potential industry clusters**



Source: Identificación de oportunidades estratégicas para el desarrollo del estado de Tamaulipas, 2009

### 3.2 Industry Clusters and Distribution Growth Framework

Clusters and the Distribution Growth Framework are related through the strategies, drivers and challenges. They pursue the same objective that is the growth of companies, industries and the economy of a region.

We can assume that in an industry cluster all the companies operate under similar conditions in terms of utility costs, wages, distribution costs, market, access to suppliers and infrastructure. Under similar conditions, the way for a company to become competitive is through *penetration, innovation, expansion* and *efficient production*.

#### 3.2.1 Industry Clusters and Generating Growth Framework

The first three strategies mentioned above correspond to strategies previously presented by the Generating Growth Framework. The framework suggests the implementation of such strategies with the objective of generating revenue, which is the first step for a company's growth.

- The penetration strategy suggests the company should focus on new customers. Given that there is a cluster in the region, the market is shared by several companies. With the objective of increase the revenue and being more competitive, the company can apply this strategy and focus on customers not yet satisfied. The cluster has clearly identified the gaps, so is possible to identify new customers. Moreover, given the existence of the cluster, it is easier for a company to find suppliers that satisfy the changes in the production line if those are required.
- With the existence of an industry cluster the number of competitors is higher, however even when the market is big, there is opportunity to increase the presence in the market. Innovation means the creation of new products in the market or improves in the processes. The market for the existing products may be saturated and then, it is possible to take advantage of this condition by introducing something different from what the competition is offering. Apple is a good example; by 2001, instead of competing for a saturated market for personal computers Apple decided to innovate and offered a new product with a growing market at that time. They innovated and started to produce the iPods which were a great success.

- Similar to penetration and innovation, the expand strategy suggest exploring new market segments. Although, given the high competition, it is possible that new segments of the market offer more opportunities than traditional segments.

While the Generating Growth Framework suggests these strategies to generate revenue, industry clusters motivate the use of those strategies for companies in order to be competitive. Clearly, the cluster is inducing the generation of revenue for the companies and growth at the same time. Due to the relationship between firms within a cluster, is expected that growth in one firm creates a better business environment for others in the group.

### **3.2.2 Industry Clusters and Managing Growth Framework**

In order for a company to compete under similar conditions, one strategy may be reducing the price of products and services. Although such measure such be evaluated carefully. On the other hand, cost like distribution, utilities and raw materials might be similar to competitors, so price reductions may imply that the company should produce in a cost efficient manner.

Efficient production means that the company should produce using the optimal resources or produce with minimal waste. To achieve this objective, sometimes the companies need to make changes in the production processes, optimize technology use or better management techniques.

The Managing Growth Framework is focused on reducing the cost by making a company profitable. As it was described before, the economic drivers refer to aspects of the company that affect the efficiency in production. Some of these aspects are presented as follow:

- The inventory management is the administration of the amount of raw material or finishing products that the company carries. It represents costs, but at the same time the shortage of those generates a cost also. As a consequence, by being in an industry cluster the suppliers are closer and therefore it is possible to rapidly restore the raw materials' inventory level. This represents an opportunity to reduce the costs on inventory or also may create the opportunity to reduce prices. Dell is an example of managing profitability by reducing the costs of inventory. In 1994, Dell was carrying a large amount of inventory, but four years later its inventory level was near to zero (Byrnes, 2003). With the reduction of costs of inventory, Dell not only became profitable, but also had the opportunity to reduce the prices to compete in a saturated market.

- As mentioned, industry clusters also incorporate organizations like universities and training institutions, as a consequence there is an increment of trained labor force available. Usually, companies need to train their workforce because of often lack of available trained labor; this factor increases the cost of hiring new workers. However, by locating in an industry cluster, companies have more trained workforce available, which reduces the costs of training and hiring. Another consequence is the capacity of rapidly replacement of personal.
- An industry cluster integrates different suppliers to form the supply chain necessary to support the companies in the cluster. Moreover, suppliers in the industry cluster are from different industry sectors, even from a different industry cluster. For example, the information technology (IT) cluster needs suppliers from other industries such as advanced manufacturing, electronic manufacturing, media and design, etc. In the same way, suppliers can supply several different industries. Industry clusters not only attract suppliers to a region, additionally attract customers by offering important benefits such as lower prices, better quality and innovating products, etc. For example, plastic manufacturing suppliers are important for the food industry, distribution and warehousing because they may provide new products in the packing sector that can attract new customers. For example, one of the companies interviewed during this research belongs to the plastic sector; this company is a main supplier for distribution and food industries at national level.
- Finally, with more companies in the same industry performing similar operations in the cluster, there is market for attracting for example equipment suppliers. This boosts the development of new equipment and machinery. New equipment is usually focused to reduce the wastes in the operation processes, or to improve the production in terms of time or quality. Companies have more and better equipment available to improve their production and reduce the wastes. For example, the oil and gas industry possesses high presence of firms in Gregg County; the high market for oil and gas extraction equipment has attracted several firms in the machinery manufacturing industry to the region. One of the companies we interviewed was developing special equipment for oil extraction. Another company also interviewed indicated that their main customers are companies in the oil and gas industry; this company provides engines and engines' repair service for companies in the oil extraction sector.

### **3.2.3 Industry Cluster and Sustaining Growth Framework**

Forming an industry cluster is possible only when a specific industry has been successful and sustainable for a long term. The increased technological change and innovations encouraged by the clusters may reduce the risk on investment in start-up companies in the cluster.

Indeed, the competition increases the innovation and the value added to products, which makes the market sustainable for a long term by attracting new customers and by making easier for companies to follow the industry trends.

In summary, an industry cluster provides better opportunities for companies to growth in the long term and helps them reduce the risks to do business.

## 4 Market Analysis

### 4.1 Market Assessment Methodology

A four-step methodology was adopted to assess the potential market for Gregg County in the targeted industrial sectors. Initially, we studied the national market trend to identify the key players and overall growth potential of the industry in general. After assessing the national level market structure, focus was centered on Gregg County to estimate the potential market that can be served from Gregg County. The following sections describe the proposed four-step methodology.

- **Step 1-** *Assessment of national level market for a given sector.* It includes determining the key market indicators such as total current revenue, exports value, number of businesses, and growth forecast. Both published resources and industry interviews were used to obtain the market data.
- **Step 2-** *Identification of major players and their market share nationally in the given sector.* After determining the major players, next step is to determine whether or not they are present in Texas in general and Gregg County in particular.
- **Step 3-** *Identification of size of Gregg County market.* It involves two market segments: 1) Market potential for Gregg County, and 2) the surrounding market that can be served from Gregg County, which may include Dallas-Fort Worth, Houston, Shreveport, LA, Little Rock, AR and other major cities depending upon the sector. The metrics used to assess the size of the market includes (but not limited to) the factors like population, industrial demand, projected market growth (by various agencies), and industry reports. The main objective of this task is to determine if the market is big enough to attract any relevant company to the region.
- **Step 4-** *Identification of Target Company.* This is primarily done based on the gap analysis of the national players. For example, if a national player is not present in Gregg County (or Texas in some cases, depending upon the nature of industry sector) then that will be the first target. However, the research also outlines the strength of Gregg County that can drive the growth of the given industry sector. In addition, we analyzed the supply chain map to identify the missing link (which can be a potential target) in that sector.

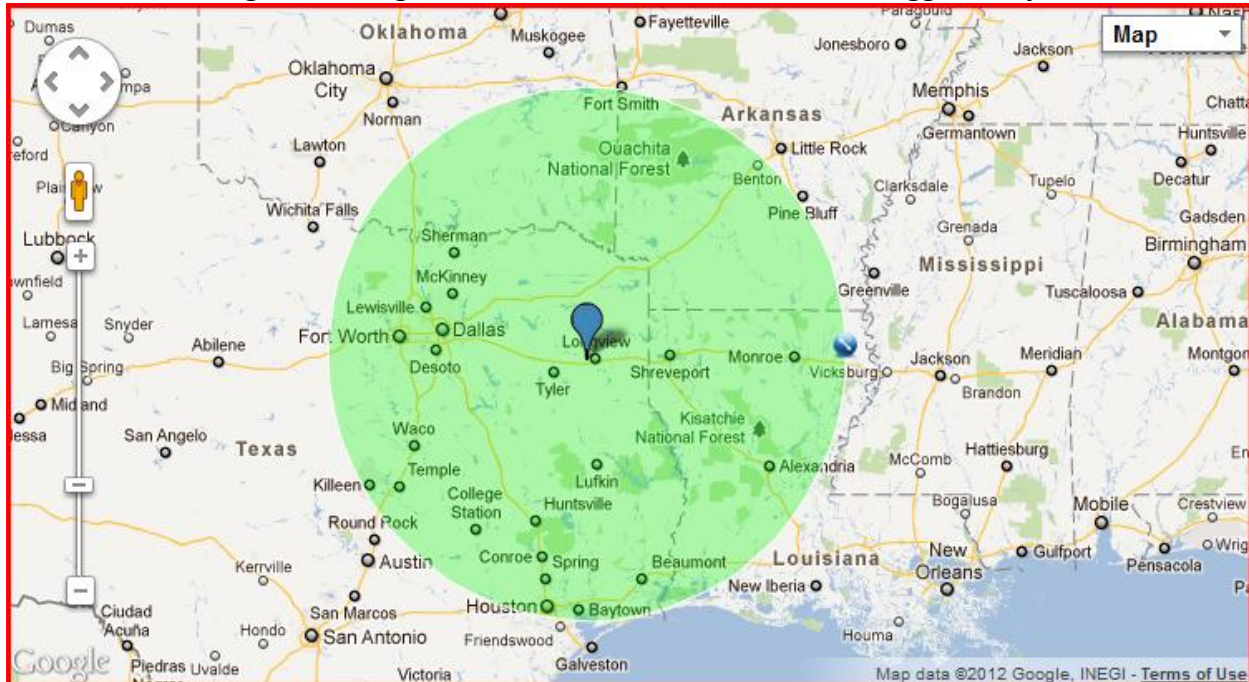
## 4.2 Industry Sectors

- A. Metal Products manufacturing
- B. Chemicals manufacturing
- C. Plastics products manufacturing
- D. Food Industry
- E. Distribution/Wholesaling

## 4.3 Region of Interest

The market potential for Gregg County and its surrounding areas is given by assessing the market volume in the region of interest. In this study, the region of interest is defined as 200 or 300 miles around Gregg county depending upon the relative importance of accessibility to markets for each industry sector. The major Texas cities in the region of interest are Fort Worth, Dallas, Austin, Houston and Beaumont. Similarly, some of the major cities in neighboring states that fall in the region of interest are Shreveport in Louisiana, Jackson in Mississippi, Fort Smith and Little Rock in Arkansas, Tulsa and Oklahoma City in Oklahoma.

**Figure 24: Region of Interest - 300 miles around Gregg County**



Source: Free Map Tools

#### **4.4 Site Location Factors**

The factors which are rated high for the location of an Industry are listed as follows:

- Access to Markets
  - Geographic Proximity
  - Transportation Costs
- Access to Resources
  - Energy Dependability and Costs
  - Raw materials
  - Water Availability
- Public Sector Impacts
  - Regulatory Policies
  - Business Taxes
- Work Force
  - Skilled and unskilled labor availability and costs
- Environment and Cost of living

These factors significantly affect the production and revenue of the industries that are the focus of this study. Based on the location and economic conditions of Gregg County, these factors are more broadly discussed in each section. This list of factors was adapted from an earlier study done by Whittacker Associates, Inc. for the Longview Economic Development Corporation (2002).

#### **4.5 Metal Products Manufacturing**

The metal industries mainly deal with steel works, blast furnaces, iron and steel foundries, primary and secondary smelting and refining of nonferrous metals, rolling, drawing and extruding of metals and miscellaneous primary metal products. These can be grouped into two major categories as follows:

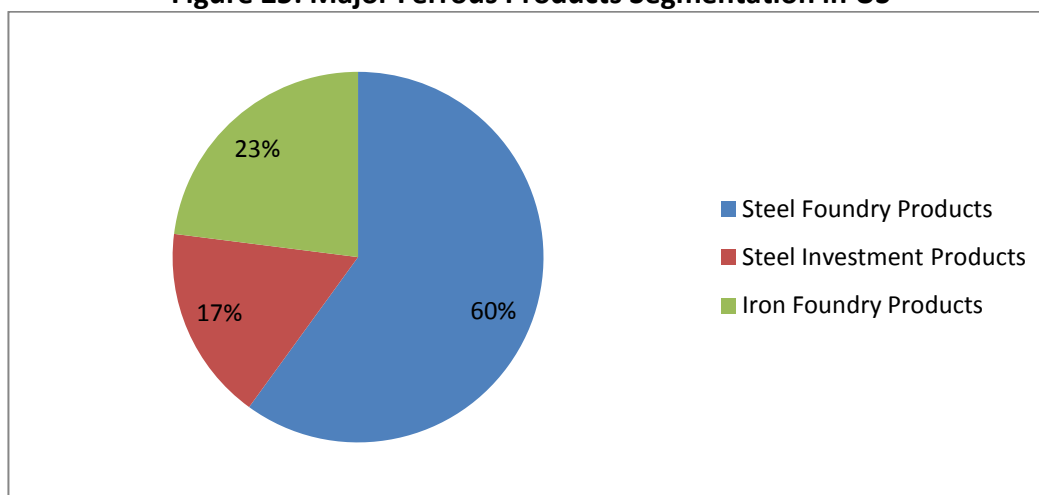
- A. Ferrous metal foundry products, and
- B. Nonferrous metal foundry products.

### 4.5.1 Ferrous metal products

#### 4.5.1.1 Primary Activities

Ferrous metal production industries manufacture iron and steel castings and finished iron products. In 2011, their production volume with respect to overall ferrous metal products market was, as shown in Figure 25.

**Figure 25: Major Ferrous Products Segmentation in US**



Source: (Bueno, 2011(a))

#### 4.5.1.2 National Level Market

The national revenue for the ferrous metal production industries in US in 2011 was estimated to be \$18.3 billion with profits amounting to \$ 1.3 billion. The overall exports account for about \$ 1 billion of the total revenue. There are about 688 industries dealing with ferrous metal products across the nation. About fifty percent of the exports are to Canada and Mexico mainly due to the North American Free Trade Agreement (NAFTA) between United States, Canada and Mexico which had resulted in tariff – free or reduced – tariff trade between the three countries. According to the IBIS World report (Bueno, 2011(a)) the projected annual growth rate for ferrous foundry products is 3.5% for the next five years.

#### 4.5.1.3 Major Players

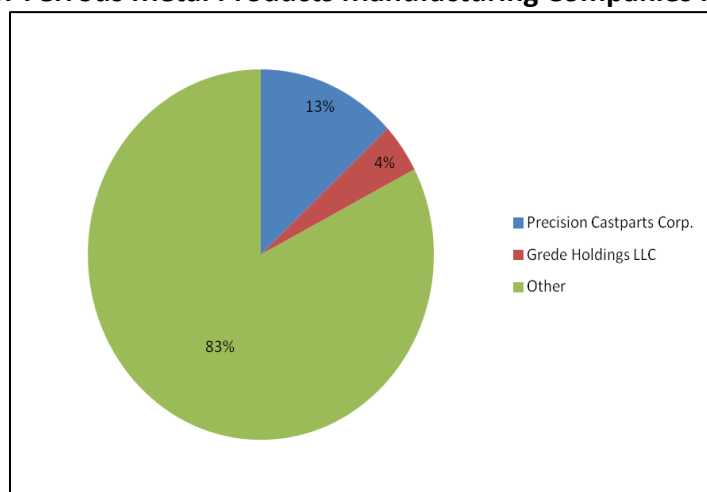
The major establishments in this sector and their market shares based on revenue are shown in Figure 26. Two of the major players in this sector are *Precision Castparts Corp* and *Grede*

*Holdings LLC*, who account for about 20% of the total market revenue. Generally, the market concentration of an industry is classified as High, Medium and Low depending on whether the largest four major players account for over 70 % revenue, 40%-70% of revenue or less than 40% of the national revenue respectively. The market concentration in this sector is low as the major players account for less than 40% of the national revenue.

*Grede Holdings LLC* is a metal castings manufacturing company having facilities located in Michigan, Wisconsin, Indiana, Alabama and Nebraska. They serve the agricultural, industrial, wind energy, petroleum, medium and heavy truck markets. Their primary customers are Ford, DANA Corp, Toyota, Borg Warner, Volvo, Caterpillar, Nissan, and Cummins among other companies. *Grede Holdings LLC* would be a good target for Gregg County as Texas has a cluster of petroleum and industrial companies. In addition, most of the primary customers of *Grede Holdings LLC* have facilities in Texas including a few of them located in Longview, TX.

The level of regulation is medium as the Environmental Protection Agency (EPA) enforces limits on the emission of pollutants and the discharge of waste. Trade associations such as American Foundryman's Association (AFA), American Iron and Steel Institute (AISI), American Metal Markets (AMM) and the American Institute for Steel Construction (AISC) provide general trade assistance to the industries in this sector. This industry poses high barriers to entry mainly due to the heavy capital investment required for the manufacturing facilities involved in the construction of a foundry. Further, development of customer-specific casting equipment poses a threat in this sector.

**Figure 26: Major Ferrous Metal Products Manufacturing Companies in the US in 2011**



Source: (Bueno, 2011(a))

#### 4.5.1.4 Market for Gregg County

Metal products are generally sourced locally and after investigations with local companies in Kilgore, a region of interest of 300 miles is considered for analysis. The market volume for Gregg County is assessed by considering all major cities that are located within a distance of 300 miles around Gregg County. The major cities and their market volume are shown in Table 1. The market volume that can be served from Gregg County amounts to \$ 508 million and by considering a growth rate of 3.5%, the market volume for 2016 is forecasted to be \$ 614 million.

**Table 1: Market Volume of Ferrous Products Industry for Major Cities around Gregg County**

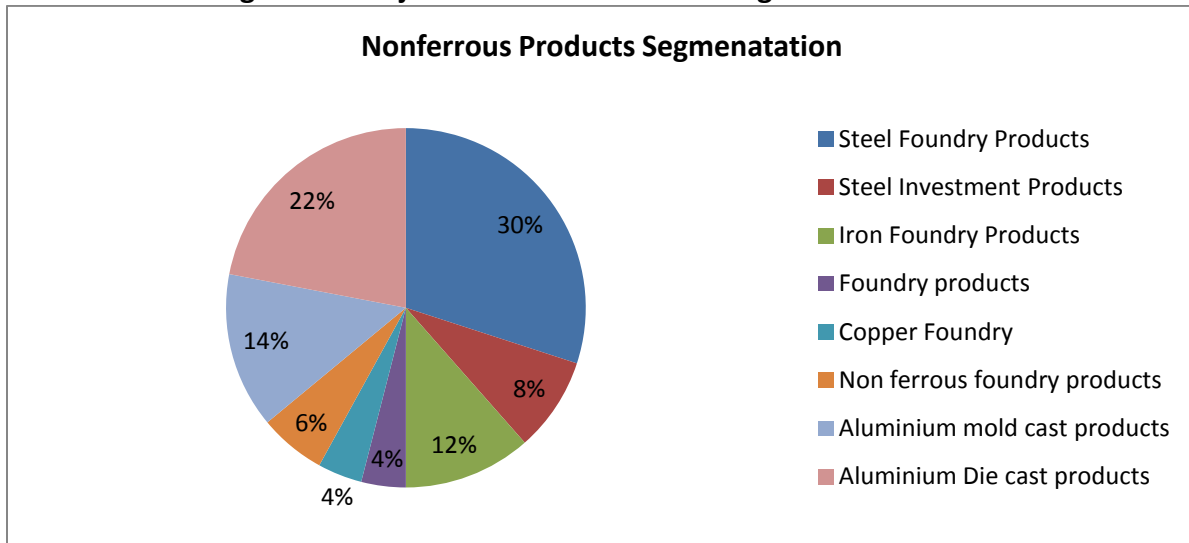
FERROUS METAL PRODUCTS		
CITY	MARKET VOLUME IN 2010	MARKET VOLUME FORECAST FOR 2016
Dallas, TX	\$154 million	\$186 million
Fort Worth, TX	\$52 million	\$ 63 million
Houston, TX	\$ 103 million	\$ 124 million
Tulsa, OK	\$ 199 million	\$ 241 million
Markets that can be served from Gregg County	\$ 508 million	\$614 million

Source: Ferrous Metal Foundries, Bizminer, 2011

## 4.5.2 Nonferrous Metal Foundry Products

### 4.5.2.1 Primary Activities

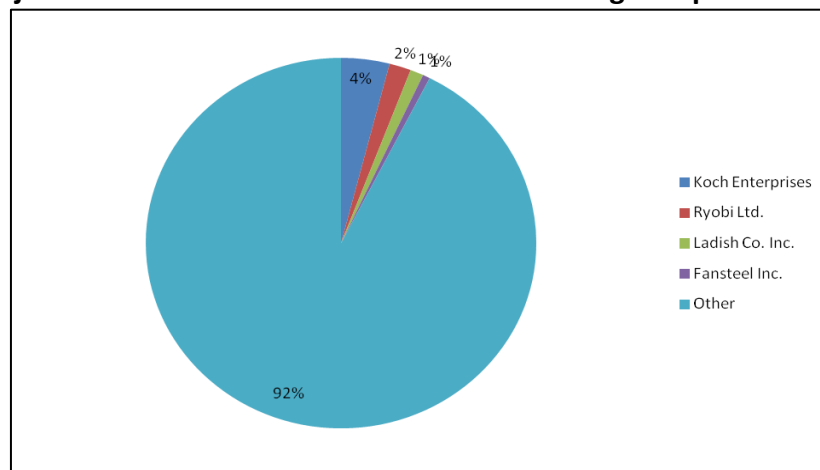
This industry manufactures castings by melting and pouring nonferrous metals such as aluminum, copper, magnesium, titanium and zinc into molds of desired shapes. The product segmentation of this industry is as shown in Figure 27.

**Figure 27: Major Nonferrous Products Segmentation in US**

Source: (Bueno, 2011(b))

#### 4.5.2.2 National Level Market

There are about 1014 nonferrous metal foundry products business establishments nationwide. In 2011, the overall revenue of this industry, as estimated by the IBIS world US industry report is \$ 12 billion with profits amounting to \$ 625 million. The demand from automobile and aerospace parts manufacturing are the key external drivers of this industry. Due to recession in these industries, the revenue of the nonferrous metal foundry products industry is forecast to decline at the rate of 0.4% over the next five years.

**Figure 28: Major Nonferrous Metal Products Manufacturing Companies in the US in 2011**

Source: (Bueno, 2011(b))

#### 4.5.2.3 Major players

The Nonferrous metal products manufacturing industry has low market concentration with high barriers to entry similar to ferrous metal foundry products. There are high costs associated with the construction and development of a new foundry which is a significant deterrent to entry as new entrants would lack the considerable capital outlay requirements. These industries have medium level of regulation enforced by the Clean Air Act (CAA) and Clean Water Act (CWA) which require compliance with air and water quality standards respectively.

The major players' revenue segmentation is shown in Figure 28. *Fansteel Inc*, a major player having facilities at Pennsylvania, Iowa and Mexico, serves the aerospace, automotive and industrial markets. Non-aerospace applications include 1600 pound pumps for the oilfield industry and castings for computer chip manufacturing. *Fansteel Inc* could be targeted for the region of interest as the parts supplied by the company are heavy and it would be economical to locate near primary markets. There are numerous automotive and oilfield industries located in and around Gregg County, which the company *Fansteel Inc* could serve, by having a manufacturing plant in Gregg County.

#### 4.5.2.4 Market for Gregg County

The total market volume that can be served from Gregg County is estimated to be \$ 112 million. The market volumes of the major cities that are within 300 miles around Gregg County were obtained from various market research databases. The major cities and their market volumes are shown in Table 2.

**Table 2: Market Volume of Nonferrous Products Industry for Major Cities around Gregg County**

NONFERROUS METAL PRODUCTS		
CITY	MARKET VOLUME IN 2010	MARKET VOLUME FORECAST FOR 2016
Dallas, TX	\$26 million	\$25 million
Fort Worth, TX	\$26 million	\$25 million
Houston, TX	\$ 60 million	\$ 59 million
Markets that can be served from Gregg County	\$ 112 million	\$109 million

Source: Non Ferrous Metal Foundries, Bizminer, 2011

#### *4.5.2.5 Reasons to locate in Gregg County*

- Gregg County is located at a geographically advantageous position due to the Railroad and Interstate highway connectivity for transportation of goods such as Interstate 20, State Highways 31 & 42 and U.S highways 259 and 271. Rail services are provided by Union Pacific (UP), and Burlington Northern Santa Fe (BNSF).
- It is closer to the port of Houston and exports account for 5.7% of the metal industry's revenue. In 2010, Texas primary metal exports were estimated to be \$6.3 billion – up from \$4.9 billion in 2009. In 2010, this was Texas' 7th largest category.
- The availability of energy and water is sufficient and there is good access to raw materials as Texas is famous for iron ore deposits and numerous mining and exploration companies are located here.
- Metal manufacturing industries are generally located where electricity could be obtained at a reasonable cost. The Energy Information Administration, U.S Department of Energy ranks Texas as 21<sup>st</sup> in nation in electricity price in 2012. Moreover, the Longview region is serviced by the Southwestern Electric Power Company which has the lowest electricity prices in the state.

### **4.6 Chemical Industry**

The chemical industry produces industrial chemicals from natural raw materials. For the purpose of this study, the following sub-sectors of the chemical industry have been considered:

- A. Petrochemicals
- B. Inorganic
- C. Organic
- D. Pesticides
- E. Fertilizers
- F. Plastic and Resin
- G. Paint, adhesive and other chemical products

#### *4.6.1.1 Primary Activities*

The petrochemicals industry manufactures products like ethylene, propylene, butylene, benzene, and toluene from refined petroleum or liquid hydrocarbons. These are used extensively in the manufacturing of consumer products and automotive components. Inorganic chemicals are generally mineral-based while most organic chemicals are carbon-based. Inorganic chemical industry manufactures products like chlor-alkali and carbon black products

which are used as inputs in a number of manufacturing and industrial processes. Organic chemical industry manufactures products like ethyl alcohol, synthetic dyes and other basic organic chemicals. Companies dealing with pesticides and fertilizers produce materials which are used for agricultural purposes. Similarly, plastic, resin and paint industries produce ingredients which serve as raw materials for construction and automotive manufacturing industries.

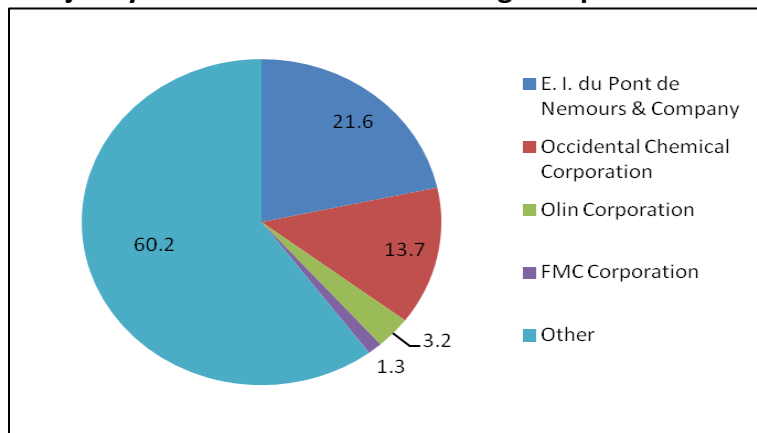
#### *4.6.1.2 National Level Market*

BASF, one of the major players in the world chemical industry reported that 2011 was a successful year for the chemical industry with positively developing global chemical production. With increasing international trade and high demand from key customers, U.S chemical industry market is booming. The overall national revenue of the U.S chemical industries including all sub-sectors is estimated to be \$684.22 billion. There are around 9884 establishments located across the nation. The industry growth rate is projected to be 2.26% annually.

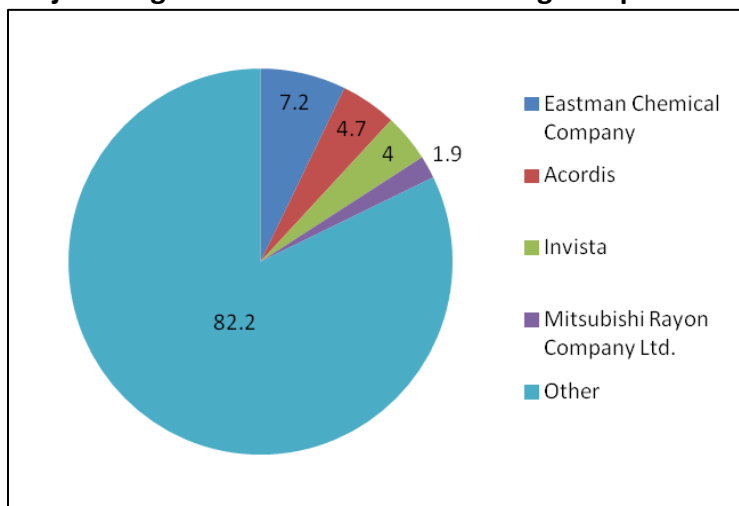
#### *4.6.1.3 Major Players*

The market structure and concentration varies in each subsector of the chemical industry. The synthetic fiber industries and the inorganic chemical industries are identified to have low market concentration and a fragmented market structure. The barriers to entry to these industries are medium which are characterized by significant capital requirements and high cost integrated manufacturing facilities.

**Figure 29: Major Synthetic Fiber Manufacturing Companies in US in 2011**

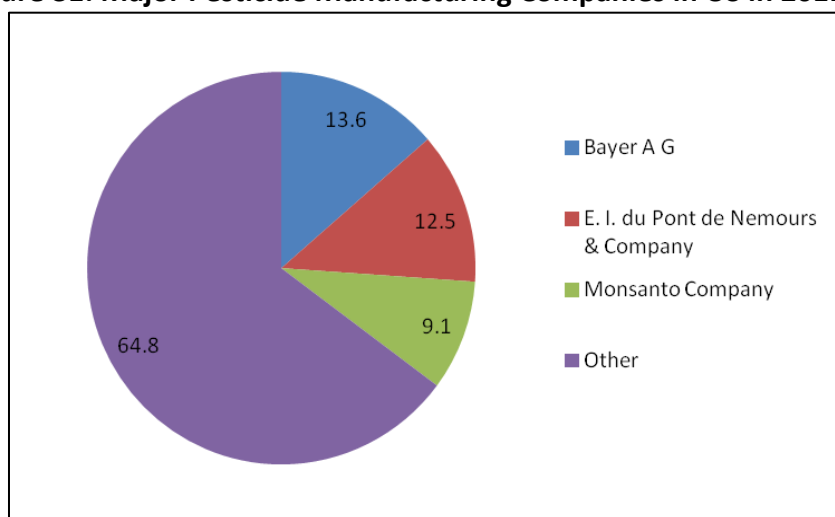


Source: (Nanfelt, 2011(a))

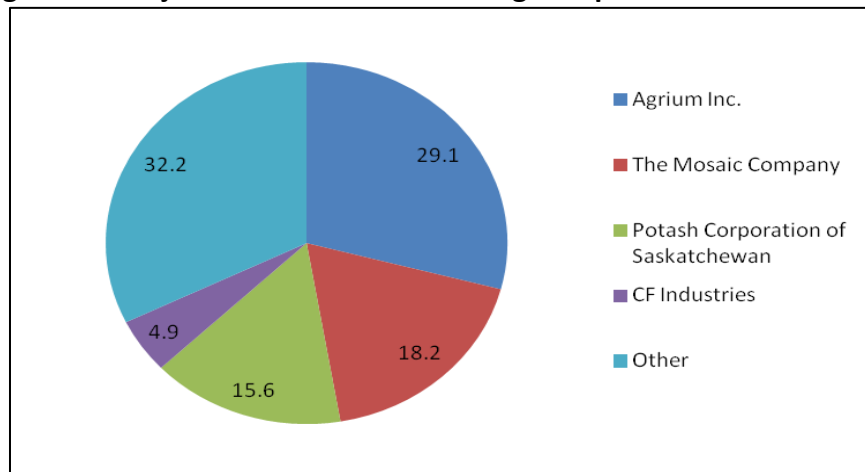
**Figure 30: Major Inorganic Chemical Manufacturing Companies in US in 2011**

Source: (Radia, 2012(a))

The fertilizer industry has a high market concentration with a consolidated market structure. The existence of a high concentration of manufacturers poses a threat to new entrants. Therefore, the revenue volatility which measures the risks in entering a new industry is very high for this sector. *Agrium Inc*, the major player in Fertilizers manufacturing is headquartered in Canada with one nitrogen production facility in Borger, TX and several other retail units located across the country. It would be promising to locate more production facilities to explore further markets.

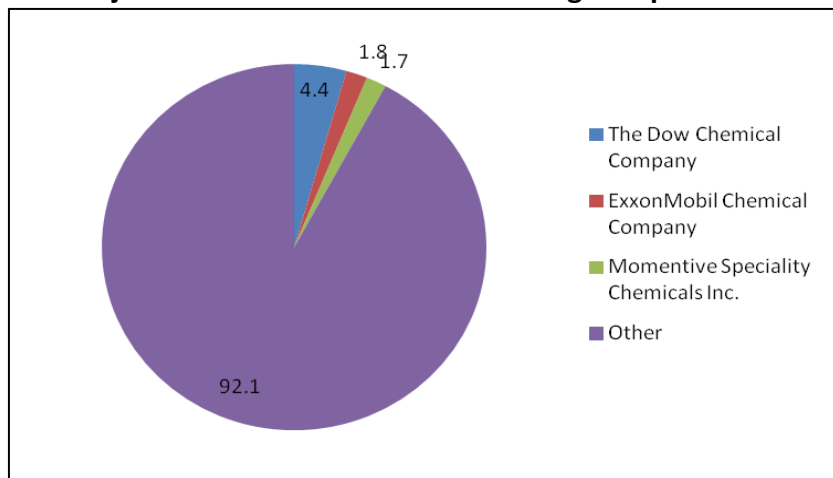
**Figure 31: Major Pesticide Manufacturing Companies in US in 2011**

Source: (Gotaas M. , 2011(a))

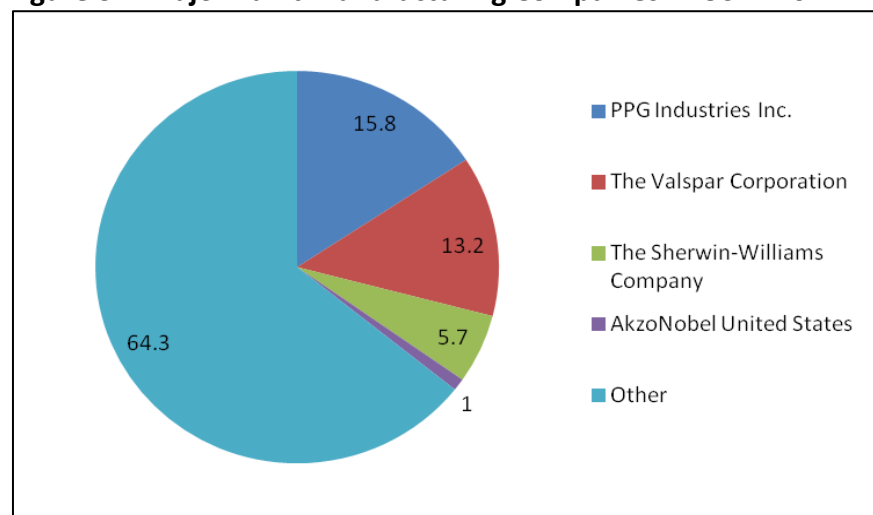
**Figure 32: Major Fertilizer Manufacturing Companies in US in 2011**

Source: (Radia, 2011(b))

The plastic and resin and paint manufacturing industries are characterized by low market concentration and fragmented market structure. It is learned from market research and interactions with key establishments in Kilgore that a resin manufacturing plant would complement the industries already located in the area. Therefore, any resin manufacturing plant will be a good target for the Gregg County in order to meet the demand from plastics and chemical industries already located there. However, the paint manufacturing industry has strong brand dominance and established distribution networks by the existing major players which act as a major barrier to entry. The *Sherwin-Williams Company* and *Benjamin Moore & Co* are some of the major players in the paint manufacturing sector that could be targeted for Gregg County. *Benjamin Moore*, a subsidiary of Berkshire Hathway is located in New Jersey and is currently concentrating on restructuring its manufacturing facilities and distribution centers all over the country in order to strategically locate these centers and to improve manufacturing efficiency. The *Sherwin-Williams Company* is located in Ohio and has distribution centers nationwide. With key suppliers (chemical industries) and key consumers (automotive & industrial sectors) found in and around Gregg County, these companies could be attracted to locate in Gregg County.

**Figure 33: Major Plastic and Resin Manufacturing Companies in US in 2011**

Source: (Gotaas, 2011(b))

**Figure 34: Major Paint Manufacturing Companies in US in 2011**

Source: (Radia, 2011(c))

#### 4.6.1.4 Market for Gregg County

Chemical Industries have a huge market volume in Texas as well as neighboring states. It is estimated that the total market volume of cities that can be served from Gregg County is \$ 96.64 billion in Texas. By considering a growth rate of 2.26%, the market volume is projected to be \$ 105.84 billion in 2016 Table 3 lists the major cities of Texas and their market volume for the chemical industry as a whole.

**Table 3: Market Volume of Chemical manufacturing industries for major Cities around Gregg County in Texas in 2011**

CHEMICAL MANUFACTURING				
CITY	MARKET VOLUME IN 2011(\$billion)		MARKET FORECAST (\$billion)	VOLUME FOR 2016
Beaumont	7.58		8.31	
Brazoria	1.81		1.98	
Dallas	21.97		24.09	
Fort Worth-Arlington	4.35		4.77	
Houston	51.95		56.96	
Long View-Marshall	8.87		9.73	
Markets that can be served from Gregg County	\$ 96.64 billion		\$ 105.84 billion	

Source: Bizminer (Chemical Manufacturing, 2011)

#### 4.6.1.5 Reasons to target these companies in Gregg County

- Texas, New Jersey, Louisiana, North Carolina, and Illinois are the nation's top chemical producers. Therefore, companies located in Texas will not only have geographic advantage, but also favorable resource availability.
- In 2011, Chemical shipments from Texas were valued at \$46.6 billion which represents the second largest category of exports from Texas. It is also found from market research literature (Gotaas, 2011(b)) that in 2011, the plastic and resin manufacturing industry is expected to generate export earnings of \$34.3 billion, which represents roughly 36.0% of industry revenue. Gregg County is closer to the Houston port which is the key port for Chemicals exports and imports from Texas.
- The chemical industry is the second largest consumer of energy in manufacturing. Texas was ranked number one in energy production in 2009.
- Chemical industry consumes the highest amount of net electricity and natural gas among all manufacturing sectors. The electricity and natural gas prices in Texas are very low compared to other places. Further, electricity price in Longview is 5.6 cents/KWh which is relatively lesser than other counties.
- Chemical industries are often located near consumers and to a lesser extent near raw material suppliers. Many consumers of the chemical industry are located in Texas. According to the IBIS World (Radia , 2012 (e))report, the plastic and resin manufacturing industry has most of its plants (10.3%) in Texas. Additionally, 60.0% of the industry's cyclic crudes and intermediates customers are in Texas.

## **4.7 Plastics Products Manufacturing**

The plastics products manufacturing industry is one of the fastest growing manufacturing sector in US. According to William R. Carteaux, president and CEO of Society of Plastic Industries (SPI), the plastics industries trade association, the U.S. plastics industry is stronger than ever and still growing in sales after years of globalization. For the purpose of this study, the following subsectors of the plastic industry have been considered:

- A. Plastic film, sheet and bag manufacturing
- B. Plastic pipe and parts manufacturing
- C. Plastic bottle and container manufacturing
- D. Plastic products miscellaneous manufacturing

### *4.7.1.1 Primary Activities*

The main activity of the plastic film, sheet and bag manufacturing industries is converting plastic resins into plastic bags and other materials. The pipe and parts manufacturing industries are involved in making plastic fittings, rigid and non-rigid plastic pipes, PVC pipes, etc. The firms of the miscellaneous plastic products manufacturing industries produce a wide range of plastic products, including housewares, building materials, motor vehicle parts, resilient floor coverings and appliance parts.

### *4.7.1.2 National Level Market*

The overall market volume of the plastics industry amounts to \$ 161.8 billion with profits up to \$ 5.66 billion. There are about 8274 businesses dealing with plastic products located nationwide. The national revenue including the profits, the annual growth rate over the next five years and the number of business establishments in each sub-sector of the plastic products manufacturing industry are presented in Table 4.

**Table 4: National Market Outlook of Plastic Industry in 2011**

SECTOR	MARKET REVENUE	PROFIT	ANNUAL GROWTH (2011-16) (%)	NUMBER OF BUSINESSES
Plastic film, sheet and bag	\$39 billion	\$1.4 billion	2.3	1093
Plastic pipe and parts	\$17.4 billion	\$575.2 million	1.8	660
Plastic bottle and container	\$10.8 billion	\$693.7 million	1.9	179
Plastic products miscellaneous	\$94.6 billion	\$3.0 billion	1.7	6342

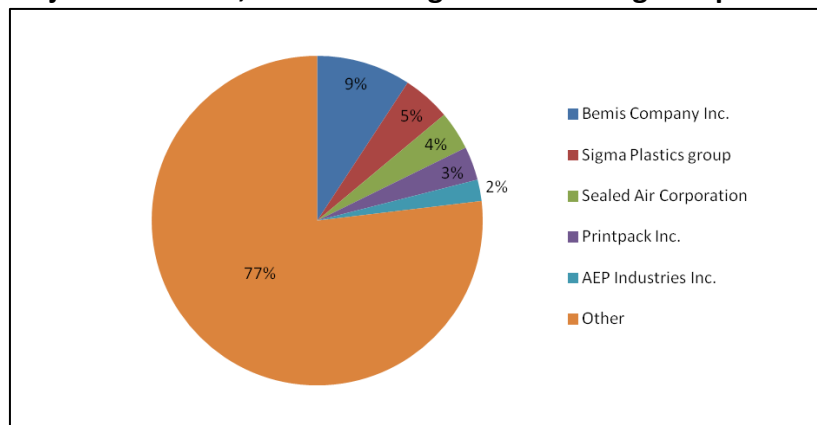
Source: (Bueno, 2011(g))

#### 4.7.1.3 Major Players

##### *Plastic film, sheet and bag manufacturing*

The major player in the plastic film, sheet and bag manufacturing industry is *Bemis Company Inc.* with a market share of 9.3%. Over the five-year period, consolidation has occurred within the industry. As mentioned in the IBIS World (Bueno, 2011(g)) report, the trend toward consolidation indicates major players are realizing the benefits of economies of scale and attempting to gain a competitive advantage through acquisition and growth. Recently, *Bemis* acquired *Alcan Packaging's* America's food operations, *Rio Tinto* which is expected to increase the domestic market share of *Bemis*. The major players and the other companies having significant market shares are shown in Figure 35.

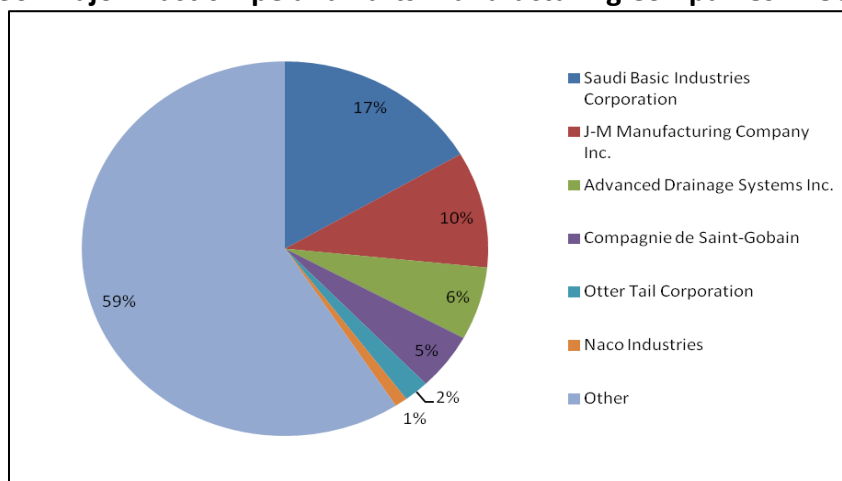
The market concentration is low with minimum barriers to entry. The regulation level is also light and the revenue volatility is medium which makes it easier for start-up companies to establish themselves quickly.

**Figure 35: Major Plastic film, Sheet and Bag Manufacturing Companies in US**

Source: (Bueno, 2011(g))

*Plastic pipe and parts manufacturing*

The plastic pipe and parts manufacturing industry has high capital intensity with a low level of market concentration. The barriers to entry are low although the industry has a high competition level. The major barrier to entry is the significant financial investment involved to account for high research and development expenditures. The plastic pipes manufacturing facility of *Otter Tail Corporation* can be considered as a good target for Gregg County. *Vinyltech PVC Pipes*, the plastics parts Manufacturing subsidiary of *Otter Tail Corporation* is located in Phoenix; Arizona and is one of the largest American owned producers in the western United States. It can be targeted to locate in Gregg County to cover the Eastern market. The market segmentation is shown in Figure 36.

