Shiraz Chemical Industries

Strategies for Domestic and International Growth

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ABSTRACT

The intent of this study is to propose strategies that would help Shiraz Chemical Industries (SCI) to expand its domestic and international market share for the Urea-Formaldehyde (UF) and Melamine-Formaldehyde (MF) resins that the company manufactures. Since production launch in 2008, the company's market share has been growing slowly. The slow growth rate has triggered the need for revisiting the operational state of the company and proposing new growth strategies.

The paper begins by providing an overview of SCI, a summary of the company's products and markets, and a description of the problem that is to be investigated. Next, the results of the internal and external analyses are presented. Based on the findings gathered through the internal and external analyses, this study establishes the industry's Key Success Factors (KSFs) and, subsequently, evaluates strategic options that would help SCI achieve its long-term objective of growing market share.

Keywords: Amino Resins; Urea-Formaldehyde Resin; Melamine-Formaldehyde Resin; Growth Strategy; Supply Chain; Thermoset; Key Success Factors

DEDICATION

Nima Boostani

First and foremost, I would like to dedicate this study to my beloved wife, Sara Eslami, for her never-ending support during the course of my MBA education. Without her encouragement, sacrifices, and guidance, my journey would not have succeeded.

I would also like to extend my utmost gratitude to my parents whose support, both emotionally and financially, enabled me to fulfill this project.

Nasim Boustani

I would like to dedicate this study to my kind, loving Ted, whose tremendous support gave me strength, motivation and focus in every step of this journey.

This paper is also dedicated to my parents whose generous moral and financial support made it possible for me to embark on this voyage.

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We have received significant support in preparing this paper. The management team and CEO of Shiraz Chemical Ind. were extremely generous in providing us with the data that we needed for understanding the external and internal business environments of the company. The team never hesitated to provide corporate documents needed to support this research project. The success of this study is greatly due to their continued support and open communication.

We have also been privileged to receive the support of our advisors, Dr. Elicia Maine and Dr. Mark Moore, in preparing this study. Their invaluable input and guidance strengthened our ideas and provided us with exceptional learning. For that, we are extremely thankful.

Table of Contents

Table of Figures

Table of Tables

Glossary

CEH	Chemical Economics Handbook
DM	De Mineralized
FOB	Freight On Board or Free On Board
IFA	International Fertilizer Industry Association
KSF	Key Success Factors
MDF	Medium Density Fiberboard
MDI	Methylene Disocyanate
MUF	Melamine Urea Formaldehyde
MF	Melamine Formaldehyde
MT	Metric Ton
PB	Particleboard
QA	Quality Assurance
SCI	Shiraz Chemical Industries
UF	Urea Formaldehyde
WP	World Petrochemical
WTP	Willingness To Pay

1. Introduction

Shiraz Chemical Industries (SCI) wishes to investigate growth opportunities in the domestic and international markets for its amino resin products. As a result, this project is undertaken to help SCI assess strategic options that would support this initiative. The following chapter presents a brief overview of the company, its products and markets, as well as a full description of the problem this study attempts to address.

1.1 Company History

SCI was founded in 2006 by a partnership of seven private investors. The partners take full ownership of the SCI stock, and are industry veterans with many years of experience acquired through working for major competing private and public firms. The main goal of SCI is to grow market share.

Three of the shareholders, who – together - hold controlling interest in SCI, have been involved in previous partnership ventures. One rather successful venture is another chemical manufacturing company - Saravid Industrial Co. Saravid Industrial Co. was founded in 1982 and is currently one of Iran's leading producers of Urea Fomaldehyde (UF) and Melamine Formaldehyde (MF) moulding compounds.

SCI is headquartered in Shiraz, Iran, from where the company gets its name. SCI's manufacturing site is located 14km south east of the city next to Saravid's plant. In this manufacturing site, the company currently operates two production units: *Unit 100* and *Unit 200*. *Unit 100* is designed for the production of Formaldehyde or Formalin (mixture of Formaldehyde and water), a chemical that has wide usage in the production of other chemical products including amino resins. Although SCI sells this product to external customers, the main reason for producing Formalin is to vertically integrate the production of this chemical and support Unit 200 and Saravid Industrial Co. with this feedstock. The production capacity of this unit is 40,000 MT / yr. *Unit 200* is designed for the production of amino resins, which, in turn, find usages in the production of a wide range of products such as laminates, adhesives, surface coatings, and wood products. As noted above, this unit obtains its needed feedstock of Formaldehyde from unit 100. Today, Unit 200 supplies nearly 14,000 MT of amino resins to the domestic market annually (SCI, personal communication, April 8, 2011). Considering that the total domestic consumption of amino resins is around 120,000 MT / yr (illustrated in Figure 1-5), Unit 200's output

constitutes nearly 12% of the total domestic demand. Unit 200's production capacity is 30,000 MT / yr. Equipment installation for units 100 and 200 began in 2006 and the first production run commenced in 2008.

1.2 Products and Markets

UF-based and MF-based resins are thermoset polymers that constitute the primary chemicals in a group called amino resins. In this group, UF resins constitute 80% of amino resins and MF resins account for the majority of the rest (Osemeahon & Barminas, 2007). Normally, a two-stage reaction process is used in the industry to produce these resins (Forsdyke & Starr, 2002, p. 8) - SCI's process is no different.

In the case of UF resins, first Urea, $CO(NH_2)_2$, is produced via a reaction between carbon dioxide, CO_2, and ammonia, NH_3, under heat and pressure. The resulting Urea is then condensed with Formaldehyde and further treated in acidic conditions to produce viscous syrup that forms the UF resin. Producing MF resins, on the other hand, begins by first producing Melamine, $C_3H_6N_6$, from Urea under high pressure and temperature conditions. MF resins are subsequently produced by condensing Melamine with Formaldehyde in a mildly alkaline environment. Figure 1-1 presents a summary of the high-level chemical reactions involved in producing UF and MF based resins.

After the two-stage production, amino resins may be transformed into powder using a module called an atomizer. In powder form, amino resins' shelf life significantly increases before they are converted back into liquid for use. However, the liquid resins produced from powder resins are less stable in terms of formaldehyde emission. The reason is that the process of converting liquid resins into powder form includes ridding the adhesive of short-length polymers because short-length polymers exhibit a low melting point and, therefore, create sticky glue that fuses to the walls of the dryer. In liquid resins, these short-length polymers fill some of the vacant spaces in the adhesive and "trap" the formaldehyde in the resin, preventing it from being emitted. The fewer the short length polymers, the less stable the resin and the higher the formaldehyde emission. Because of such limitations, the powder adhesives are only sold in regions where nearby producers cannot support demand for liquid resins, customers possess the required equipment and processes to transform powder resin into liquid resin, and no enforceable

regulatory policies concerning formaldehyde emission levels exist. Any reference to amino resins in this study is concerned with resins in liquid form unless noted otherwise.

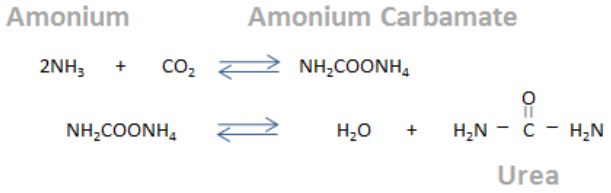
Aside from MF and UF resins, SCI also produces Formaldehyde. As illustrated in Figure 1-1, Formaldehyde is a key input material for producing both MF and UF resins. SCI has vertically integrated the production of Formaldehyde to satisfy its input capacity needs of this chemical. From time to time, the company may sell its extra capacity of Formaldehyde as a secondary product with very low margins.

In today's market, UF and MF resins are adopted in a wide variety of applications for end use in diverse industries including automotive, furniture, and construction (Conner, 1996; Boswell et al., 2010; World Petrochemical report on UF Resins, 2010; Greiner & Funada, 2010). Figure 1-2 illustrates the market segments that consume amino resins. The largest consumers of UF resins are in the fibrous and granular wood segment. For MF resins, laminate producers constitute the largest market segment.

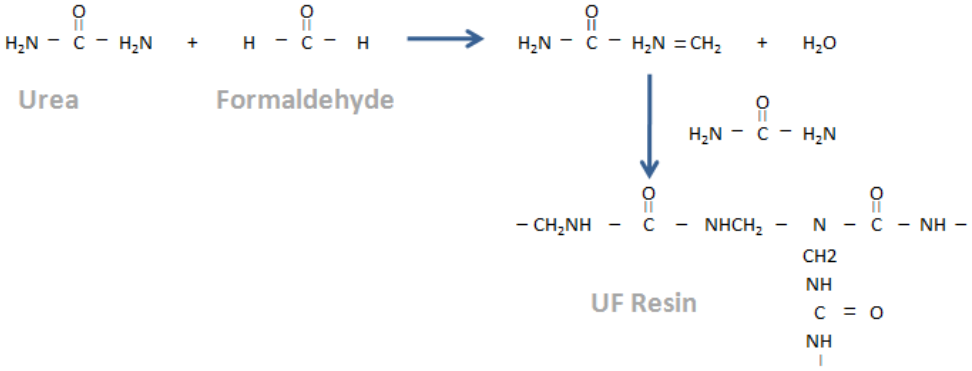
It is important to note that the market segments are defined using the final application of MF and UF resins as the segmentation variable. Additionally, it is important to note that Figure 1-2 includes the results of two separate reports – Chemical Economics Handbook (CEH) and World Petrochemical (WP). According to SRI, The data provided by these two reports vary because of the different methods used by each reporting group to allocate amino resin consumption capacities to application segments in different geographic regions. Despite the apparent differences between the data presented by Greiner & Funada (2010) and WP reports, the largest consuming sectors for UF and MF resins remain consistent between the two sources.

UF RESINS

Step1



Step 2



MF RESINS

Step 1

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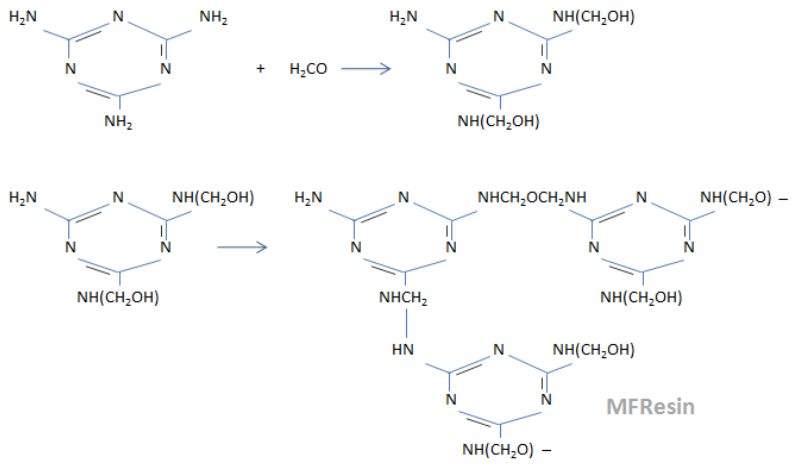
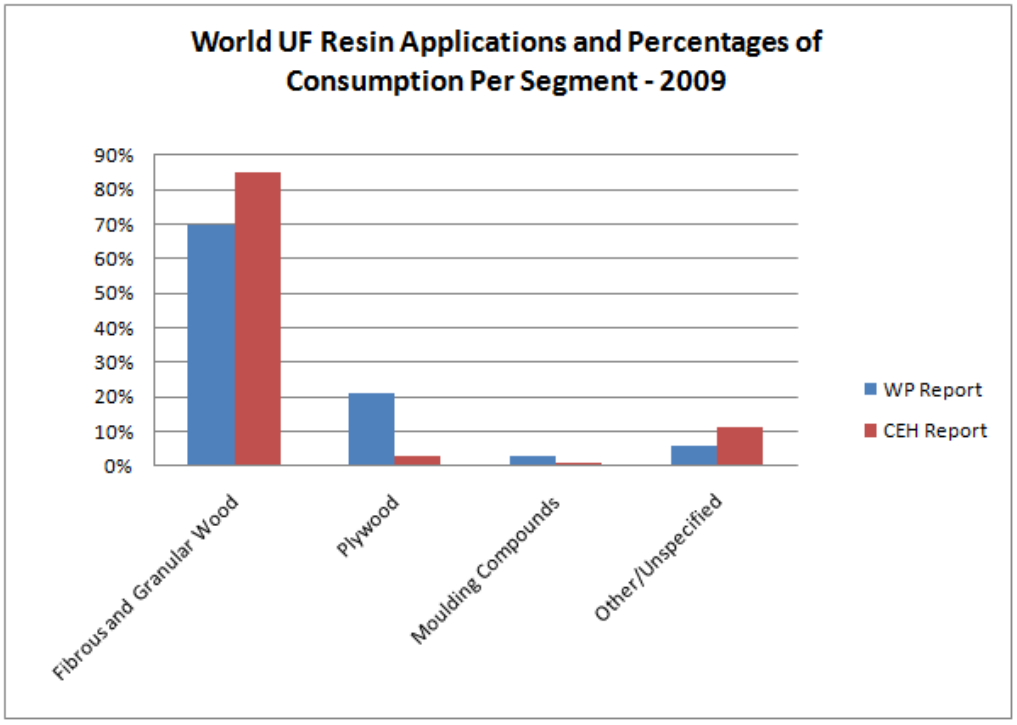


Figure 1-1: High-level chemical reactions for producing UF and MF based resins and adhesives



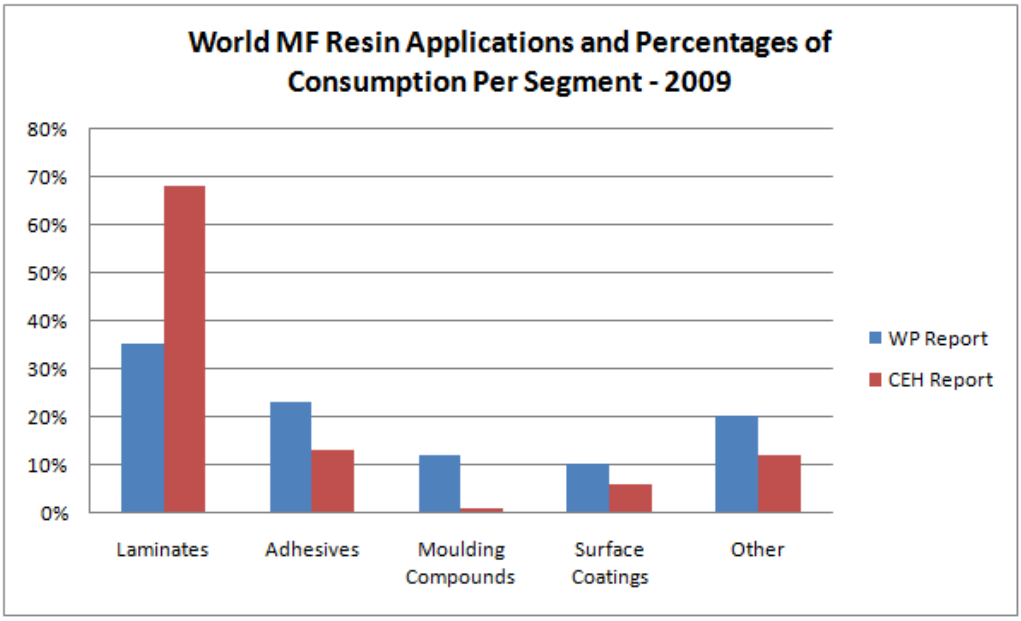


Figure 1-2: Applications of UF and MF resins and Adhesives (World Petrochemical report on UF Resins, 2010; World Petrochemical report on MF Resins, 2010; Greiner & Funada, 2010) [1]

[1] Percentages from the WP reports are estimated via the visual inspection of the pie charts in the source.