**Figure 36: Major Plastic Pipe and Parts Manufacturing Companies in US in 2011**

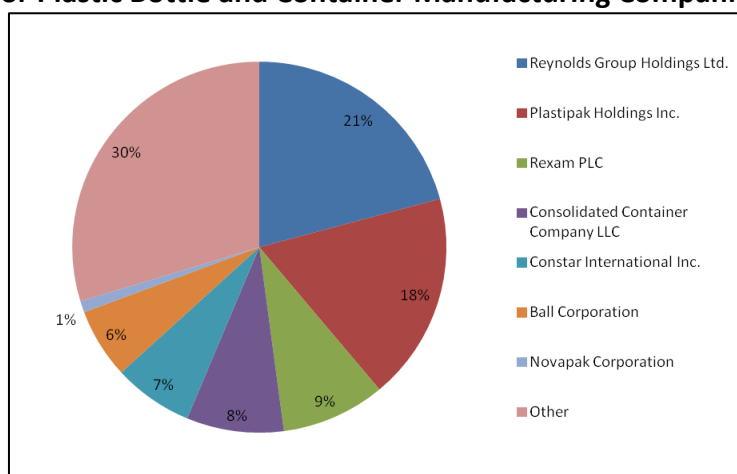
Source: (Bueno, 2011(f))

*Plastic bottle and container manufacturing*

The major players and their market shares of this industry are shown in Figure 37. This industry is characterized by a consolidated market structure with a medium concentration level. This industry has high level of trade assistance from the government as well as trade associations such as the Society of the Plastics Industry (SPI) and has minimum regulation levels. The technology used in this industry changes rapidly due to research and development focusing on expanding the use of recycled materials to improve the product performance and applications. Key suppliers of this sector (Chemical industries) are located in abundance around Gregg County. Currently, *Novapak Corporation* has state-of-the-art plant facilities in Hazleton, PA; Paris, IL; Walterboro, SC; Philmont, NY and Manchester, PA . *Novapak Corporation* produces polyethylene terephthalate (PET) bottles and is actively involved in PET recycling.

The national association of PET container resources states that for every pound of recycled PET flake used, energy use is reduced by 84%; greenhouse gas emission by 71% and according to the Institute of Scrap Recycling Industries 2011 Report the recycling of all materials creates 459,131 jobs and \$ 10.3 billion in domestic tax revenues. Therefore, *Novapak Corporation* can be considered as good target for Gregg County.

**Figure 37: Major Plastic Bottle and Container Manufacturing Companies in US in 2011**

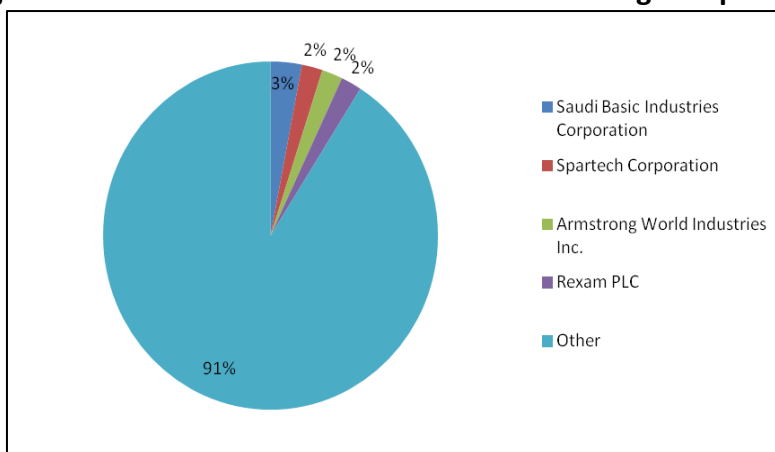


Source: (Gotaas, 2011)

### *Plastic products miscellaneous manufacturing*

This industry has a low level of concentration and the competition level is medium. Similar to plastic bottle and container manufacturing industry, the technology change in this industry is also rapid and frequent. The major players and their market shares are shown in Figure 38. *Spartech Corporation* is a leading producer of a wide range of plastic products including polymeric compounds, concentrates, custom extruded sheet and roll stock products and packaging technologies. As the company serves multiple customers with diversified needs, it could be targeted for Gregg County, where the company could reach a wide spectrum of customers.

**Figure 38: Major Plastic Products Miscellaneous Manufacturing Companies in US in 2011**



Source: (Bueno, 2011(e))

#### **4.7.1.4 Market for Gregg County**

The market volumes of all the subsectors of the plastics products manufacturing industries are added to estimate the total market volume of the plastics products industry. It can be seen that the total market volume that can be served from Gregg County is \$ 5.148 billion and over the next five years, this is projected to be \$ 5.739 billion. The major cities those are located within 300 miles around Gregg County and their market volume for the plastic product manufacturing industries as a whole is shown in Table 5.

**Table 5: Market Volume of Plastics manufacturing industries for major Cities around Gregg County**

PLASTICS MANUFACTURING		
CITY	MARKET VOLUME IN 2010	MARKET VOLUME FORECAST FOR 2016
Austin, TX	\$257 million	\$286 million
Houston, TX	\$1.7 billion	\$1.9 billion
San Antonio, TX	\$143 million	\$159 million
Dallas, TX	\$2.28 billion	\$2.54 billion
Fort Smith, AR	\$119 million	\$132 million
Little Rock, AR	\$119 million	\$132 million
Jackson, MI	\$92 million	\$102 million
Tulsa, OK	\$227 million	\$253 million
Oklahoma City, OK	\$211 million	\$235 million
Markets that can be served from Gregg County	\$ 5.148 billion	\$5.739 billion

Source: Bizminer (Plastics Manufacturing, 2011)

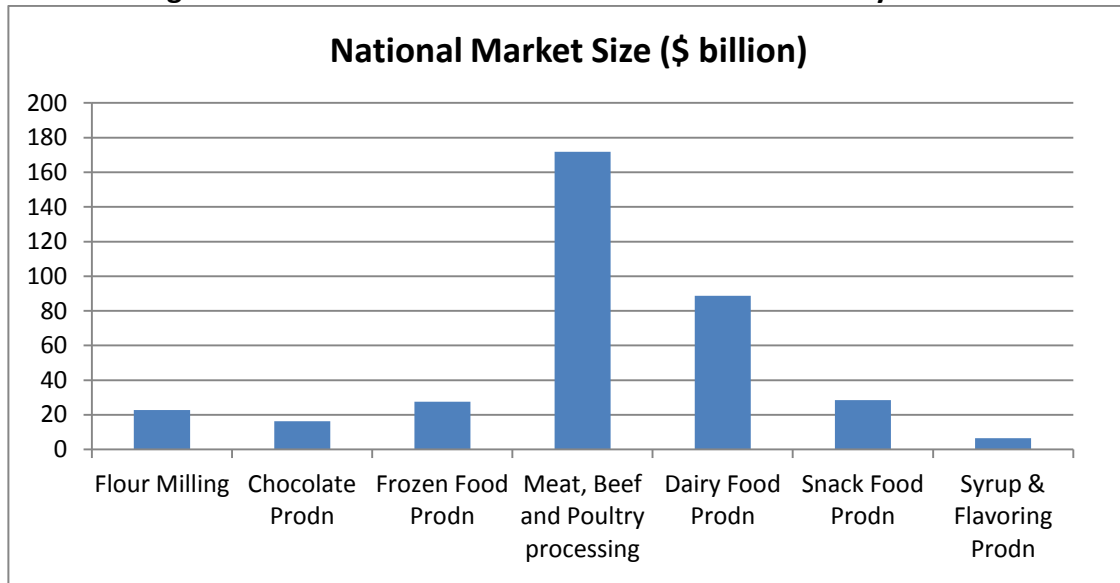
#### 4.7.1.5 Reasons to Locate in Gregg County

- Gregg County is placed at a favorable location with railroad and interstate highway connectivity for transportation of goods. Similarly, it is closer to Houston port and major cities in Arkansas, Louisiana and Mississippi.
- The major raw materials for the plastics industry are the chemical products. Texas is one of the leading states in chemical production.
- It is economical for these establishments to be located near petroleum refineries as the resin and synthetic rubber are derived from petrochemicals, it is more cost efficient to manufacture these chemicals near petroleum refineries. As it is widely known, Texas accounts for more than one-fourth of total U.S. Petroleum refining capacity.

## 4.8 Food Industry

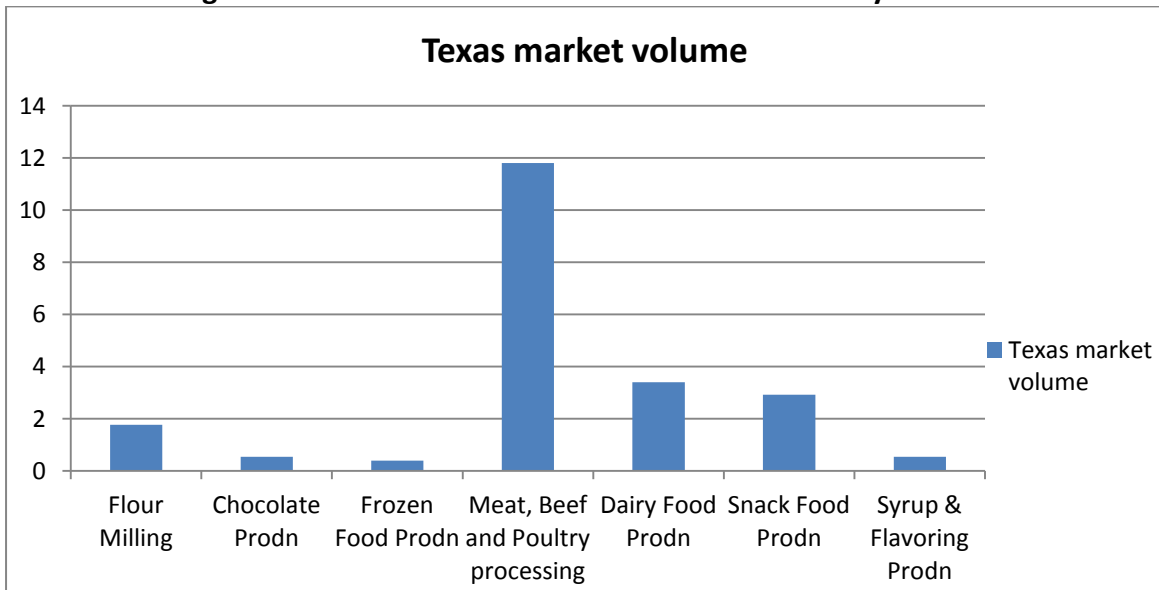
The food industry covers a wide variety of sectors such as animal production, frozen food production, snack food production, sea food processing, specialty food industries, cereal production etc. The market volume and the growth rates of the various sectors were analyzed to identify the sectors suitable for the region of interest (Gregg County).

**Figure 39: National Market Volume of the Food Industry Sectors**

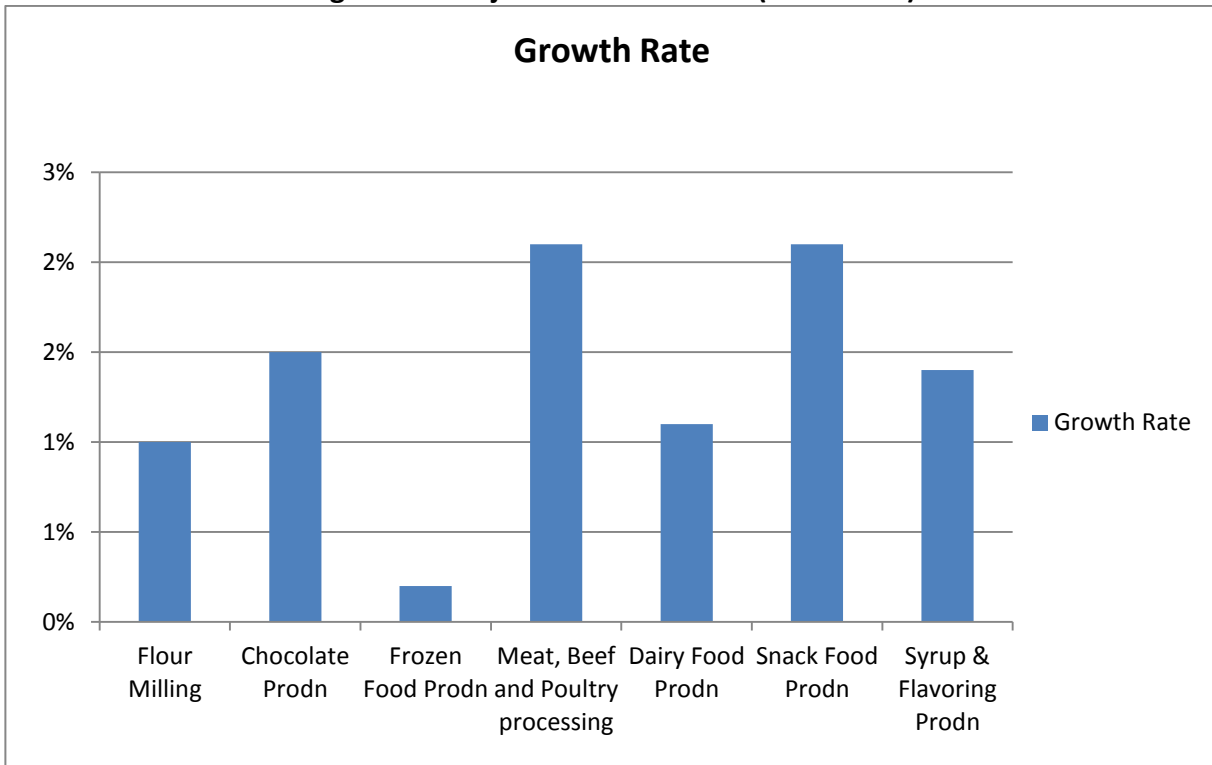


Source: U.S. Census Bureau

**Figure 40: Texas Market Volume of the Food Industry Sectors**



Source: U.S. Census Bureau

**Figure 41: Projected Growth Rate (2011-2016)**

Source: U.S. Census Bureau

It is found from market research that the meat, beef and poultry processing industry, dairy food production industry and the snack food production industry have high market volume as well as a high projected growth rate for the next 5 years.

Although the meat, beef and poultry processing industry have high consumption rates and a huge market volume, the industry is well established in the state of Texas. Further, our interactions with Longview and Kilgore's Economic Development Corporations officials revealed that it was not in the strategic interest to pursue meat processing industries. In accordance with their requirements, the meat, beef and poultry processing industry is not analyzed in this study.

With respect to Gregg County, this study was mainly focused on the following subsectors of food industry:

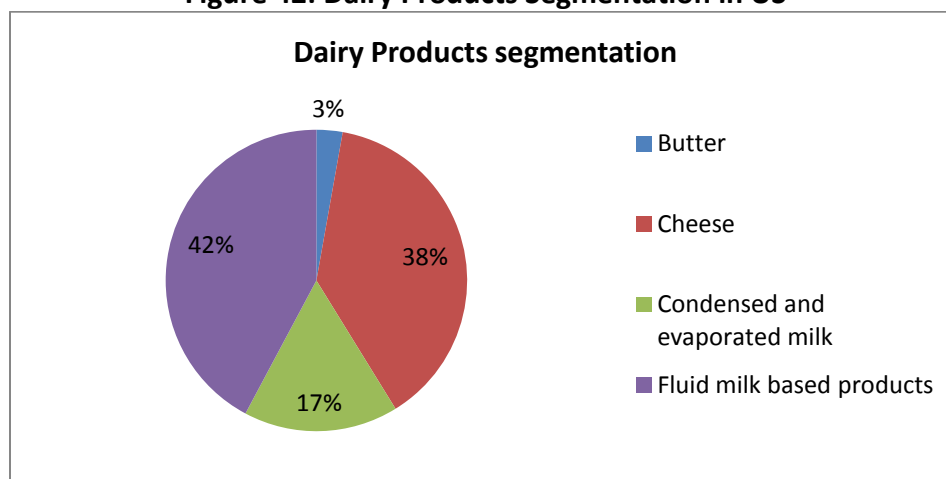
- A. Dairy products
- B. Frozen food production
- C. Snack food production

### 4.8.1 Dairy Product

#### 4.8.1.1 Primary Activities

This industry primarily involves manufacturing pasteurized milk, cheese, ice cream mix, yoghurt, cream, evaporated milk and butter. Frozen dairy products are not part of this industry. The products segmentation of dairy product industry is shown in Figure 24.

**Figure 42: Dairy Products Segmentation in US**



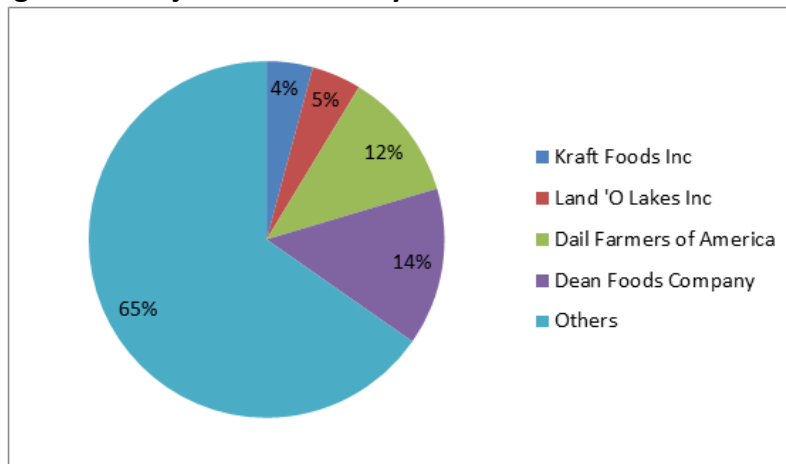
Source: (Mcbee, 2011(a))

#### 4.8.1.2 National level market

At the national level, revenue of the dairy products industry is estimated to be \$ 88.7 billion with exports to countries like Mexico, Japan, China, and others contributing to \$ 4.4 billion dollars. The projected growth rate for the next five years is 1.1 % annually. The profits achieved by this industry are found to be \$2.3 billion. There are about 753 businesses of dairy products nationwide (Mcbee, 2011(a)).

#### 4.8.1.3 Major players

There are four major national players in the dairy products sector. This industry is mainly owned by regional cooperatives or associations. The number of businesses is declining due to mergers and acquisitions. The major players and their market share are shown in Figure 43.

**Figure 43: Major national Dairy Products Industries in US 2011**

Source: (Mcbee, 2011(a))

The market concentration of this sector is found to be low as the major players contribute about 34.7 % of the total market share. The industry has heavy regulations enforced by four major programs. They are the Dairy Product Price Support Program (DPPSP), the Dairy Export Incentive Program (DEIP), the Milk Income Loss Contract (MILC), and the Federal Milk Marketing Order System (FMMOS). They establish standards regarding the price and food safety measures. However, these programs also provide significant trade assistance to these industries.

#### *4.8.1.4 Market for Gregg County*

The market volume for dairy products as estimated by the Economic Census, U.S Census Bureau, for the state of Texas is found to be \$3.4 billion. Based on the population metric and per capita consumption rate of the dairy products, the market volume of the major cities within 250 miles from Gregg County is shown in Table 6. The total market volume that can be served from Gregg County is estimated to be \$ 9.5 billion and the forecasted value for 2016 is \$ 10.13 billion

**Table 6: Dairy Products market of Major cities around Gregg County**

DAIRY PRODUCTS			
CITY	MARKET VOLUME IN 2010	MARKET VOLUME FOR 2016	FORECAST
Dallas-Fort worth	\$3.88 billion	\$4.13 billion	
Houston, TX	\$ 3.61 billion	\$ 3.84 billion	
Austin, TX	\$ 1.04 billion	\$ 1.1 billion	

Beaumont, TX	\$ 71 million	\$ 75 million
Little Rock, AR	\$ 425 million	\$ 453 million
Fort Smith, AR	\$ 181 million	\$ 192 million
Shreveport, Louisiana	\$ 325 million	\$ 346 million
Markets that can be served from Gregg County	\$ 9.5 billion	\$ 10.13 billion

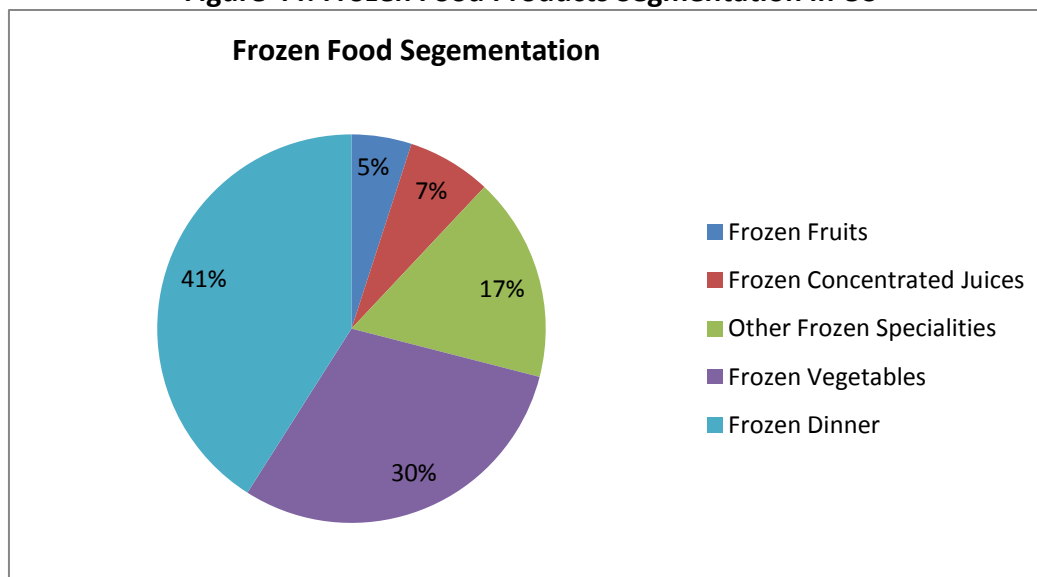
Source: Bureau of statistics USDA, 2010, and U.S. Census Bureau

## 4.8.2 Frozen Food Industry

### 4.8.2.1 Primary Activities

Frozen food production companies include manufacturers who produce frozen fruits, vegetables, juices, pancakes, pizza and desserts. The frozen food products segmentation is shown in Figure 44.

**Figure 44: Frozen Food Products Segmentation in US**



Source: Nanfelt, 2012

### 4.8.2.2 National level market

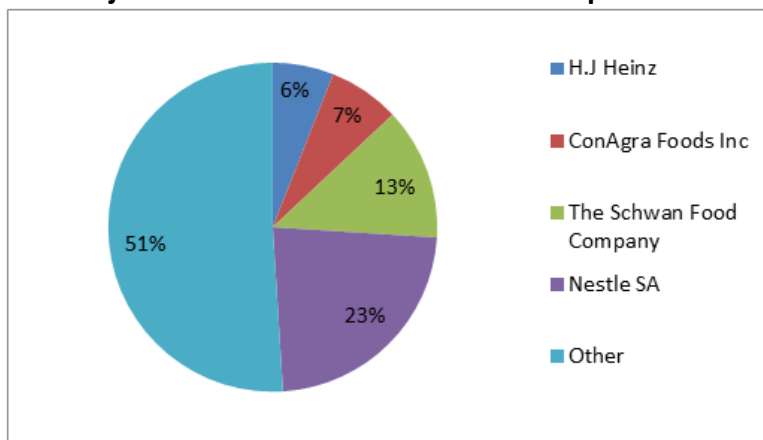
According to the IBIS World (Nanfelt, 2011(a)) report, frozen food production has about 497 business establishments across the country. The national revenue of frozen food production industry is estimated to be \$ 27.6 billion. The overall profit gained by this industry amounts to

\$3.6 billion. Exports contribute to about \$2.2 billion. The annual growth rate for the period 2012-2017 is projected to be 0.2 %.

#### 4.8.2.3 Major Players

The market structure of this industry is consolidated with the company Nestle SA holding that accounts about 22.4% of the total market share. This industry is characterized by low level of revenue volatility which implies that there are minimal risks associated with this industry. The market concentration and the competition level in this sector are medium. Significant level of initial capital investment and the fact that the industry's major players are well-established with strong customer loyalty and favorable contracts with key suppliers serve as barriers to new entrants. Major companies in this sector and their market share are shown in Figure 45.

**Figure 45: Major Frozen Products Production Companies in US in 2011**



Source: Nanfelt, 2012

Based on market research, some of the major players which do not have a facility in Texas, other companies having substantial market shares and their competitors are analyzed. *H.J Heinz* can be a potential target company for Gregg County as the company does not have a production facility in Texas. The market share of North American consumer products was estimated to be 3.3% for H.J. Heinz and about 12% of this was propelled by emerging markets. Since the company is accelerating growth in emerging markets, it would be promising to consider it as a potential target.

*J R Simplot Company* is a privately held agri-business corporation located in Idaho. The company produces and sells frozen fruits and vegetables and the company is also the principal

provider of French-fries to McDonalds, Burger King, KFC and Wendy's. *J R Simplot Company* could be a good candidate for Gregg County to cater to the needs of the frozen food market. IBISWorld projects the company's revenue to reach \$4.6 billion in 2012. Moreover, the company is also actively involved in feedlot operations with facilities in Idaho and Washington. Texas is the leading state in livestock production and the East Texas region, in particular is famous for its cattle raising activities. Thus, having a facility in Gregg County, would also support the company's feedlot management activities.

*McCain Food Limited* is the world's largest producer of French fries and it also produces frozen green vegetables, desserts, pizzas, juices, beverages and other oven meals. The company was established in New Brunswick, Canada and has 55 production facilities across 12 countries. In order to raise its competitiveness, the company is strongly pursuing its growth strategy and it could be targeted for Gregg County to expand its markets.

#### 4.8.2.4 Market for Gregg County

As per the data stated by the Bureau of Statistics, USDA 2011, the per capita consumption of frozen fruits, vegetables, and desserts is approximately 92 pounds. The prices of the frozen commodities multiplied by the consumption gives the per capita consumption rate which is in turn multiplied by the population of the city to give the market volume of that city. In this manner, the market volume that can be served from Gregg County is estimated to be \$ 12.4 billion.

**Table 7: Frozen Food Products market of Major cities around Gregg County**

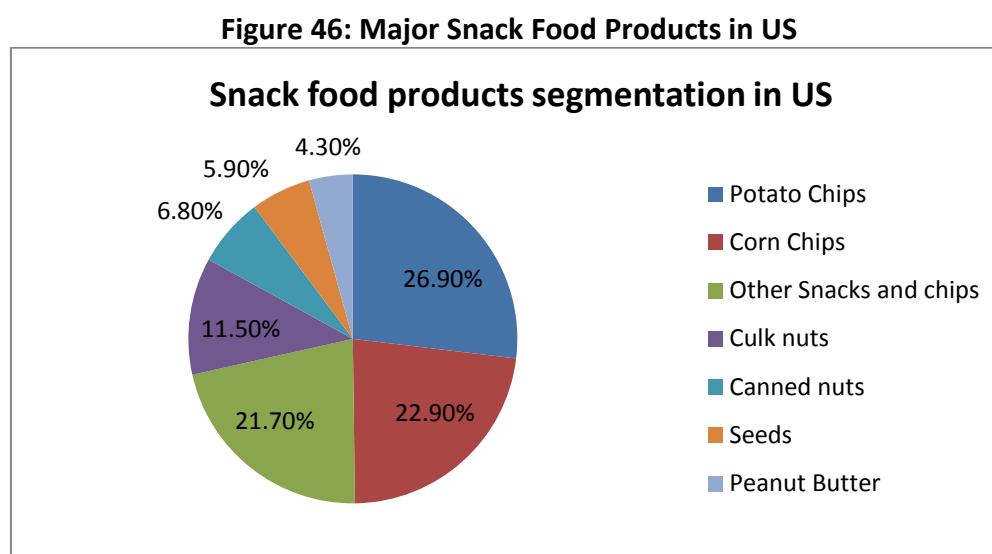
FROZEN FOOD PRODUCTS		
CITY	MARKET VOLUME IN 2010	MARKET VOLUME FORECAST IN 2016
Dallas-Fort worth	\$ 5.06 billion	\$ 5.18 billion
Houston, TX	\$ 4.7 billion	\$ 4.81 billion
Austin, TX	\$ 1.36 billion	\$ 1.39 billion
Beaumont, TX	\$ 93 million	\$ 94 million
Little Rock, AR	\$ 555 million	\$ 561 million
Fort Smith, AR	\$ 237 million	\$ 239 million
Shreveport, Louisiana	\$ 424 million	\$ 429 million
Markets that can be served from Gregg County	\$ 12.4 billion	\$12.7 billion

Source: Bureau of statistics USDA, 2010, and U.S. Census Bureau

### 4.8.3 Snack Food Production in the US

#### 4.8.3.1 Primary Activities

The snack food production industry in the US is majorly involved in salting, roasting, drying, cooking, or canning nuts, processing grains or seeds into snacks, producing peanut butter manufacturing potato chips, corn chips, popped popcorn, pretzels (except soft), pork rinds and rice cakes. The major products of the snack food industry are shown in Figure 46.



Source: (Gotaas, 2011(c))

#### 4.8.3.2 National Level Market

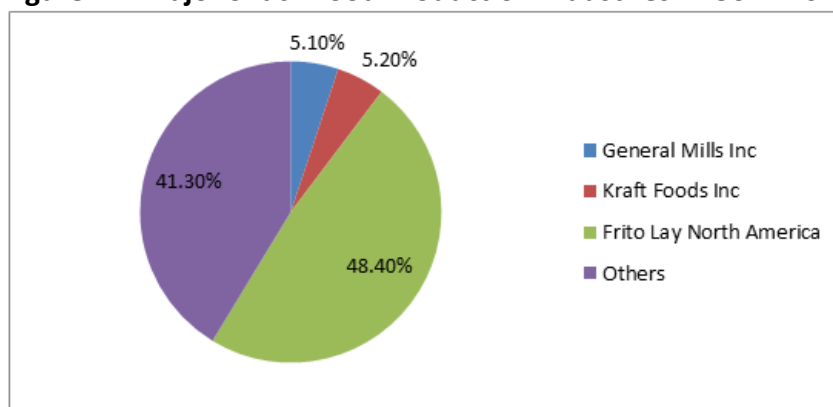
In 2011, the national level revenue was \$28.4 billion including the international trade revenue of \$ 823 million. There are about 359 establishments across the nation and the profit gained by establishments in this industry is estimated to be \$ 5.9 billion. These establishments are primarily clustered around California and Pennsylvania as most of the major players have their production and distribution facilities in these states to gain access to the large and affluent consumer base in surrounding areas. The projected growth rate for this industry is 2.1% annually for the next five years.

#### 4.8.3.3 Major Players

The market structure of the snack food production industry is consolidated with the industry leader Frito Lay North America, headquartered in Plano, TX, owning up to 48% of the national

revenue. The major players of this industry are widely known due to their strong brand dominance. Their market shares are shown in Figure 47. The barriers to entry to this industry are mainly due to the well-established major players who have gained customer loyalty and long-term supply contract relationships. As a result of this, they have lower unit production costs and therefore spend more on advertising and promotions which might hinder the growth of new entrants. Apart from the major players, companies like *Proctor & Gamble (Pringles Manufacturing)* and *Diamond Foods Inc.* also have significant market shares. In June 2012, the Pringles manufacturing division of Proctor & Gamble is expected to be acquired by *Kellogg Company* and it could be considered as a target company for Gregg County to add to *Kellogg Company's* expansion activities. *Diamond Foods Inc.* has production facilities in Stockton, California; Salem, Oregon; Fishers and Van Buren, Indiana; Beloit, Wisconsin; Robertsdale, Alabama. *Diamond Foods Inc.* is also involved in international trade activities and it would be promising to locate in Texas to further explore national and international markets.

**Figure 47: Major Snack Food Production Industries in US in 2011**



Source: (Gotaas, 2011(c))

#### 4.8.3.4 Market for Gregg County

As the snack food production industries deal with a diverse variety of products, it is hard to estimate the market volume based on the consumption rates. As per the Economic Census, the market volume based on the total value of products produced and sold of some of the major cities around Gregg County is presented in Table 8. The total market volume that can be reached by serving these major cities from Gregg County accounts about \$2.57 billion and with a projected growth rate of 2.1%, the market volume in 2016 is \$2.83 billion.

**Table 8: Market Volume of Snack Food Production of Major Cities around Gregg County in 2011**

SNACK FOOD PRODUCTION		
MAJOR CITIES	MARKET VOLUME 2011	MARKET VOLUME FORECAST FOR 2016
TEXAS	\$ 2.99 billion	\$ 3.30 billion
Dallas, TX	\$ 2.14 billion	\$ 2.36 billion
Houston, TX	\$ 0.432 billion	\$ 0.477 billion
Markets that can be served from Gregg County	\$ 2.572 billion	\$ 2.837 billion

Source: U.S. Census Bureau

#### 4.8.3.5 *Reasons to establish Food production industries in Gregg County*

- Access to market: Port of Houston is one of the major ports from which the export of frozen products takes place. It located at about 200 miles from Gregg County. Also, Gregg County is located in close geographic proximity to major cities in Arkansas, Louisiana and Mississippi. Furthermore, railroad and interstate highway connectivity for transportation of goods such as Interstate 20, state highways 31 & 42 and U.S highways 259 and 271 provide favorable transportation facilities in Gregg County.
- Access to resources: Energy dependability is a vital factor for the food processing industries. Texas is ranked number one in energy production in 2009.
- Workforce: The percentage distribution of workforce requirement among the different industry segments as given by the Bureau of Labor statistics, US Department of Labor is shown in Table. Since the work force level is generally low-medium, it is well available in Texas. In US, the average wage per employee in the food industry is \$ 30.20.

**Table 9: Employment percentage for various Food Industry Segments in US**

Industry segment	Employment
Animal slaughtering and processing	34.5
Bakeries and tortilla manufacturing	18.7
Fruit and vegetable preserving and special food manufacturing	11.9
Dairy product manufacturing	8.8
Sugar and confectionary product manufacturing	4.8
Grain and oilseed milling	4.2
Animal food manufacturing	3.5
Seafood product preparation and packaging	2.5
Other food manufacturing	11.0

Source: BLS Quarterly Census of Employment and Wages, 2008

- Impact of Public sector: The average tax rate of the state of Texas is 0.5237 % and Gregg County has a relatively lesser tax rate of 0.2675 % for the year 2010.
- Cost of Living: Texas has the 3rd lowest cost of living out of 50 states in 2011.
- In US, food processing industries account for about 67,474 million kWh of net electricity consumption and 587 billion cu. ft of natural gas usage. Texas ranks 24th and 33rd in the nation in 2011 in electricity and natural gas prices respectively, which would prove economical for the food industries.

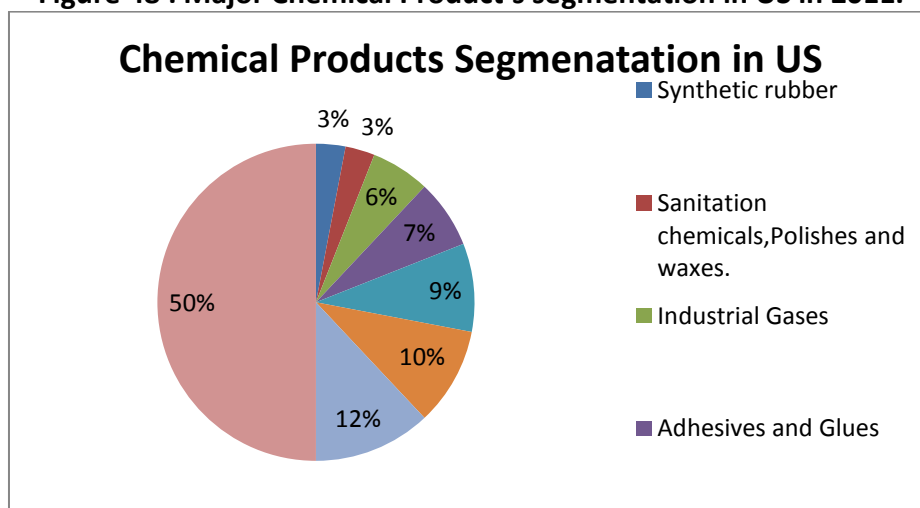
## 4.9 Distribution/ Warehousing

### 4.9.1 Chemical Wholesaling

#### 4.9.1.1 Primary Activities

This industry involves wholesaling of chemicals and its related products such as acids, chemical additives (e.g. concrete, food, fuel and oil), compressed gases (except LP gas), explosives (except ammunition and fireworks), industrial chemicals, laundry soap, chips and powder, oil additives, resins and synthetic rubber, sulfuric acid and synthetic rubber. These products are used in a host of different industries such as manufacturing, mining and energy.

**Figure 48 : Major Chemical Product's segmentation in US in 2011.**



Source: (Radia, 2012(d))

#### 4.9.1.2 National Level Market

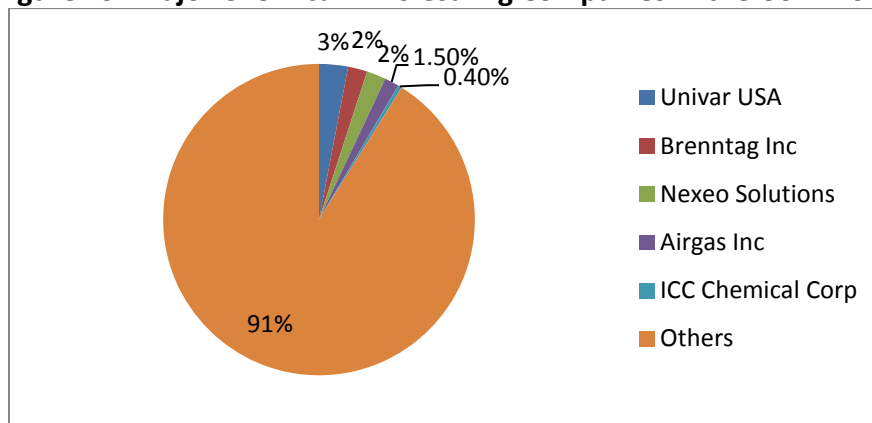
At the national level, the market revenue for the chemical wholesaling industry is estimated to be \$ 149.5 billion. The profit, which is taken as the earnings before interest and taxes, is calculated to be 5.5% of the total market revenue. There are about 5899 business establishments in this sector, with a majority of the establishments located in Texas. This industry is not involved in international trade and therefore, it does not record any import or export revenue.

#### 4.9.1.3 Major Players

The top firms account for less than 9% of the total market revenue. The concentration in this industry is low with a lot of mergers and acquisitions taking place. Some of the major chemical wholesaling companies in US and their market shares are shown in

Figure 49 for new entrants, considerable capital costs are involved in terms of setting up computerized inventory controls, machinery to move stock, warehousing and logistics. Due to the varying demand from the industrial customers, the revenue volatility is determined to be medium. The industry players are subject to extensive regulations laid down by the Toxic Substances Control Act (TSCA) and the Department of Labor's Occupational Safety and Health Administration regarding the transportation of chemicals.

**Figure 49: Major Chemical Wholesaling Companies in the US in 2011**



Source: (Radia, 2012(d)), Purchasing Magazine (2005)

#### 4.9.1.4 Market for Gregg County

Based on our industry visits to Gregg County, it is found that the major distribution/warehousing companies located in East Texas, reach up to seven states from there. Although, a region of smaller radius is analyzed for the purpose of this study, there is ample scope to reach markets beyond this region which will significantly increase the market volume. The region of interest is taken to be 200 miles around Gregg County and the market volume of some of the major cities in this region is shown in Table 10. The market volume of Houston, TX is found to contribute more than fifty percent of the state of Texas' market volume. With a growth percentage of 2.5%, this amount is projected to be \$ 9.5 billion in 2016.

**Table 10: Market Volume of Chemical Wholesaling industries for major Cities around Gregg County**

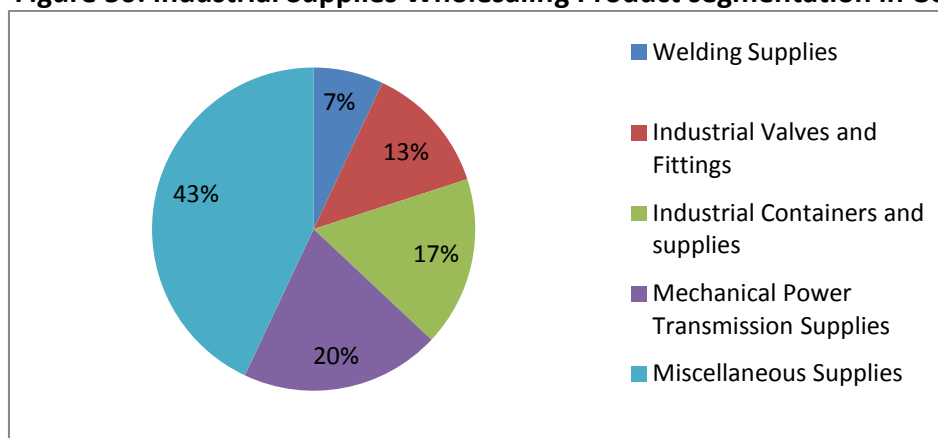
CHEMICAL WHOLESALING		
CITY	MARKET VOLUME IN 2012	MARKET VOLUME FORECAST FOR 2016
Dallas, TX	\$ 679 million	\$ 747 million
Houston, TX	\$ 8.5 billion	\$ 9.4 billion
TEXAS	\$ 11.6 billion	\$ 12.7 billion

Source: Economic Census, U.S. Census of Bureau (2012)

## 4.9.2 Industrial Supplies Wholesaling

### 4.9.2.1 Primary Activities

The industrial supplies wholesaling primarily serve the manufacturing, oil wells and warehousing industries. The industry deals with the wholesaling of bearings, welding supplies, refractory materials, containers, valves and other industrial supplies. The product segmentation of the industrial supplies wholesaling industry is shown in Figure 50.

**Figure 50: Industrial Supplies Wholesaling Product segmentation in US**

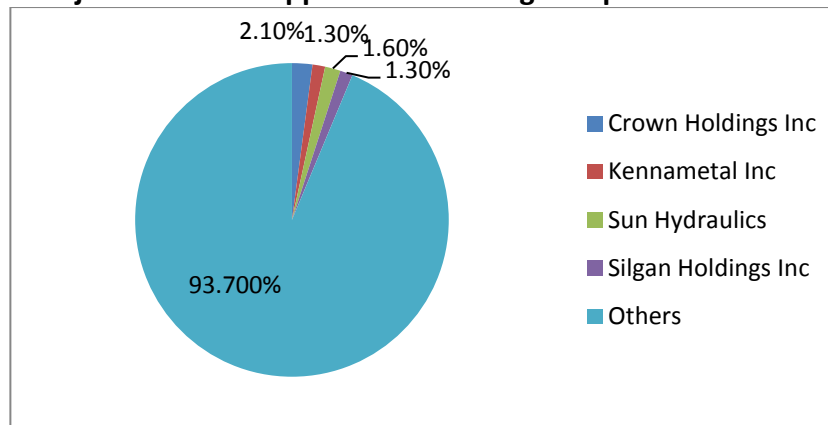
Source: (Mcbee, 2011(b))

#### 4.9.2.2 National level Market

The national market revenue of the industrial supplies wholesaling industry is \$72.9 billion. The profits of this industry, consisting of 8319 business establishments, are calculated to be \$ 4.3 billion. The IBIS World report (Mcbee, 2011(b)) projects 2.6% annual growth for this industry in the next five years.

#### 4.9.2.3 Major Players

The top firms in this sector and their market shares are shown in the Figure 51. Some of these firms are manufacturers and distributors of industrial supplies that serve a wide variety of sectors ranging from the food industry to the oil and gas service industries.

**Figure 51: Major Industrial Supplies Wholesaling Companies in the US**

Source: (Mcbee, 2011(b))

In this industry, the capital intensity is low and it is mainly comprised of labor charges and purchase of stocks which accounts to be 6% and 73% of the total expenditures respectively. Manufacturers who are also distributors have lower unit costs which provide them with a cost advantage against new entrants. The concentration in this sector is low with a fragmented market structure. Low level of regulations and policies are enforced in this sector.

#### 4.9.2.4 Market Volume for Gregg County

The total market volume that can be served from Gregg County is \$4.33 billion. By considering a growth rate of 2.6% annually, the forecasted market volume that can be served from Gregg County is \$4.7 billion. The market volume of the industrial supplies wholesaling sector for major cities around Gregg County in Texas and neighboring states are shown in Table 11.

**Table 11: Market Volume of Industrial Supplies Wholesaling Industries for Major Cities around Gregg County**

INDUSTRIAL SUPPLIES WHOLESALERS		
CITY	MARKET VOLUME IN 2012	MARKET VOLUME FORECAST FOR 2016
Shreveport, LA	\$ 56.2 million	\$ 62.07 million
Dallas-Fort worth, TX	\$ 1.94 billion	\$ 2.14 billion
Houston-Baytown, TX	\$ 2.26 billion	\$ 2.49 billion
Beaumont-Port Arthur, TX	\$ 55.24 million	\$ 60.98 million
Markets that can be served from Gregg County	\$ 4.33 billion	\$ 4.7 billion

Source: Economic Census, U.S. Census of Bureau, 2012

### 4.9.3 Oil and Gas Services and Equipment distribution

#### 4.9.3.1 Primary Activities

Companies dealing with oil and gas services and equipment distribution are involved in a wide variety of activities and are therefore classified under several industry sectors. Majorly, they are grouped under the following NAICS categories.

- Industrial machinery and equipment merchant wholesalers- oil well/refinery machinery and equipment merchant wholesalers ( NAICS: 4238306 )
- Mining services-support activities for oil and gas operations ( NAICS: 213112)

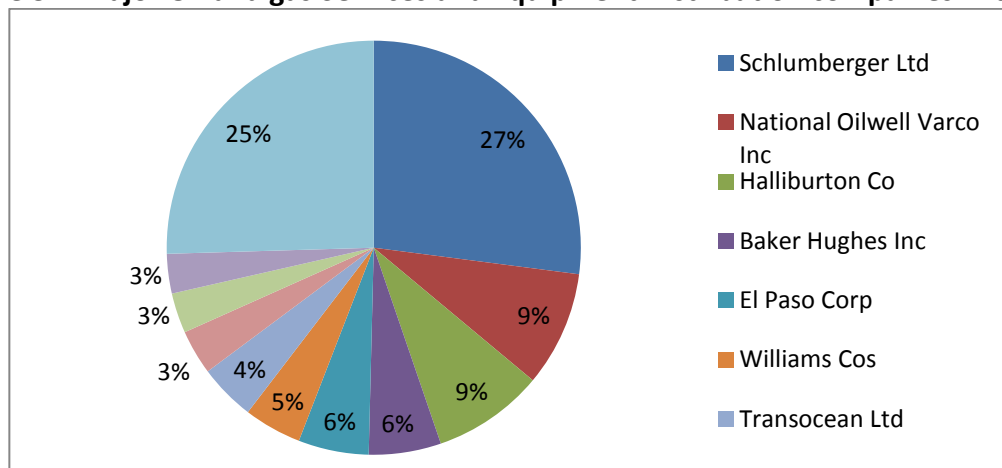
The primary activities of the firms in this sector are providing support services to companies in the oil and gas extraction field and also they deal with wholesaling of equipment involved in the excavation and refinery of oil products.

#### *4.9.3.2 National level Market*

The national market revenue as calculated by the Dow Jones U.S Oil Equipment, Services and Distribution index is 393.2 billion with an annualized total returns for a 5-year and 10-year period amounting to 5.03% and 10.88% respectively. There are about 6367 establishments providing support activities for oil and gas operations and 2817 establishments in the oil well machinery and equipment wholesaling business in US.

#### *4.9.3.3 Major Players*

The major players and their market shares as of 2012 are obtained from Dow Jones U.S Oil Equipment, Services and Distribution index and are presented in Figure 52. This market sector is concentrated with high barriers to entry. The existing players are well established and new entrants may pay comparatively higher prices for raw materials and transportation costs than existing players. The competition level is high with medium level of technology change. However, the industry is growing due to an increase in the outsourcing activities of oil gas excavators. According to the IBIS World (Bueno, 2012(c)) report, the major growth opportunities for firms in this industry are provided by the service technologies associated with the extraction of natural gas and offshore oil. Further, innovations in extraction techniques and discovery of oil at greater depths will stimulate growth and increase demand for companies in this sector.

**Figure 52: Major Oil and gas Services and Equipment Distribution companies in the US**

Source: Dow Jones U.S. Oil Equipment, Services &amp; Distribution Index, 2012

#### 4.9.3.4 Market Volume for Gregg County

The state of Texas' market volume for the industrial equipment wholesalers is estimated as \$5.10 billion in 2011. The market volume for cities within 200 miles of Gregg County as obtained from the U.S Census Bureau for the year 2011 is presented in Table 12 and Table 13. Table 12 gives the market volume for oil well equipment wholesaling and Table 13 gives the market volume for the support activities for oil and gas operations for major cities around Gregg County. The market volume that can be served from Gregg County for support activities for oil and gas operations amounts to \$ 10.6 billion and the forecast shows \$ 15.148 billion in 2016.

**Table 12: Market Volume of Oil well machinery equipment wholesalers for major Cities around Gregg County**

OIL AND GAS SERVICES AND EQUIPMENT'S DISTRIBUTION -Oil well/refinery machinery & equipment merchant wholesalers		
CITY	MARKET VOLUME IN 2011	MARKET VOLUME FORECAST FOR 2016
Shreveport, LA	\$ 50.9 million	\$ 54.7 million
Houston, TX	\$ 2.48 billion	\$ 2.66 billion
TEXAS	\$ 5.10 billion	\$ 5.4 billion

Source: Bizminer (Mining Services) 2011

**Table 13: Market Volume of Support activities for oil and gas operations for major Cities around Gregg County**

OIL AND GAS SERVICES AND EQUIPMENT'S DISTRIBUTION - Support Activities for Oil and Gas Operations		
CITY	MARKET VOLUME IN 2011	MARKET VOLUME FORECAST IN 2016
Dallas-Fort worth, TX	\$ 1.11 billion	\$ 1.58 billion
Beaumont-Port Arthur, TX	\$ 231 million	\$ 330 million
Longview-Marshall, TX	\$ 1.08 billion	\$ 1.54 billion
Austin, TX	\$ 76 million	\$ 108 million
Houston, TX	\$ 7.42 billion	\$ 10.61 billion
Fort Smith, AR	\$ 148 million	\$ 211 million
Shreveport, LA	\$ 538 million	\$ 769 million
Markets that can be served from Gregg County	\$ 10.6 billion	\$ 15.14 billion

Source: Economic Census, U.S. Census of Bureau, 2012

#### 4.9.3.5 Reasons to locate in Gregg County

- Some of the distribution/ warehousing companies located in Gregg County serve the states - Missouri, Louisiana, Texas, Oklahoma, Colorado, New Mexico and Arkansas. And some companies serve worldwide from the East Texas facilities mainly due to the proximity to Houston airport.
- Houston has higher tax rates and less availability of land which makes Gregg County a favorable location. Gregg County has low tax rates and No State Tax on property for industries that manufactures or produces a product used in pollution control.
- Texas is the leading state in chemical production and oil and gas services and equipment distribution mainly due to the presence of major oil refineries near Houston and other ports.
- The work force level is generally low-medium so it is well available. At the national level, the average wage per employee in the wholesale trade- durable goods is \$ 46.81 and for nondurable goods is \$40.72. Gregg County has lower Labor costs in comparison with other counties in Texas.
- According to a report by IBIS World (Radia, 2011(a))“the chemical industry is projected to experience higher demand from the manufacturing and construction sectors, which will drive revenue into 2016”.
- Similarly, the demand for oil and gas equipment's services will continue growing due to the discovery of Appalachian oil deposits and advances in extraction techniques.

## 5 Industry Requirements

This section presents a general analysis about the industries' costs and requirements. Costs include machinery, inventory, R&D, office equipment, project, and operating costs. In addition, other requirements include facilities, workforce, and utilities.

The objective of this analysis is to present a benchmark for potential companies. Using data from a company, it may be possible to identify whether the company is over or under the industry average level and thus is possible to estimate costs and requirements. This information may be useful for new companies, existing companies planning to expand, or existing companies planning to relocate. Furthermore, in a ROI analysis, this information may be useful to estimate missing data, or to analyze companies with similar characteristics.

It is important to mention that the basis for comparison used in each industry summary refers to the after-tax cost of startup and operation for the representative business over a 10-year planning horizon. National results are based on the combined results for a group of comparable cities in each country. Also, national and city results are expressed as an index in comparison to the baseline results of the United States (100.0) (Competitive Alternatives)

**Figure 53: Chemicals – Industry requirement**

CHEMICALS		
Specialty Chemicals Manufacturing – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Leased industrial site	3 acres	(12,141 m2)
Size of factory	50,000 ft <sup>2</sup>	(4,645 m2)
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$14,000	
Office equipment – US \$'000	\$500	
R&D equipment – US \$'000	\$500	
Inventory – US \$'000	\$5,000	
Equity financing – % of project costs	50%	
<b>Workforce</b>		
Management	5	
Sales and administration	11	
Customer support	5	
Production/non-dedicated product development		
- Professional, technical	34	
- Operators	33	
- Unskilled laborers	10	
Other	2	
Total employees	100	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	300,000 kWh and 1,080 kW	
Gas monthly consumption	41,300 CCF	(116,997 m3)
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$50,000	
Materials and other direct costs – % of sales	53%	
Other operating costs – % of sales	8%	
Investment in tax-eligible R&D – % of sales	2.1%	

Source: KPMG Competitive Alternatives – Industries

The chemical manufacturing industry serves a wide range of markets, including important industries in Gregg County such as oil and gas and metal manufacturing. Companies in chemical manufacturing consider an important percentage of skilled labor such as operators and technicians.

Additionally, chemical manufacturing consumes significant amount of utilities; specifically gas consumption is high in comparison with other industries (for example pharmaceutical production uses one fourth of chemical manufacturing).

Materials and other direct costs are about 53% of the sales, which is little lower than other industries (advance manufacturing is about 60%).

**Figure 54: Plastics – Industry requirements**

PLASTICS		
Plastic Product Manufacturing – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Leased industrial site	6 acres	(24,281 m2)
Size of factory	100,000 ft <sup>2</sup>	(9,290 m2)
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$17,750	
Office equipment – US \$'000	\$250	
R&D equipment – US \$'000	–	
Inventory – US \$'000	\$2,000	
Equity financing – % of project costs	50%	
<b>Workforce</b>		
Management	3	
Sales and administration	11	
Production/non-dedicated product development		
- Professional, technical	14	
- Operators	45	
- Unskilled laborers	14	
Other	3	
Total employees	90	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	400,000 kWh and 1,350 kW	
Gas monthly consumption	8,900 CCF	(25,212 m3)
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$25,500	
Materials and other direct costs – % of sales	32%	
Other operating costs – % of sales	2%	
Investment in tax-eligible R&D – % of sales	–	

Source: KPMG Competitive Alternatives – Industries

The plastic manufacturing industry uses a very low percentage of sales in materials and other operating costs (34% in total). This allows to this industry to have very profitable business.

The workforce requirements for plastic manufacturing are concentrated in operators, which do not require a high skill level. However, training in machinery and equipment operation is required. Usually companies provide the corresponding operating training given of specific uses of machinery and equipment.

Plastic manufacturing consumes high amount of utilities, especially electricity (see chemical manufacturing).

**Figure 55: Metal component – Industry requirements**

METAL COMPONENTS		
Metal Machining – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Leased industrial site	6 acres	(24,281 m <sup>2</sup> )
Size of factory	100,000 ft <sup>2</sup>	(9,290 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$19,500	
Office equipment – US \$'000	\$500	
R&D equipment – US \$'000	–	
Inventory – US \$'000	\$2,700	
Equity financing – % of project costs	50%	
<b>Workforce</b>		
Management	4	
Sales and administration	16	
Production/non-dedicated product development		
- Professional, technical	17	
- Operators	44	
- Unskilled laborers	14	
Other	5	
Total employees	100	
<b>Energy Requirements</b>		
Electricity monthly consumption/peak demand	240,000 kWh and 780 kW	
Gas monthly consumption	10,200 CCF	(28,895 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$27,750	
Materials and other direct costs – % of sales	36%	
Other operating costs – % of sales	3%	
Investment in tax-eligible R&D – % of sales	–	

Source: KPMG Competitive Alternatives – Industries

Metal component manufacturing consumes fewer utilities than plastic and chemical manufacturing. Also, the percentage of sales for material and other operating costs is relatively low (39% in total).

Similar to plastic manufacturing, metal component require more operators than other type of labor force. In the same way, most of the requirements are specific for training in machinery and operation processes.

**Figure 56: Agri-food – Industry requirements**

AGRI-FOOD		
Food Processing – Summary of Operating Parameters		
<b>Facilities Requirements</b>		
Leased industrial site	3 acres	(12,141 m2)
Size of factory	50,000 ft <sup>2</sup>	(4,645 m2)
<b>Other Initial Investment Requirements</b>		
Machinery and equipment – US \$'000	\$18,000	
Office equipment – US \$'000	\$300	
R&D equipment – US \$'000	–	
Inventory – US \$'000	\$2,000	
Equity financing – % of project costs	50%	
<b>Workforce</b>		
Management	6	
Sales and administration	12	
Production/non-dedicated product development		
- Professional, technical	14	
- Operators	43	
- Unskilled laborers	32	
Other	3	
Total employees	110	
<b>Energy requirements</b>		
Electricity monthly consumption/peak demand	370,000 kWh and 1,260 kW	
Gas monthly consumption	30,000 CCF	(84,986 m3)
<b>Other Annual Operating Characteristics</b>		
Sales at full production – US \$'000	\$40,000	
Materials and other direct costs – % of sales	44%	
Other operating costs – % of sales	6%	
Investment in tax-eligible R&D – % of sales	–	

Source: KPMG Competitive Alternatives – Industries

Food processing requires more unskilled labor than the other industries previously presented. Many processes do not require any training and when training is necessary, usually is relatively simply.

The utilities consumption is higher than metal manufacturing and plastics. Many food products require some type of refrigeration or special store requirements. These special requirements consume utilities even when the company is not producing.

Material and other operating cost are about 50% of the sales; which is a relatively low value in comparison with other industries (for example, auto-parts are more than 60%).

## 6 Industry Analysis – Verticals Analysis

The study will research and create knowledge on the growth of industrial clusters and similarly, the market drivers which influence the economic longevity of the existing and potential industries for Gregg County. The verticals analysis will develop a method to identify companies who supplement, or rather, complement the existing industrial cluster supply chains. Ultimately, the study aims to identify the gaps in the cluster infrastructure to ensure the economic growth and prosperity of a region or location.

### 6.1 Economic Base

To determine which goods and services are prevalent in a region, a compilation of the companies therein are categorized based on revenue, primary NAICS code (North American Industry Classification System), employees, and headquarter information. This information is obtained utilizing LexisNexis Academic's Company Dossier tool. It is important to note that both private and public companies are available; however, private company employee and revenue data is approximated.

**Table 14: Categorizing Regional Employers (Gregg County)**

Company Name	No. of Employees	Headquarters	Primary NAICS Code	Sales/Revenue
Basic Energy Services Inc	3181	Yes	213112 Support Activities for Oil and Gas Operations	730148000
Mustang Pipeline Company	2500		486910 Pipeline Transportation of Refined Petroleum Products	
LETOURNEAU TECHNOLOGIES INC	2285		331 Primary Metal Manufacturing	
Good Shepherd Health System	2200	Yes	62111 Offices of Physicians	
TEXAS EASTMAN	2000		621112 Offices of Physicians, Mental Health Specialists	499999999
EASTMAN CHEMICAL CO	1500		325998 All Other Miscellaneous Chemical Product and Preparation	160000
MARTIN RESOURCES INC	1300	Yes	221210 Natural Gas Distribution	1540000000

Source: Produced by T-MEX, Texas A&M University

Table 14 displays an example of private and public companies located in a specific region. As mentioned above, the companies are ranked by their employee data, rather than revenue, because private companies are not required to release this information. A company may have multiple NAICS codes, but their Primary NAICS Code defines which products and services generate the bulk of their revenue. Headquarter information reveals whether that company is headquartered in the region.

Once the companies are ranked, it is necessary to determine which industries generate the most revenue and employment; this is accomplished utilizing a Pivotchart and the companies'

Primary NAICS Codes. The Pivotchart sums the individual codes based on revenue and employee data.

**Table 15: Industry Rank (Gregg County)**

Industry	Sum of Sales/Revenue	Count of No. of Employees	Count of Headquarters	Percent Revenue
213112 Support Activities for Oil and Gas Operations	1231498300	7,524	4	5.25%
621112 Offices of Physicians, Mental Health Specialists	780063520	4,063	3	3.32%
452111 Department Stores (except Discount Department Stores)	211446996	2,943		0.90%
486910 Pipeline Transportation of Refined Petroleum Products	252000000	2616		0.11%
331 Primary Metal Manufacturing		2,285		0.00%
484121 General Freight Trucking, Long-Distance, Truckload	156571985	1990	12	0.67%
221210 Natural Gas Distribution	1594099997	1,697	1	6.79%

Source: Produced by T-MEX, Texas A&M University

Table 15 is the result of a Pivotchart taking a count of the variables above. For example, Sum of Sales for Support Activities for Oil and Gas Operations is the sum of revenue generated by the companies identified under that Primary NAICS Code. Therefore, Basic Energy Services (Table 14) accounts for a large portion of the employee data under Support Activities for Oil and Gas Operations. In addition, the other variables are results of multiple companies' information. This information creates a starting point from which to identify a region's competitive advantage and potential cluster integration.

The economic base in Gregg County consists of industries related to oilfield support activities, industrial machining, distribution/warehousing, and natural gas distribution. These industries generate a substantial portion of the region's revenue and require the most labor, both skilled and unskilled. For example, Support Activities for Oilfields are concentrated because of the large amount of oil and natural gas in the region. These companies will gravitate toward the well heads in order to cut down on transportation and communication costs.

### 6.1.1 Concentration Analysis

The industries that yield a large sales and employee count are further analyzed with a location quotient. The location quotient determines which goods and services are produced in a region (Blair, 1995).

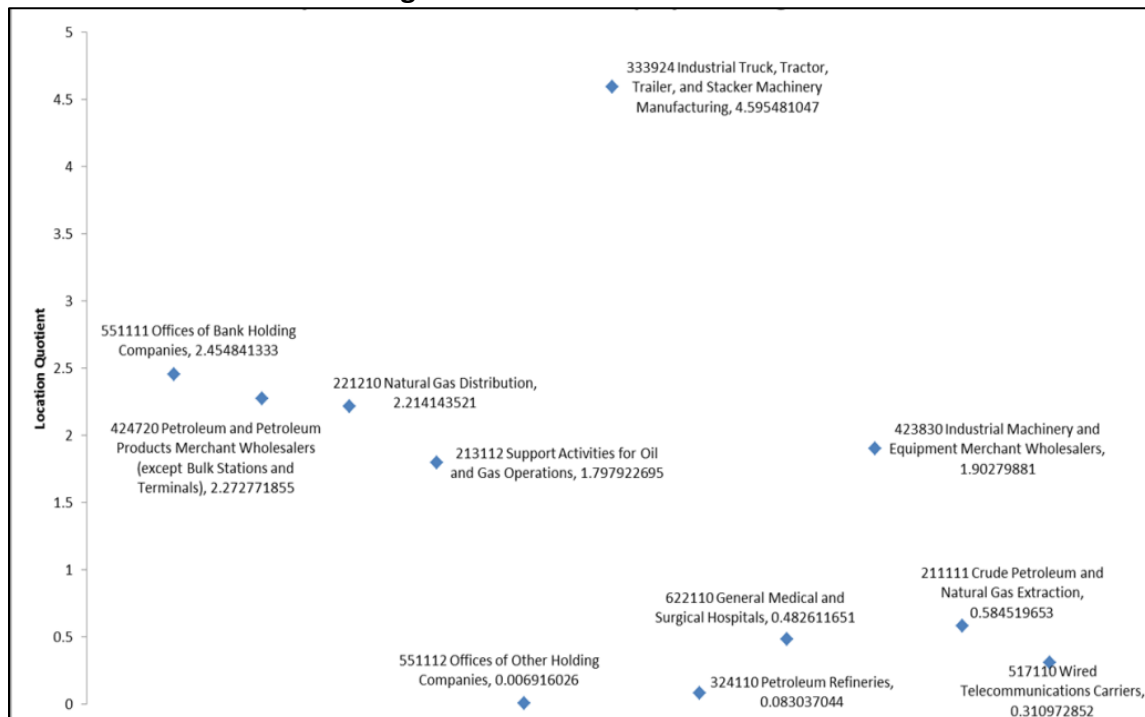
**Equation 2: Location Quotient**

$$\frac{\text{Specific Industry Emp}_{MSA}}{\text{Specific Industry Emp}_{Texas}} * \frac{\text{All Emp}_{Texas}}{\text{All Emp}_{MSA}}$$

Source: Blair, 1995

The location quotient compares the region to a reference economy. In our case, the reference economy is Texas. This equation is a simple frequency identifier which determines how concentrated an industry is compared to a reference economy.

Utilizing Table 15, the chart identifies which Primary NAICS Codes are more concentrated in the region than in Texas as a whole. A Location Quotient higher than one indicates a higher concentration than Texas. Furthermore, a rather high quotient (Industrial Truck, Tractor, Trailer, and Stacker Machinery Mfg.) may indicate a competitive advantage for that particular industry (Figure 57). These charts identify nominal industries from which to begin supply chain mapping and lead to cluster integration analysis.

**Figure 57: Concentration Table**

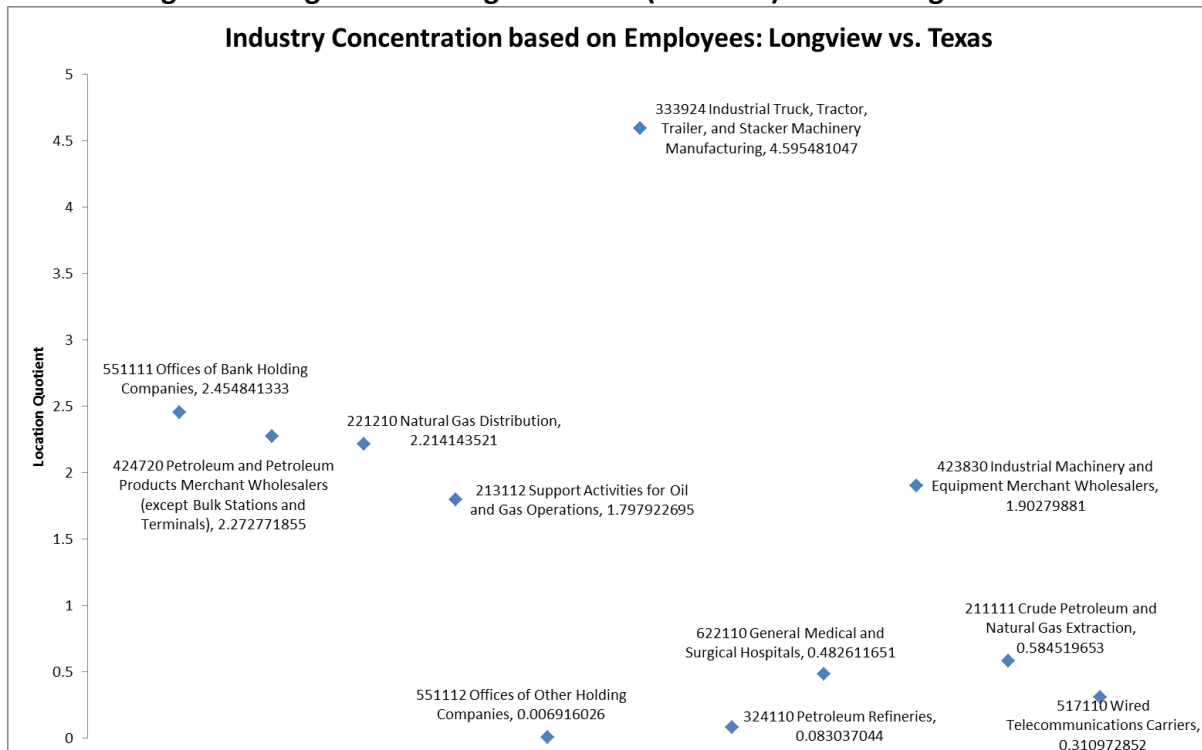
Source: Produced by T-MEX, Texas A&amp;M University

To select the industries in Figure 58 a sum of the revenues generated per industry was generated. For example, the companies identified as Natural Gas Distribution generate a certain amount of revenue; this revenue was combined and identified as a high sales grossing industry in comparison to other industries.

Analyzing Figure 58, industries with a location quotient higher than one indicates a high concentration with respect to Texas. These industries represent an area of specialization and are likely to be a part of the site's economic base. For example, Industrial Truck, Tractor, and Stacker Machinery Manufacturing is almost 4.5 times more concentrated in Kilgore than in Texas.

These quotients were computed using the LexisNexis database employee and revenue data. We made these charts with the caveat that employee data for private firms and specific facility locations are approximated. However, the industries identified in Figure 58 seem to represent the economic base of Kilgore-Longview MSA.

**Figure 58: Highest Grossing Industries (Revenue) within Longview MSA**



Source: Produced by T-MEX, Texas A&M University

In addition to the concentration analysis, we were able to rank specific industries by their revenue (mentioned above). By finding the combined revenue and employment we can identify which industries have a large impact on the economic base.

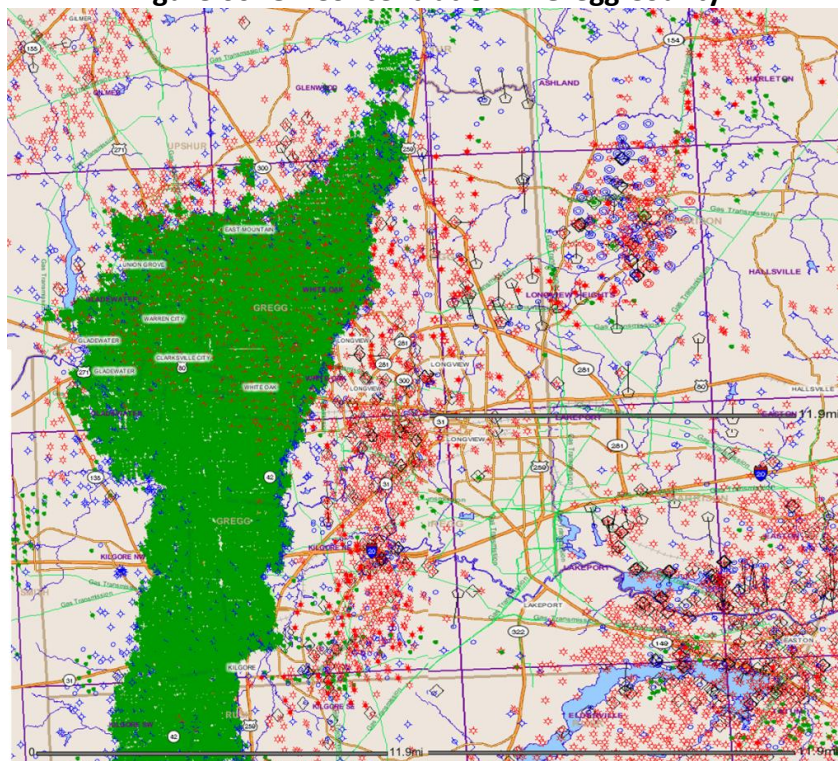
As indicated in Figure 59, Mining Machinery and Equipment Manufacturing generate a substantial portion of Gregg County's Revenue; LeTourneau Technologies is represented by this NAICS code. LeTourneau Technologies contributes a large amount of employees and revenue to this industry in Gregg County. Therefore, this industry is a part of Gregg County's economic base and will be analyzed further.

**Figure 59: Sum of Industry Employment and Revenue**

Primary NAICS Code	Revenue	Employees	% Revenue	% Employee
221210 Natural Gas Distribution	1544030000	506	10.79%	0.44%
333131 Mining Machinery and Equipment Manufacturing	1077900000	4800	7.53%	4.15%
32531 Fertilizer Manufacturing	919749000	651	6.43%	0.56%
213112 Support Activities for Oil and Gas Operations	204122274	2867	1.43%	2.48%
221119 Other Electric Power Generation	202024898	35	1.41%	0.03%
424720 Petroleum and Petroleum Products Merchant Wholesalers	199966394	570	1.40%	0.49%
332996 Fabricated Pipe and Pipe Fitting Manufacturing	193800000	887	1.35%	0.77%
423830 Industrial Machinery and Equipment Merchant Wholesalers	149648150	700	1.05%	0.60%
334210 Telephone Apparatus Manufacturing	149569000	202	1.04%	0.17%
517110 Wired Telecommunications Carriers	144283640	437	1.01%	0.38%
484121 General Freight Trucking, Long-Distance, Truckload	126790455	1473	0.89%	1.27%
236220 Commercial and Institutional Building Construction	109124880	587	0.76%	0.51%
339991 Gasket, Packing, and Sealing Device Manufacturing	100133000	705	0.70%	0.61%
486910 Pipeline Transportation of Refined Petroleum Products		2500	0.00%	2.16%
334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	94874000	2117	0.66%	1.83%

Source: Produced by T-MEX, Texas A&M University

Figure 60 displays the East Texas Oil Field petroleum well heads in green, and red represents natural gas extraction. The proximity to well heads brought most of the industries to Gregg County that are identified in Figure 59. The primary industries, such as Natural Gas Distribution, Support Activities for Oil and Gas Operations, and Petroleum Products Merchant Wholesalers are directly dependent upon the petroleum market regionally and nationally. However, Mining Machinery and Equipment Manufacturing and Fabricated Pipe and Pipe Fitting Manufacturing are secondary industries that branched off of the petroleum sector. These industries are still affected by the volatile fluctuations of petroleum prices, but not as severely. For example, machinery and metal manufacturing utilize the same labor force as the petroleum sector. This specialized labor force will move freely between Petroleum and Metalworking Industries when the petroleum market is up because the oil fields will offer more working hours and higher wages.

**Figure 60: Oil Concentration in Gregg County**

Source: Texas Rail Road Commission

## 6.2 Food Sector

### 6.2.1 Overview

Food industries are strongly interdependent and also dependent on the external economic environment. Industries will fluctuate depending on economic conditions and the health of substitute industries. For example, when the meat and poultry processing industry experienced a downturn, the frozen food processing industry will experience growth. This is because of certain consumer preferences, economy, and convenience.

The food sector experiences the same type of economic impact from legislation that other sectors face. However, it seems that the food sector is dramatically affected by one particular legislative incentive: ethanol. The production of ethanol incentivizes farmers to produce corn, but not for the food manufacturing industry. These incentives have greatly increased the price of corn, which in turn, trickles down the food manufacturing supply chain. Industries, such as beef cattle production, livestock ranching and farming, hog and pig farming, are greatly affected by the increase of corn prices because their industries require corn to sustain their products. The frozen food, meat and poultry processors purchase this raw meat at a higher price than

before. In addition to the higher prices, the recession deters consumers from spending money on higher quality meat products, especially when they are priced higher because of increased corn prices.

To combat the increased price of commodities, food manufacturers have adjusted their manufacturing processes. For example, manufacturers invest in larger output facilities and automated equipment. This reduces the cost of labor and other fixed costs to yield economies of scale. From Gregg County's perspective, this contradicts the idea of job creation. Increased automation will reduce the amount of employees needed in the distribution or processing facilities. Thus, attracting a food processor may only result in minimal employment because this industry is increasingly automated.

## 6.2.2 Location Factors

Location factors are fairly consistent across a wide-range of industries. The primary location factors include: market, labor, infrastructure, personal preferences, environment, and fiscal policies (Lopez, 1989). These primary factors consist of a variety of subsets. For example, labor is broken down to skill of labor pool, worker productivity, availability of labor, and prevailing wage rates. These sub-factors reduce the location factor consistency across the food processing sectors.

In 1989, Rigoberto A. Lopez conducted a survey of more than 60 food processors, including egg, vegetable, poultry, egg, and seafood processors. These processors were asked to rank primary location factors. The results are presented below in Figure 61:

**Figure 61: Ranking of Primary Location Factors Affecting Processing Plants**

	Overall Ranking of Category					
	Market	Infrastructure	Labor	Personal	Environmental	Fiscal
Overall	1	2	3	4	5	6
Type of Raw Products						
Vegetable	1	3	2	4	6	5
Fruits	2	1	4	6	5	3
Poultry	1-3	1-3	4-5	6	1-3	4-5
Eggs	5	1	2	3	6	4
Seafood	4	1	2	3	5	6
Plant Size (No. Employees)						
Small (1-19)	1	4	3	2	5	6
Medium (20-99)	2	1	3	4	5	6
Large (+100)	5	3-4	2	6	1	3-4

Source: Lopez, 1989

From these results, market seems to be the prevailing factor for food processing site locations; this is considered to be consistent across most industries as well. However, depending on the type of industry, infrastructure and labor might be weighted differently. For example, an industrial machinery manufacturer might require skilled labor rather than ranking higher an existing infrastructure.

The primary factors are broken down into their sub-factors to reveal the processor preferences. Figure 62 ranks vegetable, fruit, poultry, egg, and seafood processors based on their weighted subsets.

**Figure 62: Ranking of Subset Location Factors**

Factor	Category	Rank				
		Vegetable	Fruit	Poultry	Eggs	Seafood
Availability of an Existing Plant Facility	I	1-2	1	4-6	1	1
Availability of Raw Agricultural (Seafood) Supplies	M	4	6	11-14	4-7	2
Already Reside or Do Business in the State	P	1-2	3	22-23	3	4
Proximity to Markets	M	3	4	17-21	2	5
Availability of Labor	L	7	8	24	4-7	3
Availability and Quality of Water	I	6	2	11-14	10-11	11
Proximity to Distribution Centers	M	5	14-17	7-10	4-7	14-15
Availability of Waste Treatment/Disposal Facilities	I	11	7	1-3	17-22	6-7
Attractive Place to Live	P	14	13	22-23	8-9	8
Labor Productivity and Work Ethics	L	24	5	16	12-14	6-7
Existence of Municipal Sewers to Handle Waste Water	E	12	9-10	7-10	15-16	19-20
Land Costs	I	8-9	20-21	29-41	25-27	10
Prevailing Wage Rate	L	8-9	33	25-28	8-9	14-15
Water Pollution Regulations	E	31	14-17	1-3	17-22	16
Proximity to Relatives	P	16	14-17	29-41	4-7	17
Skill of Labor Pool	L	10	36	17-21	10-11	12-13
Existence of Municipal Facility to Handle Solid Waste	E	22-23	18-19	7-10	17-22	19-20
Water Waste Disposal Costs	E	17-19	22	1-3	17-22	21
Availability and Cost of Truck and Rail Services	M	13	12	17-21	23	22
Solid Waste Disposal Regulations	E	37-39	14-17	7-10	17-22	12-13
Utility Costs	I	15	9-10	25-28	12-14	32

Source: Lopez, 1989

Factor	Category	Rank				
		Vegetable	Fruit	Poultry	Eggs	Seafood
Construction Costs	I	17–19	20–21	29–41	12–14	23
Annual Costs to Comply with Environmental Regulations	E	35	11	11–14	17–22	33
Stringency of Enforcement of Environmental Regulations	E	28–30	23–25	4–6	28–31	24–27
Unionization of Labor	L	20–21	31–32	25–28	24	18
Ease and Speed of Compliance with Environmental Regulations	E	26–30	15	28–31	24–27	24
Proximity to Existing Food Processing Facilities	I	17–19	26–30	17–21	33	28–29
Proximity to Ports	M	11	26–30	29–11	37–41	9
Air Pollution Regulations	E	33	31–32	17–21	28–31	24–27
Cost of Living	P	34	23–25	29–41	15–16	28–39
Capital Expenditures for Pollution Abatement, Including New Equipment	E	40	41	4–6	25–27	31
Difficulty of Identifying Relevant Environmental Regulations, Permits, & Permitting Agencies	E	37–39	37	11–14	28–31	24–27
State Corporate Income Taxes	F	22–23	23–25	29–41	37–41	26–41
Unemployment Insurance Taxes	F	20–21	26–30	29–41	37–41	36–41
Image of State	M	36	18–19	29–41	37–41	30
Local Property Taxes	F	26–27	34–35	29–41	25–27	34–35
Worker's Compensation Insurance	F	28–30	26–30	29–41	34–36	36–41
Insurance Costs	F	28–30	34–35	29–42	32	36–41
State and Local Development Incentives	F	25	38–40	25–28	34–36	34–35
State Personal Income Tax	F	32	38–40	29–41	37–41	36–41
State Marketing Assistance Programs	M	37–39	38–40	29–41	34–36	36–41

Source: Lopez, 1989

Analyzing the table, food processors rank the availability of an existing plant as the top ranked infrastructure factor. Additionally, proximity to market, and proximity to distribution centers were ranked within the top ten as well.

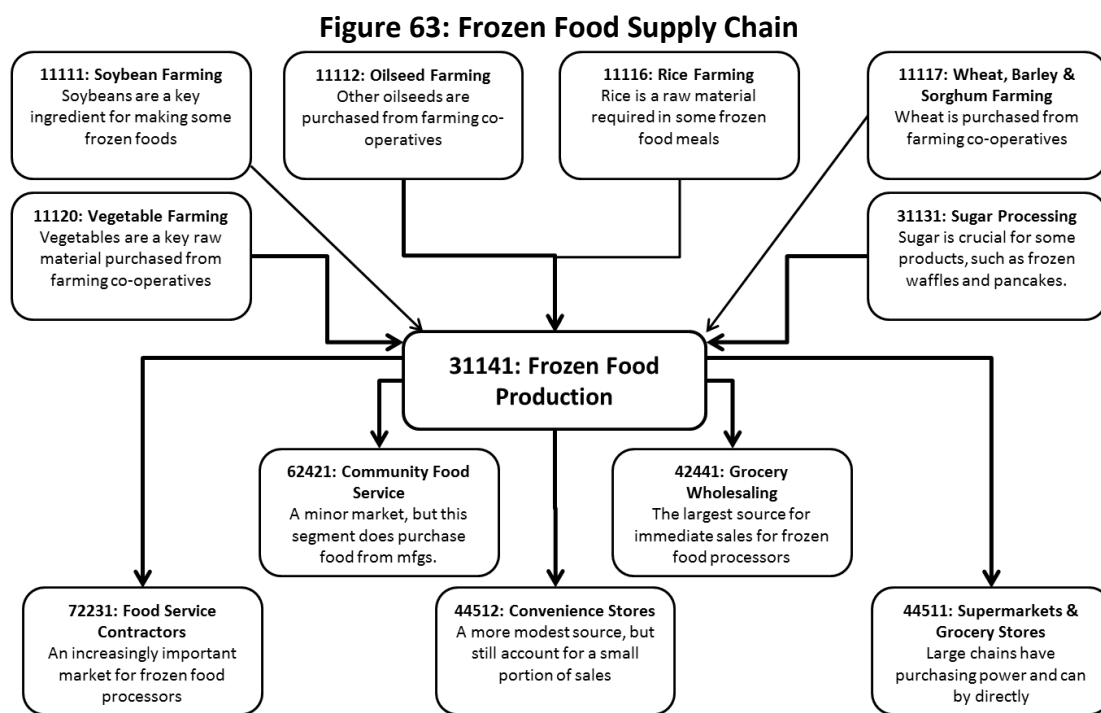
Interestingly, poultry processors seem to be the outlier from a ranking perspective. Among their top three sub-factors we can mention availability of waste treatment facilities, water waste disposal costs, and water pollution regulations. Meaning poultry processors will use more water in comparison to the others. However, poultry processor's rank of utilities is low; contradicting the idea of water consumption or determining that water expense is insignificant on the grand scale. Another key characteristic to recognize about poultry processors is their ranking of Availability of Raw Suppliers in comparison to the other processors. Lopez notes that poultry processors "often vertically integrate when they locate or establish production-management contracts with poultry farmers" (Lopez, 1989). Therefore, poultry processing should not be held consistent with the other processors.

The overall purpose of these locations factors is to realize how food processors, in general, determine their locations. These location factors are going to be fairly consistent across all food processors including: frozen food, snack, and spice production. As indicates, food processors will want to be in a close proximity to distribution facilities, already reside or do business in the state, prefer to be close to their market, and require a high availability of labor. These factors

will change based on the expected production capacity and labor requirements; however, the location factors should remain fairly consistent across most food processing industries. Gregg County will need to tailor their efforts to these location factors in order to attract a food processor. A food processor is not going to relocate to Gregg County because there is a large supplier base, but they will relocate if several of these factors are accounted for.

### 6.2.3 Food Distribution

To visual grasp product movement throughout the food sector supply chain, we created industry and company level supply chains.



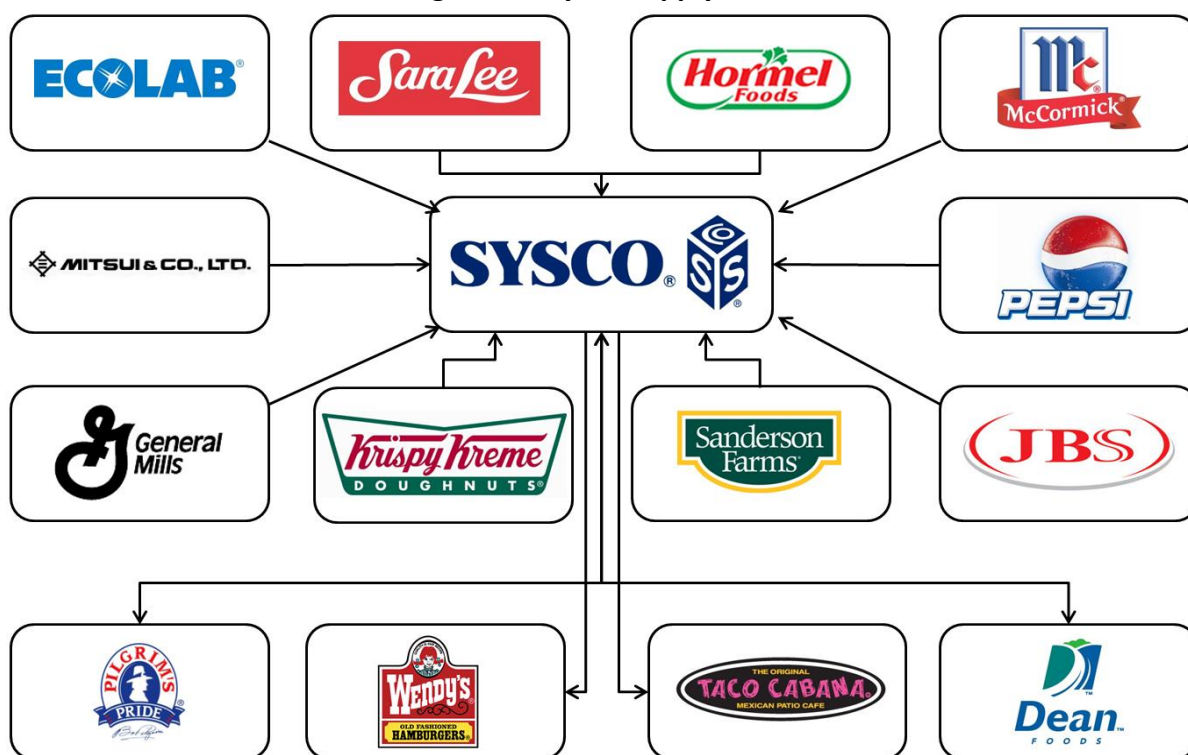
Source: Produced by T-MEX, Texas A&M University utilizing IBISWorld

Note the movement of product through the Frozen Food Production supply chain. As indicated by the location factors, proximity to raw suppliers and distribution facilities, are heavily weighed when a food processor is considering relocation. Gregg County does not have a specific advantage when raw suppliers are considered. More specifically in East Texas, Castro County has more of an advantage when it comes to raw suppliers. The presence of chicken broilers in Castro County has led to a 146 million dollar income in poultry; also, hay and feed

crops are around 18.8 million. This is compared to Gregg County which has 909 thousand USD from poultry (United State Department of Agriculture, 2012). This suggests that Gregg County will not attract a supplier based on abundance of raw materials, but rather access to medium location markets and other location factors mentioned previously are taken into consideration.

In addition to the industry supply chain, we created a company level supply chain based on a nationally ranked food distributor. The Sysco Corporation has up to 170 distribution facilities and multiple subsidiaries involved in full-service restaurants and supermarkets and other grocery stores. Therefore, Sysco is difficult to classify under one industry code because they are heavily integrated.

**Figure 64: Sysco Supply Chain**



Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

Sysco looked at other communities in East Texas, but decided on Gregg County because of the same consistent distribution relocation factors: “central location to customer, the outstanding site location, available labor force, and the strong support of LEDCO and its staff (Palizza, 2004)” These relocation factors are consistent across all distribution companies. However, when considering the relocation of a food processing facility the location factors are significantly different; as indicated by the previous section.

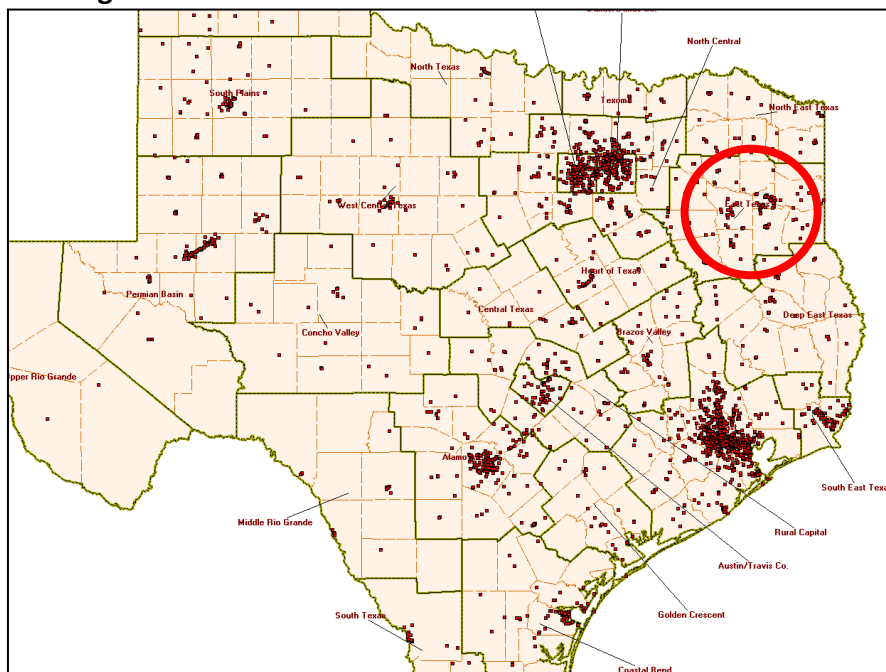
Specifically, Lopez mentioned that “fiscal policies such as tax and development incentives are insignificant” when proposing relocation to a food processor. His findings indicated that location choices are “driven by market and infrastructural factors (Lopez, 1989).