Studying the demand chain of UF and MF resins helps identify the forces that affect the demand for amino resins. Figure 1-2 illustrates that wood producers are the main immediate consumers of UF resins. Wood products, in turn, are primarily consumed in the construction and furniture industries (Greiner & Funada, 2010; "Feasibility Studies", 2008); therefore, it can be inferred that the construction and wood furniture industries are strong demand drivers for UF resins. Moreover, the demand for MF resins is predominantly influenced by the demand for laminates, adhesives, and, to some extent, surface coatings (Greiner & Funada, 2010). Laminates and adhesives are mostly consumed in the construction and remodeling industries while surface coatings are mostly used by consumers in the automotive industry. Hence, it can be concluded that the construction, remodeling, and the automotive industries are strong drivers of demand for MF resins. Figure 1-3 illustrates the first-tier and second-tier demand forces for UF and MF resins.

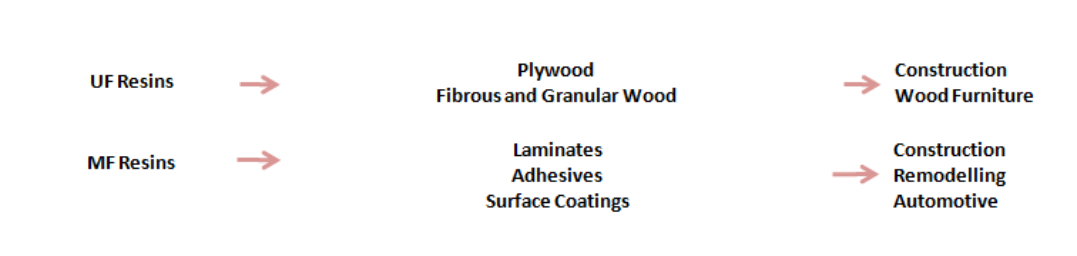


Figure 1-3: Demand chain constituents for UF and MF resins

Similarly, examining the supply chain of amino resins facilitates understanding the forces that impact the cost of producing these resins and, hence, their trade prices. Figure 1-4 illustrates the supply chain comprising of the technologically separate petrochemicals needed to produce UF and MF resins. Because the majority of MF and UF resins are perishable and cannot be transported over long distances, the regional production costs and regional prices of the commodities in the supply chain generally determine the trade price of MF and UF resins in different geographic regions. For instance, in 2010, UF resins used in the manufacturing of Medium Density Fiberboard (MDF) were traded at approximately $350 / MT in Iran. During the same time frame, similar resins used in similar applications cost approximately $550 / MT in Western Europe (Greiner & Funada, 2010; SCI interview notes).

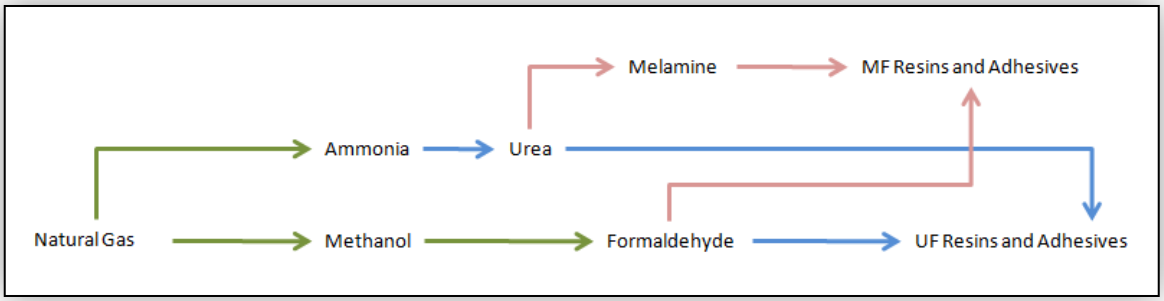


Figure 1-4: Supply chain constituents for UF and MF resins

Having examined the applications as well as the supply and demand chains of amino resins, it is important to determine the regions in which SCI could potentially target amino resin market applications for further growth. Operating in Iran, SCI currently targets domestic markets. In addition to the domestic market opportunities, SCI may be able to also consider international opportunities in regions such as China, Western Europe, Other Asia[2], and Central/Eastern Europe. Targeting all these international markets at once, however, goes beyond SCI's current resources according to SCI. Therefore, it must be determined which international market SCI should pursue first. Selection of the first point of entry into international markets is dependent on assessing the market potential of all the noted international regions. However, thoroughly assessing the growth potential in all these markets is beyond the scope of this project. Therefore, this study utilizes a coarse filter to determine a rough estimate of the long-term business potential in each region in an attempt to determine the first international opportunity that this study should examine in detail.

The coarse filter parameters utilized are twofold: the estimated growth in regional demand for amino resins, and the regional installed production capacity for amino resins vs. estimated future regional demand. Using these coarse filter parameters brings Western Europe to top of the list as the first point of international entry that offers the highest long-term growth potential: It is anticipated that the amino resin consumption in Western Europe would increase by 20% from 2009 to 2015 with a growth amount of 581,000 MT according to Greiner & Funada (2010). These statistics form the highest growth rate and the second highest growth volume

[2] Includes Indonesia, India, Malaysia, the Republic of Korea, Pakistan, the Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam

among those for the international regions of interest. Furthermore, Greiner & Funada (2010) suggest that current installed capacity for UF resins in Western Europe will fall short of the expected 2015 UF resin demand. According to the statistics provided by Grainer & Funada (2010), this situation does not occur in the other international regions under consideration. Based on this assessment, in evaluating strategic options for SCI's growth, this study mainly focuses on two geographic locations - Western Europe and Iran. Note that, throughout this study, Iranian markets may also be referred to as domestic markets.

With Iran and Western Europe established as the two primary regions under focus, it is pertinent to examine the size and the prospects of the amino resin markets in these regions. Through interviews with SCI, it was estimated that the domestic aggregated annual consumption of MF and UF resins in 2009 was 120,000 MT – an amount equivalent to 1.93kg per capita – out of which 105,000 MT is allocated to UF resins. This demand, the majority of which is generated by wood manufacturers, is satisfied through domestic production. With new MDF and laminate board production facilities being installed, it is expected that demand for amino resins by wood manufacturers will increase in Iran. However, there is no exact growth figure at hand for the growth of amino resins in this country. Figure 1-5 summarizes the 2009 production, consumption, import, and export volumes for amino resins in Iran. Also, Iran's UF resin statistics is illustrated in Figure 1-6. These figures show the amino resin statistics for Western Europe as well: Western Europe's consumption of UF and MF resins in 2009 totaled 2,831,000 MT out of which 2,326,000 MT is allocated to UF resins. The total amino resin production is equivalent to 7.0kg consumption per capita in Western Europe in 2009. Between 2009 and 2015, Western Europe's UF resin market is estimated to grow at an average annual rate of 3.3%; the region's MF resin market is estimated to grow at an average annual rate of 3.5% (Greiner & Funada, 2010).

In terms of the scope of the markets being served by SCI, the company presently services eight customers, which primarily operate in the domestic laminate and Fibrous and Granular wood industries. These consumers use SCI resins in the production of MDF and particle boards. The resulting demand volume utilizes 46% of the production capacity of the company. Internationally, SCI does not currently serve any customers.

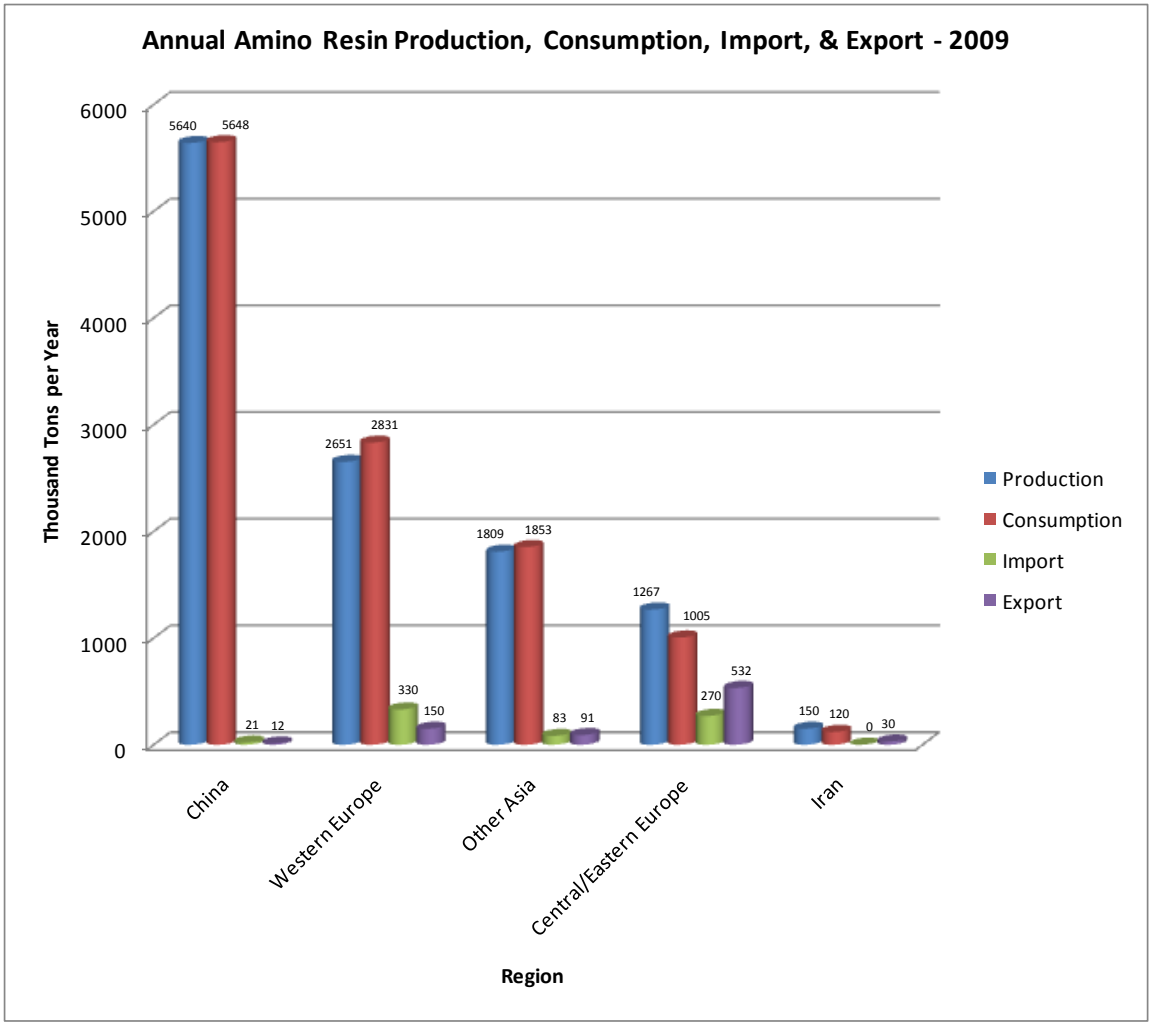


Figure 1-5: Domestic and international production, consumption, import, and export numbers in 2009 for amino resins (Greiner & Funada, 2010; SCI interview notes)

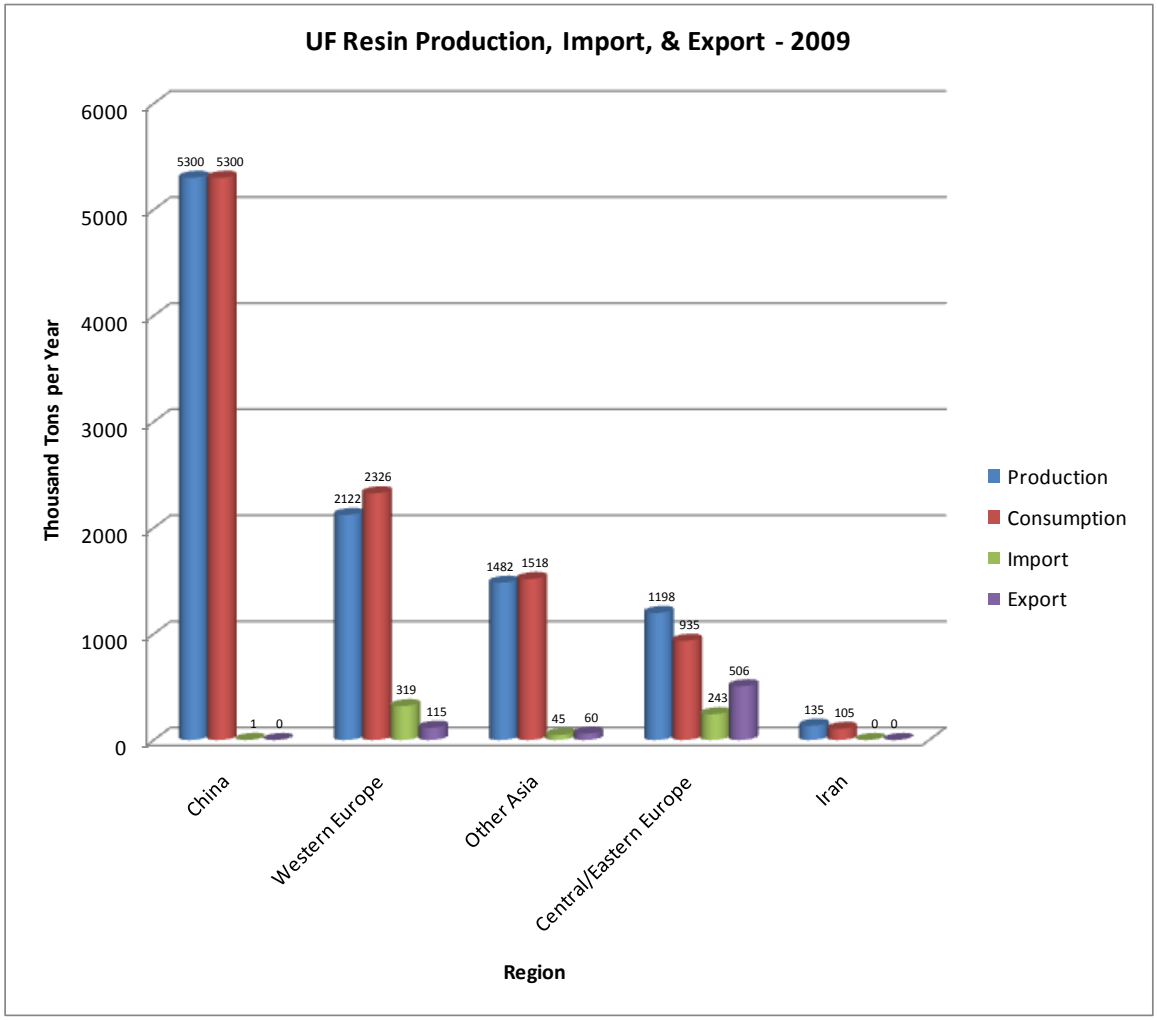


Figure 1-6: Domestic and international production, consumption, import, and export numbers in 2009 for UF resins (Greiner & Funada, 2010; SCI interview notes)

Over the past three years, SCI has attained limited market penetration in the domestic market and no penetration in the international markets. Because of this, the production volume of SCI is below optimum levels and the assets of the company are currently underutilized. This remark forms the basis of the problem statement that this study intends to address.