### 6.3 Chemical Sector

The chemical sector is represented by large manufacturers and distributors. Certain chemicals are needed at the well heads which requires these employers to be located in the vicinity. Response time is highly important in the oilfield industries because of the losses that may incur in production downtime.

From 2009 to 2011 there was a 3% chemical manufacturing decrease in East Texas (Infomration, 1997). This slight decrease is reflected by the economic recession, but is not significant enough to have an impact on the area. Figure 65 plots establishments related to chemical and petroleum production. The red circle contains Gregg County and a large portion of East Texas.

**Figure 65: Chemical and Petroleum Texas Concentrations**

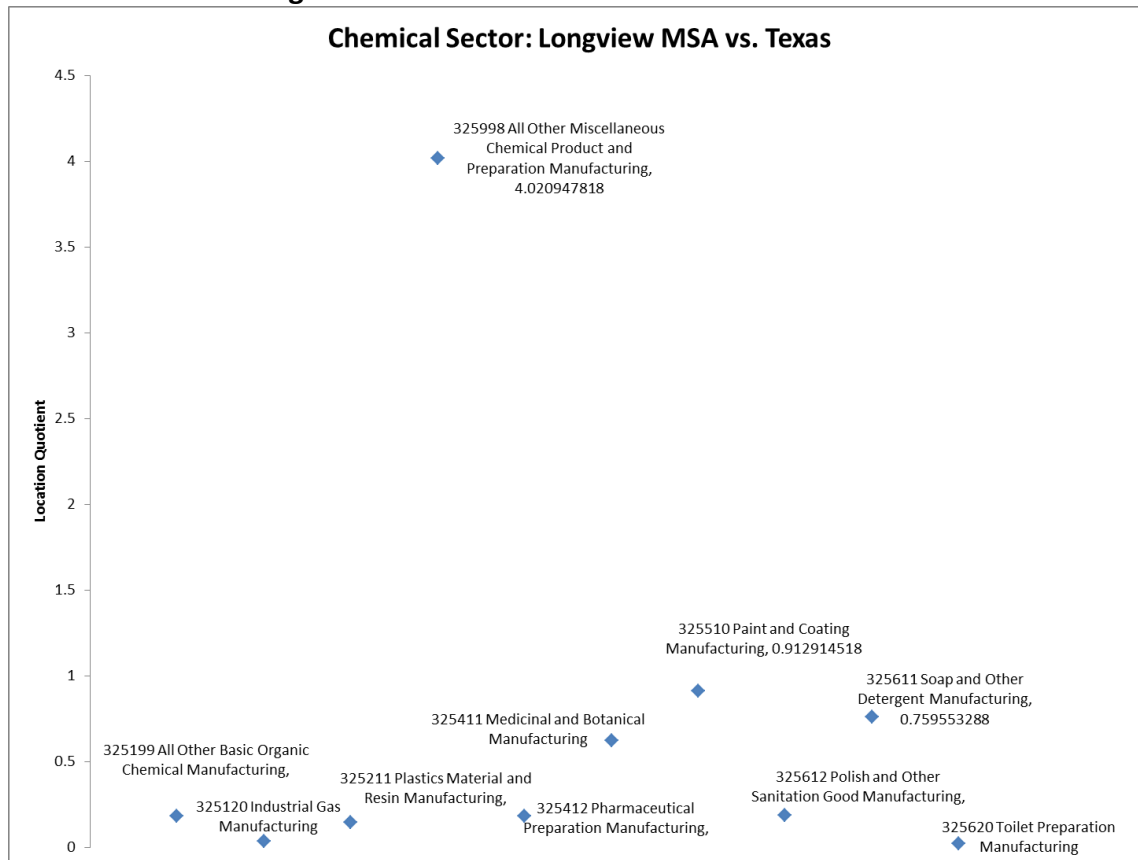


Source: Texas Industry Profiles

This map reveals the large concentration of establishments in regions such as Houston, Dallas, Austin, and Galveston. These concentrations are due to various factors that will be discussed in the Cluster Analysis Section.

Concentration tables were calculated for individual sectors in order for Gregg County to grasp their areas of specialization in the proposed sectors, and display the industry specialization within the Chemical Sector.

**Figure 66: Chemical Sector Concentration Table**

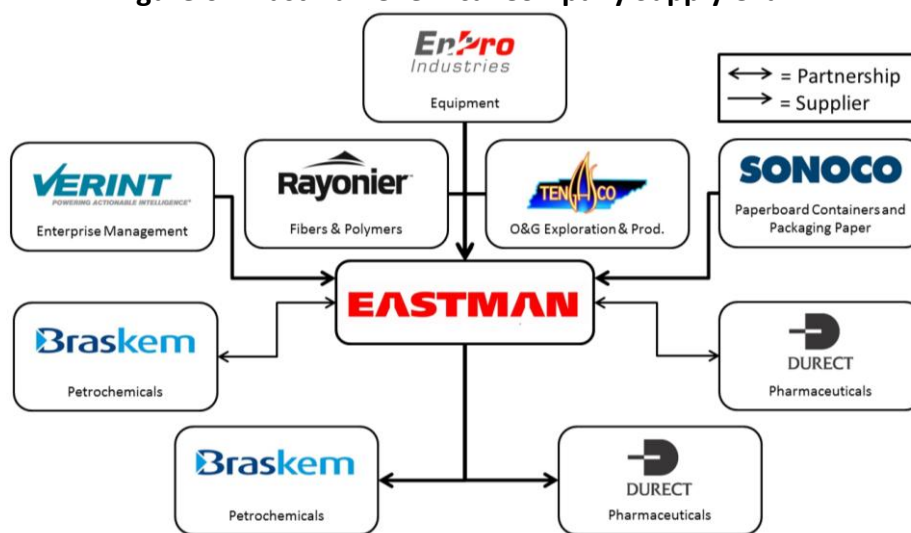


Source: Produced by T-MEX, Texas A&M University

It is easy to identify the outlier in the industry specialization; Eastman Chemical Co. Eastman was identified previously in Table 14 as one of the larger employers in the area. However, this does imply the location quotient should be high. Rather, Eastman Chemical Co. is a larger chemical manufacturing in this specific industry. In comparison to Texas, Gregg County has a competitive advantage in this industry because of Eastman Chemical Co.

Because Eastman's area of specialization and large employment, a company supply chain was analyzed in Figure 67. The purpose is to identify a customers or suppliers who would benefit from relocating in the East Texas region. Additionally, an industry supply chain (Figure 68) is created for the same purpose.

**Figure 67: Eastman Chemical Company Supply Chain**



Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

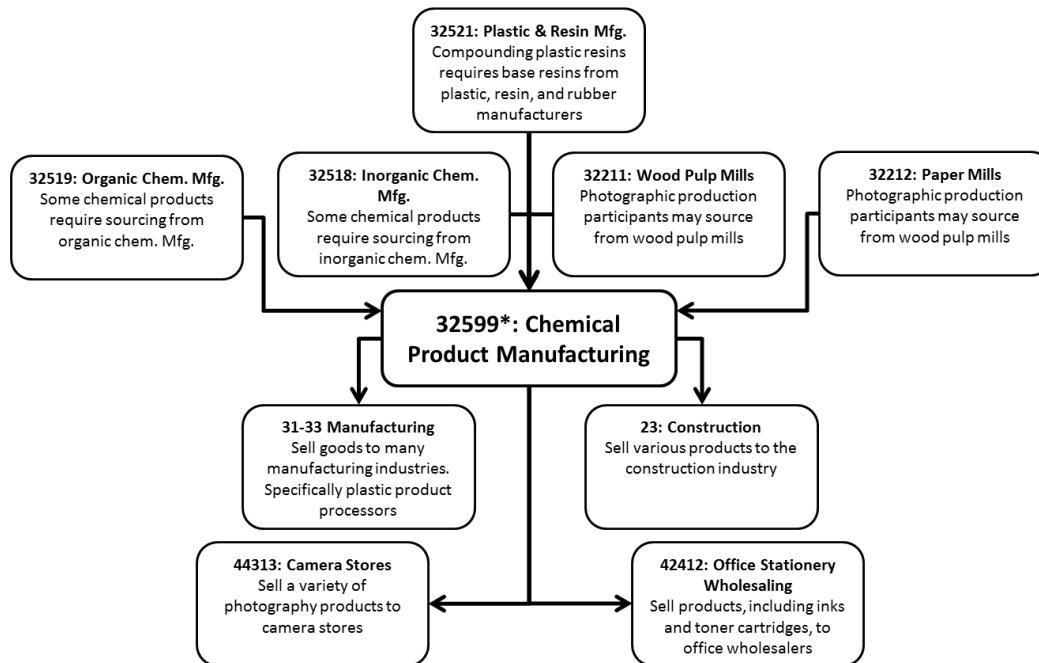
Most of the suppliers found in Figure 67 would not relocate to Gregg County based on their current locations and industry. For example, Tengasco is involved with natural gas extraction in Tennessee, Kansas, and offshore between Texas and Louisiana. In addition, Rayonier is already located close to East Texas in Louisiana where they produce high performance fibers. Enpro industries and the other suppliers have no relation to the chemical sector; they would not benefit from Gregg County relocation.

Although the Eastman Chemical supply chain does not have any promising relocation candidates, Figure 68 suggests potential in a couple of the suppliers. For instance, Plastic and Resin Manufacturing supply Plastic Film, Sheet and Bag manufacturers, such as Pak-sheer; plastic bottle manufacturing also sources from this industry. This shows the high level of integration between plastic and chemical sectors.

On the other hand, inorganic chemical manufacturers supply both the chemical product manufacturers and paint manufacturers; they also supply cardboard box and container

manufacturers. Cardboard box and paint manufacturers are both present in Gregg County. This further tightens the bond between chemical and plastic manufacturing.

**Figure 68: Chemical Manufacturing Industry Supply Chain**



Source: Produced by T-MEX, Texas A&M University utilizing IBISWorld

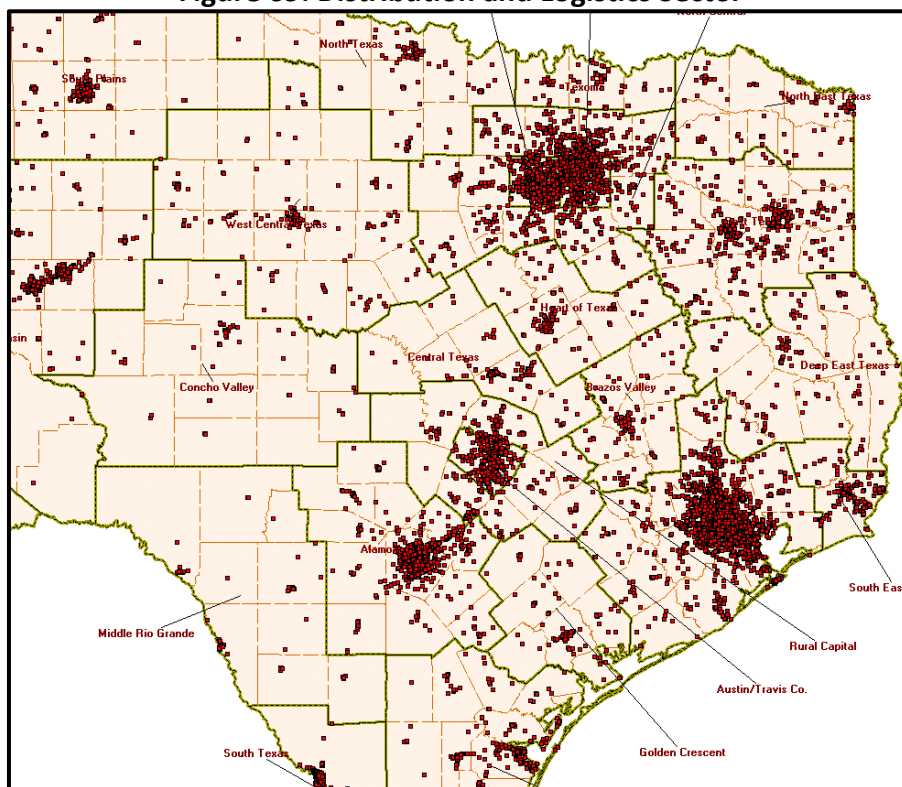
## 6.4 Distribution/Warehousing Sector

Distribution and warehousing is highly concentrated in East Texas; there was 18% increase in warehousing and a 1.2% increase in wholesale employment (Information, 1997). Large employers in the area include, Orgill Inc., Neiman Marcus Group, and Sysco East Texas. These employers are involved in different industries, but there are factors for Gregg County's relocation that are consistent. The factors for distributor relocation are:

- Medium location to markets
- Availability of Labor
- Transportation Infrastructure
- Hard working Labor
- Cheap Land
- Tax Abatements and Incentives
- There will also be personal preferences specific to the company

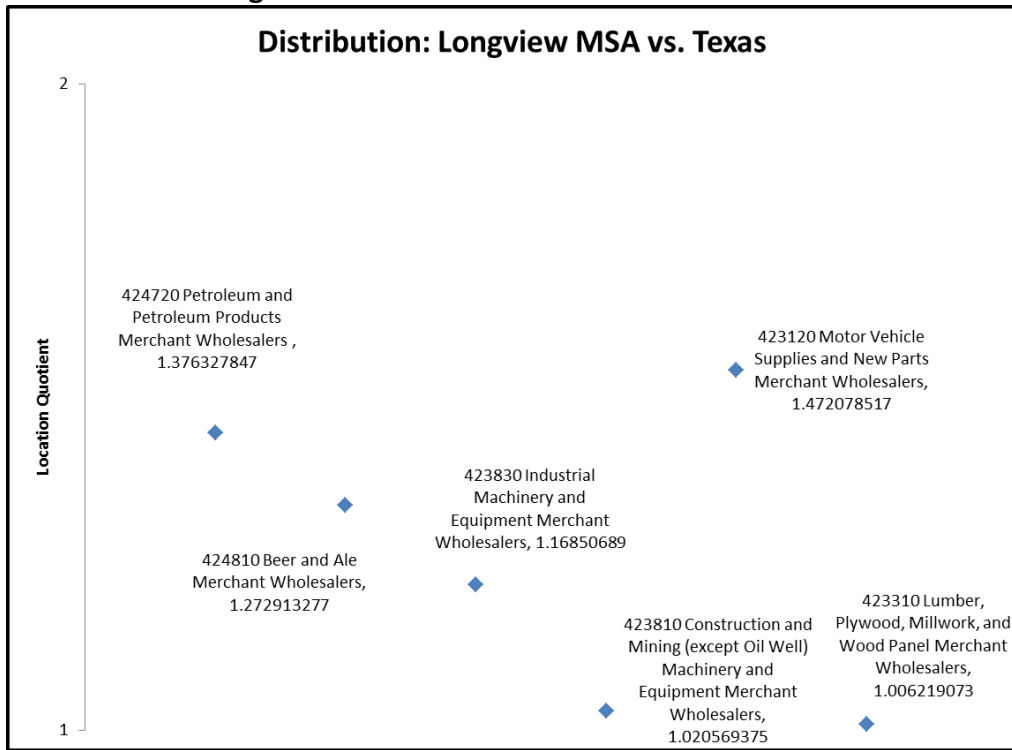
Figure 69 displays the Distribution and Logistics sector as defined by the Labor Market Career Information Center. There will always be a large concentration of establishments in the major cities, but the distribution establishments are more disseminated than other sectors. This makes sense because companies in these industries relocate based on proximity to markets, medium locations, interstate access and cheap labor. East Texas has multiple establishments distributed evenly in comparison to other Workforce Development Area (WDAs); this reveals a competitive advantage based on medium location to markets.

**Figure 69: Distribution and Logistics Sector**



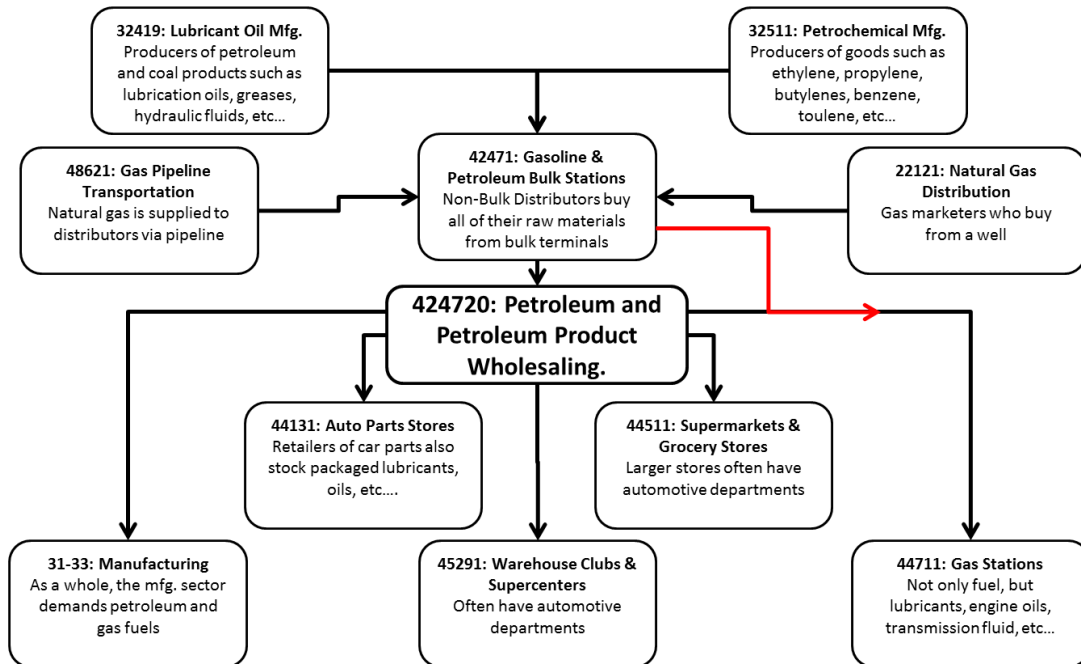
Source: Texas Industry Profiles

Concentration tables were made for the distribution sector as well. As the table identifies, petroleum and petroleum products merchant wholesalers are concentrated in the area. This does not come as a surprise because of Gregg County's proximity to oil industry markets, highway access, and medium locations in comparison to large ports and cities.

**Figure 70: Distribution Concentration Table**

Source: Produced by T-MEX, Texas A&amp;M University

An industry supply chain was created to identify any supply chain anomalies that may have enticed petroleum products merchant wholesalers to relocate. Figure 71 reveals some interesting concepts not seen in the previous chemical manufacturing sectors. For instance, Natural Gas Distribution is a key supply chain member in Petroleum Products Distribution; Gregg County has several natural gas wells and distributors. Additionally, Gas Pipeline Transportation is seen in the industry supply chain; Gregg County has one of few primary gas pipelines running through their region. This indicates a possible agglomeration of supply chain members. Distribution and wholesaling will be met later in the Cluster Analysis section.

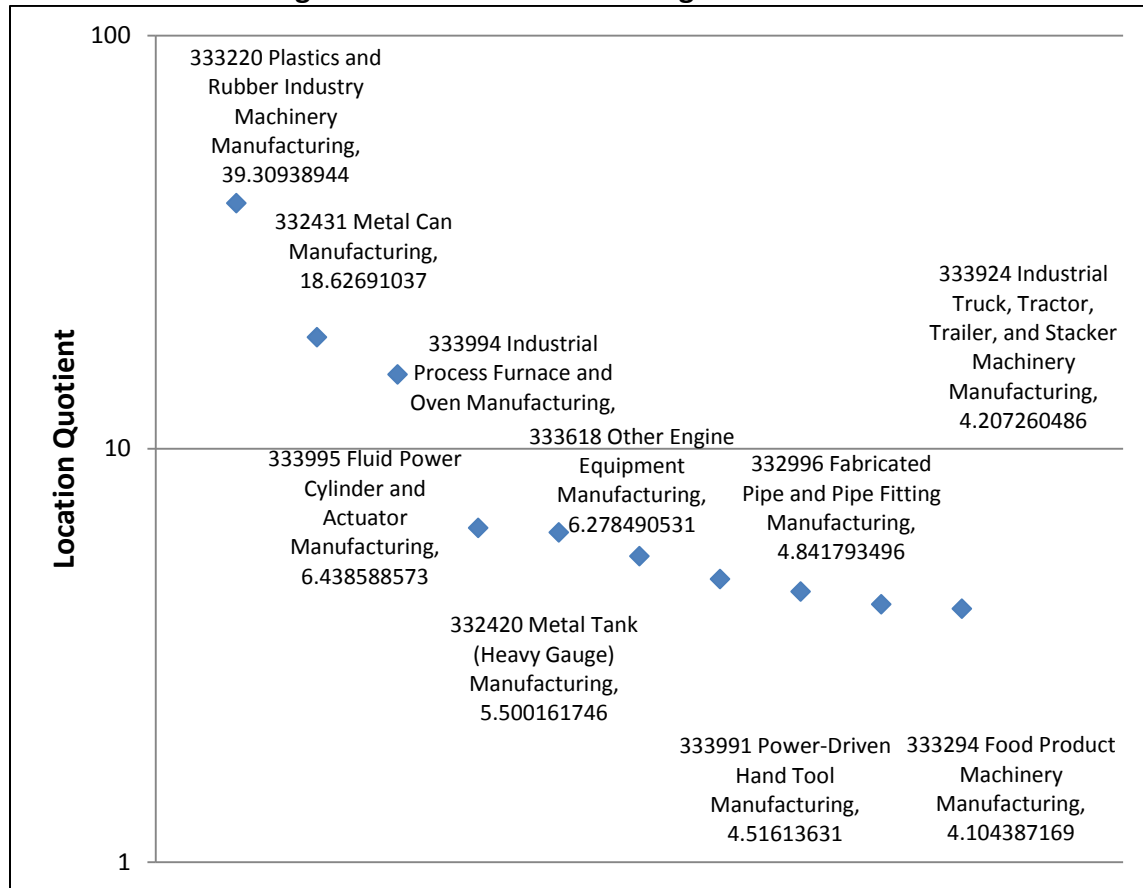
**Figure 71: Petroleum and Petroleum Product Distribution**

Source: Produced by T-MEX, Texas A&M University utilizing IBISWorld

## 6.5 Metal Manufacturing Sector

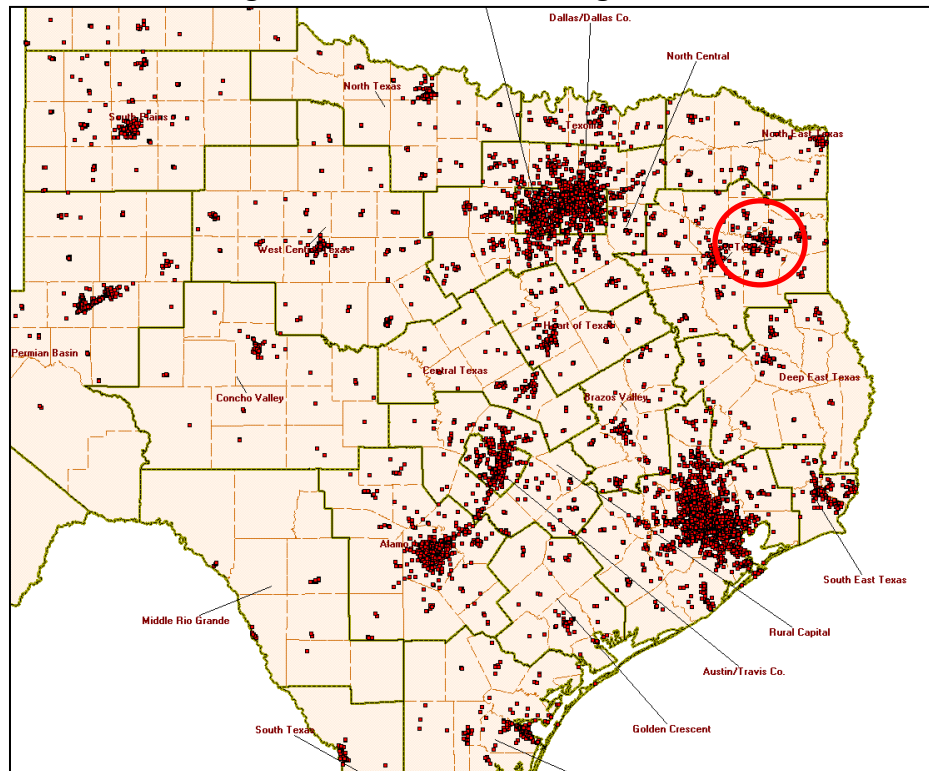
As discussed earlier, the industrial machining industries are subsequent based on oil concentration. Machining products, such as valves, fittings, pipes, and bearings are necessary to maintain and service oil industry components. Recently, East Texas has experienced a significant decrease in metalworking employment; a 7% drop in fabricated metal product manufacturing and an 18% drop in machinery manufacturing between 2009 and 2011 (Infomration, 1997).

However, economic recession has spread across all industries, but has not affected the metalworking sector as a whole in Gregg County. Metalworking is highly concentrated in the area as indicated by Figure 72. This table had to be formatted to a logarithmic scale because the concentration of industries was too great in comparison to Texas. Notice Plastics and Rubber Machinery Manufacturing is almost 40x more concentrated in Gregg County than in Texas. Additionally, Metal Can Manufacturing is 18x more concentrated. Figure 73 maps the establishments and reveals the concentration of metalworking in East Texas.

**Figure 72: Metal Manufacturing Concentration**

Source: Produced by T-MEX, Texas A&amp;M University

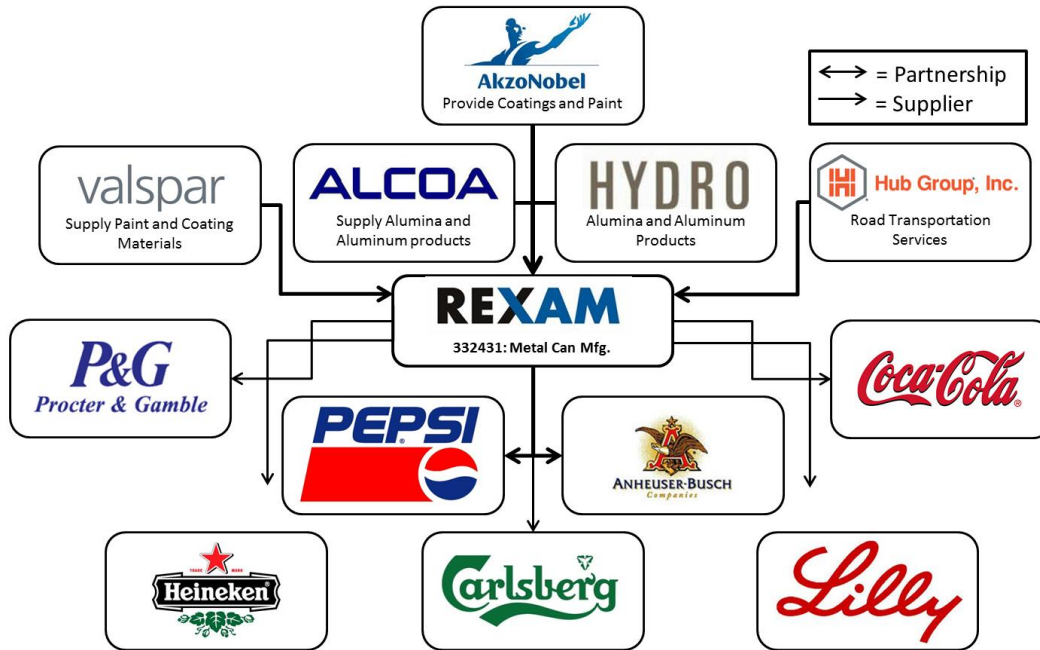
Companies, such as Lebus International, Rexam Beverage, Letourneau Technologies, and Trinity Rail valued the potential for skilled labor in East Texas. Finding an ample supply of skilled machinist, welders, and operators at a reasonable price is difficult in most regions. However, as the oil industry died down in Gregg County a surplus of petroleum related employees were left. Their skills were easily translated into other metalworking industries. Due to oil price fluctuations, skilled labor is transferred to the oil industry from the metal working sector. Now, there has been an effort to maintain the supply of skilled metalworkers through certifications and on-the-job training.

**Figure 73: GIS Metal Working Clusters**

Source: Texas Industry Profiles GIS Software

Rexam's company supply chain was analyzed in Figure 74 to reveal any sourcing agent or clientele specific to East Texas. Rexam supplies Coca-Cola's and Pepsi's bottling operations in North Carolina and Pepsi's in Idaho. This leads to believe that the skilled labor and logistics for clients could be the reasoning for East Texas manufacturing.

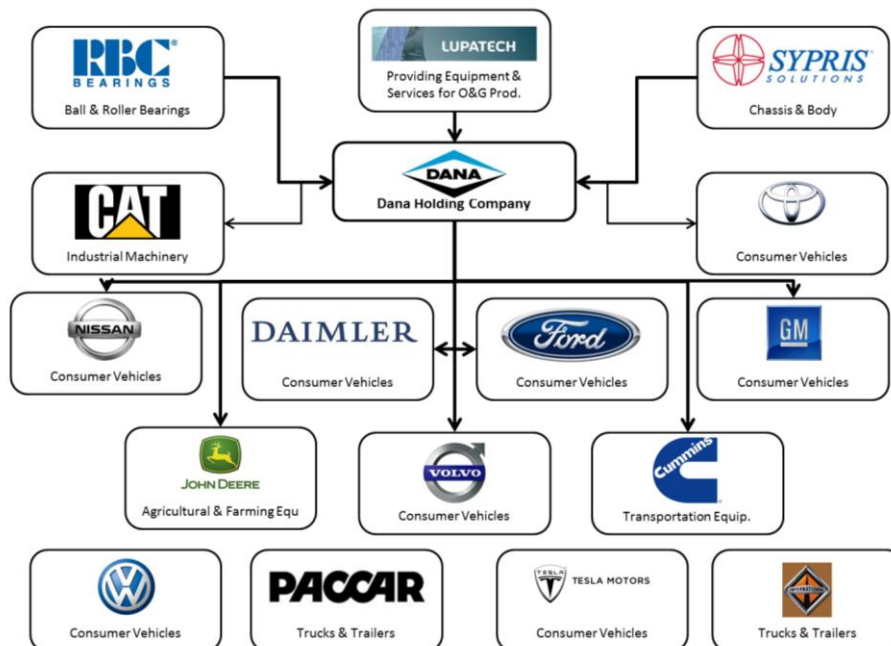
**Figure 74: Rexam Company Supply Chain**



Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon/ (Gill, 20012)

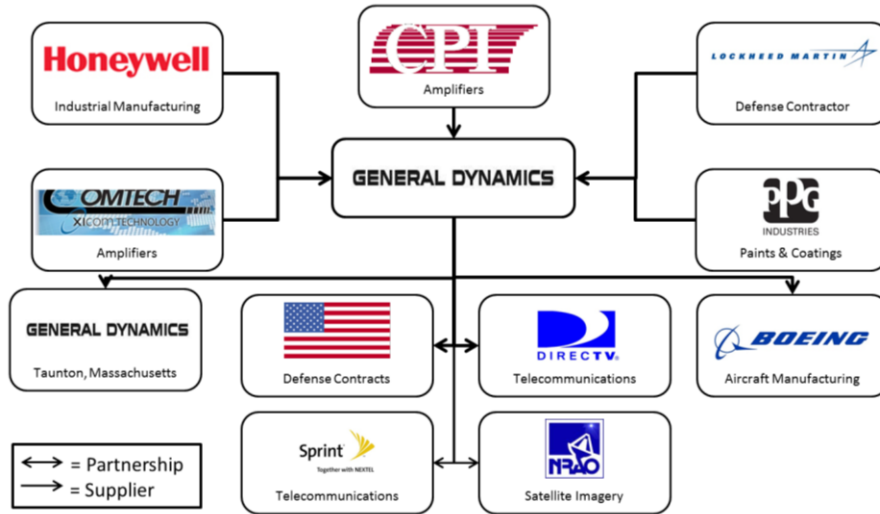
In addition to the Rexam Company Supply Chain, we created more metalworking company supply chains based on large employers in the area:

**Figure 75: Dana Corp. National Supply Chain**



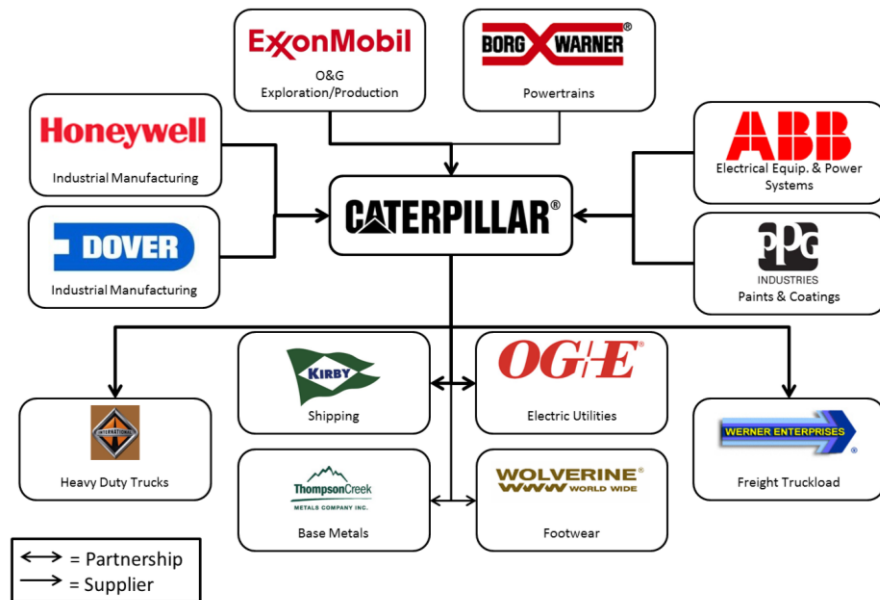
Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

**Figure 76: General Dynamics Supply Chain**



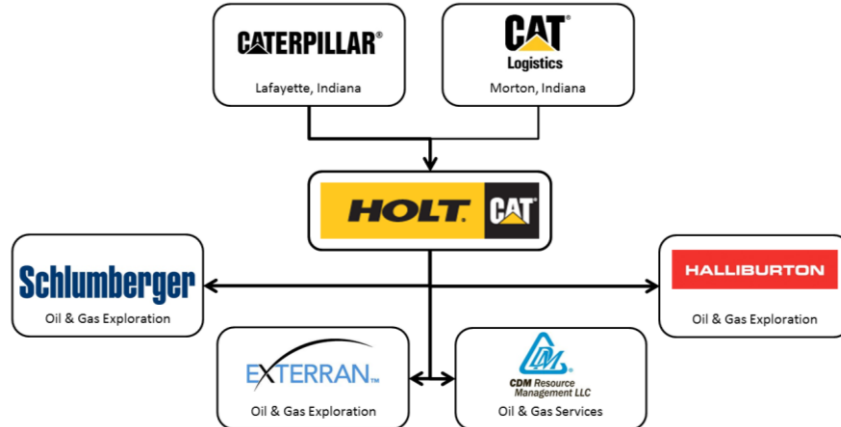
Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

**Figure 77: Caterpillar National Company Supply Chain**



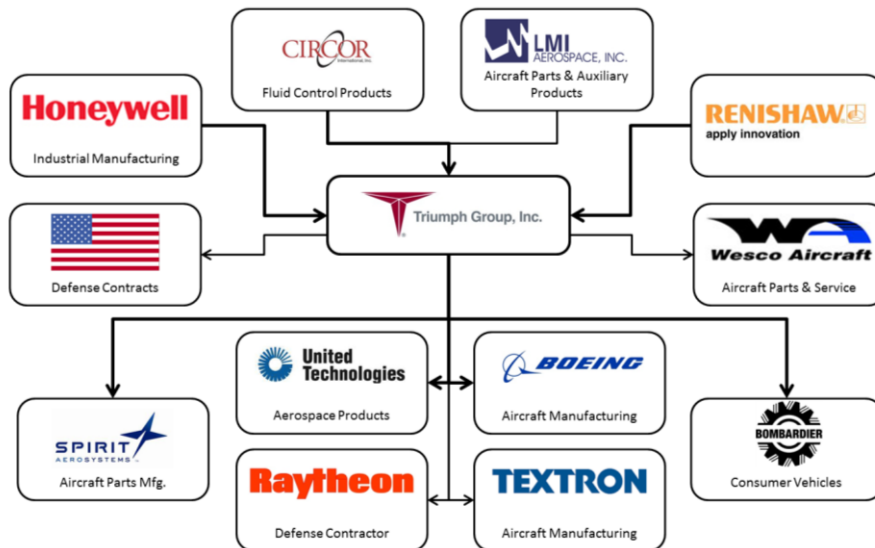
Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon/ (Morrison, 2012)

**Figure 78: Holt CAT Regional Supply Chain**

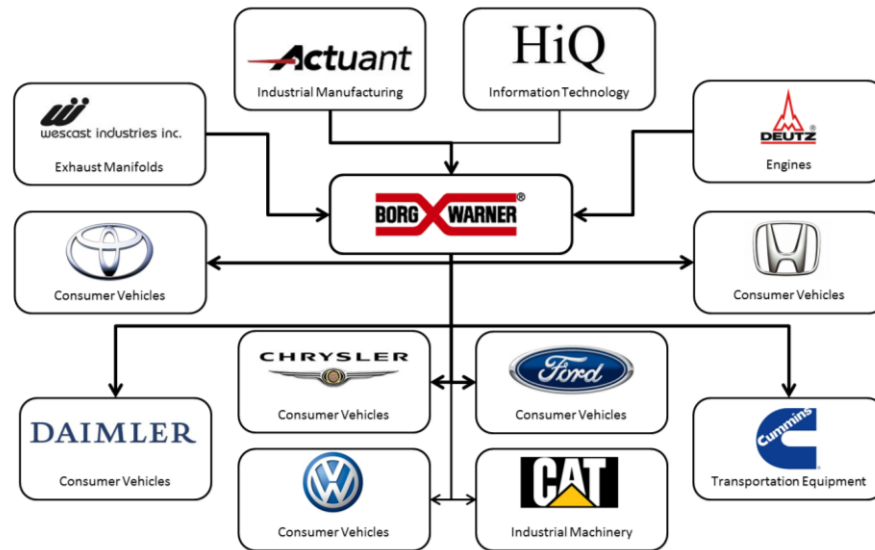


Source: Produced by T-MEX, Texas A&M University utilizing (Morrison, 2012)

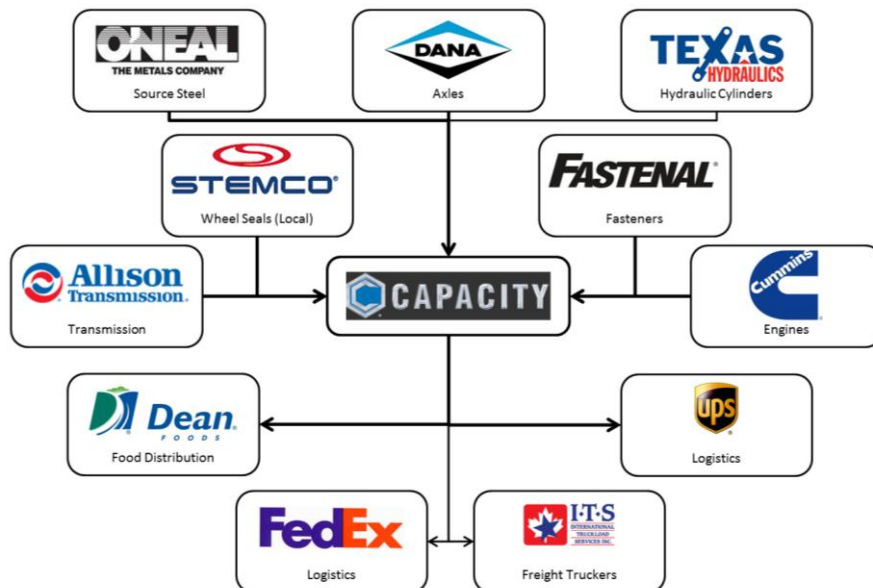
**Figure 79: Triumph Group National Supply Chain**



Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

**Figure 80: BorgWarner National Company Supply Chain**

Source Produced by T-MEX, Texas A&M University utilizing Mergent Horizon



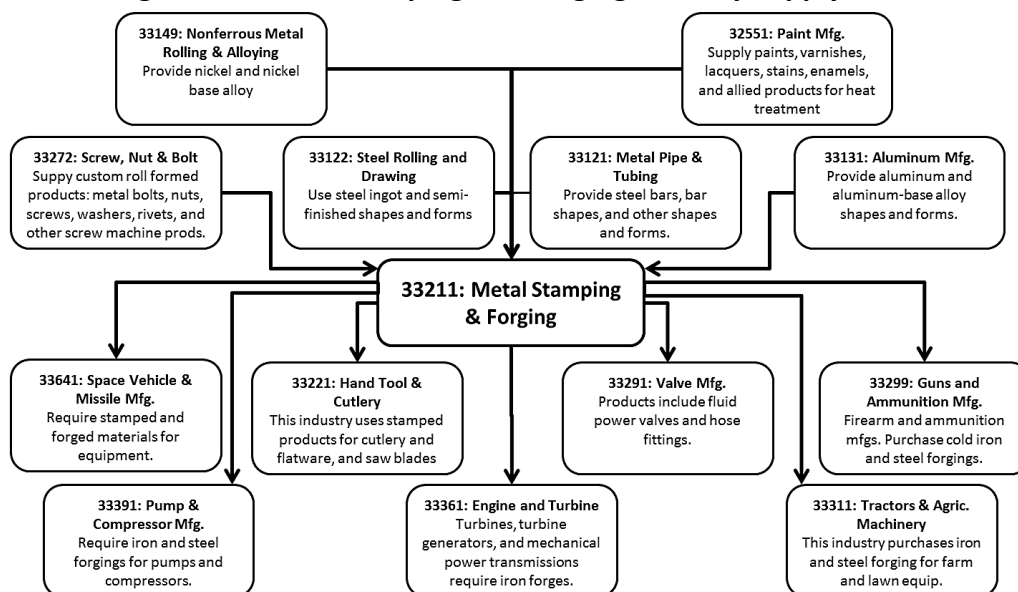
Source: Produced by T-MEX, Texas A&M University utilizing Capacity of Texas

An industry supply chain for metal stamping and forging was identified in Figure 81. On the selling side of Figure 81, many industries resemble that of Gregg County. For instance, Tractors and Agricultural Machinery, Valve, and Pump and Compressor manufacturing are all present in East Texas. However, none of the buying industries are remotely located in East Texas. That is not to say a distribution facility should not be located in Gregg County; there are multiple metal distribution facilities located in Dallas because of the automotive industry. We believe a

distributor would benefit from relocating in Gregg County if they could cater to the large metal working companies in the area.

There is also potential for the metalworking sector based on competitors of industries currently in Gregg County. Competitors could enter a new market as well as compete for the same skilled labor as the companies already located in Gregg County. This trend is already present in the Mining, Oil and Gas Machinery Manufacturing Industry. Gregg County has the top five competitors, NOV, Caterpillar, Baker Hughes, Joy Global, and Halliburton, are already present in the region. They are not necessarily manufacturing mining machinery equipment, but the companies are present.

**Figure 81: Metal Stamping and Forging Industry Supply Chain**



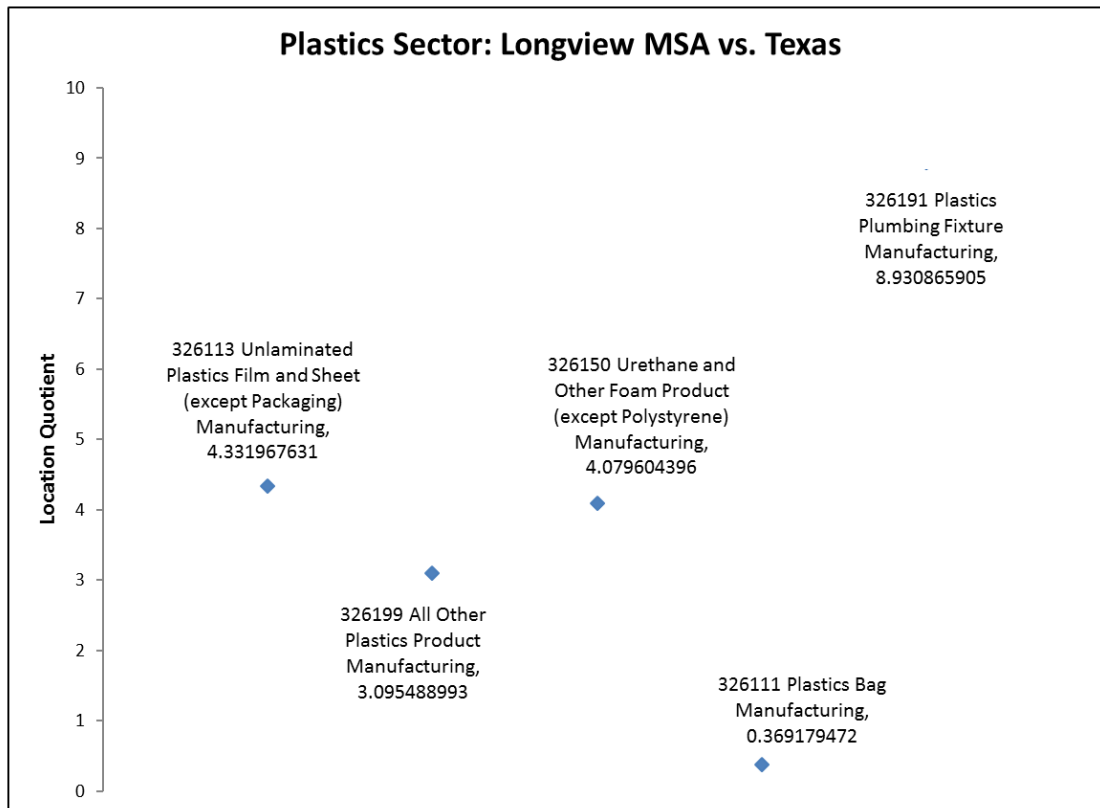
Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

## 6.6 Plastics Sector

The plastics sector consists of processing new or spent plastic resins into intermediate or final products; the processes included are compression, extrusion, and injection molding. The large manufacturers in the area include Pak-Sher, Genpak, and Closure Systems International. Although there was a 12% decrease from 2009 to 2011 in East Texas, the plastics sector in Gregg County is heavily concentrated. In Figure 82, it is possible to identify the large

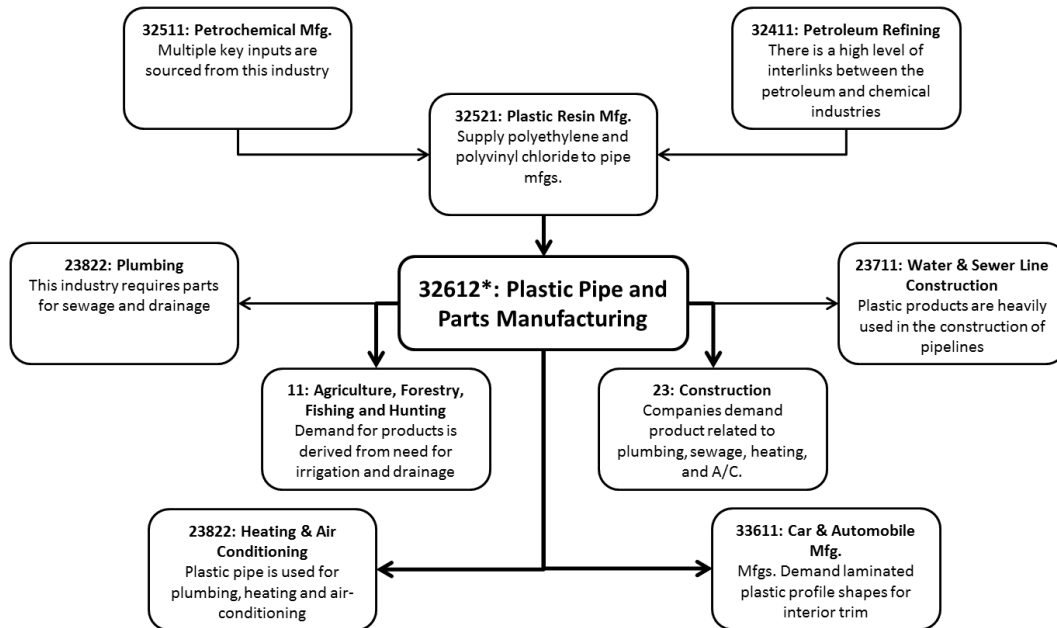
concentration of plastic industries in Gregg County. For instance, Unlaminated Plastics Film and Sheet Manufacturing are more than four times concentrated in Gregg County then in Texas.

**Figure 82: Plastic Sector Concentration Table**



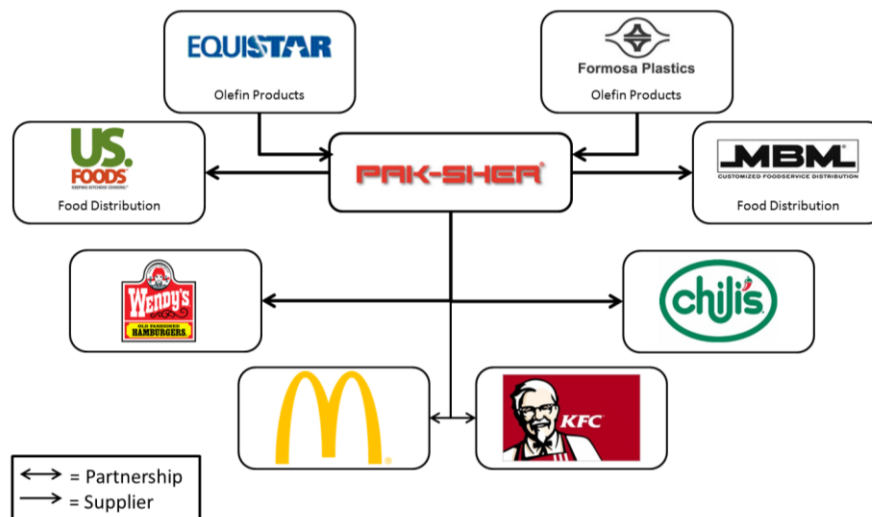
Created by Texas A&M utilizing the LexisNexis database

We created an industry supply chain which is identified in Figure 83. Because of the high correlation between chemical and plastic industries, much of the suppliers are similar. Notice that plastic and resin manufacturing is a key supplier for this industry; that is synonymous with the Chemical Product Manufacturing which was identified previously in Figure 68. This high level of correlation was identified by Porter (Porter M. E., 2003). Porter indicated that the petroleum, plastic, and chemical industries have a high level of overlap in terms of products, services, and employment.

**Figure 83: Plastics Sector Industry Supply Chain**

Source: Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

In addition to the industry supply chain, a supply chain was created for Pak-Sher in Figure 84.

**Figure 84: Pak-Sher Supply Chain**

Source Produced by T-MEX, Texas A&M University utilizing Mergent Horizon

Pak-Sher sources much of their raw materials from suppliers outside of the East Texas region. However, Eastman Chemical produces the raw materials that are very similar to what Pak-Sher requires. Local and regional integration is required in order to facilitate cluster development.

## 6.7 Cluster Analysis

The cluster analysis involves the economic base, industry and company supply chains, market potential and proposed sectors to identify industry gaps that will benefit the region as a whole, rather than just a particular sector. For instance, both plastic and metalworking manufacturers would benefit from a plastic resin manufacturer because they could source various products from the same supplier. Porter summarized the cluster approach (Porter M. E., 2003):

- A focused approach that directs scarce development resources toward industries with the most benefit.
- Determine linkages between industries that many times play a role in location decisions, and subsequent spatial patterns.
- Induce dynamic development by studying clusters that are possible rather than industries that only complement the economic base.

Figure 85 is a graphical representation of clustering and overlapping industries in the United States. It is beneficial to notice two sub-clusters: Chemical products (Red) and Metal Manufacturing (Purple). These sub-clusters identify the situation in Gregg County; specifically, the oil and gas sub clusters. There is significant overlap of chemical, petroleum, and plastic companies signified by Eastman Chemical, Halliburton, and Closure Systems of Gregg County, respectively. Additionally, it is beneficial to notice distribution services as a non-overlapping industry. This is not to say that distribution services do not support clusters, but as a core industry, distribution does not influence a cluster directly.

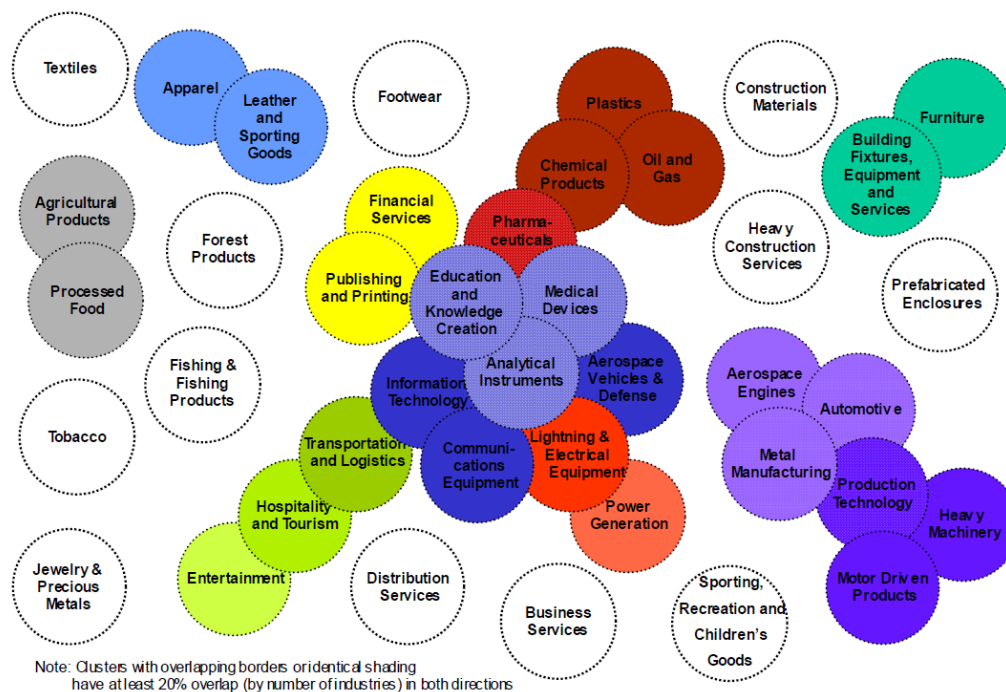
**Figure 85: Graphical Representation of Clustering Industries**

Table 16 is a Petroleum Cluster as defined by the Texas Workforce Commission (TWC) (Infomration, 1997). Defining a cluster by NAICS is perhaps the most difficult process of analyzing a cluster, but the Texas Office of Governor Rick Perry's created a team to define clusters and their sub-components for the state.

The figure below represents multiple NAICS codes that make up the Core, Ancillary, and Support industries of a Petroleum Cluster. The highlighted industries are present in Gregg County; this does not imply the industries are concentrated as to sustain a petroleum cluster, but merely, there are companies present in Gregg County with those primary NAICS codes. Notice that Petroleum Merchant Wholesalers are a Core component of a Petroleum Cluster; whereas, Freight Transportation Arrangement and General Freight Trucking are Support Industries. This is what Porter described in Figure 85, that distribution services, such as General Freight Trucking, are Support Industries.

This concept can help Kilgore and Longview narrow down the industries that will benefit and support the existing companies in their region. These industries are defined to help economic development programs create an industrial cluster by attracting the right industries. Gregg County already has a good base for both Energy and Petroleum Clusters; these clusters will be analyzed further in the following sections.

**Table 16: NAICS Defined Petroleum Cluster**

Core Industries	Ancillary Industries	Support Industries
Petroleum & Coal Products Mfg. (Refining)	Oil & Natural Gas Extraction	Machinery & Supply Merchant Whls.
Basic Organic Chem. Mfg.	Oil Well Drilling & Support Activities	Heating Oil, Propane & Other Customer Direct Sales
Resin, Rubber, and Synthetic Fibers Mfg.	Natural Gas Distribution	Rail Transportation
Pesticide & Agricultural Chem. Mfg.	Utility/Communications System Construction*	Sea, Coastal & Great Lakes Transport.
Cleaning Compound and Toiletry Mfg.	Boilers, Tanks, and Shipping Containers Mfg.	General Freight Trucking, Long Haul
Other Chemical Preparation Mfg.	Bolt, Screw & Threaded Product Machine Shops	Specialized Freight Trucking, Long Haul
Misc. Plastics Product Mfg.	Misc. Fabricated Metal Product Mfg.	Port & Harbor Operations Services
Tires, Tubes & Misc. Rubber Mfg.	Other General Purpose Machinery Mfg.	Freight Transportation Arrangement
Ag., Construction, and Mining Machinery	Market Research & Other Professional Serv.	Warehousing & Storage
Industrial machinery Mfg.		Wired Telecommunication Carriers
Electronic Instrument Mfg.		Wireless Telecommunication Carriers
Chemical Merchant Whls.		Data Processing & Related Services
Petroleum Merchant Whls.		Depository Credit Intermediation
Pipeline Transportation of Crude Oil		Nondepository Credit Intermediation
Pipeline Transportation of Natural Gas		Colleges, University, Tech, and Junior Schools
Other Pipeline Transportation		
Federal Govnt.		
State Govnt.		

Source: Mergent Horizon

In order to understand Figure 73 we will define the industries based on the proposed verticals. Considering the chemical, plastics, and petroleum verticals (because the three are heavily integrated) the industries that relate in the table are:

- Petroleum and Coal Products Mfg. (Martin Midstream Partners Lp)
- Basic Organic Chemical Mfg. (Eastman Chem. & Air Liquide America Corp.)
- Resin, Rubber, and Synthetic Fibers Mfg. (No establishments in the region)
- Pesticide and Agricultural Chemical Mfg. (Close: Vital Earth Resources Inc.)
- Other Chemical Preparation Mfg. (Eastman Chemical)
- Tires, Tubes & Miscellaneous Rubber Mfg. (Close: Moore's Retread & Tire)
- Chemical Merchant Wholesalers (14 Estbs: Baker Hughes & Champion Technologies)
- Petroleum Merchant Wholesalers (H&W Petroleum & Martin Midstream Partners)
- Misc. Plastic Product Mfg. (Pak-Sher, CSI, Frye International Corp. & Genpak)

Notice that Eastman Chemical and Martin Midstream are involved with multiple industries; this implies these companies have multiple NAICS codes. Also, there are a couple of industries that are only in the vicinity or have only one company representing the NAICS code. Because there is only one company representing the industry, it is not reasonable to say that industry is satisfied in terms of completing a Petroleum Cluster. Also, it is important to notice that Oil & Natural Gas

Extraction, Natural Gas Distribution, and Oil Well Drilling and Support Activities belong to sectors other than petroleum, plastic, and chemical sectors.

Some other core and ancillary industries are prevalent to the Gregg County Region as well. These industries are primarily metalworking and distribution industries. We will define the core, ancillary, and support metalworking industries:

Core:

- Ag., Construction, and Mining Machinery Mfg. (LeTourneau Tech. & NOV)
- Industrial Machinery Mfg. (King Tool Company)

Ancillary:

- Boilers, Tanks, and Shipping Containers Mfg. (Rexam & West Drum Corp)
- Bolt, Screw & Threaded Product Machine Shops (Rich's Machinery Co & Water Cut Svc)
- Misc. Fabricated Metal Product Mfg. (Texas Pipe Works Inc. & Morrison Supply Co.)
- Other General Purpose Machinery Mfg. (CDM Resource Mgmt. & Tegron)

Support:

- Machinery and Supply Merchant Wholesalers (Several)

The only other proposed vertical that complements the petroleum cluster is distribution and warehousing. One caveat is these industries are more related to transportation and logistics rather than distribution. We will define the core, ancillary, and support distribution industries found in a petroleum cluster:

Core:

- Pipeline Transportation of Crude Oil (Enbridge Pipeline Co., Mid-Valley, & TX Eastern)
- Pipeline Transportation of Natural Gas (No establishments in the region)
- Other Pipeline Transportation (None, but nearby in Tyler)

Ancillary:

- Natural Gas Distribution (East Texas Producers & Targa Resources)

Support:

- Rail Transportation (Minimal, but Union Pacific & RR Co. of America)
- Sea, Coastal & Great Lakes Transportation (No establishments in the region)
- General Freight Trucking, Long Haul (Plains Marketing & Teddy's Specialized Hauling)
- Specialized Freight Trucking, Long Haul (Several: More than 20)
- Freight Transportation Arrangement (None, nearby in Tyler)

Also, it is important to note that Oil and Natural Gas Extraction and Oil Well Drilling and Support Activities for Mining are related to the Energy, Mining and Related Support Services Sector as defined by the Labor Market and Career Information Center (Infomration, 1997); this is not to be confused with the Petroleum Refining and Chemicals Sector that was mentioned previously.

The remaining industries are related to the Business and Financial Sector and the Telecommunications and Information Services Sector. The industries defined by these two sectors are as followed:

**Business and Financial Sector:**

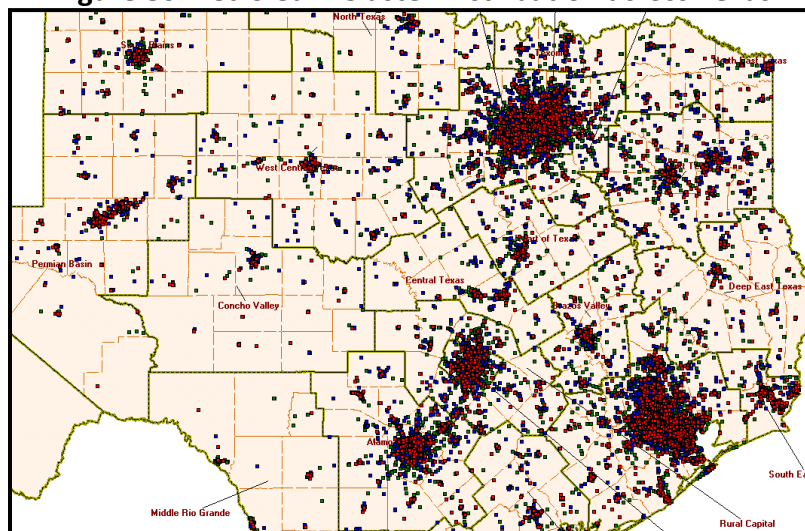
- Depository Credit Intermediation (Several: Telco Plus Credit & Community Bank)
- Non depository Credit Intermediation (Onemain Financial & Homestar Mortgage)
- Market Research and Other Professional Service (Several: Theiman and Assoc Inc)

**Telecommunications and Information Service Sector:**

- Wired Telecommunications Carriers (Etex Telephone Co-op Inc.)
- Wireless Telecommunications Carriers (Sprint, Alert Comm., and Verizon Wireless)
- Data Processing and Related Services (Local Net and VNC Enterprises)

To visually grasp the Petroleum Clusters in Texas, Figure 88 maps the core (red), ancillary (blue) and support (green) industries that comprise a Petroleum Cluster. The clusters tends to be around larger cities, but considering less populated regions, Gregg and Smith County have a sizeable agglomeration of Petroleum Cluster industries.

**Figure 86: Petroleum Cluster Distribution across Texas**



Source: Texas Industry Profiles GIS Software

**Figure 87: NAICS Defined Energy Cluster**

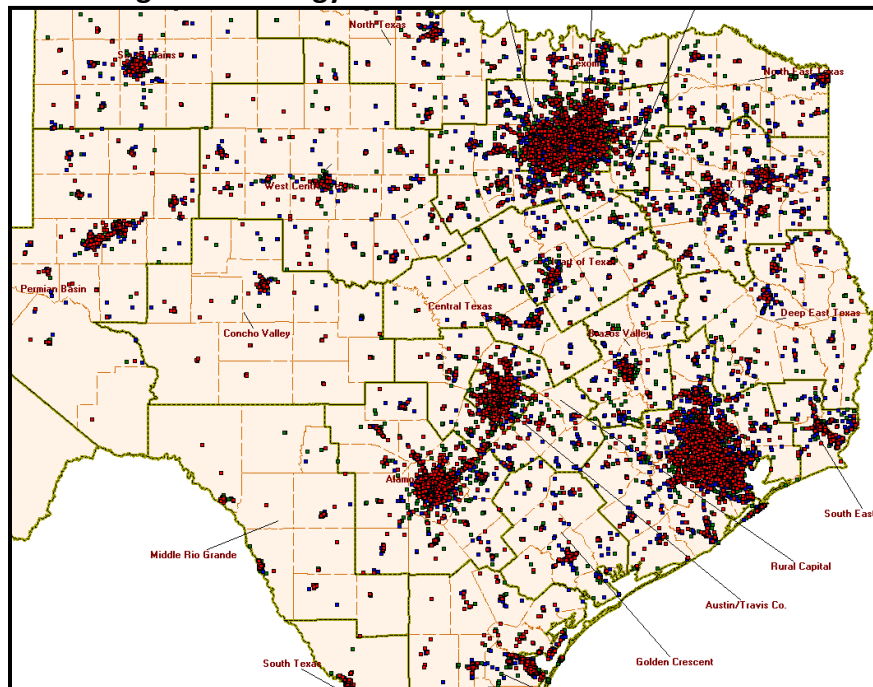
Core Industries	Ancillary Industries	Support Industries
Oil and Natural Gas Extraction	Bolt, Screw & Threaded Product Machine Shops	Specialized Freight Trucking, Long Haul
Anthracite Coal Mining (But close in proximity)	Misc. Fabricated Metal Product Mfg	Wired Telecommunications Carriers
Oil Well Drilling & Support Activities for Mining	Other General Purpose Machinery Manufacturing	Wireless Telecommunications Carriers
Electric Power Generation and Supply	Electronic Instrument Manufacturing	Nondepository Credit Intermediation
Natural Gas Distribution	Batteries, Fiber Optic Cable & Misc Electrical Mfg	Securities & Commodities Investment Activity
Utility/Communications System Construction	Metal and Mineral Merchant Wholesalers	Investment, Portfolio and Misc. Financial Services
Other Heavy Construction	Machinery & Supply Merchant Wholesalers	Lessors of Real Estate
Turbine & Power Transmission Equipment Mfg	Other Pipeline Transportation	Activities Related to Real Estate
Power Generators & Electrical Equipment Mfg	Management & Technical Consulting Services	Machinery & Equipment Rental & Leasing
Pipeline Transportation of Crude Oil	Scientific Research and Development Services	Lessors, Nonfinancial Intangible Assets
Pipeline Transportation of Natural Gas		Legal Services
Architectural, Engineering, Testing Lab Services		Accounting and Bookkeeping Services
		Facilities Maintenance and Support Services
		Waste Collection
		Waste Treatment and Disposal Services

Source: Labor Market and Career Information

Figure 87 is another cluster that is fairly similar to the Petroleum Cluster, the Energy Cluster. This cluster has most of the same industries as the Petroleum Cluster, but the industries are prioritized differently. For example, Oil and Natural Gas Extraction is an ancillary industry in the Petroleum Cluster, but a Core Industry in the Energy Cluster. Also, it seems the Gregg County area has more establishments defined under Energy Cluster industries than Petroleum Cluster Industries.

The Energy Cluster is more focused on the mining and extraction of raw material rather than the processing and refining as in the Petroleum Cluster. One big advantage Gregg County has is the close proximity to only one of six Anthracite Coal Mines in Texas (Hallsville). The only core industries not currently in the area are Turbine and Power Transmission Equipment Mfg. (None) and Power Generators and Electrical Equipment Mfg. (Flander Electric Motor Service); Power Generation and Supply is also a core industry not seen previously (Brown Electric Company).

Figure 88 maps the Energy Cluster industries across Texas just as Figure 87 did previously with the Petroleum Cluster industries. There tends to be the same type of distribution between the two industries because the clusters are so similar in nature; only the colors have changed because the clusters prioritize the industries differently.

**Figure 88: Energy Cluster Distribution across Texas**

Source: Texas Industry Profiles

Now, the goal is to narrow down the potential industries that complement the economic base and contribute to the growth of a cluster. A cluster case study took place in Cincinnati, Ohio identified criteria for targeting industries within a cluster. Accordingly to such study the following variables are considered critical for a cluster (Economics Center for Education & Research, 2004):

- High average/median salary
- Strong employment base
- High location quotient
- Exhibit strong national employment growth
- Exhibit local employment growth
- High export base

**Table 17: Petroleum Industries Complying with Target Criteria**

Industry	Regional Establishments	Median Salary	National Growth	Regional Growth	Location Quotient
4246: Chemical Merchant Wholesalers	14	41214	-9.5	41	1.16
4862: Pipeline Transportation of Natural Gas	1	64599	-9.0	22	5.71
211111: Oil and Natural Gas Extraction	16	67122	-16.0	23	5.27
22129: Natural Gas Distribution	4	43705	-5.6	23	1.35
5171: Wired Telecommunications Carriers	7	52548	-11.00	19	1.41
5172: Wireless Telecommunications Carriers	12	49347	-1.4	23	0.93
4841: General Freight Trucking, Long Haul	10	38789	10.30	9	1.26
4842: Specialized Freight Trucking, Long Haul	29	33170	10.30	10	2
5411: Legal Services	42	46593	34.40	21	0.76
2131: Support Activities for Mining	30	39028	-23.2	9.0	13.55
5413: Architectural, Engineering, Testing lab Services	28	59979		22	0.88
Source	Texas Industry Profiles GIS Software	Tracer: LMCI.State.Tx.Us	Bureau of Labor Statistics	Tracer: LMCI.State.Tx.Us	Texas Industry Profiles (East TX vs. US)

Table 17 takes the variables into consideration and displays Petroleum Industries that fall within the parameters.

Because recent economic conditions and Gregg County preferences, certain variables are more significant. For instance, Gregg County requested the need for high skilled employment; this would translate into a higher median salary. Also, the recent recession skews national employment data.

The Table 18 shows various industries that were identified previously as part of the economic base, such as Oil and Natural Gas Extraction, Natural Gas Distribution, and Support Activities for Mining. Chemical Merchant Wholesalers, Data Processing and Related Services, and Testing Lab Services were not previously identified.

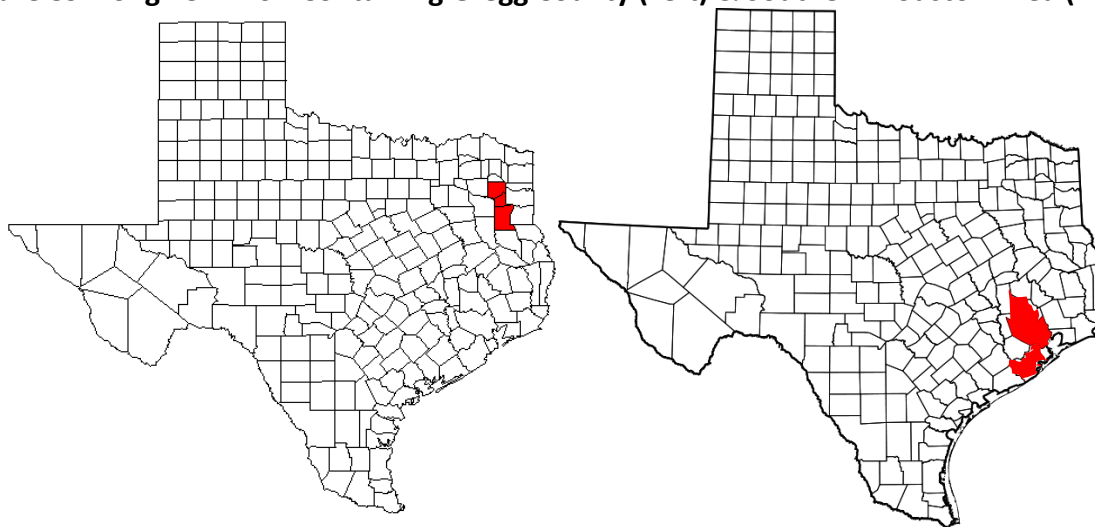
**Table 18: Energy Industries Complying with Target Criteria**

NAICS Code	Industry	Regional Establishments	Median Salary	National Growth	Regional Growth	Location Quotient
2121	Anthracite Coal Mining	0 But 1 close in prox.	34758	4.1	21	
2212	Natural Gas Distribution	4	43705	-5.6	23	1.35
5416	Management & Technical Consulting Services	10	50374	82.8		0.62
5417	Scientific Research and Development Services	12	62669	27.1	20	
4842	Specialized Freight Trucking, Long Haul	29	33170	10.3	10	2
Source	Texas Industry Profiles GIS Software	Tracer: LMCI.State.Tx.	Bureau of Labor Statistics	Tracer: LMCI.State.Tx.Us	Texas Industry Profiles (East TX v.	

In addition to the methodology based on the variables from the Cincinnati study, we developed a cluster comparative analysis. The comparative analysis utilizes the concentration tables found in the previous sections to compare Gregg County's cluster potential to a "known" cluster. For example, a known cluster would be Houston's Petroleum Cluster. Identifying Houston's Petroleum Cluster Industries will set a nominal from which to judge Gregg County's potential petroleum or energy cluster. The geographic locations that were covered are displayed in Figure 89.

It is assumed that the Southern Houston Area is a Petroleum Cluster consisting of an adequate number of employees for industries identified in Table 16. Houston's chemical sector will also be compared because it is known to be highly concentrated in Southern Houston as well (Information, 1997) (Railroad Commission of Texas).

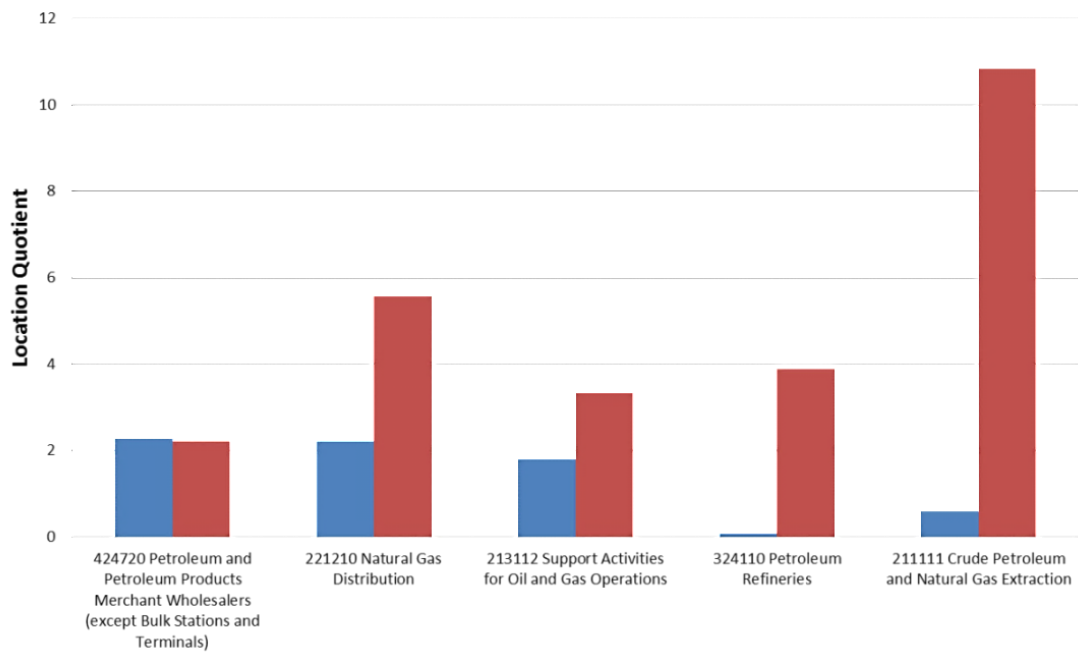
**Figure 89: Longview MSA Containing Gregg County (Left) & Southern Houston Area (Right)**



Source: Google Images

Figure 90 identifies the same concentration tables seen previously, but Houston is indicated by the red and Gregg County, by the blue. The table indicates that Gregg County's Petroleum Product Merchant Wholesale industry is more concentrated than in Houston; this implies the industry is adequate to sustain a petroleum cluster (based on the assumption of Houston being a petroleum cluster). Whereas, Crude Petroleum and Natural Gas Extraction is significantly more concentrated in Houston than Gregg County. However, this is not an industry that is attracted, but rather located based on resource and geography. Additionally, Support Activities for Oil and Gas Operations is lower, but that is due to the higher concentration of Petroleum and Natural Gas Extraction in Houston. Natural Gas Distribution is three times more concentrated in Houston than Gregg County; this is a large industry for Gregg County and could potentially be expanded further. Petroleum Refineries is almost non-existent in Gregg County; there are refineries nearby in Tyler.

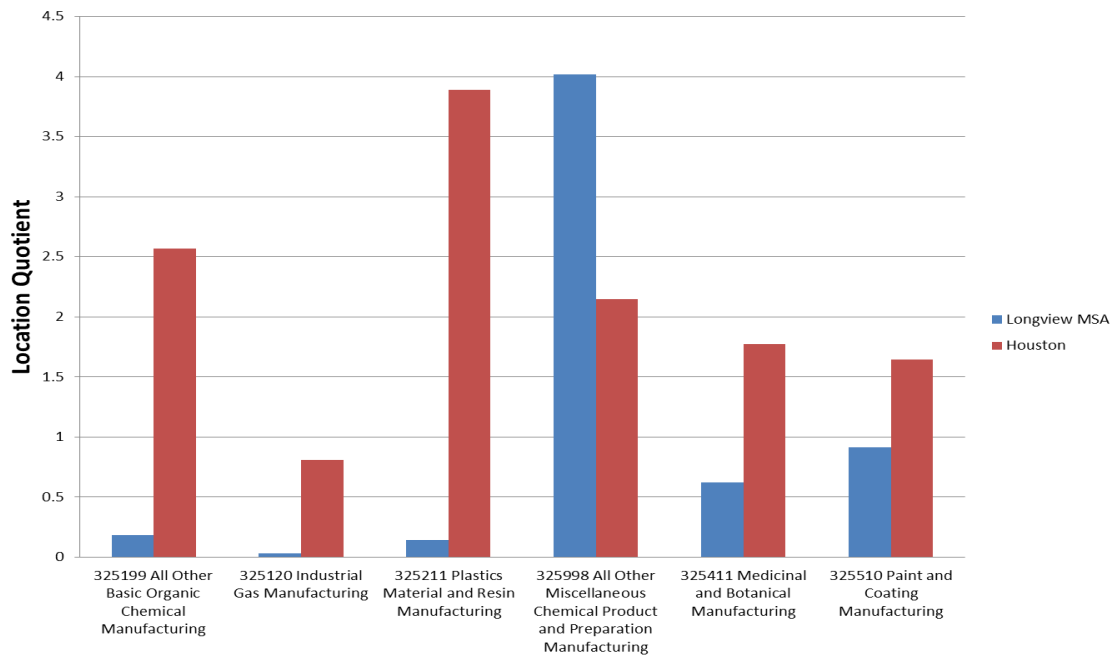
**Figure 90: Petroleum Sector Location Quotient Comparison**  
**Concentration Chart: Longview MSA v. Houston (Ref. Texas)**



Source: Produced by T-MEX, Texas A&M University

Additionally, Gregg County's Chemical Sector was compared to the Southern Houston Area; Figure 91 displays the industries compared. It seems that most of the chemical industries are more concentrated in Houston than Gregg County, with the exception of Other Misc. Chem. Product Manufacturing (Eastman Chemical Co.).

**Figure 91: Chemical Sector Location Quotient Comparison**  
**Chemical Concentration Chart: Longview MSA v. Houston**



Source: Produced by T-MEX, Texas A&M University

The Plastics Material and Resin Manufacturing are surprisingly low. Not only is this industry 8x less concentrated in Gregg County than Houston, but it is not even as concentrated as it is in Texas as a whole. Because it is a core Petroleum Cluster industry this implies there is a large gap in Gregg County's Plastic Sector.

## **7 Location Equation and ROI Analysis**

### **7.1 Location Equation and Return on Investment (ROI)**

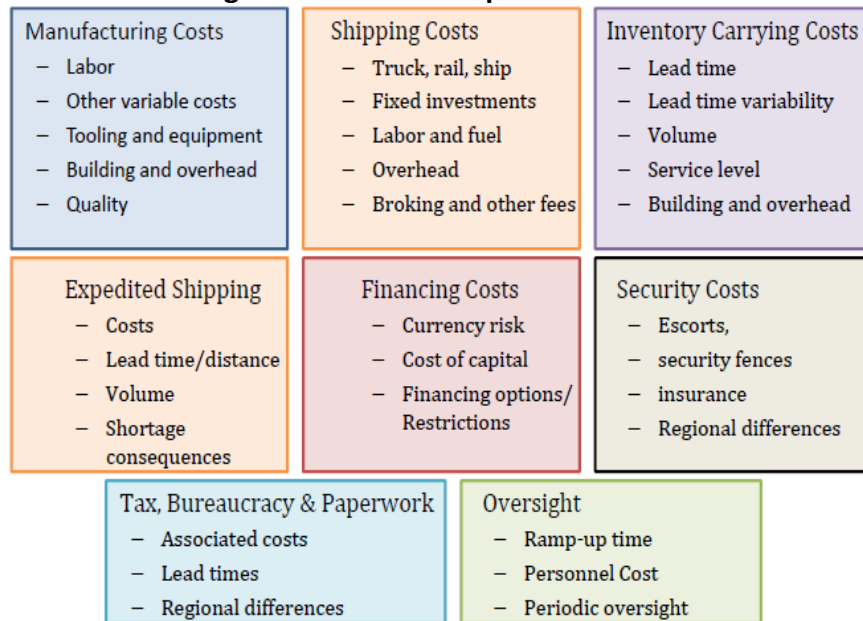
A key decision to be made by both manufacturers and distributors is where to locate facilities. This decision is also critical to the region where the firm decides to locate, as it can lead to jobs, infrastructure, and other enhancements for an area.

When assessing alternative locations, lower labor costs are typically paramount. However, lower labor costs may not always translate into lower overall costs for manufacturing and distribution operations. Other costs could include the need for increased inventory due to longer supply chains.

There is also the risk of component delay which can lead to expedited shipping, the shutdown of other facilities, or the loss of a sale. There may also be the need to oversee or supervise operations, which can be especially important when outsourcing or initializing operations. There is also the cost incurred to cross borders or to import goods to be considered.

Industrial Distribution Department at Texas A&M developed a mathematical tool to assess the factors that impact the location decision according to the company processes: operation, transportation, financial costs, etc. This tool received the name of location equation and its objective is to provide to manufacturers or distributors a measure that supports their decision of where they should be located.

The methodology considers the main factors and quantifies how they interact and impact the company performance in a specific region. For example, if the utilities cost is higher in one region, it doesn't mean that the overall performance will be worse; it is possible that the transportation costs are small enough to compensate those, and even to make it so that the region can offer a better performance overall.

**Figure 92: Location equation factors**

Source: Produced by T-MEX, Texas A&amp;M University

The Location Equation considers the costs directly and indirectly through the analysis of key variables. This represents a comprehensive equation with many quantifiable costs not included in other analyses.

The ROI equation summarizes the factors considered in the location equation, thus it measures the effectiveness of the companies' investment and how it is affected by regional factors. "The Return on Investment (ROI) is a straightforward financial tool that measures the economic return of a project or investment. ROI measures the effectiveness of the investment by calculating the number of times the net benefits (benefits minus costs) recover the original investment." (Odellion Research, 2005)

Three major components are necessary to calculate the ROI: revenues, expenses, and assets. These three components summarized the factors described above.

**Equation 3: ROI Equation**

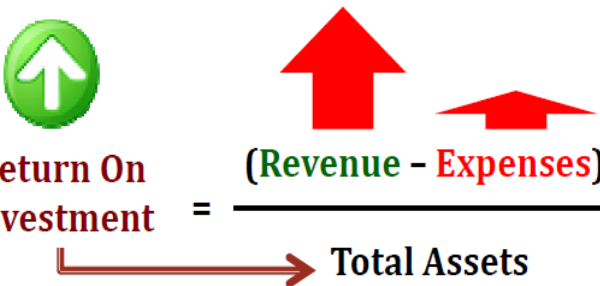
$$\text{ROI} = \frac{\text{Revenues} - \text{Expenses}}{\text{Assets}}$$

Source: Produced by T-MEX, Texas A&amp;M University

Revenue is related to demand conditions in the Porter's diagram (see Figure 20). It reflects the market potential, including both the local market, and also the demand that can be satisfied from a specific location. Revenue is the first factor in the companies' growth (Generating Growth Framework, section 2.1), and is an important factor on the ROI equation. An increase in the revenue may increase the ROI value (assuming that other factors have not changed) and therefore increase company effectiveness. But, following the distribution growth framework, revenue is only one of the main factors, although other factors should be analyzed.

Section 2.2 presented the Managing Growth Framework, which explains that companies should not focus only on generating revenue, but should make the revenue profitable. It is clear that the relation between revenue and expenses should be a relation that allows revenue to outpace expenses; otherwise investors would not have motivation to reinvest in the company.

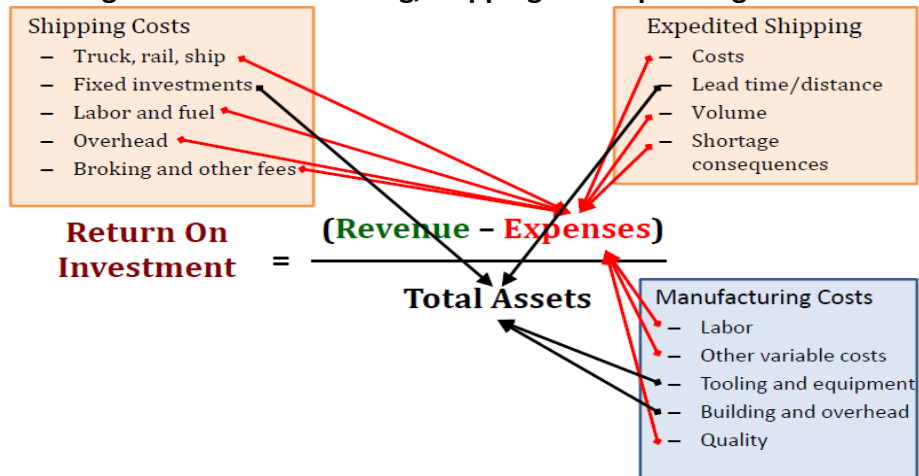
**Figure 93: Return on Investment grows up as long the Revenue outpaces Expenses**



$$\text{Return On Investment} = \frac{(\text{Revenue} - \text{Expenses})}{\text{Total Assets}}$$

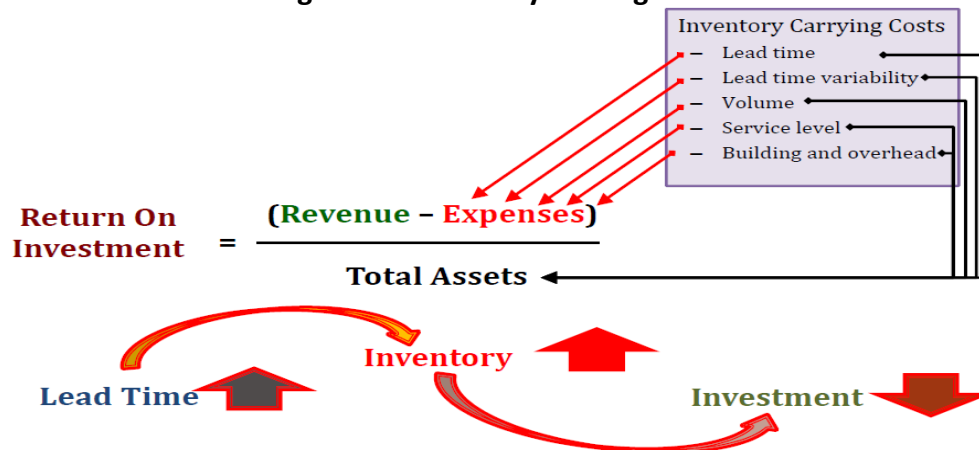
Source: Produced by T-MEX, Texas A&M University

Company operations not only generate expenses, but also involve assets. For example, manufacturing is a process that generates expenses like acquiring raw material; however this activity also implies the need of assets like machinery, used to produce. The figure below shows some examples of factors related with manufacturing, shipping, and expediting, and shows which generate expenses and which impact assets.

**Figure 94: Manufacturing, shipping and expediting factors**

Source: Produced by T-MEX, Texas A&amp;M University

It's more complicated for inventory because the same factors generate expenses and impact assets depending of the stage of the process. For example, a product held in inventory generates expenses like cost of warehouse, while at the same time it involves the asset for the company.

**Figure 95: Inventory holding costs**

Source: Produced by T-MEX, Texas A&amp;M University

## 7.2 ROI Analysis

With a greater understanding on the ROI equation, the following pages will explain, step by step, the methodology for the ROI analysis. As well, this section presents an explanation on the assumptions made, the decisions taken in the analysis and includes calculation results.

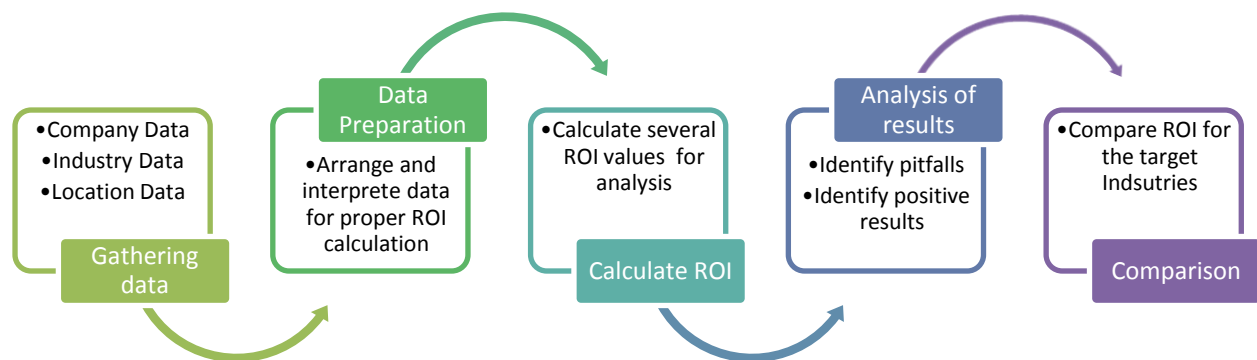
### 7.2.1 Methodology

The ROI analysis represents the revenue a business can produce with the assets that it owns. However, to be able to calculate the ROI, it was necessary to understand the state of the market; that involved a market study of the targeted industries as well as their potential growth. This information is valuable to create a context for which the ROI results could be compared to, and in turn it can be helpful to create a benchmark for companies looking to relocate in Gregg County. Also, the results can potentially show different strategies for the different industries.