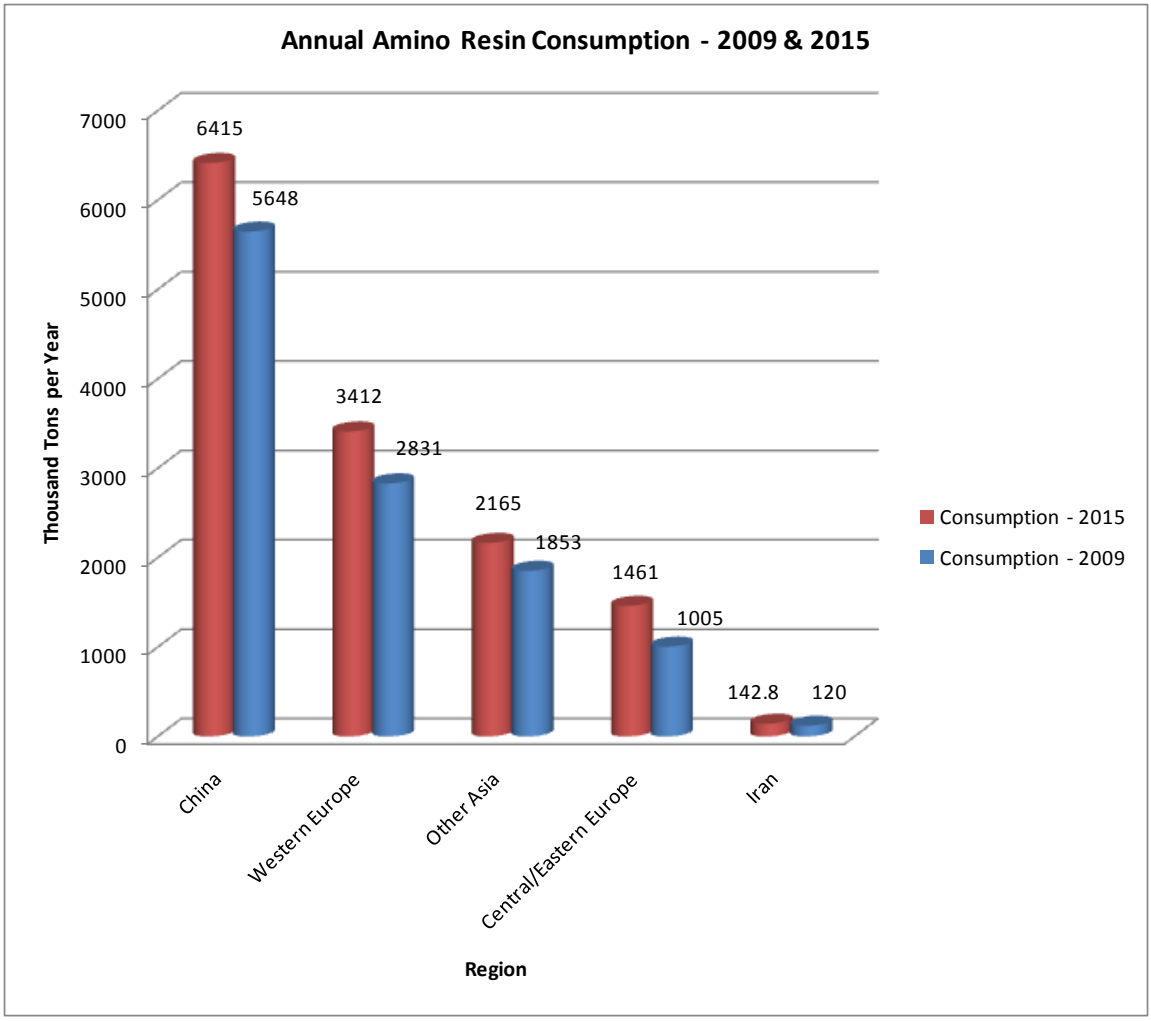


Figure 1-7: 2015 forecast for amino resin consumption (Greiner & Funada, 2010)

1.3 Problem Statement

As noted in section 1.2, over the past three years, since commencing its production, SCI has witnessed a slow market penetration for its UF and MF resin and adhesive products. Witnessing this languid progress has prompted SCI to study how the company could expedite its market share growth partly to improve plant utilization. In fulfilling this initiative, SCI's management team is interested in considering both domestic and international opportunities.

To support its recommendations, this study first embarks on establishing a clear picture of the current state of SCI's business. To this end, the amino resin industries in Iran and Western Europe are studied. Based on this external analysis, a list of Key Success Factors (KSFs) are

prepared. SCI's internal business environment is then reviewed to determine whether the company possesses, or can acquire, the KSFs necessary to achieve a sustainable growth in the markets in which it wishes to compete. Next, this study proposes several strategic options with due consideration given to, among other factors, the company's available and obtainable resources for the execution of the growth strategies. Lastly, the final recommendations of this study are presented.

2. Current State: External Analysis Using Porter's Five Forces

To assess the external business environments in which SCI currently competes or wishes to compete in the future, this study utilizes Michael Porter's five forces framework (Porter, 1986, p541). The forces discussed in this framework include the force of rivalry, substitutes, entry barriers, suppliers, and customers. These forces determine the sustainability and profitability of a firm in the markets in which it competes. Prior to examining these forces, the markets in which amino resin producers compete must be clearly defined.

As noted in section 1.2, this study mainly focuses on growth opportunities in Iran and Western Europe. Therefore, the external analysis presented in this chapter is mainly concerned with the amino resin markets in these regions. It must be noted that the markets for amino resins in Iran and Western Europe are segregated. The segregation of markets primarily results from two reasons: 1- Amino resins are perishable; this increases the risk of obtaining perished shipments when transported over long routes. 2- High transportation costs associated with transporting resins over long routes increases selling prices and, hence, the ability of suppliers to effectively compete in markets far from their production base. Consequently, markets are confined to localities that suppliers can safely and cost effectively service. The following section presents the assessment of the Porter's five forces in these markets.

2.1 Market Forces

2.1.1 Rivalry (Domestic: High and Stable; Western Europe: Medium and Stable)

In the domestic market, SCI and six other producers are the main suppliers of amino resin products. Figure 2-1 illustrates the geographic position of these seven incumbents. The names and estimated production capacities for the seven incumbents are listed in Table 2-1 (SCI, personal communication, April 15, 2011).The limited number of players in the market suggests that the structure of the industry is an oligopoly. These seven firms, together, support nearly the entire national consumption of UF and MF resins which totaled 120,000 MT in 2009.

Table 2-1: Producers of amino resins in Iran

	Company Name	Location	Capacity (MT / yr)
1	Fars Chemical Industries	Shiraz, Fars, Iran	40,000*
2	Sina Chemical Industries	Shiraz, Fars, Iran	30,000*
3	Samed Chemical Industries	Mashhad, Khorasan, Iran	100,000
4	Chassb Saz Co.	Sari, Mazandaran, Iran	20,000
5	Gharb Resin Co.	Kermanshah, Iran	N/A
6	Gharb Kimia Co.	Kermanshah, Iran	20,000
7	Shiraz Chemical Industries	Shiraz, Fars, Iran	30,000

* Estimates based on company annual reports (Sina Chemical Industries , 2010; Fars Chemical Industries, 2010)

Product differentiation is generally low across the board and firms generally attempt to establish cost advantage. However, SCI's amino resin products are differentiated based on performance parameters that result in better performing finished wood products. Although SCI's products are differentiated based on performance, it must be determined whether improved product specification would translate into reduced levels of competition and increased, sustainable rents for SCI.

The available market data from domestic clients suggests that improved performance matter less than price to amino resin buyers. According to SCI, differentiation based on improved performance has not resulted in significant customer loyalty for the company. In fact, despite SCI's product specifications outperforming that of its competitors, some of SCI's acquired customers have switched back to original suppliers because of better payment terms and lower offered prices. Observing this situation along with noting that SCI is facing challenges in raising its product prices could suggest that exceeding minimum required specifications may not lead to reduced competition levels and increased Willingness To Pay (WTP). Therefore, it is expected that price remain a dominant factor influencing customers' purchasing decisions.

In terms of the scope of competition, competition is segregated and confined to localities that suppliers could cost effectively and reliably access. This results from market segregation noted in the opening paragraph of chapter 2. As an example, consider the territory encompassing the province of Fars. The major players that compete in this locality are SCI, Fars Chemical Industries, and Sina Chemical Industries. Long distances between the markets and production factories and transportation complexities over long routes have forced other suppliers, such as

Samed Chemical Industries, to abandon competing in the distant province of Fars. Today, competition most significantly occurs between SCI, Sina, and Fars – the companies with equal access to the southern market.

Rivalry is further influenced by supply and demand forces in each territory. Territories with installed production capacity exceeding demand exhibit high levels of rivalry; this is currently the case in the region in which SCI competes. With enough sources of supply, consumers enjoy increased negotiating power. Suppliers, therefore, compete vigorously to win orders from customers; needless to say, securing orders is the only option to improve asset utilization. In their attempt, incumbents exercise different methods to ensure receiving a continuous flow of orders. Some of the methods employed are extended payment terms, price cuts, and sample offerings. Exercising these methods has increased rivalry and reduced rents for incumbents in the south.

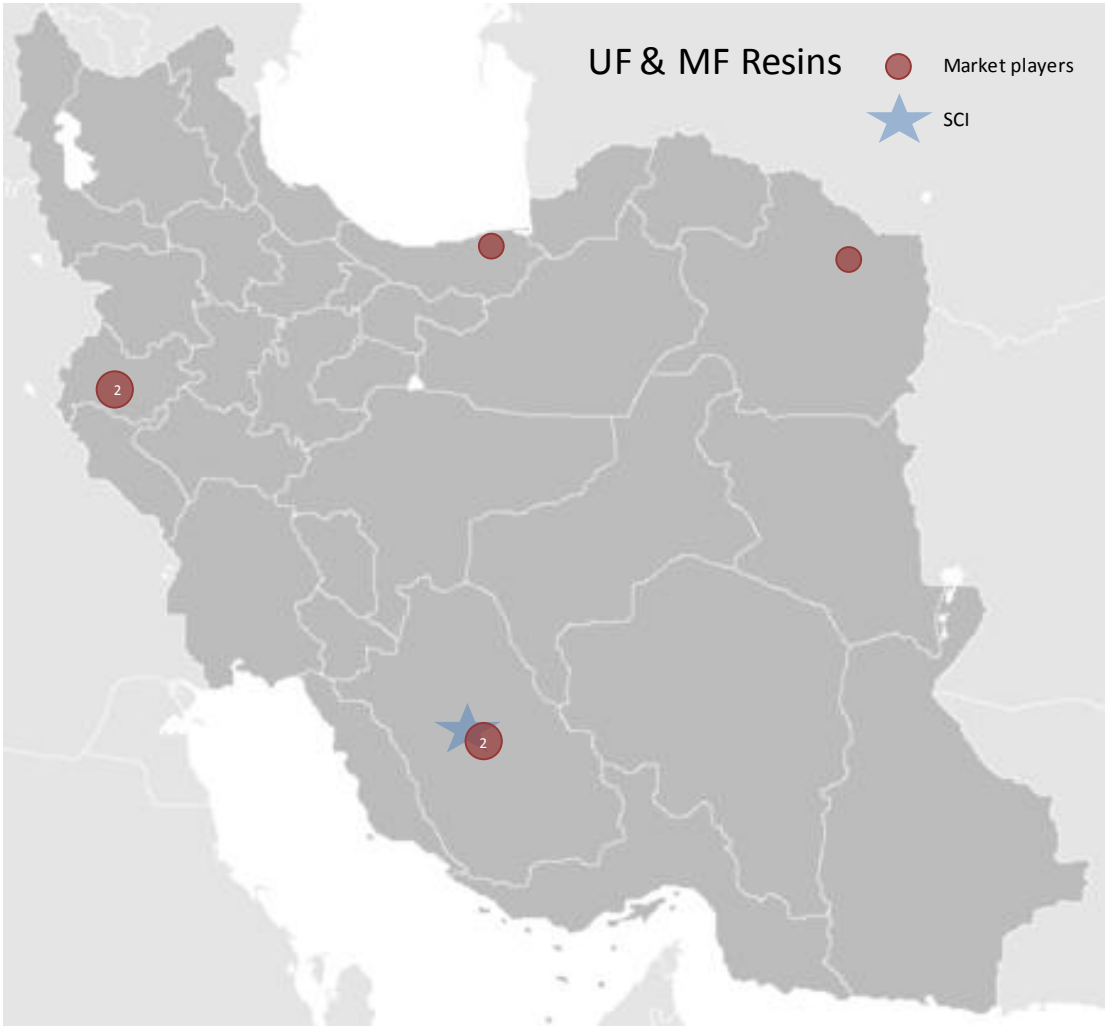
Barriers to exit also contribute to high levels of rivalry. With significant investments in specialized machinery and ongoing cost of borrowed money, exit costs are substantial. The high exit costs pressure incumbents to choose to compete before exit logically becomes an option.

Rivalry in the domestic market is somewhat reduced through operational flexibility – operational flexibility is further discussed in section 4.2.3. Different applications of amino resins demand different formulae of amino resins. By establishing that they can produce a wide range of formulae of amino resins that customers may need, amino resin suppliers attempt to differentiate and increase WTP in the domestic market. Although differentiation through establishing operational flexibility is not very strong, it is important to note that possessing such flexibility is important to establishing reputation in the market and achieving potential future competitive advantages through continuous development and introduction of new amino resin products. Overall, it is determined that the level of rivalry in the domestic market is currently high and is expected to remain high for a foreseeable future.

In Western Europe, rivalry takes place between 63 major amino resin producers. The dispersion profile of the western European market players is shown in Figure 2-2. Based on the dispersion profile and the number of incumbents, the structure of the market is expected to be monopolistically competitive. These companies support the consumption of approximately 7 kg per capita in this region. Product differentiation is low and all products must comply with

European standards. Because of low levels of differentiation, it is expected that firms pursue a cost advantage strategy in this international market as well.

Rivalry could be intense locally if local installed capacity exceeds the local demand. Unfortunately, local information is not readily accessible for individual plants' production and utilization data. However, according to the data presented in Figure 1-5, overall supply of amino resins in Western Europe is currently lower than consumption volumes in the western European region. This could rule out high levels of competition in the region as a whole. If supply is distributed evenly and local supply does not surpass local demand, considering the monopolistic competition in the market, it could be inferred that local competition levels are medium. With high costs of new capacity installations and the near 3%, amino resin consumption growth rates, it is expected that rivalry will remain reasonably stable for a while.