For this project it was decided that the ROI analysis would be divided into two phases both of them following the methodology in Figure 96. In the first phase an ROI will be calculated based on the vertical and a set of assumptions. This method will be explained later in greater detail. The second phase will consist of calculating ROI for specific companies. The companies should represent one of the verticals and should be located in the Gregg County area.

The Methodology we determined shows the following process:

**Figure 96: ROI analysis methodology**



Source: Produced by T-MEX, Texas A&M University

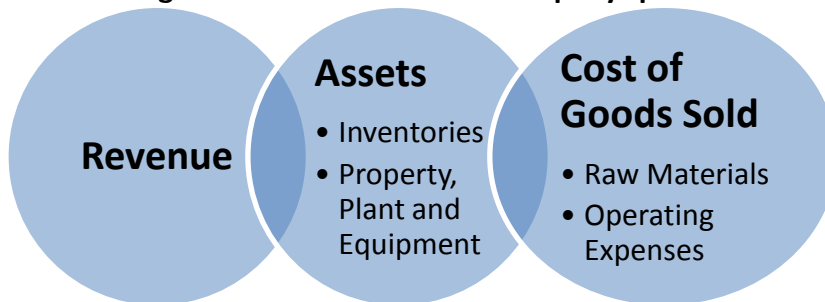
In this section, we will go into the details of the analysis for each step followed. However, it is important to understand some aspects of the process. The methodology begins with gathering data. The data included anything relevant to the project and the ROI analysis. After data collection, the process then moved linearly; however the process had to backtrack to a previous step (meaning gathering new data) when flaws or incomplete data was encountered. Sometimes, new data was needed to improve the quality of the results. This method ensures a high quality of data analysis, as well as a confidence factor in the ROI analysis. This will be exemplified in later sections throughout this section.

### 7.2.2 Gathering Data

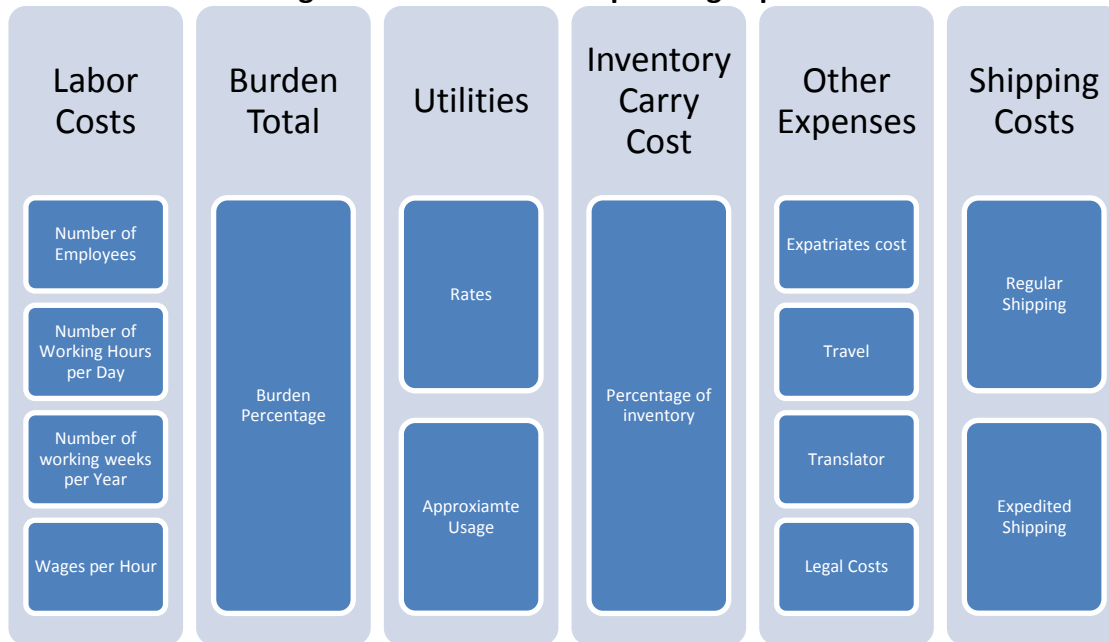
As mentioned before to calculate a ROI, it is necessary to gather financial data for each company that is going to be analyzed. The best analysis would gather almost exclusively area specific data and would take into account the state of the location (localized costs).

The data deemed important for the analysis is as follows:

**Figure 97: Data needed for company specific ROI**



Source: Produced by T-MEX, Texas A&M University

**Figure 98: Definition of Operating Expenses**

Source: Produced by T-MEX, Texas A&M University

In the first phase of the analysis, the data needed was financial data by each vertical. The objective was to calculate a benchmark ROI for the industry. This means that, in order to calculate an industry ROI, it was necessary to gather all the data points needed and mentioned before (revenue, expenses, and assets) for all the companies in the industry. This process seemed out of the timeline for the project, so a different approach was taken. By considering the limitations of the setback due to the lack of some private companies' information, it was decided to return to the beginning of the methodology, which means defining new ways to gather useful data. From experience we know that the best way to gather a great amount of data is to utilize databases available to the research.

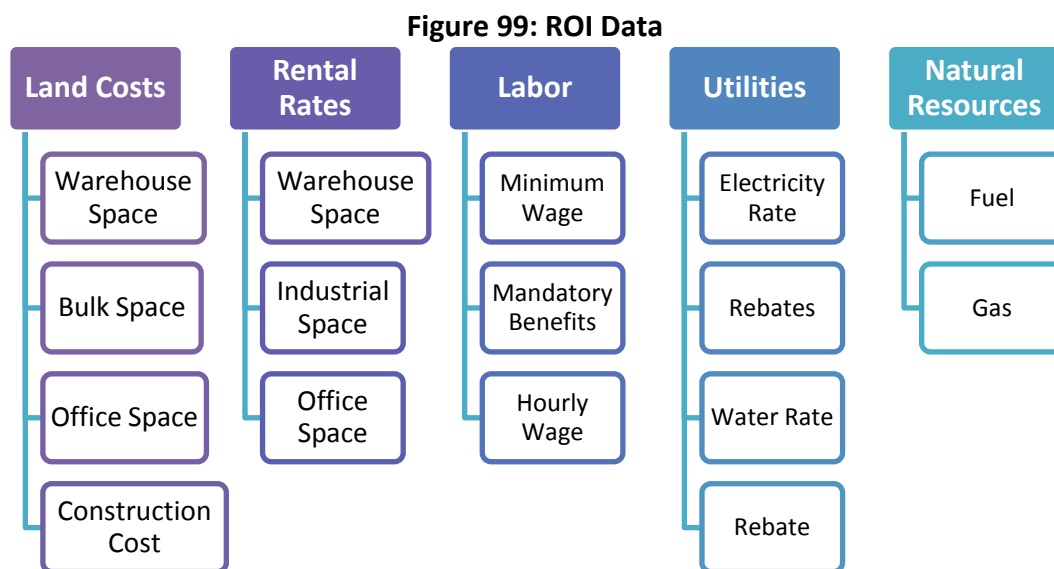
We started the process by identifying useful sources and databases. Several databases that are maintained by local and federal governments were used. As well, we identified sources from market research firms. Consequently, the first approach was to collect similar data for a much bigger sample size. For consistency, it was determined the following assumptions:

- The sample pool will be based on public companies. This will eliminate the processing time for the NDA (Non-Disclosure Agreement) required by firms to provide information, so the analysis will fit the project's time frame.

- The companies must be active in the last reporting year and active the last two years prior to that. This assumption avoids outliers in the data. For example, companies that did not operate or reported the last year would have incomplete data or even data that does not represent the state of the industry.
- The data will be compared based on the NAICS codes and then analyzed to calculate the ROI for the industry based on the sample pool. The idea behind this assumption is to be able to capture the state of the industry, as well as to help with the comparison process.
- The sample pool will only include companies that are registered in the United States as their headquarter country. This will eliminate companies that do not report financial data in similar manner than companies in the United States. Please, note that those companies could be doing business all over the world, but because the companies would be registered in the United States they require following a similar reporting system.

Once the data was gathered for all the active companies operating in a specific NAICS code, a ROI analysis would be produced to obtain the benchmark that we will use to compare the ROI calculated in the second phase of the process. It was decided to calculate the ROI for specific companies located in the Gregg County area. This involved collecting specific data for the location area.

The data deemed important for this process was as follows:



Source: Produced by T-MEX, Texas A&M University

The importance of this step was to understand the attributes that Gregg County (location) offers in general. This would allow a better understanding of what Gregg County has to offer in comparison with competing cities. The Kilgore Economic Development Corporation (KEDC) and the Longview Economic Development Corporation (LEDC) have a vast amount of information in their respective websites and it was decided to utilize data based on their information. The information used for the ROI referred to electricity rates which is data well documented for public use. For example, the electrical power cost for both cities is as follows:

**Table 19: Electrical rates for the Gregg County area**

Electric Power		
Residential		
AEP/SWEPCO	State Average	National Average
7.86 ¢/kWh	8.71 ¢/kWh	12.01 ¢/kWh
Commercial		
AEP/SWEPCO	State Average	National Average
6.28 ¢/kWh	7.05 ¢/kWh	10.21 ¢/kWh
Industrial		
AEP/SWEPCO	State Average	National Average
5.18 ¢/kWh	4.82 ¢/kWh	6.71 ¢/kWh

Source: Adapted from the American Electric Power/SWEPCO and the cities' economic development websites.

As you can see, Longview and Kilgore offered a lower utilities cost in comparison to other cities and states. This should give companies an advantage over their competitors when electrical consumption is so high among facilities and if a specific vertical consumes electricity in large amounts during its production process. Based on our interviews, companies mentioned that usually the highest utility cost as a percentage of expenses is electrical power and the lower cost should provide Gregg County an advantage over other cities.

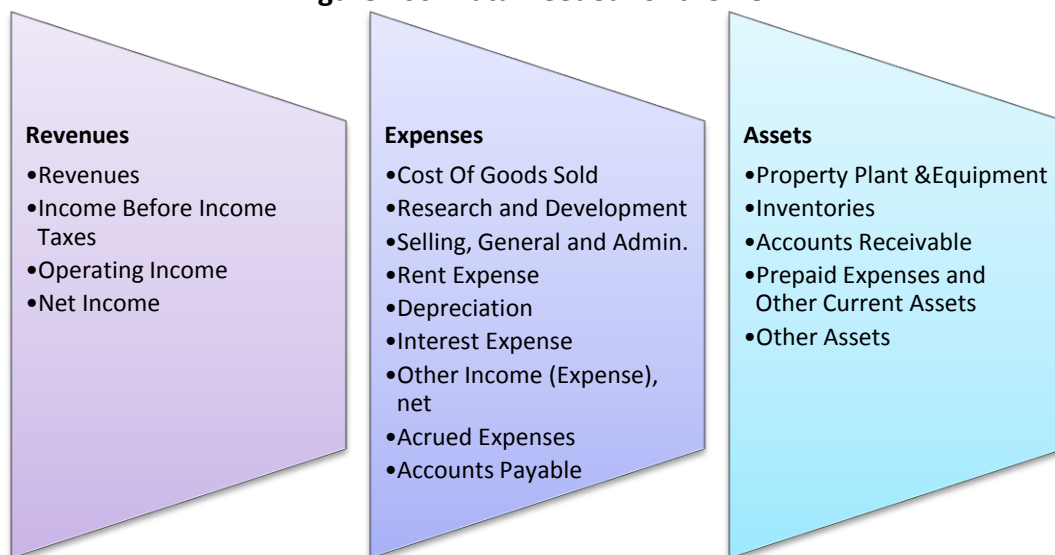
Given that the previous information is so well documented in Gregg County, it was decided to move to the next set of data to be collected which the company specific data was mentioned before. This data included most of the financial information for the companies we surveyed and was obtained within the site. For example, data needed are exemplified in the figures above (see Figure 97 and Figure 98). However, this type of data is very particular for each company, and the majority of the companies are private (meaning their financials were not disclosed). In some cases, we interviewed the companies and some of them were able to provide us the data required, in other cases, we needed to do assumptions.

It is essential to understand the major reasons why some companies do not share their financial information. First, companies are not required to publish or even calculate location specific data. This creates some secrecy between the public information. Second, companies do not only operate in only one city or state, they tend to do business around the globe. This approach would work for companies willing to or trying to define if moving or relocating in Gregg County with a very specific objective in mind. Third, the non-disclosure process in companies and public entities take several months to process, that represented a constraint for gathering data for this project (there is a timeline of only few months to execute it). However, even with the secrecy about private data we were able to collect individual company's data for further analysis.

### 7.2.3 Data preparation

Once the information was gathered some data preparation is always needed. During this step, it is decided what information is deem useful and what information does not fit the objectives and parameters for the project. It was determined that one of the best and more complete sources for the data was MergentOnline. At this moment, when using this approach, the data that was determined the most useful is presented as follows:

**Figure 100: Data Needed for the ROI**



Source: Produced by T-MEX, Texas A&M University

## 7.2.4 ROI Analysis

### 7.2.4.1 Calculate ROI

In order to calculate the ROI for each industry we also used the Equation 4. This ROI represents the annualized operating income produced by the company based on the average capital invested during the current and previous years. This ROI represent a different risk control measure than the ROI from Equation 3, because that one represented the revenues produced based on assets by the company.

Also, given that industries in different sectors has different operation processes, the ROI equation is modified accordingly to the main industry operations. As for example, for companies mainly focused on R&D, the inventory barely exists and is not affecting the assets.

Once the data was researched, gathered, and prepared for analysis, we proceeded to the ROI calculation. From the data obtained in the database, the team extracted the ROI equation based on operations defined as:

#### Equation 4: ROI (Operations)

$$ROI (Operations) = \frac{\text{Annualized Operating Income}}{\frac{\text{Investment Capital 2010} + \text{Investment Capital 2011}}{2}}$$

Source: Produced by T-MEX, Texas A&M University

The ROI in Equation 4 was extracted directly from the database and provided a benchmark of what is the potential for companies in the industry. For this ROI, only the companies that satisfied the assumptions were considered. Then, the companies that were ranked as the top ten were grouped and used as a sample. Furthermore, the ROI presented in Equation 4 above we compiled it to have it as comparison to the ROI we calculated using Equation 3. Once the ROI in Equation 4 was extracted, comparison reports were created based on the NAICs codes to further analyze the data. The following is an example of a comparison report:

**Table 20: ROI (Operations) comparison report NAICS code 324110**

Company Name	ROI % (Operating) - 2010	ROI % (Operating) - 2009
<b>Chevron Corporation</b>	29.32	18.75
<b>ConocoPhillips</b>	22.85	13.03
<b>Enterprise Products Partners L.P.</b>	16.74	17.33
<b>Exxon Mobil Corp.</b>	37.74	29.13
<b>Hess Corp</b>	18.3	11.03
<b>Marathon Oil Corp.</b>	17.12	12.16
<b>Marathon Petroleum Corp.</b>	8.45	-
<b>Murphy Oil Corp</b>	16.25	16.26
<b>Sunoco, Inc.</b>	14.01	-9.87
<b>Valero Energy Corp.</b>	8.24	-0.26
<b>ROI</b>	18.90	11.95

Source: Produced by T-MEX, Texas A&amp;M University

#### 7.2.4.2 NAICS Codes

As indicated initially, we used NAICS codes to gather data for each industry. There are two methods that can be used for the selection of the NAICS codes. The first method is based on the identification of potential companies that are considered a good fit for the area. These companies would be recommended by the market study and the supply chain analysis. Once a list of companies is created, it is necessary to match each company with their respective NAICS codes. The NAICS codes were selected and then the companies were extracted from the database with the comparison reports based on the code.

The second method (this was the method used for the analysis) is used when there is not a clear set of potential companies for a location (early in the process) or when the companies are already located in the area. For this method, the industry was divided into all the relevant NAICS codes (this means, all the six-digits NAICS codes based on the vertical for the project). Once the relevant NAICS codes were extracted, then the comparison reports were created.

Once we produced the reports needed for the first phase of the ROI analysis it was important to do the respective analysis for individual companies from which we had sufficient financial data to create a quality ROI that would properly paint a picture of the possibilities in the Gregg County Area.

### 7.2.4.3 ROI Comparisons

As part of the analysis several comparison tables were created to compare the different ROIs for the different NAICS codes.

**Table 21: Example of NAICS Codes comparison report (Not entire table, for full table refer to Table 22)**

Primary NAICS Code 333: Machinery Manufacturing	ROI (%)
333112 : Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing	19.31
333120 : Construction Machinery Manufacturing	11.71
333132 : Oil and Gas Field Machinery and Equipment Manufacturing	16.59
333220 : Plastics and Rubber Industry Machinery Manufacturing	18.07
Other: Code 3331 and 3332	15.46
Other: Code 3333 and 3334	14.53
333512 : Machine Tool (Metal Cutting Types) Manufacturing	10.45
Other: Code 3335	15.08
333611 : Turbine and Turbine Generator Set Units Manufacturing	19.41
333612 : Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing	12.05
333999 : All Other Miscellaneous General Purpose Machinery Manufacturing	18.07
Other: Code 3339	12.37
<b>ROI for Primary NAICS Code 333</b>	<b>15.52</b>

Source: Produced by T-MEX, Texas A&M University

Some things to note:

- The ROIs for the “Other” categories were combined with all or most of the 6 digits codes other the 4 digit code, to avoid outliers, for example:

331511 : Iron Foundries	
331512 : Steel Investment Foundries	
331521 : Aluminum Die-Casting Foundries	
331528 : Other Nonferrous Foundries (except Die-Casting)	
331513 : Steel Foundries (except Investment)	
	<b>Other: Code 3315</b>
	<b>12.38</b>

- The industry average is calculated at the end of the table. In this case the industry has an ROI of 15.52% which is close to the historical average rate that we usually see in other manufacturing activities.

Additionally to the analysis made, we not only considered the ROI extracted from the database, but we calculated ROIs based on assets following Equation 3. The ROI's calculated would be useful for potential companies to consider possibilities of expanding their market according to the NAICS codes selected in each industry.

Once the industries with higher opportunities, bigger gaps or potential market expansion (based on the market analysis and supply chain analysis) were identified, then a recommendation was suggested and validated by these ROI calculations.

### **7.3 Case Studies**

These are critical steps in the ROI calculation process. During these tasks, logic results and solid arguments should be produced that explain the insight information of the targeted industry. Also, by the produced results we should be able to analyze the potential gaps of the industries in the region.

At this point of this section, we will include case studies based on each industry for which the ROI has been calculated and analyzed. It is important to mention that to maintain the privacy of the interviewed companies, the names have been change and the number modified with a multiplier. The multiplier is different for each company to avoid the possibility of back engineering. In the first case study we will use the Metal Manufacturing Industry.

#### **7.3.1 Metal Manufacturing Industry**

This industry was divided in the first phase in two different NAICS codes:

- Primary Code 331: Primary Metal Manufacturing
- Primary Code 333: Machinery Manufacturing

The following tables (Table 22 and Table 23) include the results for this industry:

**Table 22: Example of ROI – Machinery Manufacturing NAICS Codes**

Primary NAICS Code 333: Machinery Manufacturing	ROI (%)
333111 : Farm Machinery and Equipment Manufacturing	12.26
333112 : Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing	19.31
333120 : Construction Machinery Manufacturing	11.71
333132 : Oil and Gas Field Machinery and Equipment Manufacturing	16.59
333220 : Plastics and Rubber Industry Machinery Manufacturing	18.07
Other: Code 3331 and 3332	15.46
333294 : Food Product Machinery Manufacturing	16.56
333295 : Semiconductor Machinery Manufacturing	19.24
333298 : All Other Industrial Machinery Manufacturing	13.47
333313 : Office Machinery Manufacturing	13.90
333314 : Optical Instrument and Lens Manufacturing	13.45
333319 : Other Commercial and Service Industry Machinery Manufacturing	18.30
333411 : Air Purification Equipment Manufacturing	14.53
333414 : Heating Equipment (except Warm Air Furnaces) Manufacturing	14.57
333415 : Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	15.12
Other: Code 3333 and 3334	14.53
333512 : Machine Tool (Metal Cutting Types) Manufacturing	10.45
Other: Code 3335	15.08
333611 : Turbine and Turbine Generator Set Units Manufacturing	19.41
333612 : Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing	12.05
333613 : Mechanical Power Transmission Equipment Manufacturing	14.20
333618 : Other Engine Equipment Manufacturing	13.18
333911 : Pump and Pumping Equipment Manufacturing	15.31
333992 : Welding and Soldering Equipment Manufacturing	13.25
333993 : Packaging Machinery Manufacturing	20.57
333996 : Fluid Power Pump and Motor Manufacturing	20.47
333999 : All Other Miscellaneous General Purpose Machinery Manufacturing	18.07
Other: Code 3339	12.37
<b>ROI for Primary NAICS Code 333</b>	<b>15.52</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Table 23: Example of ROI – Machinery Manufacturing NAICS Codes**

<b>Primary NAICS Code 331: Primary Metal Manufacturing</b>	<b>ROI (%)</b>
331111 : Iron and Steel Mills	9.61
331221 : Rolled Steel Shape Manufacturing	9.59
Other: Code 3311 and 3312	7.42
Other: Code 3313	9.52
Other: Code 3314	10.30
Other: Code 3315	12.38
<b>ROI for Primary NAICS Code 331</b>	<b>9.80</b>

Source: Produced by T-MEX, Texas A&amp;M University

As mentioned before this industry is a big player in the Gregg County economy. It provides services for the oil and mining industry. Also, East Texas and especially Gregg County have a high concentration of companies that do work within these two primary NAICS codes (331, 333). In other words, these codes are represented by big players like LeTourneau Technologies, Capacity of Texas and Holt Cat in the area's economy. Most of the work done within these codes is to provide products and services for the oil and mining industry.

According to the industry analysis done for the NAICS code "333220: Plastics and Rubber Industry Machinery Manufacturing" is evident that is highly concentrated in the area. A close look at the average ROI for that NAICS code displays an ROI of 18.07% almost 3% higher than the average for the entire industry of 15.52%. Based on the first phase analysis the code 333220 is a code that could show potential for the area if sufficient labor force is available for it to thrive.

Also, after a few visits to the area it was noted that other codes that also operate within this NAICS code can operate and grow. For example, the codes "333994: Industrial Process Furnace and Oven Manufacturing" and the code "333924: Industrial, Truck, Tractor, Trailer, and Stacker Machinery Manufacturing" have a relatively high concentration in the area and are able to operate at great efficiency and effectiveness, because of location infrastructure and industry support.

Once potentials for the area were evaluated, several companies were visited for further analysis. For an individual company case study within this vertical company "MMI" was visited (for privacy to the company the real name has been changed). The company shows the following ROI:

**Table 24: Case Study Metal Manufacturing**

<b>Plant Size:</b>	
-Revenue	<b>\$351,000,000.00</b>
-C.O.G.S.: (Expenses)	<b>\$ 305,684,712.00</b>
Average COGS (Raw Material)	<b>\$ 280,800,000.00</b>
- Labor cost per plant or the following breakdown	<b>\$ 5,334,336.00</b>
- # of employees	280
- # of working hours per day	9
- # of working weeks per year	49
- Wages Per hour	<b>\$ 16.00</b>
Burden Total	<b>\$ 2,000,376.00</b>
- Burden Percentage	38%
Company-to-Average ratio	0
- Utilities	<b>\$ 5,375,995.49</b>
-Inventory Carry cost	<b>\$ 9,450,000.00</b>
-Percentage to inventory	25%
- Travel, trade shows, admin	<b>\$ 2,700,000.00</b>
- Turnover ratio	<b>\$ 24,004.51</b>
- Percentage	3%
- Cost to replace one worker	15%
- Assets	<b>\$ 129,600,000.00</b>
- Inventories in \$	<b>\$ 37,800,000.00</b>
- Account receivable	<b>\$ 64,800,000.00</b>
- Property, Plant and Equipment	<b>\$ 27,000,000.00</b>
<b>ROI</b>	<b>22.73%</b>

Source: Produced by T-MEX, Texas A&amp;M University

Company MMI has a calculated ROI of 22.73% this is a very high ROI for a manufacturing facility. MMI has being able to maintain natural growth in Gregg County and the area allows them to continue expanding into new markets or products. MMI is able to ship product around the world and is maintaining a healthy environment thanks to the infrastructure offered in the area. As expected, the ROI shows promise growth and, when we talked to leaders in the industry located in Gregg County they mentioned us that the location and the area is optimal for their type of business. The company is located in Gregg County and has a good history in the area. They are not planning to relocate and actually are enjoying the benefits that the County has to offer.

The ROI for company MMI is 22.73% and this ROI is much higher than the national average ROI for the industry which is 15.52%. This suggests that the area offers a good environment for a metal manufacturing company. According to industry leaders there are a few advantages of been located in Gregg County:

- Labor pool (It is great when they are available, yet this is an area that needs improvement – more trained workers)
- Proximity to major traffic arteries (allows for easy transportation of goods)
- The low cost of utilities (somewhat relevant to the industry, more like a bonus)
- Location helps maintain low cost which is important to the industry (this involves utilities and low taxes)

This industry has a good potential for the Gregg County area. The existing labor force revolves around this type of industry which could be very important for the growth of this industry. The dependency of the area in the oil and gas industry creates an “interdependent” relationship with this industry, because of labor. This industry generates this dependency because when the oil and gas industry is booming the majority of the available skill labor moves to that sector to make big money, however, when the industry is in a recession labor floods to the metal manufacturing industry because the skill requirements are very similar, although it doesn’t imply expecting similar salaries and similar working conditions. Yet, this industry accepts this dependency because the oil and gas industry trains people for similar skills and uses the metal manufacturing for certain needs.

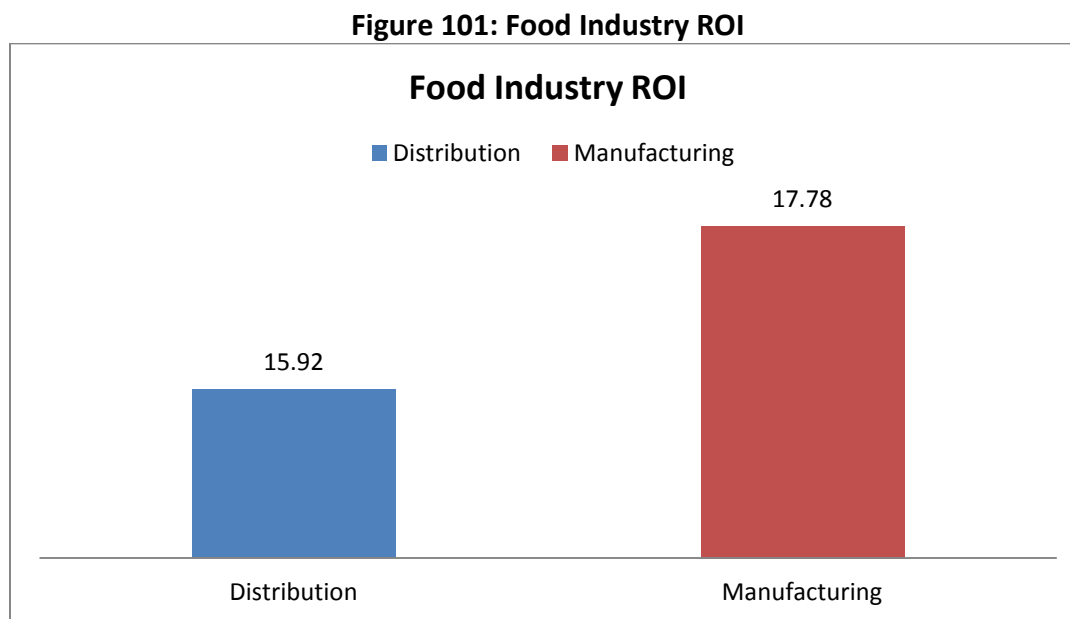
### **7.3.2 Food Industry**

The food industry could be divided in several different sectors depending on production and distribution. As part of the research we had some conversations with industry leaders (not necessarily located in Gregg County), it was decided that the ROI analysis should divide the industry in two main sectors: a) Food manufacturing or b) Food distribution. This would allow a better understanding of the industry. Also, it would help to connect and understand possible opportunities in the food industry. Even thou the distribution analysis is included later, food distribution could be a major player in Gregg County so it we decided to include it in this section also.

Keeping in mind the goals for the area of giving priority to clean manufacturing, low and high skill jobs creation and sustainability of industries and clusters, we believe the food industry could present different constrains as a potential candidate for Gregg County. The food industry

requires a low skill labor force, low utility costs, and a good level of quality for the resources (like water) and somewhat lower standards for pollution (if manufacturing) most of this needs were mentioned in the “Industry Analysis” section.

The following figures and tables contain a summary of the food manufacturing and distribution sectors:



Source: Produced by T-MEX, Texas A&M University

The food-manufacturing sector considered for the analysis is divided into major twenty subsectors. The subsectors in the food manufacturing are presented in Table 25.

Note that the subsectors that are label “Other:...” include a few subsectors combined. These subsectors were combined because to maintain the statistical integrity of the data. Table 24 also presents their respective ROIs and the average ROI for the subsector.

**Table 25: Food Manufacturing**

<b>Manufacturing</b>	
NAICS Code: Food MAnufacturing	ROI (%)
311111 : Dog and Cat Food Manufacturing	12.12
311119 : Other Animal Food Manufacturing	13.54
Other: Code 3112 Grain and Oilseed Milling	12.34
Other: Code 3113 Sugar and Confectionery Product Manufacturing	14.68
311411 : Frozen Fruit, Juice, and Vegetable Manufacturing	28.99
311412 : Frozen Specialty Food Manufacturing	21.98
311421 : Fruit and Vegetable Canning	18.31
311422 : Specialty Canning	27.25
311514 : Dry, Condensed, and Evaporated Dairy Product Manufacturing	11.64
Other: Code 3115 Dairy Product Manufacturing	10.05
Other: Code 3116 Animal Slaughtering and Processing	20.38
Other: Code 3117 Seafood Product Preparation and Packaging	24.98
311813 : Frozen Cakes, Pies, and Other Pastries Manufacturing	15.71
Other: Code 3118 Bakeries and Tortilla Manufacturing	24.93
311919 : Other Snack Food Manufacturing	13.83
311920 : Coffee and Tea Manufacturing	20.55
311941 : Mayonnaise, Dressing, and Other Prepared Sauce Manufacturing	24.12
311991 : Perishable Prepared Food Manufacturing	16.15
311999 : All Other Miscellaneous Food Manufacturing	17.77
Other: Code 3119 Other Food Manufacturing	10.78
<b>Food Manufacturing ROI</b>	<b>18.00</b>

Source: Produced by T-MEX, Texas A&amp;M University

Notice that according to the results, the sector has an average ROI of 17.78 %. The subsector with the highest ROI is the code “311411: Frozen Fruit, Juice, and Vegetable Manufacturing, with an ROI of 28.99%. The subsector with the lowest ROI is the combined code “3115 Dairy Product Manufacturing” with an ROI of 10.05%. This low ROI is due to the low ROI involved in the Fluid Milk Manufacturing subsector of the industry.

The food distribution sector considered is divided into main three subsectors. The subsectors in the food distribution sector are as follows (see Table 26).

**Table 26: Food Distribution ROI**

<b>Distribution</b>	
NAICS Code	ROI
424410 : General Line Grocery Merchant Wholesalers	19.93
Other: Code 4244 Grocery and Related Product Merchant Wholesalers	15.87
Other: Code 4245 Farm Product Raw Material Merchant Wholesalers	11.96
<b>Food Distribution ROI</b>	<b>15.92</b>

Source: Produced by T-MEX, Texas A&amp;M University

Table 26 also presents their respective ROIs and the average ROI for the subsector. According to the results, the sector has an average ROI of 15.92%. The subsector with the highest ROI is the “424410: General Line Grocery Merchant Wholesalers”, with an ROI of 19.93%. The subsector with the lowest ROI is the combined code “4245 Farm Product Raw Material Merchant Wholesalers”, with an ROI of 11.96%.

Logic would suggest that Gregg County could pursue the subsectors with the highest ROI. That have great potential to grow and thrive in the area and that would produce many low skill labor jobs in the area. These would be the following codes:

For manufacturing:

- 311411 : Frozen Fruit, Juice, and Vegetable Manufacturing
- Combined code 3117 : Seafood Product Preparation and Packaging
- Combined code 3118 : Bakeries and Tortilla Manufacturing

For distribution:

- 424410 : General Line Grocery Merchant Wholesalers

However, given the market analysis, and from conversations with industry leaders and the goals of Gregg County, picking the highest ROI is not the best choice. The area should be able to support the subsector whichever it might be suited best and the sector that should be in position to growth. This is why it was decided that Gregg County will see a lot of rewards by attracting two different sectors for the food industry:

For distribution:

- The best plan to action is to attract big distribution centers. The distribution center should take advantage of the location factors already in the area. As mention in the

supply chain section, Gregg County offers great advantages for food distribution companies to consider for relocation like labor force, access to main traffic arteries and the support for the local economic development units (KEDC and LEDC)

- The best options for this sector are national name distribution centers for example a Walt-Mart Distribution Center. As mentioned before Gregg County offers great advantages for this type of business in this sector of the food industry.

For Manufacturing:

- Other specialty foods like spices manufacturing, tortilla manufacturing or related areas
- Snacks manufacturing and distribution

There are two main reasons for this suggestion in sectors for the ROI analysis. First, these sectors fit very well with the goals Gregg County has for economic growth. They produce many low-skill level jobs. Second, distribution is poised for future growth in major MSAs the distribution of food requires a great number of customers. This is why locating a major food distribution center could be beneficial for Gregg County and for the company. The location of Gregg County is located in close proximity to major MSA and should be a great springboard for goods passing through the region.

As part of a second phase for this sector there were several attempts to visit one of the few food companies in the area, but they were not available for an interview. However, it was noted that the major food manufacturing companies in the area can continue growing if support is given to the industry. The location of Gregg County and the cost of doing business could allow companies with specialty manufacturing items to thrive.

### **7.3.3 Chemical Sector**

As mentioned before the chemical sector is an industry that is well suited for the Gregg County area because of the strong presence of the oil and gas industry. As mentioned before the oil sector requires specialize chemicals that requires chemical companies to be in the area. This suggests that this industry is highly correlated to the oil and gas industry.

The chemical sector considered for the first phase analysis was divided into two major codes:

- 324: Petroleum and Coal Products Manufacturing
- 325: Chemical Manufacturing

The following figures and tables contain a summary of the Chemical sector. For the code 324, it was divided into three major subsectors. The subsectors in the petroleum and coal products are as follows (Table 27):

**Table 27: Code 324: Petroleum and coal Products Manufacturing**

<b>Primary NAICS Code 324: Petroleum and Coal Products Manufacturing</b>	<b>ROI (%)</b>
324110 : Petroleum Refineries	18.90
324199 : All Other Petroleum and Coal Products Manufacturing	23.26
Other: 324122 and 324191	22.886
<b>ROI for Primary NAICS Code 324</b>	<b>21.68</b>

Source: Produced by T-MEX, Texas A&M University

For the code 325, it was divided into nineteen major subsectors. The subsectors in the Chemical manufacturing sector are as follows (Table 28):

**Table 28: Chemical Manufacturing**

<b>Primary NAICS Code 325 Chemical Manufacturing</b>	<b>ROI (%)</b>
325110 : Petrochemical Manufacturing	18.29
325131 : Inorganic Dye and Pigment Manufacturing	12.13
325181 : Alkalies and Chlorine Manufacturing	15.94
325188 : All Other Basic Inorganic Chemical Manufacturing	14.74
Other: Code 3251 Basic Chemical Manufacturing	16.02
325199 : All Other Basic Organic Chemical Manufacturing	21.36
325211 : Plastics Material and Resin Manufacturing	20.58
Other: Code 3252 Resin, Synthetic Rubber ....	17.78
325222 : Noncellulosic Organic Fiber Manufacturing	14.67
Other: Code 3253 Pesticide, Fertilizer, and other Agricultural...	17.30
325320 : Pesticide and Other Agricultural Chemical Manufacturing	18.21
325510 : Paint and Coating Manufacturing	15.18
325520 : Adhesive Manufacturing	20.28
325611 : Soap and Other Detergent Manufacturing	16.15
325612 : Polish and Other Sanitation Good Manufacturing	16.90
325613 : Surface Active Agent Manufacturing	23.51
325620 : Toilet Preparation Manufacturing	19.80
Other: Code 3259 Other Chemical Product and Preparation Manu.	11.8
325998 : All Other Miscellaneous Chemical Product and Preparation Manufacturing	16.50
<b>ROI for Primary NAICS Code 325</b>	<b>17.22%</b>

Source: Produced by T-MEX, Texas A&M University

Table 27 and Table 28 present the respective ROIs and the average ROI for the subsector and the entire sector. Notice that according to the results, the NAICS code 324 has an average ROI of 21.68%; while the NAICS code 325 has an average ROI of 17.22%. These two NAICS codes are complements of each other and should not be compared against each other. However, when considering the industry to be formed from both NAICS codes then the average ROI for the industry is 19.89%.

This result on which code 324 has a high ROI was somewhat expected given that the NAICS code 324 is highly correlated to the movement of the price of oil and gas. On the other hand, code 325 shows an average ROI close to historical averages for manufacturing processes.

Several companies were visited for further analysis. For an individual company case study within this vertical company “CPI” was visited (for privacy to the company the real name has been changed). The company shows the following ROI:

**Table 29: Case Study Chemical Industry**

<b>Plant Size:</b>	
-Revenue	<b>\$5,750,000.00</b>
-C.O.G.S.: (Expenses)	<b>\$ 5,362,602.74</b>
Avg COGS (Raw Material)	<b>\$3,737,500.00</b>
- Labor cost per plant or the following breakdown	<b>\$ 655,500.00</b>
- # of employees	7
- # of working hours per day	9
- # of working weeks per year	48
- Wages Per hour	<b>\$ 19.50</b>
Burden Total	<b>\$ 393,300.00</b>
- Burden Percentage	60%
- Utilities	<b>\$ 13,573.91</b>
-Inventory Carry cost	<b>\$ 88,807.60</b>
-Percentage to inventory	25%
- Assets	<b>\$ 1,390,230.40</b>
- Inventories in \$	<b>\$ 355,230.40</b>
- Property, Plant and Equipment	<b>\$ 1,035,000.00</b>
<b>ROI</b>	<b>18.11%</b>

Source: Produced by T-MEX, Texas A&M University

Company CPI has a calculated ROI of 18.11% this was expected because in conversation with leaders in the industry located in Gregg County, they mentioned that the location and the area is optimal for their type of business.

As it can be noted the ROI for company CPI is 18.11% this ROI is much higher than the national average ROI for the industry which is 17.22% (in its NAICS code), but lower than the ROI for the entire industry (19.89). This suggests that the area offers a good environment for a chemical company whenever the company is related to the cluster in the area. According to industry leaders there are a few advantages of being located in Gregg County:

- Proximity to clients (this refers to clients in the oil and gas industry).
- Labor pool (leaders in this industry mentioned that the workers that they have are very loyal but sometimes they lack training to make them more efficient at their positions. They said that this is especially important in this industry where a mistake could cost a great deal for a company).
- The low cost of utilities (very important for this industry)
- Interaction within secondary industries and within the region (this refers to the role that a company in this industry plays within the cluster in the area)

This industry has a good potential to develop in the area. The area could create an even better environment if the cluster and the integrity of the supply chain could be maintained. This industry requires movement of hazardous materials and a train spur is highly necessary; the less times a valve has to be open to change the material from one vehicle to another (for example from train to truck) the smaller the chance of a spill. Also, proximity to customers (as mentioned before the oil and gas industry) creates opportunity for chemical companies to locate in Gregg County in close proximity to them. The location of the major chemical companies in proximity to the big energy centers, like Houston, could be discouraging. However, Gregg County has the potential to create a smaller cluster and an energy center where a few companies could be part of it.

#### **7.3.4 Plastics Industry**

As mentioned before the plastics industry plays a small, but a strong role within the area. This industry overlaps with several sectors located in Gregg County and provides great support for other industries. We say that the presence is small but just in comparison to some of the other industry verticals. This industry ranges from specialized packaging materials to plastics and rubber products.

For the code 326, it was divided into six major subsectors. The subsectors in the Plastics and Rubber Products Manufacturing sector are as follows (Table 30):

**Table 30: Plastics Sector**

<b>Primary NAICS Code 326 Plastics and Rubber Products Manufacturing</b>	<b>ROI (%)</b>
326112 : Plastics Packaging Film and Sheet (including Laminated) Manufacturing	10.81
326113 : Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing	16.24
<b>Other: Code 3261 Plastic Product Manufacturing</b>	<b>16.49</b>
326199 : All Other Plastics Product Manufacturing	14.17
<b>Other: Code 3262 Rubber Product Manufacturing</b>	<b>13.33</b>
326299 : All Other Rubber Product Manufacturing	14.55
<b>ROI for Primary NAICS Code 326</b>	<b>14.26</b>

Source: Produced by T-MEX, Texas A&M University

Table 30 present the respective ROIs and the average ROI for the subsectors and the entire sector. Notice that according to the results, the NAICs code 326 has an average ROI of 14.26%. This code is relatively low compared to the other researched manufacturing sectors. There are a few reasons for these results:

- To maintain statistical integrity combining some codes extracted the outlier from the analysis.
- Some of the codes only have a few active companies that reported their financial data
- The definition of the NAICs codes for this industry limits the companies in each code. The only code with more than twenty five active companies is the code “326199: All Other Plastics Product Manufacturing” which include companies that do any plastic related jobs like Hasbro (plastic toys), Tupperware (plastic containers), etc.

For an individual company case study within this vertical company “PCII” was visited (for privacy to the company the real name has been changed). The company shows the following ROI:

**Table 31: Case Study Plastics Industry**

<b>Plant Size:</b>	
-Revenue	<b>\$79,200,000.00</b>
-C.O.G.S.: (Expenses)	<b>\$ 61,291,200.00</b>
Average COGS (Raw Material)	<b>\$ 51,480,000.00</b>
- Labor cost per plant or the following breakdown	<b>\$ 2,496,000.00</b>
- # of employees	160
- # of working hours per day	10
- # of working weeks per year	50
- Wages Per hour	<b>\$ 13.00</b>
Burden Total	<b>\$ 1,497,600.00</b>
- Burden Percentage	60%
- Utilities	<b>\$ 1,987,200.00</b>
-Inventory Carry cost	<b>\$ 3,600,000.00</b>
-Percentage to inventory	25%
-Number of Translators	0
- Turnover ratio	<b>\$ 230,400.00</b>
- Percentage	8%
- Cost to replace one worker	<b>\$ 7,500.00</b>
- Assets	<b>\$ 58,393,846.15</b>
- Inventories in \$	<b>\$ 14,400,000.00</b>
- Account receivable	<b>\$ 12,793,846.15</b>
- Property, Plant and Equipment	<b>\$ 31,200,000.00</b>
<b>ROI</b>	<b>19.93%</b>

Source: Produced by T-MEX, Texas A&amp;M University

Company PCII has a calculated ROI of 19.93 % this is a high ROI in comparison to the rest of the national industry (14.26%). The company mentioned that they are able to thrive in the area given that they have the infrastructure they needed to maintain low costs and constant natural growth. The company has several products that place it as leader in the industry.

The results of the ROI allow to considering that the area can cover the need of a plastics company. When we had the opportunity to talk to companies in this industry, it was mentioned that the Gregg County area has helped them succeed in the industry. The KEDC and LEDC have played a big role for some of this companies by offering help to train workers, support to acquire new equipment etc. This is very important, the active roles of LEDC and KEDC to attract

businesses into the area. After the interview the industry leaders mentioned that the Gregg county location offers them low costs, an average labor pool and the infrastructure they need.

This company mentioned several advantages in the area, but it also mentioned some disadvantages that they felt strong about. According to industry leaders there are a few advantages of been located in Gregg County:

- Proximity to major traffic arteries (this is important to the industry when they have to deliver to the end customer or a distribution center. Gregg County offers a great gateway to other parts of the country.)
- The low cost of utilities (very important for this industry. The leaders in this industry mentioned that the cost of utilities is a great factored within their operations. They need a great amount of water and electricity to operate. They also mentioned that the low cost of these utilities in Gregg County are an advantage to them.)
- Their current infrastructure (this is a big advantage to this industry if the proper infrastructure like a train spur is locate it within the facility).

And their major disadvantages:

- Proximity to suppliers (the leaders mentioned that they are somewhat far from their suppliers, this has not such a big impact in the company's direct operations, but if supplier would be closer that would be even better because it would reduce raw material cost and at the same time improve efficiency by reducing uncertainty of materials delivery).
- Labor pool (this is in both sections because the labor pool for this industry is shared with the oil and gas industry which creates high employee turnover when the oil and gas industry is booming.). Also, it was mentioned about the constraints of some workers who lack basic educational skills (like simple math). This simple skill is of major importance within this industry because measurements need to be taken, or mixtures had to be analyzing, and a simple mathematical error could produce low quality products that would be costly to the company.

The plastics industry has a good presence in the area, and could be an opportunity to strengthen a cluster that overlaps with this industry. However, some of the industry leaders mentioned that the constant battle for good labor could be a turn off and sometimes the lack of necessary infrastructure (train spur) hurts the natural growth of this industry in the area.

### 7.3.5 Distribution & Warehousing

This is a very diverse industry. However, the needs for the companies in this vertical are not that different. This industry seems to be in a better position than other verticals in Gregg County. Yet, highly specialize transportation needs (like a rail spur) might be a drawback to this industry. The distribution industry has the advantage that it can support companies that are part of a cluster or companies that are not related to the same cluster. This is a great advantage of this industry; because it does not require Gregg County to recruit only companies that would be part of the already present clusters or industries.

The Distribution and Warehousing sector considered for the first phase analysis was divided into two major codes. Notice, that the division for the codes is the durability of the final product:

- 423: Merchant Wholesalers, Durable Goods
- 424: Merchant Wholesalers, Nondurable Goods

The following figures and tables contain a summary of the Distribution and Warehousing sector. For the code 423, it was divided into eighteen major subsectors. The subsectors in the Merchant Wholesalers, Durable Goods are as follows (Table 32):

**Table 32: Code 423: Merchant Wholesalers, Durable Goods**

<b>Primary NAICS Code 423: Merchant Wholesalers, Durable Goods</b>	<b>ROI (%)</b>
423110 : Automobile and Other Motor Vehicle Merchant Wholesalers	22.60
423120 : Motor Vehicle Supplies and New Parts Merchant Wholesalers	15.80
Other: Code 4232	11.03
Other: Code 4233	3.46
423430 : Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	19.61
423450 : Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers	17.23
Other: Code 4234	16.00
423510 : Metal Service Centers and Other Metal Merchant Wholesalers	4.86
423520 : Coal and Other Mineral and Ore Merchant Wholesalers	11.74
423610 : Electrical Apparatus and Equipment, Wiring Supplies, and Related Equip. Wholesalers	13.42
Other: Code 4236	16.01
Other: Code 4237	15.49
423810 : Construction and Mining (except Oil Well) Machinery and Equipment Wholesalers	10.10
423830 : Industrial Machinery and Equipment Merchant Wholesalers	14.77
423840 : Industrial Supplies Merchant Wholesalers	16.30
423860 : Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers	7.99

423910 : Sporting and Recreational Goods and Supplies Merchant Wholesalers	6.25
Other: Code 4239	14.66
<b>ROI for Primary NAICS Code 423</b>	<b>13.18</b>

Source: Produced by T-MEX, Texas A&M University

For the code 424, it was divided into fourteen major subsectors. The subsectors in the Merchant Wholesalers, Nondurable goods sector are as follows (Table 33):

**Table 33: Code 424: Merchant Wholesalers, Nondurable Goods**

<b>Primary NAICS Code 424: Merchant Wholesalers, Nondurable Goods</b>	<b>ROI (%)</b>
424120 : Stationery and Office Supplies Merchant Wholesalers	14.23
Other: Code 4241	17.80
424210 : Drugs and Druggists' Sundries Merchant Wholesalers	16.06
424340 : Footwear Merchant Wholesalers	16.09
Other: Code 4243	22.34
424410 : General Line Grocery Merchant Wholesalers	19.93
424490 : Other Grocery and Related Products Merchant Wholesalers	14.46
Other: Code 4244	16.65
Other: Code 4245	11.96
Other: Code 4246	12.71
424710 : Petroleum Bulk Stations and Terminals	14.62
424720 : Petroleum and Petroleum Products Wholesalers (except Bulk Stations and Terminals)	13.88
Other: Code 4248	9.92
Other: Code 4249	14.53
<b>ROI for Primary NAICS Code 424</b>	<b>15.37</b>

Source: Produced by T-MEX, Texas A&M University

Table 32 and Table 33 present the respective ROIs and the average ROI for the subsector and the entire sector. Notice that according to the results, the NAICS code 424 has an average ROI of 15.37%; while the NAICS code 423 has an average ROI of 13.18%. Just like the NAICS codes in the plastics industry, these two NAICS codes are complements of each other and should not be a comparison on which one has the highest rank because their final products differ significant. As you can see one code (423) has the distribution of goods that do not expire or go out of season and the other one does (424).

However, some conclusions could be drawn out of the results. Given that code 424 has a higher ROI could indicate that there is a premium to be charge by handling goods that have a higher risk based on their expiration date. Another possible explanation is the low ROI produce by some of the six digits codes; for example: the ROI produce by NAICS code 4233 is the lowest

ROI of the analysis. This code represents the “lumber and other construction materials” which is much correlated to the real estate market. This gives some explanation as to why this code suffered in recent years.

In general these ROIs are somewhat low in comparison to other verticals. There are some reasons as to why this is:

- The distribution sector is highly correlated to the economy, for example: when the economy is booming there are more products been sold, therefore there are more products been moved through the supply chain, increasing the revenues for the distribution industry. However, when the economy is suffering not a lot of products are been sold, and usually distribution companies will hold excess inventory and most of the time would take a hit in their revenues section. So, the current recession should be reason enough for a drop in the ROIs.
- The durable goods are more connected to the economy growth because the products do not have to move as often to maintain their integrity, which lowers the ROI significantly to the nondurable goods.
- To maintain statistical integrity combining some codes extracted the outlier from the analysis.
- Some of the codes only have a few active companies that reported their financial data.

For an individual company case study within this vertical, two companies were visited. The first of both companies offers finish good to their customers. The major difference is that company “DCI” play a bigger role in the area’s cluster while company “DRI” does not; (for privacy to the companies their real name has been changed). Company DCI shows the following ROI:

**Table 34: Distribution and Warehousing Case Study Company DCI**

<b>Plant Size:</b>	
<b>-Revenue</b>	<b>\$12,600,000.00</b>
<b>-C.O.G.S.: (Expenses)</b>	<b>\$ 11,023,212.48</b>
<b>Average COGS (Raw Material)</b>	<b>\$ 10,080,000.00</b>
<b>- Labor cost per plant or the following breakdown</b>	<b>\$ 123,832.80</b>
<b>- # of employees</b>	<b>7</b>
<b>- # of working hours per day</b>	<b>9</b>
<b>- # of working weeks per year</b>	<b>48</b>
<b>- Wages Per hour</b>	<b>\$ 19.50</b>
<b>Burden Total</b>	<b>\$ 74,299.68</b>
<b>- Burden Percentage</b>	<b>60%</b>
<b>- Utilities</b>	<b>\$ 21,420.00</b>

-Inventory Carry cost	<b>\$ 420,000.00</b>
-Percentage to inventory	25%
Rent	\$303,660.00
Tools and equipment	\$46,200.00
Facility	\$98,400.00
- Assets	<b>\$ 3,959,222.40</b>
- Inventories in \$	<b>\$ 1,680,000.00</b>
- Account receivable	\$ 2,132,222.40
- Property, Plant and Equipment	\$ 147,000.00
<b>ROI</b>	<b>25.89%</b>

Source: Produced by T-MEX, Texas A&amp;M University

As mentioned before company DRI is not directly involved in a cluster in the area. For company DRI the calculated ROI is as follows:

**Table 35: Distribution and Warehousing Company DRI**

<b>Plant Size:</b>	
-Revenue	\$150,000,000.00
-C.O.G.S.: (Expenses)	<b>\$ 124,557,760.00</b>
Avg COGS (Raw Material)	\$115,500,000.00
- Labor cost per plant or the following breakdown	<b>\$ 1,065,600.00</b>
- # of employees	185
- # of working hours per day	8
- # of working weeks per year	48
- Wages Per hour	\$ 15.00
Burden Total	<b>\$ 639,360.00</b>
- Burden Percentage	60%
- Utilities	<b>\$ 528,000.00</b>
-Inventory Carry cost	<b>\$ 6,625,000.00</b>
-Percentage to inventory	25%
- Turnover ratio	<b>\$ 199,800.00</b>
- Percentage	10%
- Cost to replace one worker	\$ 10,800.00
- Assets	<b>\$ 78,846,153.85</b>
- Inventories in \$	<b>\$ 26,500,000.00</b>
- Account receivable	\$ 13,846,153.85
- Property, Plant and Equipment	\$ 38,500,000.00
<b>ROI</b>	<b>20.97%</b>

Source: Produced by T-MEX, Texas A&amp;M University

Notice that company DCI has a calculated ROI of 25.89% while company DRI has a calculated ROI of 20.97%. There are several interesting questions and results when comparing the companies ROIs. For example; how two very similar companies located in the same geographical area could have such a gap in their ROI? Well, there are several explanations for this result:

- First, company DCI is a lot smaller than company DRI. This does not suggest that a smaller company has to have a higher ROI, but because of the size, company DCI has a lot less assets that are utilized which increases their ROI. (Also both companies have completely different products, meanwhile one sells high value goods while the other one sells more consumable goods)
- Second, another reason why DCI shows a more efficient use of assets is the fact that they rent most of their big assets (real estate, and major tools and equipment).
- Third, smaller companies run leaner (more efficient) giving the fact that they need to run the facility with “less” resources.
- Fourth, company DCI is a small subsidiary of a national company, while company DRI is not a subsidiary.

One important result from these calculated ROIs is that both of them are very high in comparison with the industry average of 14.28%. This strongly suggests that Gregg County is and should be poised to attract big companies and their distribution centers.

After our conversation with industry leaders we were able to assess that Gregg County possesses several qualities that make it a very strong candidate for distribution companies or distribution facilities. According to industry leaders there are critical advantages of being located in Gregg County:

- Proximity to major traffic arteries (this is probably one of their biggest advantages; the proximity to I-20 for example offers a great outlet east or west).
- Lower cost for real estate than major MSAs (this is also a major advantage for distribution companies which operate at low margins and high volume, having low fixed cost is a great plus).
- The low cost of utilities (this is not as important for this industry as for other verticals, however it plays a role in the decision for relocation).
- Proximity to other major MSAs that takes advantage of the geographical location of Gregg County.

This industry might show the lowest average industry ROIs of all the verticals studied, but it has a great opportunity to flourish in the Gregg County area. This industry also matches with some of the goals of the county; for example:

- They are great candidates for attracting low skill labor.
- This industry involves “clean activities” in comparison to other industries.
- This industry can sustain and growth given the right conditions. These conditions seem present in Gregg County (great outlets to the east and west, proximity to other MSAs, low cost in real estate and low utilities cost).

The major drawback is the labor pool, which comes back again to the dependency to the oil and gas industry. The industry leaders mentioned that the only major problem is keeping their employees when the oil and gas industry is booming. Yet, they also mentioned that this is a problem that can be fixed by hiring more people, but the main challenge is workers’ retention.

## 8 Conclusions and Value Proposition

In this section, we have included a summary of the analysis produced. The main objective of this serves to highlight the identification of potential opportunities and attraction of industries.

The project was organized as:

- Section 2 presented an overview of the Distribution Growth Framework developed by the Global Supply Chain Laboratory at the Industrial Distribution Program in Texas A&M University. The framework includes the strategies, metrics, drivers, and mechanisms to develop a growth strategy for companies. Subsequent sections showed the strategies and practices recommended by the framework.
- Section 3 included an overview about Industry Clusters. This section includes the definition of an industry cluster; the importance and elements of industry clusters; competition, collaboration and relationship of industry clusters with the Distribution Growth Framework.
- Section 4 provided a regional market analysis for key industries and implied the generation growth strategies. The objective was identifying market segments for each industry and potential opportunities for new companies.
- Section 5 included an industry requirements overview. This section presents the average requirements of a company in the selected industry sectors, so this section is a benchmark of the industry in general.
- In section 6 we presented the supply chain mapping. The analysis included case studies of companies located in the region and their corresponding supply chains were created. The objective was to identify opportunities for new suppliers or companies that fit into the supply chain.
- A Return on Investment (ROI) analysis was presented in section 7. This section contained the basic concepts and the methodology used to research, gather, process, and analyze the data. The results were an effective measure of validating the findings of previous analyses done in the industry sectors. Finally, this section includes the results of the ROI analysis among the companies interviewed during the research.

- Finally, the Appendix incorporates specific data from the analysis developed in previous sections.

Due to the extensive verticals defined, the analysis was narrowed to specific industry sectors listed as follows:

## **8.1 Industry Verticals**

1. Chemicals.
  - a. Petrochemicals
  - b. Inorganic
  - c. Organic
  - d. Pesticides
  - e. Fertilizers
  - f. Plastic and Resin
  - g. Paint, adhesive and other chemical products
2. Plastics (Plastics products manufacturing).
  - a. Plastic film, sheet and bag manufacturing
  - b. Plastic pipe and parts manufacturing
  - c. Plastic bottle and container manufacturing
  - d. Plastic products miscellaneous manufacturing
3. Metal manufacturing (machinery/ equipment and components either machined or fabricated).
  - a. Ferrous metal foundry products, and
  - b. Nonferrous metal foundry products.
4. Distribution/Warehousing
  - a. Chemical wholesaling
  - b. Industrial suppliers wholesaling
  - c. Oil and gas services and equipment distribution
5. Food processing
  - a. Dairy products
  - b. Frozen food production
  - c. Snack food production

## 8.2 Analysis

Section	Description	Methodology
<b>Distribution Growth Framework</b>	Presents an overview of the Distribution Growth Framework developed by the Global Supply Chain Laboratory at the Industrial Distribution Program in Texas A&M University. The framework includes strategies, metrics, drivers, and mechanisms to develop a growth strategy for companies. The project is based on the strategies and mechanisms suggested by the framework.	<p>The framework is structured as follow:</p> <ul style="list-style-type: none"> <li>• <i>Generating Growth Framework:</i> Presents the strategies, metrics and drivers to generate revenue.</li> <li>• <i>Managing Growth Framework:</i> Describes how to make the revenue profitable.</li> <li>• <i>Sustaining Growth Framework:</i> Describes how to manage the risk and how to make the growth effective in the long term.</li> </ul>
<b>Industry Clusters</b>	Presents the definition of industry clusters, the importance, elements and relation of industry clusters with the growth framework.	<p>This section is structured as follow:</p> <ul style="list-style-type: none"> <li>• <i>Industry cluster</i> is a geographic concentration of related or interdependent firms that do business, cooperate and compete between each other.</li> <li>• Industry clusters are important because they lead to <i>competition</i>, which leads to economic growth and production efficiencies.</li> <li>• Industry cluster are formed by local government, universities, training institutions, financial institutions, suppliers, customers and other supporting industries.</li> <li>• Industry clusters lead to <i>innovation</i> of products and services. Innovation is strongly related with the growth framework and the strategies that it suggests.</li> </ul>
<b>Market Analysis</b>	Following the generation growth strategies, this section presents a market analysis for key industries. The objective is to identify market growth rates, market share and potential market for the industry verticals and identify opportunities for Gregg County.	<p>The methodology followed by the market analysis is:</p> <ul style="list-style-type: none"> <li>• First, an analysis of market for each industry sector at national level. Identify market growth outlook to assess the future of that sector.</li> </ul>

		<ul style="list-style-type: none"> <li>• Second, an analysis of the market at Texas level. Identifies strengths, weakness and opportunities Texas can offer in each industry.</li> <li>• Third, identifies the market in Gregg County, and potential markets that can be served from Gregg County.</li> </ul> <p>Finally, the section proposes a list of companies that are potential targets for recruiting in Gregg County.</p> <p>Also, is included a list of factors that Gregg County can use to attract new investment and companies.</p>
<b>Industry Analysis</b>	This section presents a general analysis of the industries requirements.	<p>Identified costs are machinery, inventory, R&amp;D, office equipment, project, and operating costs. In addition, requirements included are facilities, workforce, and utilities.</p> <p>The analysis presents requirements for an average company in each industry sector and the corresponding costs associated. An important data are the materials and operating costs presented as a percentage of the total sales.</p> <p>This is helpful to compare two different industry sectors.</p>
<b>Supply Chain Analysis</b>	<p>This section presents supply chain mapping of select companies in each industry sector. The analysis includes case studies of companies located in the region and their corresponding supply chain network.</p> <p>The objective here is to identify opportunities for new suppliers or companies that fit into the supply network.</p> <p>Also, this information may be useful for companies to evaluate the supply chain network in Gregg County and determine if it satisfies their requirements, and for the government it helps to see where the gaps in the supply chains are.</p>	<p>The following steps describes the process to create this analysis:</p> <ul style="list-style-type: none"> <li>• The use of local quotients to compare the local market (Gregg County) with a reference economy (Texas).</li> <li>• Rank the business by their revenue and determine the market share.</li> <li>• Identify and group employer's headquarters in Gregg County by NAICS codes and identify the industry concentration.</li> <li>• Select case studies and develop a supply chain network.</li> <li>• Determine the supply chain gaps that can influence a potential industrial cluster</li> </ul>

<b>Return on Investment (ROI) Analysis</b>	<p>This section contains basic concepts and methodology used to research, gather, process and analyze financial data. The result is an effective measure of validating the findings of previous analysis.</p>	<p>The ROI analysis follows the next steps:</p> <ul style="list-style-type: none"><li>• Gather information of companies, location, and industry. This information was found using several databases and NAICS codes as reference to classify the industries.</li><li>• Prepare the data for its use in the ROI calculation.</li><li>• Calculate the ROI for each main digit's NAICS Code.</li><li>• Finally, perform case studies analysis by company and compare the results between different NAICS codes and companies.</li></ul>
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Source: Produced by T-MEX, Texas A&M University

From the market analysis the following was found:

**Table 36: Market Analysis – Findings Summary**

Sector	Description	Regional Market (2011)	Regional Market (2016)	Cities covered in Regional Market	Target Company(ies)
<b>Food Industry</b>	Dairy product industry	\$ 9.5 Billion	\$ 10.13 Billion	Dallas-Fort worth, Houston, Austin, Beaumont, TX, Little Rock, AR, Fort Smith, AR, Shreveport, LA	Dairy Production industries are generally owned by regional cooperatives or associations. Such associations already exist in Texas.
	Frozen food industry (except dairy products)	\$ 12.4 Billion	\$ 12.7 Billion	Dallas-Fort worth, Houston, Austin, Beaumont, TX, Little Rock, AR, Fort Smith, AR, Shreveport, LA	H.J. Heinz, J R Simplot Company, McCain Foods Ltd.
	Snack food production	\$ 2.572 Billion	\$ 2.837 Billion	Dallas-Fort worth, Houston, TX	Diamond Foods Inc, Kellogg Company, Procter and Gamble (Snack food manufacturing division),
<b>Distribution/ Wholesaling</b>	Chemical wholesaling	\$ 9.17 Billion	\$ 10.147 Billion	Dallas-Fort worth, Houston, TX	ICC Chemical Corp.
	Industrial supplies wholesaling	\$ 4.33 Billion	\$ 4.7 Billion	Shreveport, LA, Dallas-Fort worth, Houston-Baytown, Beaumont-Port Arthur, TX	All major players such as Silgan Holdings, Sun Hydraulics, Kennametal, and Crown Holdings have their subsidiaries located in Texas.
	Oil & Gas services and equipment distribution.	\$ 13.13 Billion	\$ 17.85 Billion	Shreveport, LA, Houston, Dallas-Fort worth, Beaumont-Port Arthur,	All major players are already located in Texas.

				Longview-Marshall, Austin, Houston, Fort Smith, AR, Shreveport, LA	
<b>Metal Manufacturing</b>	Ferrous metal products	\$ 0.508 Billion	\$ 0.614 Billion	Dallas, Fort Worth, Houston, TX Tulsa, OK	Grede Holdings Inc.
	Nonferrous metal products	\$ 0.112 Billion	\$ 0.109 Billion	Dallas, Fort Worth, Houston, TX	Fansteel Inc
<b>Chemicals Manufacturing</b>	Petrochemicals Inorganic Organic Pesticides Fertilizers Plastic and Resin Paint, adhesive and other chemical products	\$ 96.64 Billion	\$ 105.84 Billion	Austin, Beaumont, Brazoria, Dallas, Fort Worth-Arlington, Galveston, Houston, Long View-Marshall San Antonio, TX, Oklahoma City, Tulsa, OK Shreveport-Bossier City, LA, Jackson, MI, Fort Smith, Little Rock, AR.	<ul style="list-style-type: none"> <li>• Agrium Inc (<i>Fertilizers Manufacturing</i>),</li> <li>• The Sherwin Williams Company, and Benjamin Moore &amp; Co. (<i>Paint Manufacturing</i>)</li> </ul>
<b>Plastics Products</b>	Plastic film, sheet and bag manufacturing Plastic pipe and parts manufacturing, Plastic Bottles and Containers, Plastic Miscellaneous Products	\$ 5.148 Billion	\$ 5.739 Billion	Austin, Houston, San Antonio, Dallas, TX Fort Smith, Little Rock, AR, Jackson, MI Tulsa, Oklahoma City, OK	<ul style="list-style-type: none"> <li>• Otter Tail Corporation (<i>Plastic pipe and parts manufacturing</i>),</li> <li>• Novapak Corporation (<i>Plastic Bottles and Containers</i>)</li> <li>• Spartech Corporation (<i>Plastic miscellaneous products</i>).</li> </ul>

Source: Produced by T-MEX, Texas A&amp;M University

**Table 37: Market Structure Summary**

Sector	Industry	Market Concentration	Structure	Barriers To Entry	
<b>Food Industry</b>	Dairy product industry	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Industry Competition</li> <li>• Increasing market concentration due to mergers and acquisitions</li> <li>• High capital investment</li> </ul>
	Frozen food industry (except dairy products)	Medium	Consolidated	Medium	<ul style="list-style-type: none"> <li>• Significant level of initial capital investment</li> <li>• Industry's major players are well-established with strong customer loyalty and favorable contracts with key suppliers</li> </ul>
	Snack food production	Medium	Consolidated	Medium	<ul style="list-style-type: none"> <li>• Major players experience strong brand dominance and customer loyalty</li> <li>• Significant capital investment for advertising and promotions</li> </ul>
<b>Distribution/Wholesaling</b>	Chemical wholesaling	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Significant Capital cost</li> <li>• Competition level</li> </ul>
	Industrial supplies wholesaling	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Manufacturers that are also suppliers have lower unit costs than new entrants</li> </ul>
	Oil & Gas services and equipment distribution.	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• New entrants may pay comparatively higher prices for raw materials and transportation costs than existing players</li> </ul>
<b>Metal Manufacturing</b>	Ferrous Metal products	Low	Consolidated	High	<ul style="list-style-type: none"> <li>• High costs associated with the construction and development of a new foundry</li> <li>• Development of customer-specific casting equipment</li> </ul>
	Nonferrous Metal products	Low	Consolidated	High	<ul style="list-style-type: none"> <li>• Investment scale</li> <li>• Development of customer-specific casting equipment</li> </ul>

<b>Chemicals Manufacturing</b>	Synthetic Fiber	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• High capital cost</li> <li>• High cost of integrated mfg facilities</li> </ul>
	Inorganic Chemical	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Significant capital requirements</li> <li>• Specialized technical requirements</li> </ul>
	Organic Chemical	Low	Fragmented	Low	<ul style="list-style-type: none"> <li>• High financial investment</li> <li>• Specialized workforce</li> </ul>
	Fertilizer	Medium	Consolidated	High	<ul style="list-style-type: none"> <li>• Initial capital</li> <li>• High concentration of manufacturers</li> </ul>
	Plastic and Resin	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• High capital cost</li> <li>• Special technical equipment, machinery and expertise</li> </ul>
	Paint	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Strong brand dominance</li> <li>• Established and comprehensive distribution networks</li> </ul>
<b>Plastics Products</b>	Plastic bottle and container	Medium	Consolidated	Medium	<ul style="list-style-type: none"> <li>• High investment</li> <li>• Strong relationship of existing firms with customers</li> </ul>
	Plastic miscellaneous products	Low	Fragmented	Medium	<ul style="list-style-type: none"> <li>• Financial investment</li> <li>• Research and development cost</li> <li>• Strong relationships of small firms with big players</li> </ul>
	Plastic Film, Sheet and bag	Low	Fragmented	Low	<ul style="list-style-type: none"> <li>• Manufacturing and product technologies</li> <li>• Economies of scale</li> </ul>
	Plastic Pipe and parts	Low	Fragmented	Low	<ul style="list-style-type: none"> <li>• Financial investment</li> <li>• High research and development expenditures</li> </ul>

Source: Produced by T-MEX, Texas A&amp;M University

### 8.3 Findings

In the analysis we present findings for each industry sector and those are applied to Gregg County in general. These findings are presented as follows:

- The main factors for location of an Industry are access to market, access to resources, public sector impacts, workforce, environment and cost of living.
- According to the industry benchmark Gregg County offers a stable labor pool that is aligned with the skills needed for most of the industries located in the area.
- The labor pool is highly dependent in skill and availability with the oil and gas industry. This dependency creates friction between related industries and the oil and gas industry.
- The main reason for the labor dependency in the oil and gas industry is the difference in labor wages.
- The lack of easily available train spurs are problematic for some industries and some companies
- The accessibility to major traffic arteries is a great advantage for the companies located in Gregg County.
- The low cost of utilities specially, water and electricity, are positive aspects of the area. Some industries rely in this low cost more than other and this will mention below in this section
- All the industry leaders interviewed mentioned that the efficiency and support of the KEDC and the LEDC are key aspects to locate in Gregg County. They mentioned that both entities offer great support for companies located in the area and are great resources for further advancement and growth.
- Gregg County is located at a geographically advantageous position due to the Railroad and Interstate highway connectivity for transportation of goods such as Interstate 20, State Highways 31 and 42 and U.S highways 259 and 271. Rail services are provided by Union Pacific (UP), and Burlington Northern Santa Fe (BNSF).

Specific findings of each industry sector are presented as follows.

Section Sector	Market Analysis	Supply Chain Analysis	Cluster Integration	ROI Analysis
<b>Metal Manufacturing</b>	<ul style="list-style-type: none"> <li>• Key external drivers (aerospace and automobile parts manufacturing).</li> <li>• Exports account for 5.3% of total revenue.</li> <li>• Electricity price is a major cost factor.</li> </ul>	<ul style="list-style-type: none"> <li>• Skilled Labor is required (machinists, operators, and welders).</li> <li>• Skilled labor easily translated to oil industry.</li> </ul>	<ul style="list-style-type: none"> <li>• Key suppliers are missing (heat treatment, steel distribution, and/or steel mill).</li> <li>• 8x more concentrated in Gregg County than Texas.</li> <li>• Gregg County is located in the machinery belt which shows why this industry thrives in the area.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential candidates for recruiting are NAICs code 333220 (Plastics and Rubber Industry Machinery Manufacturing) and 333924 (Industrial, truck, tractor, trailer and stacker machinery manufacturing)</li> <li>• The NAICs code with the highest average ROI in the industry is 333993 (Packaging Machinery Manufacturing) with 20.57%. This is expected since the need for packaging machinery is very relevant in most industries given that most products have to be packaged.</li> </ul>
<b>Distribution/ Warehousing</b>	<ul style="list-style-type: none"> <li>• Access to markets is a critical location factor.</li> <li>• Gregg County is located at a geographically advantageous position due to the railroad and interstate highway connectivity.</li> <li>• Innovations in extraction techniques and discovery of oil will stimulate growth and increase demand for equipment distribution.</li> </ul>	<ul style="list-style-type: none"> <li>• Unskilled labor is more prevalent.</li> <li>• This industry is highly concentrated in Gregg County.</li> <li>• Distribution/ warehousing companies located in Gregg County can serve other states and worldwide mainly due to the proximity to Houston port/airport.</li> </ul>	<ul style="list-style-type: none"> <li>• Lower cost for real estate than major MSAs.</li> <li>• Houston has higher tax rates and less availability of land which makes Gregg County a favorable location.</li> <li>• The low cost of utilities (this is not as important for this industry as for other verticals; however it plays a role in the decision for relocation).</li> </ul>	<ul style="list-style-type: none"> <li>• Both of our case study companies show well above average ROIs.</li> <li>• The amount of job creation that this industry is aligned with the goals of Gregg County.</li> <li>• This industry might show the lowest average industry ROIs of all the verticals studied; however it has a great opportunity to flourish in the Gregg County area given the need of the industry.</li> </ul>

<b>Plastics Products Manufacturing</b>	<ul style="list-style-type: none"> <li>• High level of trade assistance from the government as well as trade associations.</li> <li>• Minimum regulation levels.</li> <li>• Characterized by rapid technology change focusing on the use of recycled materials.</li> <li>• Economical for these establishments to be located near petroleum refineries.</li> </ul>	<ul style="list-style-type: none"> <li>• Unskilled labor is more prevalent.</li> </ul>	<ul style="list-style-type: none"> <li>• About 4x more concentrated in Gregg County than Texas.</li> <li>• Compared to Houston, Gregg County Plastic Sector is more concentrated.</li> <li>• This is an industry that could show great growth based on several factors working together, for example: it will require support for overlapping industries, also it will need suppliers for major players in the industry to relocate and it will need a cluster support.</li> </ul>	<ul style="list-style-type: none"> <li>• The lack of train spurs could be challenging for this industry.</li> <li>• Some of the industry leaders mentioned that the lack of more educated labor creates problems in the company. For example, they mentioned employees unable to do simple mathematical calculations and could potentially create problems in quality of products manufacturing.</li> <li>• This industry mentioned that the low cost of utilities is a very relevant advantage to their operations.</li> </ul>
<b>Food Processing</b>	<ul style="list-style-type: none"> <li>• Projected growth rate for snack food production for the next five years is 2.1%</li> <li>• Gregg County region is famous for cattle raising activities to support dairy products industries.</li> <li>• Market is prevailing factor for food processing site locations.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires low-medium skilled workforce.</li> <li>• There is a low concentration of food processing facilities currently in Gregg County.</li> <li>• Shifting trends point to automation reducing the need for employees.</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity and natural gas prices are a major cost factor is a good advantage for Gregg County, which would prove economical for the food industries.</li> <li>• The market concentration and the competition level in this sector are medium.</li> </ul>	<ul style="list-style-type: none"> <li>• The NAICs code with the highest average ROI in the industry is code 311411: Frozen Fruit, Juice and Vegetables Manufacturing (28.99%).</li> <li>• The subsector with the lowest ROI is the combined code “3115 Dairy Product Manufacturing” (10.05%). This due to the low ROI involved in the Fluid Milk Manufacturing subsector of the industry.</li> <li>• We believe that the snack food manufacturing and distribution is a suitable NAICs code for the Gregg</li> </ul>

				County area. This code shows a small ROI in the manufacturing area (13.83), but this code satisfies clean manufacturing activities and the distribution of this product could benefit from the proximity to major traffic arteries.
<b>Chemical Manufacturing</b>	<ul style="list-style-type: none"> <li>• Texas has the highest concentration of chemical industries in the nation.</li> <li>• Highest average wage per employee (\$52.27).</li> <li>• Highest amount of net electricity and natural gas consumed among all manufacturing sectors.</li> <li>• Industries are often located near consumers and to a lesser extent near raw material suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of large employer (Eastman Chemical Co.) drives the regional chemical sector.</li> <li>• Proximity to customers (the oil and gas industry) creates opportunity for chemical companies to locate in Gregg County in close proximity to them.</li> </ul>	<ul style="list-style-type: none"> <li>• 4x more concentrated in Gregg County than Texas.</li> <li>• Compared to Houston, Gregg County is (on average) less concentrated in the Chemical Sector.</li> <li>• Any resin manufacturing plant will be a good target for the Gregg County in order to meet the demand from plastics and chemical industries already located there.</li> </ul>	<ul style="list-style-type: none"> <li>• The code with the highest ROI is 325613: Surface Active Agent Manufacturing (23.51%). This industry comprises manufacturing bulk surface active agents for use as wetting agents, emulsifiers, and penetrants.</li> <li>• Our case study company has an ROI of only 18.11% which is lower than the 19.89 average ROI for the industry. However this result does not suggest that the industry cannot flourish in the Gregg County area.</li> </ul>

### *Other findings*

Gregg County already has a good base for both Energy and Petroleum Clusters; the research also revealed findings related with this industry, these findings are presented as follows:

- Gregg County's Petroleum Product Merchant Wholesale industry is more concentrated than in Houston; this implies the industry is adequate to sustain a petroleum cluster (based on the assumption that Houston is a petroleum cluster). Whereas, Crude Petroleum and Natural Gas Extraction is significantly more concentrated in Houston than Gregg County. However, this is not an industry that is attracted, but rather located based on resource and geography. Additionally, Support Activities for Oil and Gas Operations is lower, but that is due to the higher concentration of Petroleum and Natural Gas Extraction in Houston. Natural Gas Distribution is three times more concentrated in Houston than Gregg County; this is a large industry for Gregg County and could potentially be expanded further. Petroleum Refineries is almost non-existent in Gregg County; there are refineries nearby in Tyler.
- The Energy Cluster has most of the same industries as the Petroleum Cluster, but the industries are prioritized differently. For example, Oil and Natural Gas Extraction is an ancillary industry in the Petroleum Cluster, but a Core Industry in the Energy Cluster. Also, it seems the Gregg County area has more establishments defined under Energy Cluster industries than Petroleum Cluster Industries.

## **8.4 Value Proposition**

According with the information presented it is important the role of the government in order to attract new companies and encourage the development of industry clusters. The process of creating and sustaining an industry cluster starts with government and economic developers recognizing that a cluster is present and then focusing on strengthening the cluster by supporting the infrastructure underlying the cluster.

It is necessary also that the local government promotes and supports the creation of educational and training programs. In several of the interviews with companies the access to trained labor force was one of their main concerns. An interesting finding came from a distribution company; during the interview they stated that the problem is not only the lack of trained workforce for operations, the big gap is in the labor force for management positions. According to this company, is complicated to attract people with the education level required

for management positions and the local universities do not provide this type of education. Gregg County should find a solution to attract this type of workforce or encourage and support local institutions to provide this type of training.

#### **8.4.1 Oil and gas industry cluster**

Gregg County possesses a high concentration of the oil and gas extraction industry. From Gregg County companies can serve important local and regional markets based on the access to important highway arteries. Also, companies can reach important markets for oil and gas related industries such as the Petroleum market in Houston, which is strongly established.

In addition, the market generated by the oil and gas industry is important for other industry sectors; the interviews with the companies revealed that companies in other industry sectors (e.g. chemical and machinery manufacturing) are supporting the oil and gas industry. It was found that chemical manufacturing companies prefer to locate near to the customers rather than the suppliers; this implies that a region with important market is an attractive candidate for relocate. In the same way, industries such as plastic manufacturing receive raw material from the oil, gas and petroleum industry. Moreover, plastic manufacturing also receives benefits from suppliers from oil and gas industries, as for example for chemical manufacturing.

Based on these facts, we believed that Gregg County should encourage and support the oil and gas industry cluster. This cluster would be an important attraction for companies in other industries like machinery manufacturing, oil and gas services providers, oil and gas distribution, distribution/warehousing of oil and gas related products and chemical manufacturing. At the same time, it might attract other industries that are either supplier or customer for the previous mentioned industries.

Gregg County already possesses infrastructure such as access to highways; it should focus on enhance the missing gaps, for example the necessary trained workforce or railroad access. Additionally, Gregg County should continue providing the incentives and benefits for new companies. They should focus on satisfy the missing and necessary elements presented in Figure 21.

In order to attract new companies, Gregg County should show to the companies the benefits of the strategies presented in the Section 2. For example, offer a market for new companies to penetrate; with the establishment of the cluster Gregg County would present a dynamic market, suppliers and customers that might attract new companies to the region.

### 8.4.2 Target Companies

According to the results from every analysis, the following table presents the target companies in every industry sector.

**Table 38: Target Companies for Gregg County**

Sector	Description	Target Companies
<b>Food Industry</b>	<b>Snack Food Production Industry</b>	Diamond Foods Inc
		Kellogg Company
		Proctor & Gamble(Snack food manufacturing)
	<b>Frozen food Industry (Except Dairy Product)</b>	H J Heinz
		J R Simplot Company
		McCain Foods Ltd
<b>Metal Products Industry</b>	<b>Ferrous Products Industry</b>	Grede Holdings Inc
	<b>Nonferrous Products Industry</b>	Fansteel Inc
<b>Chemical Manufacturing</b>	<b>Inorganic Chemicals</b>	Acordis Inc
	<b>Fertilizers</b>	Agrium Inc
	<b>Paint Manufacturing</b>	The Sherwin-Williams Company
		Benjamin Moore & Co
<b>Plastic Products Manufacturing</b>	<b>Plastic pipe and parts manufacturing</b>	Otter Tail Corporation
	<b>Plastic bottle and container manufacturing</b>	Novapak Corporation
	<b>Plastic products miscellaneous manufacturing</b>	Spartech Corporation
<b>Distribution/Wholesaling</b>	<b>Chemical Wholesaling</b>	ICC Chemical Corporation

Source: Produced by T-MEX, Texas A&M University

## 9 Appendix A: ROI Summary Table

Industry	Major NAICs Codes	Top 10 ROI	Industry ROI top 10	Case Study Company	Calculated ROI
<b>Metal Manufacturing</b>	331: Primary Metal Manufacturing	9.80	<b>12.66</b>	MMI	<b>22.73</b>
	333: Machinery Manufacturing	15.52			
<b>Food Industry</b>	311: Food Manufacturing	18.00	<b>16.85</b>	---	---
	4244: Food Distribution	15.92			
<b>Chemical Sector</b>	324: Petroleum and Coal Products Manufacturing	21.68	<b>19.89</b>	CPI	<b>18.11</b>
	325: Chemical Manufacturing	17.22			
<b>Plastics</b>	326: Plastics and Rubber Products Manufacturing	14.26	<b>14.26</b>	PCII	<b>19.93</b>
<b>Distribution &amp; Warehousing</b>	423: Merchant Wholesalers, Durable Goods	13.18	<b>14.28</b>	DCI	<b>25.89</b>
	424 Merchant Wholesalers, Nondurable Goods	15.37		DRI	<b>20.97</b>

Source: Produced by T-MEX, Texas A&M University

## 10 Appendix B: Top 10 ROIs

### Primary SIC

2999 : Petroleum and coal products, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Chevron Corporation	324110,324199,325998,213111,327992,531390	29.32	18.75
ConocoPhillips	324110,324199,213111,486110,486210,486910,213112	22.85	13.03
Headwaters Inc	324199,212111,333131,213113,221112,424690	-2.45	-48.64
Koppers Holdings Inc	321114,324199,551112	25.91	24.59
Marathon Oil Corp.	324110,213112,211111,486910,324199	17.12	12.16
Quaker Chemical Corp.	324199,324191,325998,325188	20.37	12.07
SinoCoking Coal & Coke Chemical Industries Inc.	212112,324199	85.53	16.49
United States Steel Corp.	324199,331513,324110,423520,212112,331210,213114	-1.77	-22.13
Universal Stainless & Alloy Products, Inc.	324199,331513,331111,331221,331222	12.46	-3.06
<b>Avg ROI</b>		<b>23.26</b>	<b>2.58</b>

Source: Produced by T-MEX, Texas A&M University

### Primary SIC

2813 : Industrial gases

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Air Products & Chemicals, Inc.	325120,325188,325199,325612,325520	14.47	9.29
Airgas Inc.	325120,221210	12.04	16.59
Praxair, Inc.	325188,325120,333298,325998	19.17	16.23
<b>Avg ROI</b>		<b>15.22667</b>	<b>14.03667</b>

Source: Produced by T-MEX, Texas A&M University

**Primary SIC**

2869 : Industrial organic chemicals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Air Products & Chemicals, Inc.	325120,325188,325199,325612,325520	14.47	9.29
Ashland Inc	325199,325211,811191	11.07	9.21
Clorox Co.	325612,325611,311941,311423,325199,314911,325998	35.99	31.68
Green Plains Renewable Energy Inc	325199,311221	9.51	5.5
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
International Flavors & Fragrances Inc.	325199	22.5	18.86
NewMarket Corp	325199	40.41	42.42
Occidental Petroleum Corp	211111,211112,325181,325188,325199	21.52	15.53
PPG Industries, Inc.	325510,327212,327211,325199,325181,325520	17.15	8.81
<b>Avg ROI</b>		<b>21.3577778</b>	<b>17.0277778</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2992 : Lubricating oils and greases

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
China Integrated Energy Inc	324191,454311	27.49	30.88
Detrex Corp.	326122,324191,325188	20.27	-16.65
Quaker Chemical Corp.	324199,324191,325998,325188	20.37	12.07
WD-40 Co.	325998,324191,325612	26.1	19.35
<b>Avg ROI</b>		<b>23.5575</b>	<b>11.4125</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**2879 : Agricultural  
chemicals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Albemarle Corp.	325211,424690,325998,325412,325320	19.32	9.28
American Vanguard Corp.	325320	8.81	-2.83
Central Garden & Pet Co.	311111,327215,453910,311119,325311,325320,327112,111998	11.61	12.73
CF Industries Holdings Inc	325314,325320	22.88	44.31
Dow Chemical Co.	325211,325320,325412,326113,326140	6.8	1.4
Du Pont (E.I.) de Nemours & Co	325211,325320,325222,325412,325131	22.76	14.8
Ecolab, Inc.	325612,562998,325320	26.94	24
FMC Corp.	325181,325188,333294,332995,325320	22.19	20.62
Monsanto Co.	325320	13.36	26.93
Scotts Miracle-Gro Co (The)	325320	27.41	18.8
<b>Avg ROI</b>		<b>18.208</b>	<b>17.004</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2865 : Cyclic crudes and intermediates

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Enterprise Products Partners L.P.	486210,211111,211112,324110,486110,486910,483211,325110	16.74	17.33
Innospec Inc	325110	25.96	8.1
RPM International Inc (DE)	325510,326299,325520,325110,325612	16.14	11.98
Sunoco, Inc.	324110,423520,325110	14.01	-9.87
Westlake Chemical Corp	325211,325110,325188,326199,326122	18.59	6.04
<b>Avg ROI</b>		<b>18.288</b>	<b>6.716</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2844 : Toilet preparations

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Church & Dwight Co., Inc.	325611,325612,325620,325181,325998	19.23	17.93
Elizabeth Arden Inc.	325620	6.86	1.52
Inter Parfums, Inc.	325620	21.72	17.15
Lauder (Estee) Cos., Inc. (The)	325620,446120	25.32	14.16
Procter & Gamble Co.	325611,322291,325620,325412,311919,311999,335911,332211	16.77	15.64
Tupperware Brands Corp	326199,325211,325620,339932,446120,446191,315999	28.9	24.11
<b>Avg ROI</b>		<b>19.8</b>	<b>15.085</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

7389 : Business services, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Albemarle Corp.	325211,424690,325998,325412,325320	19.32	9.28
Chemtura Corp	325188,325998,333220	3.01	-9.56
Chevron Corporation	324110,324199,325998,213111,327992,531390	29.32	18.75
Church & Dwight Co., Inc.	325611,325612,325620,325181,325998	19.23	17.93
Clorox Co.	325612,325611,311941,311423,325199,314911,325998	35.99	31.68
Cytec Industries, Inc.	325998,325222,325612,325211,325188	10.12	1.35
Ferro Corp.	325510,325998,327113,325132,541330,326199	10.94	2.38
Georgia Gulf Corp.	325998,325181,325211,325192,325191,325311	10.08	-0.04
Pfizer Inc	325412,325413,325998	7.8	9.97
Praxair, Inc.	325188,325120,333298,325998	19.17	16.23
<b>Avg ROI</b>		<b>16.498</b>	<b>9.797</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2816 : Inorganic pigments

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Du Pont (E.I.) de Nemours & Co	325211,325320,325222,325412,325131	22.76	14.8
Kronos Worldwide Inc	325131,325188	16.19	-1.57
NL Industries, Inc.	325131,325998,524210,551112	4.66	-
Synalloy Corp.	331210,325131,325998	9.79	1.04
TOR Minerals International Inc	325131,325188,424690,424950	9	1.33
Valhi, Inc.	325131,325188,562211,551112	10.39	-1.58
<b>Avg ROI</b>		<b>12.13167</b>	<b>2.804</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2812 : Alkalies and chlorine

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Church & Dwight Co., Inc.	325611,325612,325620,325181,325998	19.23	17.93
FMC Corp.	325181,325188,333294,332995,325320	22.19	20.62
Georgia Gulf Corp.	325998,325181,325211,325192,325191,325311	10.08	-0.04
Occidental Petroleum Corp	211111,211112,325181,325188,325199	21.52	15.53
Olin Corp.	325181,325211,325188,325612,325199	5.49	16.77
PPG Industries, Inc.	325510,327212,327211,325199,325181,325520	17.15	8.81
<b>Avg ROI</b>		<b>15.94333</b>	<b>13.27</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2819 : Industrial inorganic chemicals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Air Products & Chemicals, Inc.	325120,325188,325199,325612,325520	14.47	9.29
Cabot Corp.	325182,326113,325188,331419	13.24	-2.93
Chemtura Corp	325188,325998,333220	3.01	-9.56
Cytec Industries, Inc.	325998,325222,325612,325211,325188	10.12	1.35
FMC Corp.	325181,325188,333294,332995,325320	22.19	20.62
Occidental Petroleum Corp	211111,211112,325181,325188,325199	21.52	15.53
Praxair, Inc.	325188,325120,333298,325998	19.17	16.23
Valhi, Inc.	325131,325188,562211,551112	10.39	-1.58
Westlake Chemical Corp	325211,325110,325188,326199,326122	18.59	6.04
<b>Avg ROI</b>		<b>14.74444</b>	<b>6.11</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2821 : Plastics materials and resins