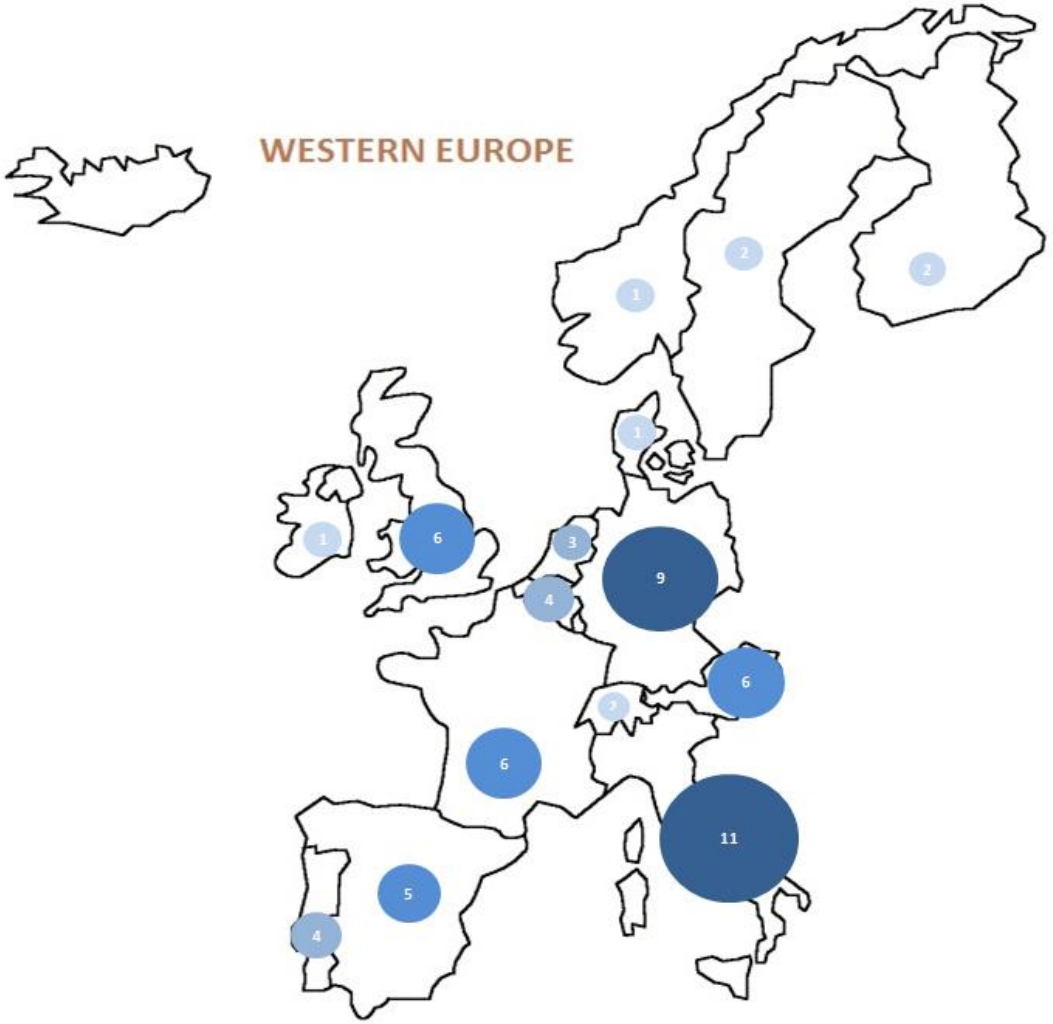
Number of Main Players: 7

Land Area Covered: 1,648,195 sq km

Total Production Capacity: 150,000 MT / yr

Total Population: 77,891,220

Figure 2-1: Iran's UF and MF resin suppliers



Number of Main Players: 63

Land Area Covered: 3,870,959 sq km

Total Production Capacity: 3,538,000 MT / yr

Total Population: 402,662,018

Figure 2-2: Dispersion of amino resin suppliers in Western Europe

2.1.2 Substitutes (Domestic: Low-Medium and Fairly Stable; Western Europe: Low-Medium and Fairly Stable)

Before examining substitutes, it is important to review the applications and limitations of UF and MF resins. Figure 1-2, in section 1.2, illustrates the primary consuming segments of UF and MF resins. In summary, UF resins are primarily used in wood adhesives for production of particleboard (PB) and MDF. Generally, they are the most cost effective adhesive used in production of forest products; however, they leave the finished wood products susceptible to certain limitations: the PBs and MDFs made from UF resins do not resist water, moisture and heat which the finished goods are exposed to in certain applications including construction in high humidity locations. Furthermore, UF can be unstable, especially in the presence of elevated temperature and moisture levels; this, can increase formaldehyde emission leading to regulatory noncompliance in certain markets such as Western Europe. To improve on these specifications, MF or melamine modified wood adhesives such as Melamine Urea Formaldehyde (MUF) are used in place of UF.

Melamine based resins are used primarily in laminates in addition to wood adhesives (Greiner & Funada, 2010). This class of resins possesses a greater resistance to water and heat, and exhibits much lower formaldehyde emission levels. Environmental regulations limiting formaldehyde emissions and exposure are expected to impose a positive effect on the market for melamine based resins going forward, likely taking a toll on overall UF resin consumption (Greiner & Funada, 2010). However, MF and MUF resin varieties cost more than UF resins because of higher melamine content. Substituting UF with melamine based resins will result in a high material cost for producers of PB and MDF and, consequently, high prices for end consumers.

Considering the applications and limitations of UF and MF resins, they are not considered immediate substitutes for one another in their respective applications. In addition, immediate substitutes that could replace UF or MF based resins are almost nonexistent today. However, an emerging potential substitute, currently under development for adhesive applications, is Methylene Diisocyanate (MDI). MDI is also made from formaldehyde (TURI, 2006, Ch 4) and can be mixed with UF to lower formaldehyde emissions (Wang, Zhang, Lu, 2006). This adhesive, however, needs to overcome commercialization challenges before it can be considered as a replacement for amino resins. FEICA, the European Adhesive & Sealant Manufacturing Association, is deeply concerned about possible respiratory allergy cases

pertaining to MDI usage. FEICA suggests new risk management levels for MDI while proposing the collection of additional data to better analyze this issue ("Proposal for a decision", 2008). Considering the high switching costs associated with adopting MDI as a substitute and the fact that MDI is still undergoing further study to address related potential safety concerns and regulatory amendments, this study assesses the threat of this substitute to be low at this point in both domestic and western European markets.

Powder forms of amino resins are not considered viable substitutes for liquid amino resins in Iran or Western Europe: According to SCI, Iranian customers do not have the facility to transform powder resins into liquid resins. Furthermore, because of the potential for growing regulatory restrictions and because of abundant access to liquid resins, customers are not willing to invest in the machinery required to process powder resins. In Western Europe, powder resins perhaps have no market due to strict standards applicable to Formaldehyde emission levels of wood products. These standards are further discussed in section 2.1.3.

In general, once a few common required performance criteria are satisfied, the demand for amino resins is primarily driven by price and that limits MDF and PB producers' choice to UF resins. The preference to buy UF resins holds as long as existent regulatory requirements for formaldehyde emission and performance requirements of end wood products are satisfied. This trend is expected to continue in the foreseeable future. However, should the market exhibit increased demand for melamine based resins due to changes in the regulatory environment or other external factors, this particular shift would not pose a significant threat to SCI as the company is capable of producing UF, MF, and MUF products. It is important to note that MUF is not currently produced domestically however.

Aside from immediate substitute products, replacements for end products that consume amino resins could also threaten the market for amino resins. For instance, potential replacement of MDF with carpet, automotive paint with paint that is not based on amino resins, wood material with non-wooden construction material - all of these shifts in downstream demand could shrink the demand for amino resins. Overall, substitutes are assessed to pose a low to medium threat to SCI's growth. These remarks equally apply to both the domestic and western European markets.

2.1.3 Entry Barriers (Domestic: Medium and Stable; Western Europe: Medium and Stable)

Entry into the domestic and international UF and MF resin markets is not free of challenges. The level of resources required to overcome these challenges impact the likelihood of successful entry. In the following, challenges with entry into the domestic market are considered first.

Although price is the primary demand driver in the domestic market, entrants must establish a certain level of reputational capital to succeed in their dealings with prospects. This is a challenge for new entrants because establishing brand and reputations is costly. It takes consumers' resources and time to assess new suppliers and register them on approved vendor lists. Moreover, it is difficult for consumers to mitigate all future risks that cannot be examined during the early stages of a new relationship. To minimize risks for consumers, amino resin suppliers currently offer company presentations to note company standings and sunk costs that signal long term commitments. In addition, they provide prospects with product samples, trainings, and offer price cuts, generous payment terms, and other early adopter privileges (SCI, personal communication, April 23, 2011). The required investment of time and money into these activities would increase transaction costs for new entrants and, subsequently, would impede new entry.

Market entry may be further hindered by the need of new entrants to establish a dependable product performance and necessary complementary services such as logistics. This process could take time because of low observability associated with amino resin products and their complimentary delivery services – observability is one of the five adoption factors mentioned by Rogers, 2003. Looking at amino resins' appearance tells very little about the consistency of product performance. Therefore, repeated laboratory testing and examination of end products in which the resins are used must be used to determine the performance dependability of amino resins (SCI, personal communication, April 23, 2011). Moreover, assessing dependable delivery can only occur after customers commit to a product purchase. The qualification and negotiation processes to establish delivery and performance dependability for new products consume time and resources and, therefore, hinder the adoption of new products.

Switching costs do not burden new entrants in the amino resin markets. Customers that use competing products can rather easily switch to substitute products without significant changes to their production processes. Compatibility among competing products is also high. Incidences

have been seen where customers even mix good high-performing resins with those with moderate performance in an effort to balance product specification and cost objectives. Overall, the market exhibits weak switching costs.

Entry barriers are somewhat lessened in the domestic market because of the lukewarm pursuit of protecting intellectual properties. However, the latest technologies used in the efficient production of MF and amino resins are, often, the intellectual properties of European firms which domestic firms often purchase. The substantial capital required to purchase these technologies hinder entry into the domestic market (SCI, personal communication, April 23, 2011; "Feasibility Studies", 2008). As an example, consider the investment needed to buy the latest technologies and equipments for implementing a plant with a capacity of 40,000 MT / yr. The required investment amount could reach nearly $8 million. In addition to the capital required to cover the cost of acquiring technologies and machineries, new entrants should pay nearly 10% of the total cost on import fees ("Feasibility Studies", 2008); this, further increases the upfront capital required for a successful entry. Moreover, the financing costs reaching as high as 26% further curtail new entry domestically (SCI, personal communication, April 15, 2011).

Retaliation may also hinder entry. Locally, retaliation has been observed in areas with higher supplier densities and underutilized assets. In these areas, compared to regions with low supplier density and fairly utilized assets, new entrants must devote more time and resources to marketing efforts to compete and neutralize competition forces. Since price is a critical consideration in consumers' decision making processes, players enter into price wars to win contracts. Consequently, rents are reduced and successful entry, hindered in regions with underutilized plants, like the province of Fars. Entries into the northern market are expected to face less competition than entry into the southern market: the northern part of the country accommodates more customers and less regional suppliers. Overall, establishing reputation, dependable products, and dependable operations as well as securing low-cost capital for asset purchases and surviving price competitions are the biggest challenges new entrants face domestically. It is anticipated that such challenges will be faced in the foreseeable future.

Entry barriers also exist in the western European market. One challenge that new entrants face is satisfying the standards that their customers have to meet, such as standards applicable to formaldehyde emissions from wood products. In the wood industry, wood producers need to meet the standards stipulated in EN 13986 or EN 14342 ("Formaldehyde Levels", 2010; British

Standards Institute, 2002, pp. 24, 35-36; British Standards Institute, 2006, pp. 10-11, 14-15). Passing such standards is closely dependent on the specifications of amino resins used in end products. As such, amino resin producers must assure their wood producing customers that all applicable standards can be met using their resins. This is more of a concern for international entrants; however, domestic entrants may also be impacted especially if they wish to supply resins to domestic manufacturers of wood products who export to international markets.

In addition to the effects of regulatory forces, most comments made about the domestic entry also apply to entry into Western Europe: Establishing reputation and dependable product performance are major challenges for new entrants in this market. Like domestic markets, western European markets exhibit low switching costs for amino resins because UF and MF resins can be easily substituted with their counterparts from competing firms. Lastly, new entry requires substantial initial capital to fund purchasing of required assets as well as marketing efforts. Overall, entry into the Western European market poses barriers similar to those faced by domestic entrants.

What could potentially promote entry into Western Europe, however, is that this market will need additional capacity to cope with the expected future increase in demand. This holds true particularly for UF resins: The current installed production capacity for UF resins in the region cannot fulfill the expected demand in 2015. According to Geriner & Funada (2010), in 2009, Western Europe maintained a UF production capacity of 2,773,000 MT / yr; the anticipated 2015 consumption is 2,792,000 MT / yr. The numbers for MF resins are 765,000 MT / yr and 620,000 MT / yr respectively. Based on these statistics, new capacity installations, particularly for UF resins, is necessary to support expected future demand. With firms running, on average, at near full capacity to support market demand in Western Europe, rivalry may decline and pressure on new entrants, weaken.

It is important to note that switching production lines from producing UF resins to MF resins is not difficult. Therefore, it is possible that excess production capacity of MF resins be used for producing UF resins in the future to support UF demand. If this happens, new entrants could face increased retaliation depending on the region of entry. Overall, this study assesses entry barriers to be medium and reasonably stable in Western Europe.

2.1.4 Supplier Power (Domestic: High and Stable; Western Europe: Low-Medium and Unstable)

The three primary input materials, which SCI currently obtains from external suppliers to produce MF and UF resins, are urea, melamine, and methanol. These inputs are shown in the supply chain diagram in Figure 1-4, section 1.2. Although melamine is a derivative of urea, as a technologically separate input into SCI's production process for MF resins, its supply situation is worth studying separately.

Domestically, these three chemicals are produced by the subsidiaries of National Iranian Petrochemical Company (NIPC)[1] which is owned by the government. Figure 2-3, Figure 2-4, and Figure 2-5 show the names and locations of the NIPC subsidiaries that produce urea, melamine, and methanol in Iran. Because NIPC is the sole suppliers of urea, melamine, and methanol, this study holds that the structure of the domestic supply market for these chemicals is a monopoly. In the following, the domestic market of each input material is briefly reviewed.

Urea's annual production volume is nearly 4.4 million tons in Iran, approximately 2 million tons of which is used by the domestic industries ("Iran is becoming", 2011). Because of oversupply, urea is widely available to support domestic demand. Urea stock is subdivided into industrial and agricultural classes. This classification is enforced by Iran's government. The agricultural class of urea is intended for use in agriculture as a nitrogen-release fertilizer; the industrial grade is used in industrial applications. Although the industrial and agricultural grades of urea have the same product specifications, trade prices differ between the two classifications: Agricultural urea is priced at nearly $100 per ton while the industrial grade is traded at $350 per ton. This price difference results from the state subsidy on agricultural urea.

Consumers such as SCI only qualify to purchase industrial grade urea. The most common method of obtaining industrial-grade urea feedstock is spot exchange at government regulated prices. Spot price of industrial urea is not dependent on domestic location and is almost consistent throughout the country. However, from time to time, agricultural consumers may sell their unused inventory of urea, at prices lower than industrial urea, to industrial users. These transactions are, in general, illegal; however, they do occur in certain circumstances involving

[1] http://www.nipc.net/indexen.php

certain players in attempts to gain cost advantages (SCI, personal communication, April 23, 2011).

Examining the domestic supply of methanol reveals that methanol is produced by NIPC's subsidiaries in the south. These southern subsidiaries fulfill the national demand of methanol for domestic amino resin producers. Methanol is supplied in auctions domestically. Furthermore, NIPC exports its excess capacity of produced methanol to international consumers.

Lastly, domestic Melamine supply is fulfilled by NIPC's subsidiaries that are located in the north of Iran. These subsidiaries fulfill the national demand of melamine used in the production of amino resins. Melamine is offered through auctions domestically as well.

Overall, the supply sources of urea, melamine, and methanol are tightly controlled by NIPC, which holds a monopoly domestically. In addition, importing these raw materials is tightly restricted. This has reduced the number of choices over sources of supply from which the domestic amino resin producers could buy urea, melamine, or methanol. As a result, this study asserts that supplier power in the domestic market is high and customers possess extremely low power in negotiating purchasing terms with NIPC. It is expected that this trend continue in the foreseeable future.