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
3M Co	339112,325520,322222,335931,325211	29.75	27.32
Albemarle Corp.	325211,424690,325998,325412,325320	19.32	9.28
Ashland Inc	325199,325211,811191	11.07	9.21
Celanese Corp (DE)	424690,325211	12.03	6.36
Dow Chemical Co.	325211,325320,325412,326113,326140	6.8	1.4
Du Pont (E.I.) de Nemours & Co	325211,325320,325222,325412,325131	22.76	14.8
Eastman Chemical Co.	325211	27.16	10.35
Exxon Mobil Corp.	324110,211111,486110,325211,212112	37.74	29.13
Honeywell International, Inc.	336412,336413,334514,325211,325222,336312,336340,334512	18.57	21.13
<b>Avg ROI</b>		<b>20.57778</b>	<b>14.33111</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2851 : Paints and allied products

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Ferro Corp.	325510,325998,327113,325132,541330,326199	10.94	2.38
Fuller (H.B.) Company	325520,325510,325612	11.35	13.49
LaPolla Industries Inc	325510,324122,325520	20.2	-19.99
Materion Corp	327113,331423,325188,325510,212299,551112	16.83	-4.91
PPG Industries, Inc.	325510,327212,327211,325199,325181,325520	17.15	8.81
RPM International Inc (DE)	325510,326299,325520,325110,325612	16.14	11.98
Sherwin-Williams Co.	444120,424950,325510	30.12	28.71
Tufco Technologies, Inc.	322215,322291,322222,325510	-1.28	-3.41
Valspar Corp.	325510,332812,325211	15.19	12.17
<b>Avg ROI</b>		<b>15.18222</b>	<b>5.47</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2891 : Adhesives and sealants

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
3M Co	339112,325520,322222,335931,325211	29.75	27.32
Air Products & Chemicals, Inc.	325120,325188,325199,325612,325520	14.47	9.29
Fuller (H.B.) Company	325520,325510,325612	11.35	13.49
Hexcel Corp.	335991,325520,325211	13.25	11.08
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
Nordson Corp.	333999,325520,423830	40.51	-18.2
PPG Industries, Inc.	325510,327212,327211,325199,325181,325520	17.15	8.81
RPM International Inc (DE)	325510,326299,325520,325110,325612	16.14	11.98
<b>Avg ROI</b>		<b>20.2775</b>	<b>9.465</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2842 : Polishes and sanitation goods

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Acuity Brands Inc (Holding Company)	335129,424690,325612,551112	16.16	16.68
Air Products & Chemicals, Inc.	325120,325188,325199,325612,325520	14.47	9.29
Church & Dwight Co., Inc.	325611,325612,325620,325181,325998	19.23	17.93
Clorox Co.	325612,325611,311941,311423,325199,314911,325998	35.99	31.68
Cytec Industries, Inc.	325998,325222,325612,325211,325188	10.12	1.35
Ecolab, Inc.	325612,562998,325320	26.94	24
Fuller (H.B.) Company	325520,325510,325612	11.35	13.49
Olin Corp.	325181,325211,325188,325612,325199	5.49	16.77
RPM International Inc (DE)	325510,326299,325520,325110,325612	16.14	11.98
Zep Inc	325612	13.1	12.32
<b>Avg ROI</b>		<b>16.899</b>	<b>15.549</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3089 : Plastics products, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Armstrong World Industry Inc	326199,238330	1.66	2.19
Berry Plastics Corp	326199,424610	2.94	4.88
Corning, Inc.	327213,334290,335921,326199	9.18	2.4
Greif Inc	322214,321920,332439,322211,322224,326199,113110	15.11	11.09
Hasbro, Inc.	339932,339931,326299,326199	20.44	24.34
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
Jarden Corp.	339920,339932,326199,332999	8.58	8.91
Sonoco Products Co.	322221,322130,322214,326199,321999,332999,322212,561910	16.66	13.3
Tupperware Brands Corp	326199,325211,325620,339932,446120,446191,315999	28.9	24.11
Westlake Chemical Corp	325211,325110,325188,326199,326122	18.59	6.04
<b>Avg ROI</b>		<b>14.166</b>	<b>10.921</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3069 : Fabricated rubber products, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
American Biltrite Inc.	326199,326299,322222,326220,339911,326192,339914,327122	18.24	-
Carlisle Companies Inc.	326299,326140,325211,326211,336340,335921,332214,336212,336211,551112	12.3	12.54
Cooper Tire & Rubber Co.	326211,326220,326299	21.13	17.35
Hasbro, Inc.	339932,339931,326299,326199	20.44	24.34
Helen of Troy Ltd.	335211,423620,326299,326199,335228	12.43	-5.35
Invacare Corp	339113,339112,326299,337127	6.19	8.14
Newell Rubbermaid, Inc.	326299,339941,339942,332212,332510,327213,337920,332214,332211,339932	14.72	13.11
RPM International Inc (DE)	325510,326299,325520,325110,325612	16.14	11.98
West Pharmaceutical Services, Inc.	326299,332115,326199,327213	9.34	10.65
<b>Avg ROI</b>		<b>14.54778</b>	<b>11.595</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3312 : Blast furnaces and steel mills

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AK Steel Holding Corp.	331111,331221		
Carpenter Technology Corp.	331111,331419,331513	1.35	6.29
Foster (L.B.) Co.	423510,331111,333120,423810,423860	12.58	9.99
Handy & Harman Ltd	331111,332322,331210,551112	26.02	4.93
Haynes International, Inc.	331111,331513	5.67	
Insteel Industries, Inc.	331111,332618,551112	0.52	
Keystone Consolidated Industries, Inc.	331111,332618,325611	8.37	1.98
Schnitzer Steel Industries, Inc.	423930,332618,331111,423140	11.95	
TMS International Corp	331111	10.39	-
<b>Avg. ROI</b>		<b>9.60625</b>	<b>5.7975</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3317 : Steel pipe and tubes

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Allegheny Technologies, Inc	331210,331491,331419	5.99	3.34
General Steel Holdings Inc	331210,551112	2.25	8.95
Gibraltar Industries Inc	331221,331222,331210		
Handy & Harman Ltd	331111,332322,331210,551112		
Leggett & Platt, Inc.	337121,423210,331222,331210	11.92	9.29
Metals USA Holdings Corp	331221,331210,213114,551112	12.58	-3.35
Mueller Water Products Inc	332911,326122,334514,331210,332996	0.35	
United States Steel Corp.	324199,331513,324110,423520,212112,331210,213114		
<b>Avg. ROI</b>		<b>6.618</b>	<b>4.5575</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3312 : Blast furnaces and steel mills

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Ampco-Pittsburgh Corp.	331111,331221,332410,333911	12.24	26.7
Metals USA Holdings Corp	331221,331210,213114,551112	12.58	-3.35
Mueller Industries, Inc.	331421,332996,326191,332313,331525,331221	14.56	3.63
NN, Inc	332991,331221	10.68	
Steel Dynamics Inc.	331513,331221,332312	8.39	2.82
Titan International, Inc. (IL)	331221,326211,336399	6.37	-3.34
Worthington Industries, Inc.	331221,332313,332312,331513	2.3	
<b>Avg. ROI</b>		<b>9.588571</b>	<b>5.292</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3339 : Primary nonferrous metals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Allegheny Technologies, Inc	331210,331491,331419	5.99	3.34
Cabot Corp.	325182,326113,325188,331419	13.24	-2.93
Carpenter Technology Corp.	331111,331419,331513	1.35	6.29
Globe Specialty Metals Inc	331419	8.33	-8.27
Horsehead Holding Corp	331528,221119,331419,331492,551112	11.14	-13.6
Metalico Inc	331419	13.02	4.52
RTI International Metals, Inc.	331421,331491,331419,325188	1.78	-11.48
<b>Avg. ROI</b>		<b>7.835714</b>	<b>-3.16143</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3325 : Steel foundries, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Carpenter Technology Corp.	331111,331419,331513	1.35	6.29
Haynes International, Inc.	331111,331513	5.67	-17.95
Shiloh Industries, Inc.	332116,331513,551112	7.13	-13.66
Steel Dynamics Inc.	331513,331221,332312	8.39	2.82
Universal Stainless & Alloy Products, Inc.	324199,331513,331111,331221,331222	12.46	-3.06
Worthington Industries, Inc.	331221,332313,332312,331513	2.3	-16.9
<b>Avg. ROI</b>		<b>6.216667</b>	<b>-7.07667</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3523 : Farm machinery and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AGCO Corp.	333111	10.09	7.71
Alamo Group, Inc.	333111,423810,423820	10.95	11.18
Arts Way Manufacturing Co Inc	333111	8.59	3.34
Deere & Co.	332212,333111,333120,333112,551112	12.79	8.17
Lindsay Corp	333111,336999,331210	15.91	9.69
Valmont Industries, Inc.	332323,332999,333111	15.21	24.6
<b>Avg. ROI</b>		<b>12.25667</b>	<b>10.78167</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3524 : Lawn and garden equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Andersons, Inc.	424590,424510,325314,444220,336510,333112	10.12	7.9
Blount International, Inc.	333515,333112,332213,332212,333923,333613	25.48	19.07
Deere & Co.	332212,333111,333120,333112,551112	12.79	8.17
Spectrum Brands Holdings Inc	335911,335129,335211,333319,333112,311119	6.7	-
Toro Co. (The)	333112,221310	28.79	20.1
Tractor Supply Co.	444220,424910,333112,423820	31.98	27.48
<b>Avg. ROI</b>		<b>19.31</b>	<b>16.544</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3531 : Construction machinery

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Astec Industries, Inc.	333120,333414	10.05	2.21
Caterpillar Inc.	333120,333618,522220,524128	12.25	3.96
Deere & Co.	332212,333111,333120,333112,551112	12.79	8.17
Douglas Dynamics, Inc.	333120	6.78	8.76
Foster (L.B.) Co.	423510,331111,333120,423810,423860	12.58	9.99
Gencor Industries, Inc.	333120,333994,334512,334513		
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
Manitowoc Co., Inc.	333120,333923,333415,336611	7.93	-15.08
Oshkosh Corp	336120,333120,336212		
<b>Avg. ROI</b>		<b>11.71143</b>	<b>4.28</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3533 : Oil and gas field machinery

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Baker Hughes Inc.	333132,333999,213111,213112	10.47	8.03
Cameron International Corp	333132,332911	14.94	16.37
Dover Corp	333220,333518,333132,332212,334418,336322	16.86	9.95
FMC Technologies, Inc.	333132	34.5	39.06
Joy Global Inc	333131,333132	44.94	57.32
Nabors Industries Ltd.	213111,213112,211111,333132,532412,511210,481212	3.75	0.32
National Oilwell Varco Inc	333132,423830	15.47	16.25
Oil States International, Inc.	333132,213112	12.51	7.32
Patterson-UTI Energy Inc.	213111,333132,213112	7.63	-2.13
Weatherford International, Ltd.	213111,333132,211111,213112	4.79	4.61
<b>Avg. ROI</b>		<b>16.586</b>	<b>15.71</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3556 : Food products machinery

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Crown Holdings Inc	332431,332115,333993,333294	28.13	24.09
FMC Corp.	325181,325188,333294,332995,325320	22.19	20.62
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
Key Technology Inc	333294	8.77	-0.99
Middleby Corp.	333415,333294,333319	19.59	20.68
Mueller (Paul) Co.	333294,333111,331513	-	2.65
Otter Tail Corp.	221121,221330,237110,333319,333294	2.93	3.85
Standex International Corp.	333319,333294,423740,333415,333913,423690	14.7	1.92
<b>Avg. ROI</b>		<b>16.55857</b>	<b>10.59625</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3559 : Special industry machinery, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Amtech Systems, Inc.	333295,333220,334419,334413	20.1	-2.61
Axcelis Technologies Inc	333295,333999	-6.34	-22.43
Brooks Automation Inc	334413,333295,511210,334119,541512,541513,541519	13.28	-52.96
FSI International, Inc.	333295	18.83	-29.88
Kulicke & Soffa Industries, Inc.	333220,333295,331319,811310,331521,541990	40.48	-21.84
Photronics, Inc.	334413,333295,334417	7.51	-2.58
Rudolph Technologies, Inc.	333295,334515	18.22	-19.64
Veeco Instruments Inc. (DE)	333295	41.84	-1.9
<b>Avg. ROI</b>		<b>19.24</b>	<b>-19.23</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3559 : Special industry machinery, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Lam Research Corp	333298,334413	25.93	-15.74
Lincoln Electric Holdings, Inc.	333992,333512,333298,333515,332212,335110,335991,325998,551112	15.36	7.97
Lydall, Inc.	333298,334513,336312	1.29	-10.25
Novellus Systems, Inc.	333298,334413	21.98	-5.73
Pentair, Inc.	333298,333991,333911,333999	11.9	7.76
Praxair, Inc.	325188,325120,333298,325998	19.17	16.23
Rofin Sinar Technologies Inc.	333992,333298	9.94	1.9
Twin Disc Incorporated	333298,333613,336399	2.22	11.73
<b>Avg. ROI</b>		<b>13.47375</b>	<b>1.73375</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3578 : Calculating and accounting equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Diebold, Inc.	333313,561621,541511	-0.12	9.55
Escalade, Inc.	339920,333313	7.59	1.7
International Business Machines Corp.	541519,511210,334111,333313,334119	36.15	35.39
Micros Systems, Inc.	541512,333313,443120,541618	22.26	20.57
Par Technology Corp.	333313,541511,511210	4.21	-6.49
Pitney Bowes Inc	333313,511210,541890,561499	17.02	19.2
VeriFone Systems Inc.	333313,334119,522320,541512,541611,551112	16.77	-20.93
Xerox Corp	333315,333313,522220,561499	7.35	7.22
<b>Avg. ROI</b>		<b>13.90375</b>	<b>8.27625</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3559 : Special industry machinery, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Applied Industrial Technologies, Inc.	423840,333319	18.07	13
Clarcor Inc.	336399,333411,333999,333319,332431,326199	19.18	14.38
HNI Corp	337214,337211,332999,333319	9.46	0.57
John Bean Technologies Corp	333319	31.06	30.02
Mettler-Toledo International, Inc.	334516,333319	27	28.81
Moog, Inc.	333319,423830,336413,336419,339112	10.15	7.79
Otter Tail Corp.	221121,221330,237110,333319,333294	2.93	3.85
Spectrum Brands Holdings Inc	335911,335129,335211,333319,333112,311119	6.7	-
Varian Medical Systems, Inc.	334510,333319,334517,334411,334516	40.16	38.61
<b>Avg. ROI</b>		<b>18.30111</b>	<b>17.12875</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3564 : Blowers and fans

**Annual Meeting**

In May

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
CECO Environmental Corp.	333411	10.17	-27.19
Clarcor Inc.	336399,333411,333999,333319,332431,326199	19.18	14.38
Donaldson Co. Inc.	333411,333412,333999,336399	23.41	16.67
Kaydon Corp.	332991,336330,336311,333411	11.58	10.39
MFRI Inc.	333411	6.29	10.1
Pall Corp.	333411,334512,334514,423450	20.11	16.25
Thomas & Betts Corp.	334417,332618,335932,335313,333414,333411,333415,335931,334414	10.98	10.1
<b>Avg. ROI</b>		<b>14.53143</b>	<b>7.242857</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

4911 : Electric services

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Astec Industries, Inc.	333120,333414	10.05	2.21
Colonial Commercial Corp.	333414,423720,423730	4.75	-9.41
Global Power Equipment Group, Inc.	423830,333414	26.07	-
SmartHeat, Inc.	333414,332410	19.71	28.72
STR Holdings Inc.	333414,551112	15.86	-
Thomas & Betts Corp.	334417,332618,335932,335313,333414,333411,333415,335931,334414	10.98	10.1
<b>Avg. ROI</b>		<b>14.57</b>	<b>7.905</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3585 : Refrigeration and heating equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AAON, Inc.	333415	27.86	40.22
Emerson Electric Co.	334419,335312,334513,334516,334515,333991,333415,334514	22.41	19.42
Ingersoll-Rand Plc	333415,333999,333994,332510,333611,339999	10.91	7.32
Lennox International Inc	333415	20.49	11.88
Manitowoc Co., Inc.	333120,333923,333415,336611	7.93	-15.08
Modine Manufacturing Co	336399,333415,336391,311514	1.43	-14.61
SPX Corp.	333512,332510,333415,541990,334220	10.62	5.22
Thomas & Betts Corp.	334417,332618,335932,335313,333414,333411,333415,335931,334414	10.98	10.1
United Technologies Corp.	336412,336411,333415,333921	23.38	22.6
Whirlpool Corp	335228,335224,333415,335222,335221	15.16	11.31
<b>Avg. ROI</b>		<b>15.117</b>	<b>9.838</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3541 : Machine tools, metal cutting types

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Edac Technologies Corp.	336412,333512	4.23	3.38
IDEX Corporation	333911,333999,333512,332510	13.95	10.91
Kennametal Inc.	333512,333515	5.51	-5.36
Lincoln Electric Holdings, Inc.	333992,333512,333298,333515,332212,335110,335991,325998,551112	15.36	7.97
Newport Corp.	339111,332721,334519,327212,334513,334512,333512,333921,333992	13.04	-1.72
SPX Corp.	333512,332510,333415,541990,334220	10.62	5.22
<b>Avg. ROI</b>		<b>10.45167</b>	<b>3.4</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3511 : Turbines and turbine generator sets

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Babcock & Wilcox Co. (The)	335312,335311,541330,541618,333611	32.45	59.93
Cummins, Inc.	333618,333611,336312,336311,336322,335312	32.34	16.29
Dresser-Rand Group Inc	333611	18.49	27.74
Generac Holdings Inc	335312,333611,333618	7.77	8.24
Ingersoll-Rand Plc	333415,333999,333994,332510,333611,339999	10.91	7.32
Kaman Corp.	332991,333611,332912,336413	13.68	14.48
Precision Castparts Corp.	331512,331528,336412,333611	25.23	33.29
Woodward, Inc.	333611,335999,336412,336322,335313,332912,334519,335312,335314,811310	14.41	15.81
<b>Avg. ROI</b>		<b>19.41</b>	<b>22.8875</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3569 : General industrial machinery, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Advanced Energy Industries Inc.	334419,333613,334413	19.98	-30.11
Altra Holdings Inc	333613,333612,551112	14.93	7.84
Blount International, Inc.	333515,333112,332213,332212,333923,333613	25.48	19.07
Fluor Corp.	541330,333613,213112,541490,551112,541618	15.59	35.89
Great Plains Energy, Inc.	221122,333613,551112	7.35	5.41
Regal-Beloit Corp.	335312,333612,333613,332212,333514	13.85	10.3
Twin Disc Incorporated	333298,333613,336399	2.22	11.73
<b>Avg. ROI</b>		<b>14.2</b>	<b>8.59</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3519 : Internal combustion engines, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Briggs & Stratton Corp.	333618,332510	7.55	6.27
Brunswick Corp.	333611,336612,333618,334511,339920,713950,114119	1.66	-45.23
Caterpillar Inc.	333120,333618,522220,524128	12.25	3.96
Ceradyne, Inc (DE)	336992,333618,332812,339114,334411,327125,327910,331492,332991	3.97	1.04
Cummins, Inc.	333618,333611,336312,336311,336322,335312	32.34	16.29
Generac Holdings Inc	335312,333611,333618	7.77	8.24
Gorman-Rupp Co.	333911,335312,333618,332911	18.7	15.06
Navistar International Corp.	336211,336120,333618,522220,551112	14.63	8.07
Xinde Technology Co	333618,423830	19.72	-
<b>Avg. ROI</b>		<b>13.17667</b>	<b>1.7125</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3561 : Pumps and pumping equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AptarGroup Inc.	326199,333911,333913	16.63	13.17
Colfax Corp	333911	11.67	13.87
Curtiss-Wright Corp.	333999,332911,333911,335312,334511,332811,811219,488190,332321,511210,541512	11.8	11.78
Flowserve Corp.	333911,332911,332919,331511,333999	22.62	28.52
Gardner Denver, Inc.	333911,333132,423830	17.52	-7.2
IDEX Corporation	333911,333999,333512,332510	13.95	10.91
ITT Corporation	333911,334419,333996,336340	15.99	17.17
Pentair, Inc.	333298,333991,333911,333999	11.9	7.76
Roper Industries, Inc	334513,333911,334514,423810,334516	13.42	11.55
Xylem Inc.	333911	17.61	-
<b>Avg. ROI</b>		<b>15.311</b>	<b>11.94778</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3548 : Welding apparatus

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Bonal International, Inc.	333992,423510,333515	-0.82	-0.35
Federal-Mogul Corp.	336399,336311,333992,332991,336321,336340,336211,336312	7.34	0.1
Foster Wheeler AG	236210,541330,333994,333999,333992,551112	28.32	54.39
Illinois Tool Works, Inc.	333999,326199,333992,336399,333294,333120,325520,325199	19.6	11.95
Lincoln Electric Holdings, Inc.	333992,333512,333298,333515,332212,335110,335991,325998,551112	15.36	7.97
Newport Corp.	339111,332721,334519,327212,334513,334512,333512,333921,333992	13.04	-1.72
Rofin Sinar Technologies Inc.	333992,333298	9.94	1.9
<b>Avg. ROI</b>		<b>13.25429</b>	<b>10.60571</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

3714 : Motor vehicle parts and accessories

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
American Axle & Manufacturing Holdings Inc	423120	39.19	-33.54
Barnes Group Inc.	332439,423710,423120,423840	8.22	5.73
Borg Warner Inc	336350,336312,423120	15.45	1.74
Commercial Vehicle Group Inc	336322,314110,313210,423120	11.54	-53.74
Dorman Products Inc	336399,423120	31.36	20.9
Genuine Parts Co.	423120,423830,424120,423210,423610	24.42	22.47
MarineMax, Inc.	441222,452990,493190,423110,423120,451110,524128	-4.14	-14.86
Standard Motor Products, Inc.	336322,336399,423120	17.15	7.39
Sterling Construction Inc	237110,423120	13.76	15.42
Voxx International Corp	423690,423120,334220	1.02	-13.55
<b>Avg. ROI</b>		<b>15.797</b>	<b>-4.204</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5065 : Electronic parts and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
ACL Semiconductors Inc	423430	13.28	20.34
Arrow Electronics, Inc.	423690,334419,423430	15.99	6.6
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
Dell Inc	334111,334119,334112,541519,423430,522220,551112	27.22	59.8
Ingram Micro Inc.	423430	13.37	9.1
Intuit Inc	511210,423430,541519	23.41	20.59
Microsoft Corporation	511210,334119,423430,541519	49.47	49.92
OfficeMax Inc (DE)	424120,424110,423430,423210	6.36	-0.18
Oracle Corp.	511210,541513,541512,423430	22.44	23.91
Systemax, Inc.	454111,423430	17.18	20.47
Tech Data Corp.	423430	11.4	10.87
<b>Avg. ROI</b>		<b>19.61</b>	<b>18.08455</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5065 : Electronic parts and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
ACL Semiconductors Inc	423430	13.28	20.34
Agilysys Inc	423430,541519	-2.93	-73.54
Arrow Electronics, Inc.	423690,334419,423430	15.99	6.6
Autodesk Inc.	511210,541512,423430	4.63	18.8
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
Black Box Corp. (DE)	541512,334119,454111,541519,423430	7.01	9.23
BMC Software, Inc.	511210,541511,423430	32.75	31.21
CIBER, Inc.	541511,541519,423430		
Cincinnati Bell Inc	517110,541512,516110,423690,423430,443120	18.82	22.94
CompuWare Corp.	511210,423430,541519	14.61	20.48
Daktronics Inc.	334513,339950,423430,541613,541850	-3.22	21.22
Dell Inc	334111,334119,334112,541519,423430,522220,551112	27.22	59.8
Ingram Micro Inc.	423430	13.37	9.1
Intuit Inc	511210,423430,541519	23.41	20.59
Jack Henry & Associates, Inc.	541512,423430,541511,541519	20.04	23.19
Microchip Technology, Inc.	334413,423430	12.21	11.08
Microsoft Corporation	511210,334119,423430,541519	49.47	49.92
Navarre Corp.	423430,334612,512120	28.99	-85.65
OfficeMax Inc (DE)	424120,424110,423430,423210	6.36	-0.18
Oracle Corp.	511210,541513,541512,423430	22.44	23.91
QLogic Corp.	334413,423430,334419	16.43	25.89
ScanSource, Inc.	423430,423690	15.26	15.84
SED International Holdings, Inc.	423430,423690,423620	4.64	1.03
Silicon Graphics International Corp	334111,334112,334113,423430		
Systemax, Inc.	454111,423430	17.18	20.47
Tech Data Corp.	423430	11.4	10.87
<b>Avg. ROI</b>		<b>16.03958</b>	<b>10.02708</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5047 : Medical and hospital equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AcuNetx Inc	423450,334519	-	-
AmerisourceBergen Corp.	424210,423450,561910	26.94	22.68
Boston Scientific Corp.	339112,423450	-3.75	-4.69
CareFusion Corp	423450	7.17	8.79
McKesson Corp.	424210,423450,424990,511210	21.67	14.39
Medtronic, Inc.	334510,423450	20.8	15.67
Owens & Minor, Inc.	423450	19.17	19.87
Pall Corp.	333411,334512,334514,423450	20.11	16.25
Patterson Companies Inc	423450,339114	19.26	20.46
Schein (Henry), Inc.	423450,541511	19.79	19.43
St. Jude Medical, Inc.	334510,339113,423450	21.12	23.05
<b>Avg. ROI</b>		<b>17.228</b>	<b>15.59</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5047 : Medical and hospital equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AmerisourceBergen Corp.	424210,423450,561910	26.94	22.68
AngioDynamics Inc	339112,339113,423450	5.37	4.28
Boston Scientific Corp.	339112,423450	-3.75	-4.69
Cantel Medical Corp	339112,423450	14.18	12
CareFusion Corp	423450	7.17	8.79
Conmed Corp.	334510,423450	7.4	3.79
DGT Holdings Corp	334517,339112,334419,334414,423450	10.06	-7.23
Hill-Rom Holdings, Inc.	339112,423450	22.95	-36.16
ICU Medical, Inc.	339112,423450	18.28	14.66
Lincare Holdings Inc.	621999,621610,423450	23.21	17.68
McKesson Corp.	424210,423450,424990,511210	21.67	14.39
Medtronic, Inc.	334510,423450	20.8	15.67
Nuvasive Inc	339112,423450	5.39	2.4
Owens & Minor, Inc.	423450	19.17	19.87
Pall Corp.	333411,334512,334514,423450	20.11	16.25
Palomar Medical Technologies, Inc.	334510,334412,423450,423690	-6.5	-5.04
Patterson Companies Inc	423450,339114	19.26	20.46
PhotoMedex, Inc.	335999,423690,423450	-12.07	-21.46
PSS World Medical Inc.	423450,621610	19.42	17.1
ResMed Inc.	339112,423450,551112	17.9	15.25
Schein (Henry), Inc.	423450,541511	19.79	19.43
SRI/Surgical Express Inc.	812331,423450,561210	-2.25	-6.45
St. Jude Medical, Inc.	334510,339113,423450	21.12	23.05
Steris Corp.	339113,423450,339112	21.54	19.34
Vascular Solutions Inc	339112,423450	25.99	22.61
<b>Avg. ROI</b>		<b>13.726</b>	<b>8.3468</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5063 : Electrical apparatus and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Anixter International Inc	423610,423690,334290,561499	14.21	5.12
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
Benchmark Electronics, Inc.	334412,423610,335999	8.03	4.87
DXP Enterprises, Inc.	423830,541330,561210,423610	16.69	-19.56
EMCOR Group, Inc.	238210,423690,423610		
Encore Wire Corp.	331422,423610	5.63	1.29
Genuine Parts Co.	423120,423830,424120,423210,423610	24.42	22.47
Graybar Electric Co., Inc.	423610,541614	11.61	10.85
Maxim Integrated Products, Inc.	334413,423610	11.16	0.61
New York State Electric & Gas Corp.	423610	-	-
<b>Avg. ROI</b>		<b>13.4175</b>	<b>0.395</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5065 : Electronic parts and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Analog Devices, Inc.	334413,423690	27.73	10.72
Anixter International Inc	423610,423690,334290,561499	14.21	5.12
Applied Materials, Inc.	334413,423690	18.11	-5.25
Arrow Electronics, Inc.	423690,334419,423430	15.99	6.6
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
EMCOR Group, Inc.	238210,423690,423610	-2.11	19.75
Harris Corp.	339111,334511,334220,334290,423690,334413,335999	27.89	16.78
Micron Technology Inc.	334413,334419,423690	17.19	-19.41
Philips Electronics North America Corp.	423620,335999,423690	-	-
ScanSource, Inc.	423430,423690	15.26	15.84
<b>Avg. ROI</b>		<b>16.65111</b>	<b>3.073333</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5065 : Electronic parts and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Analog Devices, Inc.	334413,423690	27.73	10.72
Anixter International Inc	423610,423690,334290,561499	14.21	5.12
Applied Materials, Inc.	334413,423690	18.11	-5.25
Arrow Electronics, Inc.	423690,334419,423430	15.99	6.6
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
Checkpoint Systems Inc	334290,423690,561621	6.24	6.4
China BAK Battery Inc	335912,423610,423690		
Cincinnati Bell Inc	517110,541512,516110,423690,423430,443120	18.82	22.94
Electro Rent Corp.	532420,423690	8.04	7.18
EMCOR Group, Inc.	238210,423690,423610	-2.11	19.75
Fairchild Semiconductor International, Inc.	334413,423690,334111	12.34	-2.91
Harris Corp.	339111,334511,334220,334290,423690,334413,335999	27.89	16.78
Key Tronic Corp.	334119,334113,423690	12.7	3.11
Littelfuse, Inc.	335313,423690	22.28	3.15
Micron Technology Inc.	334413,334419,423690	17.19	-19.41
Philips Electronics North America Corp.	423620,335999,423690	-	-
ScanSource, Inc.	423430,423690	15.26	15.84
SED International Holdings, Inc.	423430,423690,423620	4.64	1.03
SinoHub, Inc.	423690		
Sparton Corp.	334412,423690	7.95	-12.51
Standex International Corp.	333319,333294,423740,333415,333913,423690	14.7	1.92
Tessco Technologies, Inc.	423690	21.98	17.05
Verizon South, Inc.	517110,531190,541219,423690	-	-
Voxx International Corp	423690,423120,334220	1.02	-13.55
<b>Avg. ROI</b>		<b>14.0285</b>	<b>3.0735</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5084 : Industrial machinery and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Abatix Corp.	423830		
CONSOL Energy Inc	212111,212112,213113,423520,221210,423830,551112	14.37	31.3
Ensco plc	213111,423830,483113	10.45	17.7
Gardner Denver, Inc.	333911,333132,423830	17.52	-7.2
Genuine Parts Co.	423120,423830,424120,423210,423610	24.42	22.47
Moog, Inc.	333319,423830,336413,336419,339112	10.15	7.79
MSC Industrial Direct Co., Inc.	423830,423840,333999	25.02	21.12
National Oilwell Varco Inc	333132,423830	15.47	16.25
SPX Corp.	333512,332510,333415,334220,333996,335311,332912,423830	10.62	5.22
Stanley Black & Decker, Inc.	332212,561621,332213,332510,423830	4.9	10.29
Terex Corp.	333924,333298,333999,333120,333131,423830		
<b>Avg. ROI</b>		<b>14.76889</b>	<b>13.88222</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5084 : Industrial machinery and equipment

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Abatix Corp.	423830	67.78	6.52
China Power Technology Inc.	423830	-	-511.22
CONSOL Energy Inc	212111,212112,213113,423520,221210,423830,551112	14.37	31.3
Dominion Bridge Corp.	237310,423830,541330	-	-
DXP Enterprises, Inc.	423830,541330,561210,423610	16.69	-19.56
Energy Recovery Inc	423830	-4.08	5.36
Ensco plc	213111,423830,483113	10.45	17.7
Gardner Denver, Inc.	333911,333132,423830	17.52	-7.2
Genuine Parts Co.	423120,423830,424120,423210,423610	24.42	22.47
Global Power Equipment Group, Inc.	423830,333414	26.07	-
Hudson Technologies Inc	423830,334512,423740	9.34	-4.96
International Airline Support Group, Inc.	423830	-	-
Mitcham Industries, Inc.	532490,423830,334519	0.95	14.28
Moog, Inc.	333319,423830,336413,336419,339112	10.15	7.79
MSC Industrial Direct Co., Inc.	423830,423840,333999	25.02	21.12
National Oilwell Varco Inc	333132,423830	15.47	16.25
Nordson Corp.	333999,325520,423830	40.51	-18.2
RINO International Corp	423830,551112,221320,333999	-	-
SPX Corp.	333512,332510,333415,334220,333996,335311,332912,423830	10.62	5.22
Stanley Black & Decker, Inc.	332212,561621,332213,332510,423830	4.9	10.29
Terex Corp.	333924,333298,333999,333120,333131,423830	-2	-13.58
Transcat Inc	334513,334516,423830	10.62	14.33
Wellstead Industries, Inc.	423830,333319	-	-
Willis Lease Finance Corp.	423830,333999,532411	6.22	7.55
Xinde Technology Co	333618,423830	19.72	-
<b>Avg. ROI</b>		<b>16.237</b>	<b>-20.7653</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2819 : Industrial inorganic chemicals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Applied Industrial Technologies, Inc.	423840,333319	18.07	13
Asia Cork Inc	423840,423390	24.51	22.23
Avnet Inc	423690,423430,423610,423850,423840	15.59	-22.49
Barnes Group Inc.	332439,423710,423120,423840	8.22	5.73
Diversified Thermal Solutions, Inc.	327124,327121,423840	-	-
Fastenal Co.	444130,423710,423840,423810,332722	34.75	25.43
International Packaging & Logistics Group Inc	423840	-3.85	-20.91
Lawson Products, Inc.	423840	12.11	-3.95
MSC Industrial Direct Co., Inc.	423830,423840,333999	25.02	21.12
Oil-Dri Corp. of America	339999,423840,327123	12.32	12.92
<b>Avg. ROI</b>		<b>16.30444</b>	<b>5.897778</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2869 : Industrial organic chemicals, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Albemarle Corp.	325211,424690,325998,325412,325320	19.32	9.28
Celanese Corp (DE)	424690,325211	12.03	6.36
Goodyear Tire & Rubber Co.	326211,811111,811198,424690	9.58	-0.11
Grace (W.R.) Co. (DE)	331311,424690	-	-
Huntsman Corp	424690	6.83	-1.23
Rockwood Holdings Inc	424690	10.83	6.26
Sigma-Aldrich Corp.	424690	23.07	22.86
Solutia, Inc.	325998,424690	16.23	12.26
Stepan Co.	325613,424690,311930,325199	23.09	28.18
TPC Group, Inc.	424690,331311	10.33	-2.7
<b>Avg. ROI</b>		<b>14.59</b>	<b>9.017778</b>

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2048 : Prepared feeds, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
AgFeed Industries Inc	311119,541940	-22.95	9.16
Agway Inc.	311119,325320,424720,424590,424910,524128	-	-
Cagle's Inc.	311615,112340,311119	8.25	-23.9
Central Garden & Pet Co.	311111,327215,453910,311119,325311,325320,327112,111998	11.61	12.73
Darling International Inc.	311225,311119,311613	11.09	24.05
Nutrastar International, Inc.	111419,311119,551112	41.6	47.47
Pilgrims Pride Corp.	311615,112340,112320,112310,311119	11.4	5.43
Scope Industries	311111,311119	-	-
Spectrum Brands Holdings Inc	335911,335129,335211,333319,333112,311119	6.7	-
Westway Group Inc	311119,493130,311311	4.13	-
311119 - ROI		8.97875	12.49

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2037 : Frozen fruits and vegetables

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Birds Eye Foods Inc	311411,311941,311422,311421,424470,311911,311412	-	-
China NutriFruit Group Ltd	311411,311930,311421,551112	55.56	52.31
J&J Snack Foods Corp.	311919,311813,311411,445110,445291	21.35	20.33
Lancaster Colony Corp.	311412,311941,311411	39.26	31.75
Overhill Farms Inc	311412,311411	25.18	25.7
Seneca Foods Corp.	311421,311411,332431,481211	16	9.15
Sensient Technologies Corp.	325199,311930,311411,311991	13.08	11.15
SkyPeople Fruit Juice, Inc.	311411,311421,551112	32.52	35.12
UniMark Group Inc., The	311421,424420,115114,311411	-	-
311411 - ROI		28.99286	26.50143

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2026 : Fluid milk

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Feihe International Inc	112120,311514	-6.36	1.85
Mead Johnson Nutrition Co	311514,445299	65.15	87.33
Modine Manufacturing Co	336399,333415,336391,311514	1.43	-14.61
Rodobo International Inc	311514	22.76	39.01
Specialty Foods Acquisition Corp.	311514,311999,311812	-	-
Synutra International Inc	311511,311514,551112	-8.35	-46.27
Yayi International Inc	311514,551112	-4.78	42.26
311514 - ROI		11.64167	18.26167

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2053 : Frozen bakery products, except bread

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Einstein Noah Restaurant Group Inc	722211,445299,311813	18	23.09
Flowers Foods, Inc.	311813,311412	21.84	21.91
General Mills, Inc.	311230,311822,311813,311999	21.71	17.95
J&J Snack Foods Corp.	311919,311813,311411,445110,445291	21.35	20.33
Ralcorp Holdings, Inc.	311211,311230,311821,311919,311941,311911,311320,311813	8.58	10.63
Sara Lee Corp.	311612,311813,311811,311920,311821	16.93	10.4
Snyder's-Lance Inc.	311821,311911,311919,311320,311330,311340,311813	1.58	16.08
311813 - ROI		15.71286	17.19857

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

5141 : Groceries, general line

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Annie's Inc	311821,311422,311941	-	-
Birds Eye Foods Inc	311411,311941,311422,311421,424470,311911,311412	-	-
Campbell Soup Co.	311422,311812,311421,311941,311330,311821	38.3	32.62
Clorox Co.	325612,325611,311941,311423,325199,314911,325998	35.99	31.68
Global Condiments Inc	311941,424410	-	-
Heinz (H.J.) Co.	311421,311941,311412,311999	24.29	22.3
Lancaster Colony Corp.	311412,311941,311411	39.26	31.75
Ralcorp Holdings, Inc.	311211,311230,311821,311919,311941,311911,311320,311813	8.58	10.63
Sanfilippo (John B.) & Son, Inc.	311911,311999,311919,311941,311423,311330	11.06	5.68
TreeHouse Foods Inc	311421,311941,311412,311991	11.34	11.6
		24.11714	20.89429

Source: Produced by T-MEX, Texas A&amp;M University

**Primary SIC**

2099 : Food preparations, nec

Company Name	NAIC Codes	ROI % (Operating) - 2010	ROI % (Operating) - 2009
Bravo Brio Restaurant Group Inc	722110,311991	13.88	22.45
Calavo Growers, Inc.	115113,424490,445230,311991	29.22	22.57
Cheesecake Factory Inc. (The)	722110,311812,311991	21.28	11
Cuisine Solutions, Inc.	311412,311999,311991,454390,311421	-	-
ForeverGreen Worldwide Corp	311991,551112	-3.15	-8.23
Fresh Market, Inc.	445110,311991	25.73	31.75
Kaibo Foods Co., Ltd.	311991	-	-
Kraft Foods, Inc.	311999,311513,312111,311230,311991,551112	10.37	12.67
PepsiCo Inc.	312111,311919,311230,311991,311930	23.63	35.85
Sensient Technologies Corp.	325199,311930,311411,311991	13.08	11.15
TreeHouse Foods Inc	311421,311941,311412,311991	11.34	11.6
		16.15333	16.75667

Source: Produced by T-MEX, Texas A&amp;M University

## 11 Appendix C: Market Analysis Tables

Table 39: National Market Outlook

Sector	Description	Financial Metric	Amount
Food Industry	Snack Food Production Industry	Revenue	\$ 28.4 billion
		Profit	\$ 5.9 billion
		Annual Growth ( 06-11)	4.2%
		Forecasted Growth (11-16)	2.1%
		Businesses	359
	Dairy product Industry	Revenue	\$ 88.7 billion
		Profit	\$ 2.3 billion
		Annual Growth ( 06-11)	5.5%
		Forecasted Growth (11-16)	1.1%
		Businesses	753
	Frozen food Industry (Except Dairy Product)	Revenue	\$ 27.6 billion
		Profit	\$ 3.6 billion
		Annual Growth ( 06-11)	0.5%
		Forecasted Growth (11-16)	0.2%
		Businesses	497
Metal Products Industry	Ferrous Products Industry	Revenue	\$ 18.3 billion
		Profit	\$ 1.3 billion
		Annual Growth ( 06-11)	-3.9%
		Forecasted Growth (11-16)	3.5%
		Businesses	688
	Nonferrous Products Industry	Revenue	\$ 12 billion
		Profit	\$ 0.62billion
		Annual Growth ( 06-11)	-3.0%
		Forecasted Growth (11-16)	-0.4%
		Businesses	1,019
Chemicals Manufacturing Industry	Petrochemicals	Revenue	\$ 80.8 billion
		Profit	\$ 10.8 billion
		Annual Growth ( 06-11)	-1.8%
		Forecasted Growth (11-16)	3.6%
		Businesses	33
	Inorganic	Revenue	\$ 31.6 billion
		Profit	\$ 2.9 billion
		Annual Growth ( 06-11)	-0.5%
		Forecasted Growth (11-16)	2.1%
		Businesses	318

	<b>Organic</b>	Revenue	\$ 125 billion
		Profit	\$ 8.1 billion
		Annual Growth ( 06-11)	4.3%
		Forecasted Growth (11-16)	5.5%
		Businesses	612
	<b>Pesticides</b>	Revenue	\$ 14.8 billion
		Profit	\$ 1.3 billion
		Annual Growth ( 06-11)	-0.5%
		Forecasted Growth (11-16)	2.0%
		Businesses	147
	<b>Fertilizers</b>	Revenue	\$ 18.9 billion
		Profit	\$ 1.6 billion
		Annual Growth ( 06-11)	3.2%
		Forecasted Growth (11-16)	3.3%
		Businesses	395
	<b>Plastic and Resin</b>	Revenue	\$ 94.4 billion
		Profit	\$ 6.7 billion
		Annual Growth ( 06-11)	0.8%
		Forecasted Growth (11-16)	3.1%
		Businesses	658
	<b>Paint, adhesive and other chemical products</b>	Revenue	\$ 23.5 billion
		Profit	\$1.9 billion
		Annual Growth ( 06-11)	-1.2%
		Forecasted Growth (11-16)	2.1%
		Businesses	850
<b>Plastics Products Industry</b>	<b>Plastic film, sheet and bag manufacturing</b>	Revenue	\$ 39.8 billion
		Profit	\$ 1.4 billion
		Annual Growth ( 06-11)	0.7%
		Forecasted Growth (11-16)	2.2%
		Businesses	1,093
	<b>Plastic pipe and parts manufacturing</b>	Revenue	\$ 17.4 billion
		Profit	\$ 0.57 billion
		Annual Growth ( 06-11)	-0.8%
		Forecasted Growth (11-16)	1.8%
		Businesses	660
	<b>Plastic bottle and container manufacturing</b>	Revenue	\$ 10.8 billion
		Profit	\$ 0.69 billion
		Annual Growth ( 06-11)	0.2%
		Forecasted Growth (11-16)	1.9%
		Businesses	179

	<b>Plastic products miscellaneous manufacturing</b>	Revenue	\$ 97.4 billion
		Profit	\$ 3.2 billion
		Annual Growth ( 06-11)	-0.8%
		Forecasted Growth (11-16)	1.6%
		Businesses	6,308
<b>Distribution/Wholesaling</b>	<b>Chemical Wholesaling</b>	Revenue	\$ 149.5 billion
		Profit	\$ 8.2 billion
		Annual Growth ( 06-11)	0.9%
		Forecasted Growth (11-16)	2.5%
		Businesses	5,899
	<b>Industrial Supplies Wholesaling</b>	Revenue	\$ 72.9 billion
		Profit	\$ 4.3 billion
		Annual Growth ( 06-11)	-1.1%
		Forecasted Growth (11-16)	2.6%
		Businesses	8,319
	<b>Oil&amp;Gas- Industrial machinery &amp; equipment wholesaling</b>	Revenue	\$ 166.5 billion
		Profit	\$ 5.3 billion
		Annual Growth ( 06-11)	-1.5%
		Forecasted Growth (11-16)	1.9%
		Businesses	19176
	<b>Oil&amp;Gas-Mining Services</b>	Revenue	\$ 116.7 billion
		Profit	\$ 27.4 billion
		Annual Growth ( 06-11)	7.9%
		Forecasted Growth (11-16)	8.6%
		Businesses	9980

Source: Produced by T-MEX, Texas A&amp;M University

## 12 Appendix C: Acknowledgments

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Capacity of Texas	Phillip Ford
General Dynamics	Steven Chambers
Pak-Sher	David Motley

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## Bibliography

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