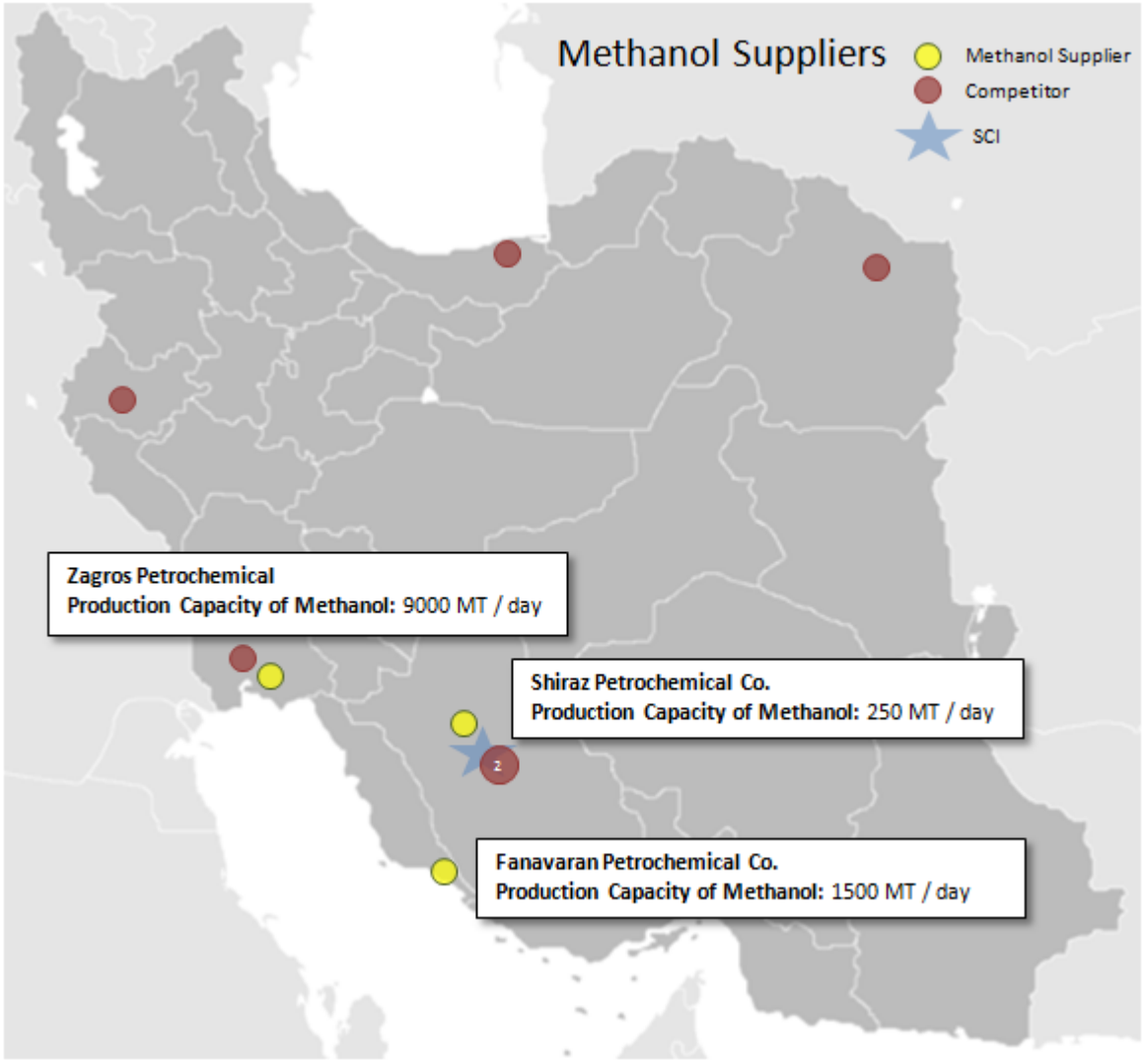


Figure 2-3: Domestic methanol supplier locations and their daily production capacities

	Company Name	Location	Capacity (Million Tons / yr)
1	Khorasan Petrochemical Co.	Khorasan, Iran	-
2	Razi Petrochemical Co.	Khoozestan, Bandar Imam, Iran	-
3	Kermanshah Petrochemical Co.	Kermanshah, Iran	-
4	Pardis Petrochemical Complex	Assaluyeh, Iran	-
5	Shiraz Chemical Industries	Shiraz, Fars, Iran	-
		Estimate Total:	4.4 million

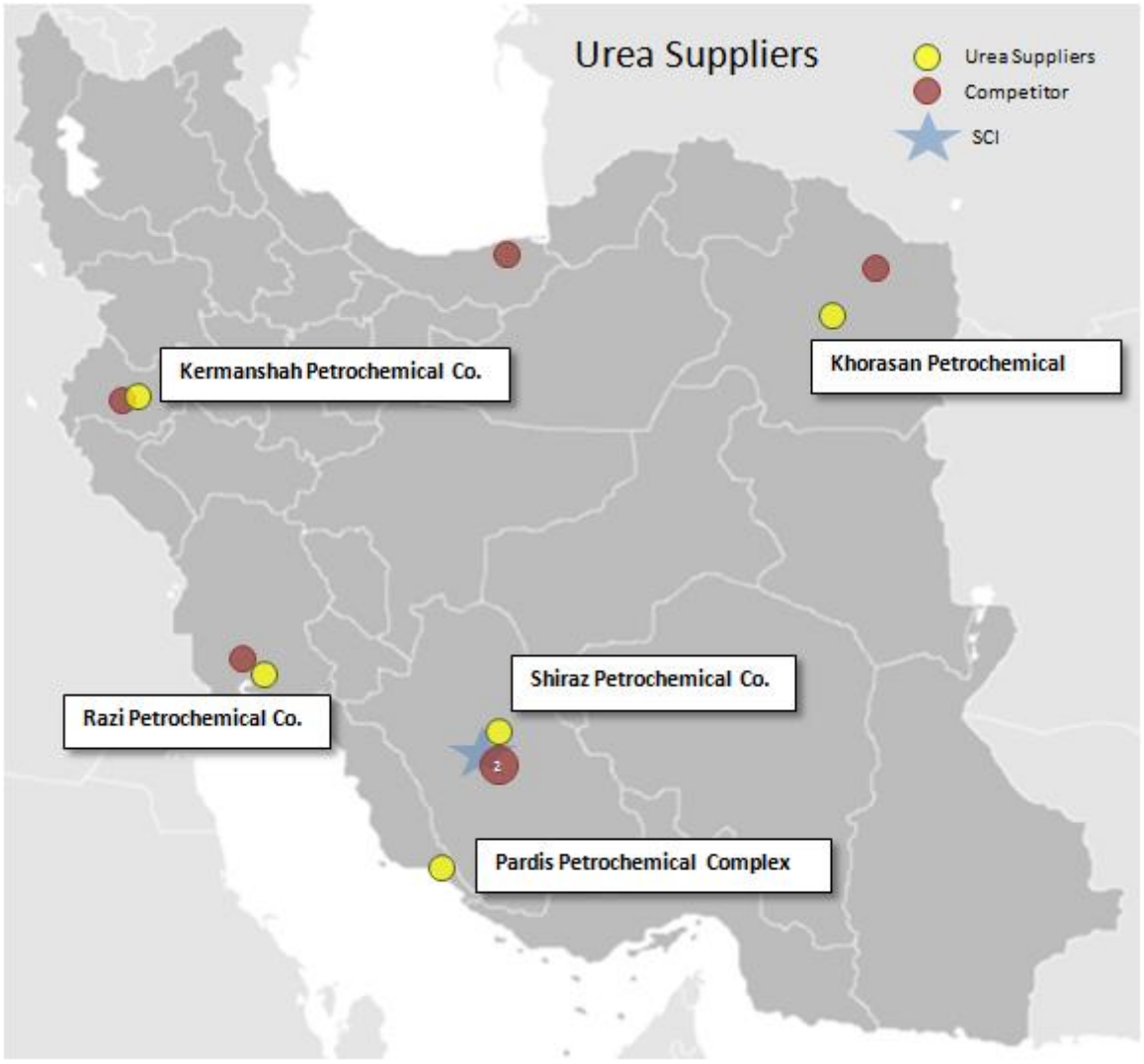


Figure 2-4: Domestic urea suppliers

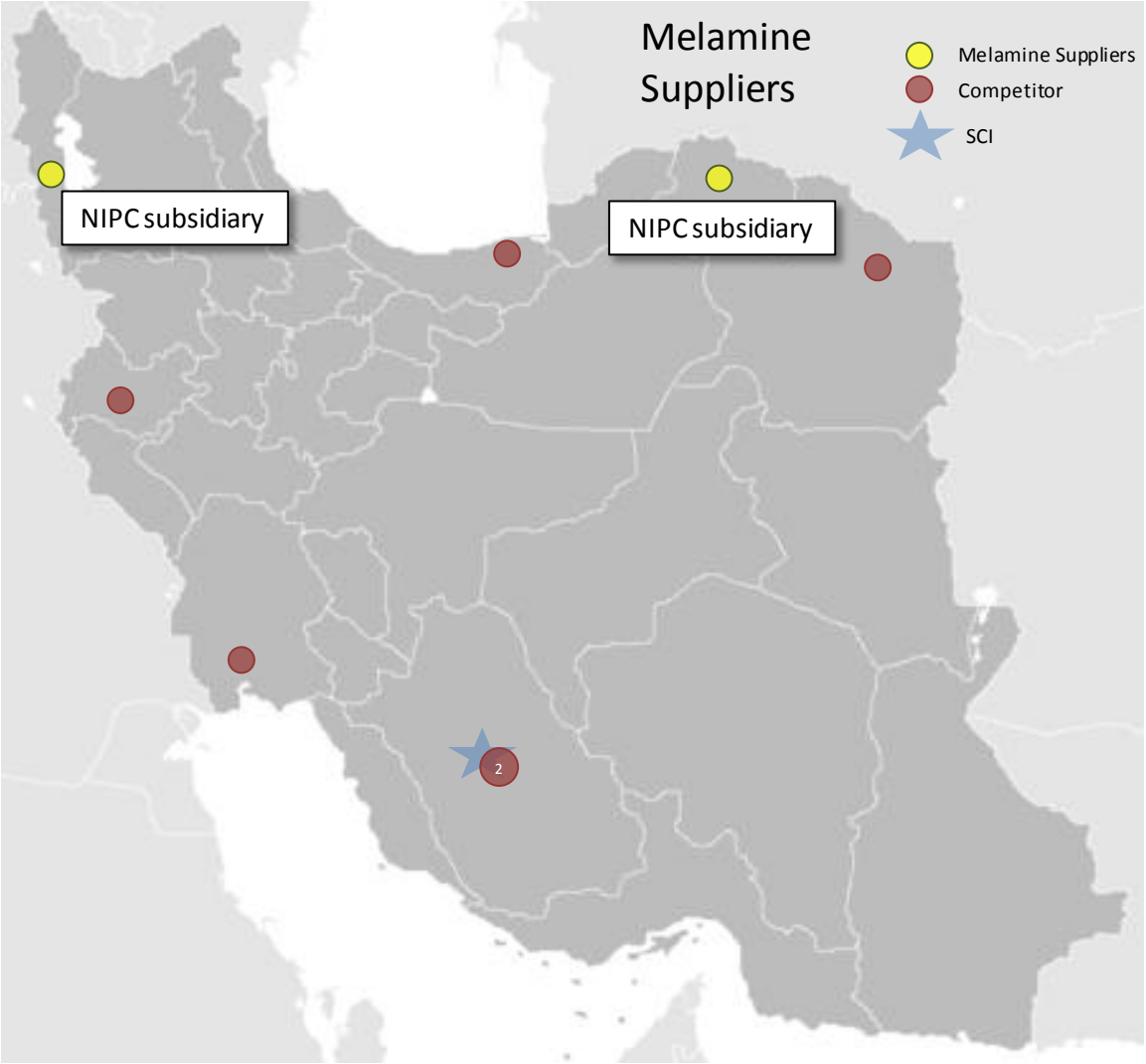


Figure 2-5: domestic melamine suppliers

The characteristics of urea's, melamine's and methanol's supply markets in Western Europe differ from those in Iran. In the western European markets, Methanol is primarily supplied by producers outside the region. Prices for methanol fluctuate and vary by several factors including global production location, economic conditions, price of natural gas, and demand and supply forces (Methanex Corporation, 2005; Methanex Corporation, 2011). Methanol price fluctuations can be established via an example: In November 2010, European spot prices for methanol were at nearly $385 Freight On Board (FOB) Rotterdam while Methanex's Europe April-to-June 2011 contract prices at $437 (Yeo, 2010). Table 2-2 lists the primary producers of methanol that supply Europe's demand of this feedstock - production capacities and

locations are also noted in this table. In addition, Figure 2-6 illustrates the flow of methanol to Western Europe. Because Western Europe receives its feedstock of methanol from globally located producers, it is important to look at the methanol market in a scale beyond Western Europe.

Table 2-2: Primary methanol suppliers to Western Europe (Yeo, 2010)

	Company Name	Location	Capacity (MT / yr)
1	Atlantic Methanol Production	Bioko Island, Equatorial Guinea	1,150,000
2	National Petroleum Company	Lybia	660,000
3	Methanol Holdings	Point Lisas, Trinidad	-
4	Methanex	Damietta, Egypt	1,300,000
5	Zagross	Asalooyeh, Iran	2,700,000
6	Petronas	Labuan, Malaysia	1,700,000

In the global market, Methanex is the largest producer of methanol holding nearly 15% of global methanol market share (Methanex Corporation, 2011). In 2010, global demand for methanol feedstock was at 48 million tons with production slightly surpassing demand at 49 million tons (World Petrochemical report on Methanol, 2011). Consumption is expected to reach $55.3 million tons in 2015 ("Global Methanol Market", 2011; World Petrochemical report on Methanol, 2011) nearly 2.1% of which is estimated to be used for amino resins produced in Western Europe according to the calculations presented in Table 2-3. The demand for methanol is mainly driven by the construction and automotive industries (Saade, 2009; "Global Methanol Market", 2011); however, new applications such as those in biofuels may increase future demand and disturb the current equilibrium between supply and demand forces ("Methanol Uses", 2010).

Table 2-3: Amount of methanol consumed, in 2015, for amino resins produced in Western Europe

	Used Methanol (kg)		
	1	**2.9**	UF Produced (kg)
	1	**3.1**	MF Produced (kg)
		Required Methanol (thousand tons)	2015 World's Methanol Capacity Used (%)
2015 UF Consumption (thousands of tons / yr)	2792	960.4	1.74%
2015 MF Consumption (thousands of tons / yr)	620	200.0	0.36%
Total	3412	1160.4	2.10%

Despite uncertainties around the application of biodiesel fuels, if adopted, such new applications could alter demand for methanol and result in periods of undersupply and oversupply: If biodiesels are adopted, quantity demanded could exceed available supply and, as a result, power could shift to suppliers in the short term. Noticeable changes in demand may be followed by corrective adjustments to increase supply. However, supply adjustments are not immediate and may not be accurate; therefore, a short-term oversupply period may pursue in which power shifts to consumers. Subsequent, repeated oversupply and undersupply conditions may cause oscillations in supplier-customer power until a new point of equilibrium between demand and supply is established.

Transportation costs may increase the power of methanol suppliers in neighboring countries and limit amino resin customers' choices in selecting methanol suppliers. However, risks of shipping methanol over long distances are low. If handled properly, methanol is not perishable. Therefore, Western European consumers could potentially source methanol from remote suppliers as long as shipping costs are not prohibitive. In the past, Europe has supplied methanol from Malaysia. This benchmark suggests that, for players in Western Europe, the benefit of supplying methanol internationally could, in some cases, outweigh its costs (Figure 2-6). The possibility to source methanol internationally could reduce the power of nearby methanol suppliers to some extent. Overall, methanol industry's attempt to keep global supply almost in par with global demand could signal a global power balancing attempt by methanol suppliers against the power of customers that could source methanol from international, independent producers.

Figure 2-6: Flow of methanol to Western Europe (Yeo, 2010)

As for the supply of urea, in 2009, urea production reached 147,307,000 tons according to the International Fertilizer Industry Association (IFA). Out of this total, Western Europe produced 4,531,000 tons of urea, 1,545,000 tons of which was exported to other regions. IFA estimates that the world's urea production in 2014 reaches 222 million tons while demand will reach 175 million tons in the same year exhibiting an average growth rate of approximately 3.8% ("Urea Uses", 2010; Yara, 2010).

Correcting for transportation costs, the price of urea in Western Europe is set by global supply and demand rather than regional forces (Yara, 2010). Figure 2-7 shows the ten largest producers, exporters, and importers of urea along with urea volumes for the countries in each class. It is argued that the price of urea is influenced by the trade profile at two hubs: the Black Sea and the Middle East ("Chemical profile: urea", 2010). The Black Sea hub supplies Europe and Latin America while the Middle East hub supplies North America, Asia, and Oceania. The main global flow of urea is shown in Figure 2-8. Other regional flows are of importance if they affect global urea's flow profile at these two hubs (Yara, 2010). November 2010 spot prices for the Middle East were between $370 and $380 while those for the Black Sea were between $340 and $363 (Roache, 2010). However, urea prices are cyclic and generally follow price cycles of gas and oil (Yara, 2010). These cycles occur mainly due to lumpiness of new capacity installations leading to periods of oversupply and undersupply; this, in turn, could disturb supplier-consumer power until new equilibriums are reached (Yara, 2010).

With installed capacity exceeding consumption, it is anticipated that Western European suppliers possess reduced power in supporting the region's demand for both industrial and agricultural applications of urea. Urea supplier power could be further reduced considering that urea buyers have the option to source urea from international sources - According to Yara (2010), countries, such as Italy, import urea. In order to quantify the level of supplier power for producers of urea in Western Europe, this study utilizes the four-firm concentration method. Major producers of urea and their estimated production capacities in Western Europe are listed in Table 2-4. The exact sales figures are not available; however, because the average capacity utilization was around 81%[1] indicating a reasonable balance between demand and supply in the

[1] Capacity utilization = $\frac{4,531,000}{5,580,000} \times 100 = 81\%$

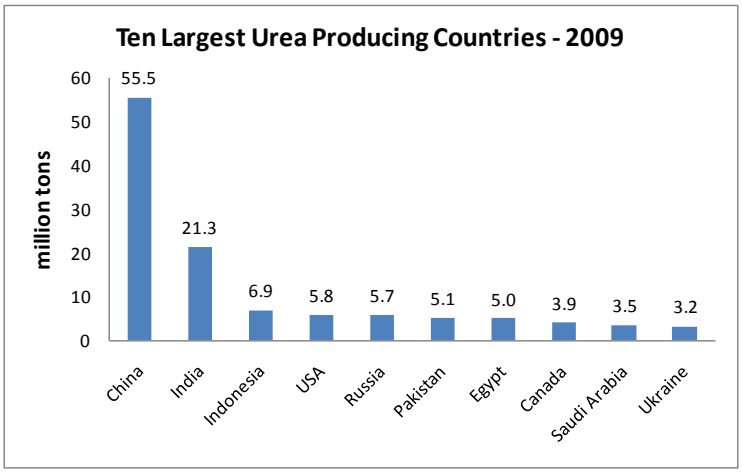
region, this study uses the production capacity figures in computing urea industry concentration. The calculation is as follows:

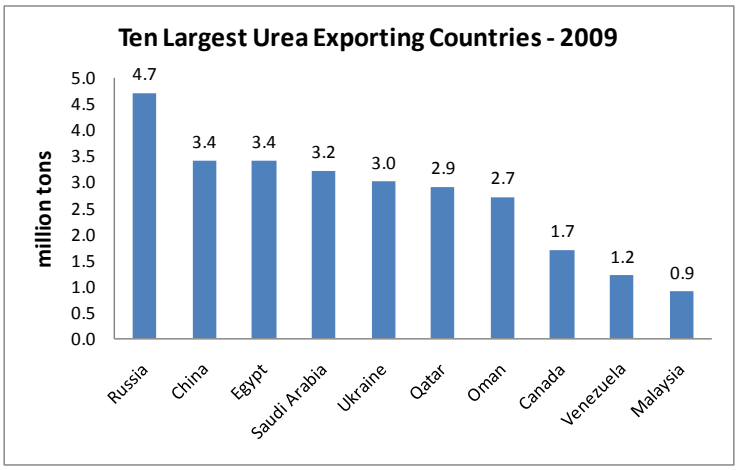
$$C_4 = \frac{S_1 + S_2 + S_3 + S_4}{S_T}$$

S_1, S_2, S_3, and S_4 represent Yara's, SKW's, Agrolinz's, and BASF's production capacities respectively. The resulting *four-firm concentration ration* is 0.8. Because, on the scale of 0 to 1, this figure is close to 1, it can be concluded that there is a small competition among producers of urea for sales to customers. This could indicate that suppliers possess some negotiating power. However, as noted earlier, with installed capacity exceeding demand and consumers enjoying some flexibility in obtaining urea from international sources, urea supplier power is limited. Transportation costs should not hinder sourcing from alternate suppliers as urea has high nitrogen content (46%) making urea's transportation relatively cheap (Yara, 2010).

Urea industry may see some consolidation in the coming years. Yara, with nearly 7% global market share and 41% market share in Western Europe, is one of the major players in the global market for urea. The company is seeking merger and acquisition opportunities. According to Reuters, Yara's CEO has noted that "there should be fewer players in the market" ("UPDATE 3", 2010). If global consolidations take place, supplier power and margins in the urea market may increase.

Demand of urea may rise because of its increased usage in controlling NOx emissions of diesel engines. Usage of urea can help meet the near-zero NOx emission requirements which is mandated by Western Europe (James & Funada, 2010). Increase in urea's consumption for this application could bring supply further in par with demand increasing supplier power in the region.





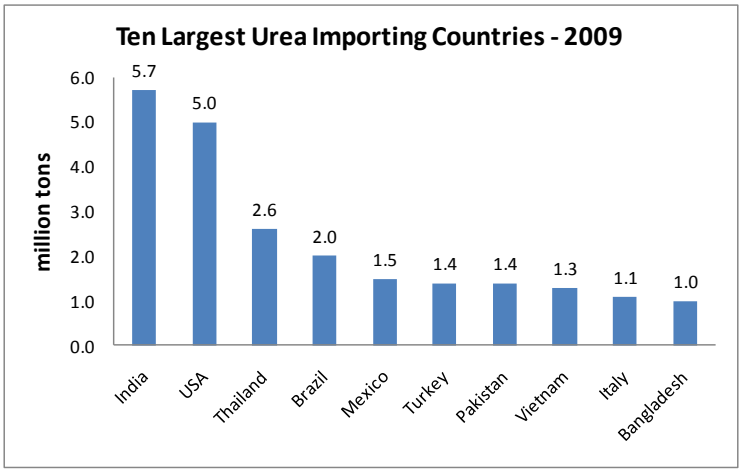


Figure 2-7: Ten largest global urea producers, exporters, and importers (Yara, 2010)

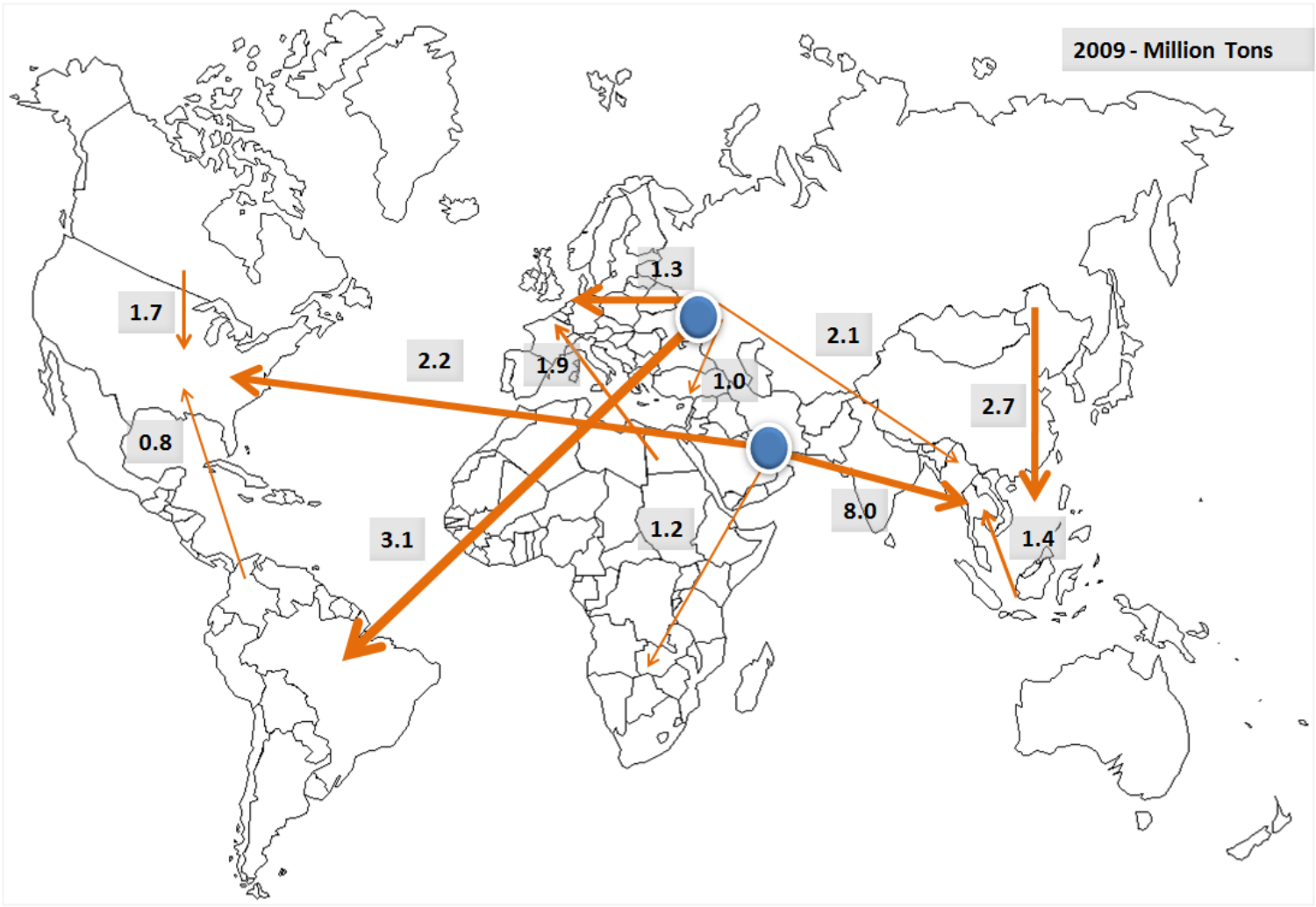


Figure 2-8: Main global flow of urea (Yara, 2010)

Table 2-4: Western European urea suppliers ("Urea Uses", 2010)

	Company Name	Location	Capacity (000 Tons / yr)
1	Adubos de Portugal	Barreiro, Portugal	95
2*	Agrolinz Melamine International	Castellanza, Italy	150
		Linz, Austria	420
3	BASF	Ludwigshafen, Germany	540
4	OCI Agro	Geleen, Netherlands	390
5	Fertiberia	Palos de la Frontera, Spain	300
		Puertollano, Spain	200
6	GPN Agriculture	Oissel, France	130
7	SKW Stickstoffwerke Piesteritz	Lutherstadt Wittenberg, Germany	1,070
8	Yara	Brunsbuttel, Germany	535
8		Ferrara, Italy	560
8		Le Havre, France	350
8		Sluiskil, Netherlands	840
		Estimate Total:	5,580

* AMI Agrolinz Melamine International is a subsidiary of Borealis

Lastly, examining the melamine supply in Western Europe, as the second largest consumer of melamine (Bizzari & Funada, 2010), reveals that melamine is likely supplied primarily by six globally located companies. These firms are listed in Table 2-5 (Strathearn, 2010). On this list, Borealis is the leading player in the European melamine market holding an estimated 20% market share.

This study estimates that the six melamine suppliers produce 601,000 MT maximum total volume of melamine per year. The price of the produced melamine in the region is likely set by demand and supply forces. Melamine customers possess some power over price of melamine because of choice over suppliers. However, forecast growth in melamine demand, according to Bizzari & Funada (2010), and production outages noted by Strathearn (2010) could create future supply shortages which, in turn, could shift power from customers to suppliers over certain periods. Strathearn (2010) provides an example concerning an Iranian supplier that was able to increase international sales prices for melamine in the past due to short-term supply shortages.

Overall, considering the supply market of urea, methanol, and melamine in Western Europe, this study asserts that supplier power in Western Europe is generally low-medium with some levels of instability.

Table 2-5: Suppliers of melamine in Western Europe

	Company Name	Location	Capacity (MT / yr)
1	Zaklady Azotowe Pulawy	Poland	96,000
2	OCI Melamine	Netherlands	120,000
3	Borealis	Germany, Austria	160,000
	BASF	Germany	65,000
4	Qafco	Qatar	60,000
5	Methanol Holdings (Trinidad) Ltd	Trinidad	60,000
6	Iranian supplier	Iran	40,000*
		Estimated Total:	601,000

2.1.5 Customer Power (Domestic: Medium-High and Stable; Western Europe: Medium and Declining)

In the domestic amino resin industry, the distance between suppliers and customers often affects the power of customers against suppliers. Amino resin buyers generally prefer to purchase their supply of resins from local suppliers and they have good reasons for this: buying locally reduces transportation costs; the reduction in transportation costs, in turn, reduces the overall cost of obtaining amino resins. Furthermore, buying locally prevents many of the risks associated with shipping perishable and sensitive chemical products across long distances. These risks include resin solidification due to weather conditions and delays in delivery due to poor driving conditions between suppliers' and customers' locations.

With demand concentrated locally due to transport considerations, customer power is dictated by the local supply and demand forces. In localities that exhibit overcapacity of amino resins, customer power is often high. Conversely, in territories with shortages of amino resin supplies, customers are expected to have reduced bargaining power because local firms face fewer challenges in filling their production capacities.

To gain a better understanding of the customer forces in the domestic market, this study begins by examining a plot illustrating the geographic locations of the main domestic amino resin customers. Figure 2-9 shows this plot. The numbers in the green circles indicate the number of customers in each locality. Based on the lengths of the routes connecting amino resin suppliers to customers, every buyer is considered to be within a reasonable distance from every amino resin supplier; this means that amino resin products can be transported from any supplier to any customer within the country before the product naturally perishes. In addition, the plot indicates that northern Iran, the part of the country with a plentiful supply of vast and dense forests, has the

highest number of amino resin buyers. These northern buyers generate an estimated 50% of the total domestic amino resin demand with the rest of the domestic demand generated by southern customers. Although the illustration in Figure 2-9 helps determine the demand distribution geographically, it is important to note that the local demand volumes, in the north or the south, are not enough to fully utilize the installed local capacities; nor are they enough, in aggregate, to fully utilize the total installed capacities nationwide. This outlook can be established by comparing capacity estimates in Table 2-1 and Iran's estimated national consumption volume in Figure 1-7.

Based on the data presented in Table 2-1 and Figure 1-7, Iran's total installed capacity for the production of amino resins is estimated to exceed 240,000MT while Iran's total consumption of the resins is estimated to reach nearly half of this amount. The overcapacity conditions provide customers with abundant access to sources of amino resin supply and, consequently, substantial bargaining powers. This power is somewhat reduced against local suppliers by the fact that supplying material from remote suppliers increases risks and costs. Nonetheless, remote suppliers remain alternatives to local resin providers; as a result, customers' positions are strengthened against local suppliers.

In a few cases, customer power may be reduced due to the requirement to conform to certain specifications. In such circumstances, conformance takes priority over obtaining the least possible price. Because of the need to meet specific requirements, such as meeting certain regulatory requirements, customers may need to work with suppliers further away from their production base – a few of SCI's low-volume customers in the north fall under this category. Under these circumstances, customers enjoy less bargaining power because of limited choice over suppliers that can satisfy their special product requirements. In such circumstances, to mitigate their bargaining power, customers utilize the technique of mixing products from different vendors – blending a high performing product with cheaper low performing versions - to achieve their desired price/performance targets while diversifying their sources of amino resin supply.

In general, this study assesses the negotiating power of domestic customers to be medium to high. This assessment considers that customers with the need to meet special requirements are quite few. Furthermore, the study contemplates that Iran's internal production of amino resins exceeds internal consumption. These observations, along with the intense domestic rivalry noted in section 2.1.1, confirm that customers maintain an abundant access to sources of amino resin

supply and, therefore, benefit from increased bargaining powers in demanding their preferences. With installed capacities significantly exceeding demand, this situation is expected to continue in the foreseeable future.

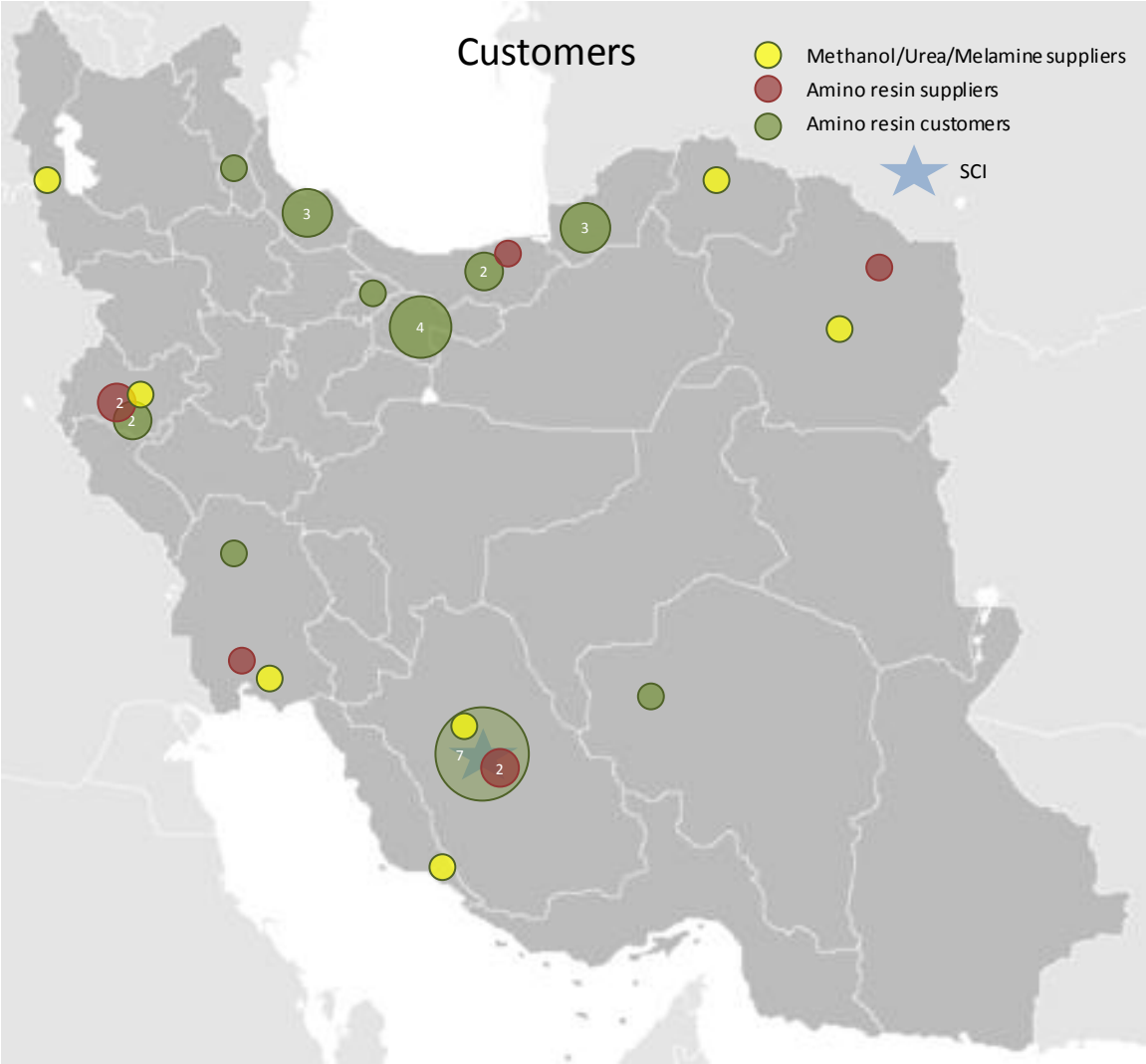


Figure 2-9: Location and concentration of domestic customers. Supplier locations indicated are for urea, methanol, and melamine combined.

In the European markets, similar to the domestic market, customers are economically inclined to buy from local suppliers. The dominance of local trade for amino resins is confirmed by Greiner & Funada (2010). They contend that most UF resins are traded within nearby regions because of transportation costs associated with shipping liquid amino resins that incorporate high

water content. MF resins have the additional disadvantage of a shorter shelf life, which further limits the range of transportation for MF resins.

With customer-supplier interactions limited to local markets, similar to that in the domestic market, the power wielded by customers depends on whether or not the local supply can meet the local demand. Determining local demand and supply capacities in international markets, however, is a challenging task which requires information about amino resin supply and demand in the localities within Western Europe. Gathering or obtaining such data is beyond the scope and resources of the current research project. Therefore, this study considers Western Europe as one aggregated region in assessing customer power in the region. In doing so, it considers the states of regional production and consumption to determine the overall supply and demand forces that, in turn, influence customer power in general.

Table 2-6 shows the Western Europe capacity, production and consumption numbers for 2009 and a demand projection for 2010 and 2015 (Greiner & Funada, 2010). This table shows that, to satisfy consumption needs in 2009, suppliers, on average, ran at 86% utilization for UF and 80% utilization for producing UF and MF resins together. Moreover, if new entry will not occur, UF consumption in the region is expected to exceed the current installed capacities in the region by 2015 – this is illustrated in Table 2-6. The total 2015 UF and MF consumption volumes could only be met if the average capacity utilization of individual plants exceeds 96%.

Customer power may be limited considering that the current production volume falls short of the consumption volume of amino resins in the region. Furthermore, with increases in demand, western European customers could lose some of their negotiating power by 2015 if no new entry occurs. Considering the already near full capacity utilization of resin production plants, local producers in Western Europe may keep production levels below maximum utilization output capacities in order to reduce the negotiating power of customers as demand increases. Overall, this study contends that the bargaining power of customers in Western Europe is medium. The prediction of this study is a declining trend in customer power.

Table 2-6: Western Europe Supply and Demand for UF and MF Resins (thousands of MT) (Greiner & Funada, 2010)

	2009			2010	2015
	Capacity	Production	Consumption	Consumption	Consumption
UF	2,773	2,122	2,326	2,432	2,792
MF	765	529	505	536	620
Total	**3,538**	**2,651**	**2,831**	**2,968**	**3,412**

2.1.6 Socio-Political Environments (Domestic: Currently Unfavourable and Unstable; Western Europe: Currently Unfavourable and Stable)

In the context of finding a strategic fit, both economic and socio-political environments must be examined - this notion is also emphasized by Grant (2008). Therefore, alongside the entry, supplier, buyer, rivalry and substitute forces, which certainly influence the business of incumbents or the selection of market entry opportunities, social and political factors should also be assessed. Consider quandaries such as whether or not the firm could have access to investors and financiers; whether it could receive support from the government; whether the business can attain social legitimacy and obtain acceptance from its consumers and the society; whether the culture of the society is a culture that nourishes effort and creativity. In addition to assessing the external economic forces, attending to these and similar socio-political factors is necessary to determine whether a business could succeed in its external business environment. Hence, in assessing SCI's growth opportunities, it is pertinent to examine the socio-political forces impacting businesses in Iran and Western Europe.

2.1.6.1 Socio-Political Environment in Iran

The Islamic Republic of Iran is a country located in the Middle East with nearly 45% of its GDP coming from the industrial sector (Congressional Research Service, 2010). This country is both labour-rich and resource-rich. However, despite the country's richness in resources and labour, over the past few years, growth in Iran has been challenging due to US and UN sanctions. Some analysts contend that the sanctions related to Iran's uranium enrichment program are imposing pressure on the country's financials and international trades (Congressional Research Service, 2010). The resulting high inflation and unemployment rates as well as low levels of foreign investment are noted to be dominant factors impeding the country's overall growth. In addition to sanctions, the controversy around Iran's presidential election has disturbed the socio-

political environment in which businesses operate. The following provides further details on how these socio-political forces are impacting the operation of domestic businesses.

Ranked as the fourth largest oil exporter, Iran finances its economy through revenues generated from this natural resource. However, the country lacks enough refineries to process oil and support demand of certain oil derivatives such as gasoline. To fulfill the country's demand, Iran imported 30-40 percent of its total consumption of gasoline (Mostafavi, 2011). But, the current political environment and the embargos against Iran have put pressure on the Iranian government to find new sources of gasoline supply. To balance supply and demand, the government has cut subsidies on fuel and energy products causing energy prices to soar significantly. Considering that Iran has not reached consensus with the powers in the west over its nuclear programs, it is anticipated that policy changes will not occur in the foreseeable future and energy costs remain high.

Along with the rising costs of fuel and energy, prices of other goods and services, such as food and housing, have increased. As a result, the inflation rate has risen significantly jumping from 12.4% in March 2011 to 14% in April 2011 (Mostafavi, 2011). Despite monetary contributions by the government to low income classes of Iran's population, the middle and low classes of the society are under extreme pressure to make ends meet. As financial pressures increase, businesses should not only find ways to cover increased operating expenses, but also manage the challenging tensions their employees and external stakeholders such as sellers and buyers face.

Businesses are further challenged to foresee what comes next because of sanctions against the country. "One day certain airlines operate in Iran; the next day those airlines ban cooperation with the country. One day international banks service Letters of Credit; the next day, they don't." SCI's CEO noted. Because of sanctions against Iran, sudden, unpredictable changes in the domestic market are likely, at least in the short term. Such uncertainties create significant challenges for domestic businesses to manage their operations, particularly their supply chains: Businesses face challenges in forecasting prices of their inputs, forecasting demand, and deciding on opportune purchasing times. In addition, businesses face difficulties in offering stable prices to customers, leading to buyers holding back on their purchases.

In addition to creating challenges in managing supply chains, the resulting instabilities in the market create predicaments for firms in securing investments needed to sustain operations. Financiers and investors hold back investments in domestic opportunities because of high risks associated with returns on investments. The result of the political situation surrounding Iran's debate over its uranium enrichment program, for the past three years, has been a stagnant economic environment with reduced investment activities. Iran has been able to slightly curb the effect of sanctions by turning to China and Russia. However, the country has not been able to completely neutralize the socio-political forces created by sanctions (Congressional Research Service, 2010).

The political unrest around the controversial presidential election has also created a social environment far from ideal for businesses. After the election, the society is more evidently divided into two groups: one segment pro and the other against the elected president. This situation makes it difficult to attain socio-political legitimacy and decide which norms to adopt. Finding a balanced path that keeps the business close enough to the line of power in order not to jeopardize the business and close enough to the two classes of the society to establish legitimacy is an extremely difficult endeavor.

Aside from sanctions and the unrest around presidential elections, looking within the domestic industry sector, the power of the private manufacturing sector has been weak compared to state-owned or state-controlled companies. As an example, the government uses oil reserve funds to support state-owned businesses at the expense of loans to private companies. This segregation puts state-owned companies at a cost advantage because they can obtain capital at zero or very little cost. In general, state-owned companies with close ties to the state enjoy a strong leeway in obtaining funds and resources. It is possible that private industries enjoy similar benefits; however, that requires established strong bonds with members in power.

Overall, the socio-political environment in Iran fosters high levels of uncertainty and financial segregation. Corporations are exposed to constant socio-political changes the effects of which have pressured the domestic industries and the economy. In addition, attaining stability and cost advantages depend on strong bonds with key influential system players – something that not every player could establish.

2.1.6.2 Socio-Political Environment in Western Europe

Since this study focuses on Western Europe that may provide SCI with growth opportunities, it is important to review the socio-political environment in this region as well. Needless to say, establishing new operations in Western Europe would require creating new relationships such as those with potential partners, suppliers, as well as real estate and hiring agencies. In doing so, socio-political forces can increase transaction costs and further frustrate attempts to enter this new market. Among all the socio-political forces that could affect SCI's entry into Western Europe, this study focuses on Iran's foreign affairs and the current state of sanctions, language barriers, cultural differences, and communication methods; these, among other socio-political factors, are considered to have strong bearing on SCI's success in international markets.

Worldwide, Iran does not enjoy a very favorable image. The United States has repeatedly rejected Iran's requests to join the WTO since Tehran's first attempt to join the organization in 1996 (3D, 2004). Since 2005, Iran has only been able to hold an Observer status in the WTO ("The WTO Members And Observers", n.d.). In November 2009, Iran has submitted its Memorandum on the Foreign Trade Regime. However, the Working Party has not yet reviewed this Memorandum to decide on the terms and conditions of entry if it is to be granted ("The WTO Accessions - Iran", n.d). In addition, the EU currently imposes sanctions against Iran over the country's controversial nuclear program. These sanctions form some of the most severe penalties EU has imposed against another country. EU last reinforced its sanctions against Iran on October 27, 2010 (Financial Sanctions, 2010). Considering that no resolution has been reached over Iran's uranium enrichment program, it is expected that sanctions continue to influence Iran-EU relationships. Furthermore, the sanctions could deteriorate Iran's reputational capital and, in turn, hamper SCI's attempts to enter the markets within Western Europe. The situation may improve should Iran eventually gain full membership status in the WTO; however, it is unknown as to when a membership agreement would be finalized.

Language differences, also, create barriers for a business in a new, unfamiliar environment. Although the English language is widely used as an accepted language for business, the level of mastery of the language varies at the individual level. Such variations, combined with mixed cultural backgrounds, can influence perceptions and impact negotiations and relationships. Depending on culture, negotiators may regard the purpose and methodology of a negotiation differently: In certain cultures, the aim of a negotiation is to reach a mutually agreeable deal and

execute on a contract; in some other cultures, the primary goal of a negotiation is to form a relationship between the two parties, and the contract, although important, is a result of the relationship (Salacuse, 2004). Such differences in views demand clear communication, time, and resources to resolve in order to reach consensus and conduct business.

To add to language and cultural barriers, accustomed communication methods could also encumber business transactions. Communication methods are different from culture to culture. For instance, some cultures advocate direct methods of communication - as is more common in western cultures; in contrast, others rely extensively on indirect methods - as is more common in Middle Eastern and Asian cultures. In the latter, the use of verbosity, facial and body expressions, and figurative speech, and other kinds of indirect communication are also common (Salacuse, 2004). Moreover, research indicates that Western and Asian negotiators exhibit differences in their body languages (Body Language Barriers, 2010). Such differences certainly pose challenges in establishing effective communication between stakeholders involved in negotiations. Overcoming these challenges requires financial backing to fund learning exercises and acquire related resources that the company may not currently possess.

Overall, the socio-political environment in Western Europe is not favourable. Iran has established a weak international image particularly in the view of western countries. Therefore, it is expected that Iranian businesses, including SCI, face increased challenges in establishing business relationships with international firms. Cultural and language barriers are expected to further hinder capitalizing on opportunities in Western Europe.

The review of the socio-political forces implicated in competing domestically and internationally suggests that these forces, similar to the economic forces, influence SCI's business. Therefore, in identifying the industry's KSFs, which are required to effectively compete in the domestic and western European markets, the impact of both the economic and socio-political forces must be considered. The industry's KSFs are reviewed in Section 2.2.

2.2 Key Success Factors (KSFs)

The assessment of the external forces surrounding SCI's business prepares the foundation for identifying the industry's KSFs. This study follows Grant's (2008, p. 88) definition of Key Success Factors as "those factors within the firm's market environment that determine the firm's ability to survive and prosper". Based on this definition, the industry's KSFs include those that

determine the survival of SCI in competing domestically. They also include the factors that determine the success of the company in entering and, subsequently, competing in the western European markets.

In identifying the KSFs, this study attempts to answer two key questions for both domestic and western European markets: 1- What do amino resin customers want? 2- How should SCI survive competition? Through a careful review of the material presented in this chapter, the answers to these questions are summarized in Table 2-7 and the KSFs that SCI must possess to pursue domestic and international growth opportunities are noted. The next chapter briefly discusses the merits of each KSF and, subsequently, examines SCI's internal position with respect to each identified KSF.

Table 2-7: KSFs for competing in the domestic market and pursuing entry into Western Europe

What Do Customers Want?	How To Survive Competition?	KSF
Competitive price	Price competition	Automated production
Proximity to suppliers	Financial strength	Low-cost location
Extended payment terms	R&D	Production near customers
Consistent product performance	Extensive marketing	Strong industry network
Consistent product delivery	Establish reputation	Knowledgeable and motivated human resources
Meet customer's minimum specification	Multiple offerings	Low-cost capital
		Low-cost input
		Extended working capital
		Dependable operation **
		Established quality **
		Flexible operation **

What Do Customers Want?	How to Enter/Compete ?	KSF
Regulatory compliant products*	Financial strength	Extended working capital
Consistent product performance *	Establish operation facility	Strong Industry network
	Extensive marketing	Strong cultural knowledge
	Establish reputation	Good international relationships
		Establishing a reliable remote team
		Access to distribution partners
		Available and knowledgeable
		Understanding customer needs

**More thorough research is necessary to understand demand drivers in Western Europe*
*** See section 4.2 - Performance Objectives - for details*

3. Current State: Internal Analysis

Subsequent to preparing the list of KSFs for growth in both domestic and international markets, this study proceeds with examining SCI's internal business. The internal assessment of the company helps to determine whether SCI currently possesses, or can acquire, the success factors necessary to sustain its existing business and pursue growth opportunities domestically and internationally. To this effect, this chapter examines SCI's position with respect to each identified KSFs listed in Table 2-6 of section 2.2. A brief justification is also provided as to why each KSF is important to the success of SCI. In ranking SCI with respect to the identified KSFs, SCI's position is compared against competitors, even if not explicitly noted. The positions of competitors against the industry KSFs have been primarily established through interviews with SCI. Table 3-1 explains the ranking system used.

Table 3-1: Ranking used for assessing SCI's position against industry KSFs

RANKING	DEFINITION
Strong	Comparable to industry leaders / potential source of competitive advantage
Medium-Strong	Better than average
Medium	Average
Weak-Medium	Less than average
Weak	Much worse than industry average

3.1 Domestic Markets

3.1.1 Automated production (Medium – Strong)

The importance of automation stems from two market requirements: price and consistent product performance. Since price is a key driving factor in competing domestically, incumbents must lower their cost of production to be able to offer competitive prices. One approach to lowering production cost is reducing overhead costs. Overhead costs can be reduced by minimizing the cost of labor which can be attained through automation. Furthermore, consistent product performance demands establishing production automation to reduce manual errors and ensure a consistent product performance and delivery. The dependency of price and consistent product performance on automation turns production automation into an important KSF that should be examined further.

SCI's internal production processes are currently automated – temperature controls, release of formalin, and timers are integrated for automating SCI's manufacturing process. However, certain steps are currently performed manually. These steps are the release of urea input, the adjustment of PH, and the control of polymerization through measuring viscosity. Further automation could slightly lower overhead. However, the resulting overhead savings per unit of output are not expected to be significant since the time required to perform these manual tasks are much shorter than the throughput time of a batch meaning that no sizable speed advantages would be gained. Interviews with SCI suggest similar levels of automation by competing firms in the industry. Overall, this study assesses SCI's process automation to be medium to strong.

3.1.2 Low-cost location (Strong)

Because low price is important to the market, the cost of acquiring property and land should not be so high as to undermine SCI's ability to price its products competitively. Therefore, securing a low-cost location for business operations is identified as a KSF. According to SCI, their current plant is situated on a 99-year lease parcel and their office is a rented space. The total annual rent and lease amount is $5000. This amount comprises a very small fraction of the total fixed costs of nearly $1.6 million and is not prohibitive when included in the allocated overhead per unit of output. SCI notes that the rent and lease amounts for its plant and office are comparable to that paid by leading competitors. This study concludes that SCI currently satisfies this KSF.

3.1.3 Production near customers (Medium)

For goods that are shipped to remote locations, shipping costs could constitute as high as 10% of the cost of goods shipped. The high shipping costs could impede the company's ability to compete in a market that exhibits high rivalry, further discussed in section 2.1.1. Surviving competition depends on closeness to sites that generate substantial demand.

Today, SCI only operates one production facility in the province of Fars, situated in the south of Iran. From its current location, the company services orders amounting to 14,000 MT of amino resins. This order volume constitutes 12% of the total domestic market and allows SCI to utilize 46% of its production capacity. Although SCI is close to southern customers, three players – SCI, Sina, and Fars – compete in the southern market and are engaged in aggressive price wars. As a result, growing market share in the south has proven very costly. Further growth depends on

whether the company could economically capitalize on the opportunities in northern Iran. SCI's marketing team has identified business opportunities totaling 27,000 MT in the north, which the company could capture if it can set its product prices competitively. However, due to its distant location from the northern market and the resulting increased transportation risks and costs, the company has faced severe challenges in reaching price agreements with the buyers. Therefore, with its current location of operation, assuming the company continues to compete on price, SCI's growth prospects are limited. Considering the distribution of amino resin suppliers in the domestic market shown in Figure 2-1, this study attests that SCI's current production location ranks average and does not align very favorably with its domestic growth objectives within the domestic amino resin industry.

3.1.4 Strong industry network (Strong)

Aside from offering products that fulfill the needs of the market, access to an established industry network is critical to compete in the domestic market. An established network helps SCI grow its market share. In addition, affiliations with regulatory bodies as well as creditors and financiers support efforts to acquire the resources needed for growth.

Because SCI is founded by seven industry veterans that combine more than 240 years of industry experience, SCI is well connected to a network including banks, regulatory bodies, provincial and national industry bureau, universities, and potential customers. Overall, access to complementary resources through this network is assessed to be relatively strong compared to competing firms. SCI also notes that its industry network in the domestic market is very well established. Therefore, this study holds that the current industry network should not inhibit future domestic growth of the company. Consequently, SCI's position with respect to this KSF is assessed to be strong.

3.1.5 Knowledgeable and motivated human resources (Medium – Strong)

In order for SCI to survive competition and deliver on customer requirements, the company needs access to a pool of talented human capital to fulfill various functions that support market demand. Currently, SCI employs 43 people. The company's staff provides the firm with the technical, Quality Assurance (QA), accounting, sales and marketing, and operations knowledge necessary to produce and sell amino resins. This knowledge comes from a history of working for competing firms as well as pertinent education. SCI believes that its knowledge pool

is very competitive in fulfilling the required supportive and operational functions needed to support further growth and survive competition in the amino resin industry.

Although, according to SCI, the company possesses industry comparable human resources to fulfill the mentioned functions, examining the company's organizational chart reveals that SCI does not currently have a department dedicated to managing employee development and training. Pursuing growth could be hindered if growing the business would require growing the human capital of the company and the latter is not properly managed to align motivations and developments with the corporate growth strategies. Figure 3-1 shows SCI's organizational chart representing the current human assets that the company possesses. Overall, this study maintains that SCI's current position with respect to its human capital is medium to strong as compared to competitors.

To satisfy customer needs and successfully compete with other incumbents, SCI not only needs staff that can perform various supporting and operational functions, it also needs a staff that is dedicated and motivated. According to SCI's CEO, the human resources assigned to various functions discussed in section 3.1.5, are very dedicated to the success of the company. Over the past two years, the company has attained a staff turnover of 0%. This has been achieved mostly through establishing a collaborative culture where contributions are recognized and rewarded. Furthermore, the reputation and prior industry successes of SCI's founders motivate current employees to stay with SCI's current management team. Based on these facts, SCI seems to currently satisfy this KSF.

However, as also discussed in section 3.1.5, the company may need to adjust its organizational structure to maintain its human capital motivated as the company pursues growth: Further growth may require growing the human capital of the company. This may require establishing a dedicated HR function to administer hiring and training activities and to effectively manage change so as to keep staff motivated and dedicated to SCI's growth initiatives.

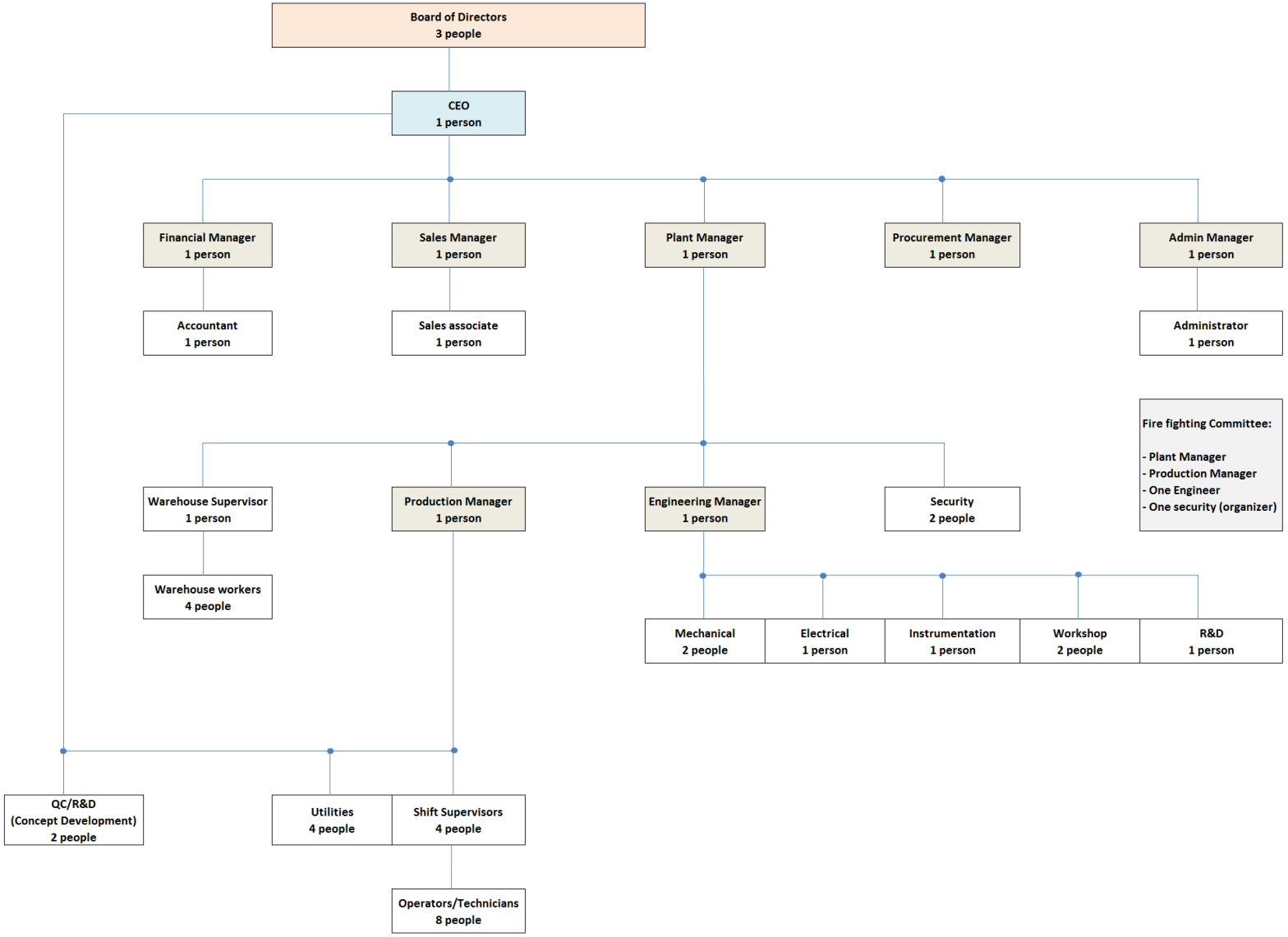


Figure 3-1: SCI's organizational chart

3.1.6 Low-cost capital (Weak)

As mentioned in section 2.1.1, domestic competitors compete vigorously on price. Consequently, for SCI to survive price wars, it is essential that the fixed and variable costs of operating the business are maintained as low as possible. This encompasses the cost of capital.

In the initial phases of financing, SCI secured its needed capital through owner's equity as well as bank loans. During the construction phase, the international embargos against Iran came into effect. As noted in section 2.1.6, these embargoes led to government subsidy cuts creating a sharp spike in the domestic inflation rate. The high inflation affected many businesses in the industrial and consumer segments leading to insolvency issues. Naturally, SCI fell short of the investment requirements to complete its plant construction phase. To compensate for shortages in its operating capital, SCI was forced to seek additional bank loans, which were issued at increasingly higher interest rates due to increased inflation. The act of securing additional financing delayed production and forestalled the expected cash flow from sales, which resulted in the company defaulting on their earlier bank loan payments. The defaults subjected SCI to penalties, which further increased their debt load.

In summary, higher than expected debt load at a higher than expected average interest rate has resulted in SCI's cost of capital to be much higher than originally anticipated. Examining the company's income statement for the 2010 fiscal year, shown in Table A-1, indicates that 30% of the company's 2010 income was used to service interest payments. Therefore, this study assesses that SCI is currently weakly positioned with respect to this KSF. The company has noted that its cost of capital is higher than that of competing firms.

3.1.7 Low-cost input (Strong for urea and melamine; Medium for methanol)

As discussed in more detail in section 5.1, the three primary raw material necessary for producing UF and MF resins are urea, melamine, and methanol. The cost of obtaining these input materials directly affects the market price of SCI's amino resins. Therefore, to grow and successfully compete in a market strongly driven by price, obtaining low cost inputs becomes an important KSF.

In assessing the low-cost-input KSF, this study compares SCI's costs of acquiring urea, melamine, and methanol feedstock with that of SCI competitors in relative terms. Furthermore, because competition primarily takes place at a local level (see section 2.1.1), this KSF only

compares SCI's cost of acquiring inputs with that incurred by SCI's local competitors – Fars and Sina.

The price at which SCI's purchasing team can obtain urea and melamine is very similar to that secured by SCI's competitors located domestically. Therefore, the acquisition price of urea does not threaten the success of SCI in the domestic market. However, the situation differs for methanol: SCI's cost of acquiring methanol is higher than that incurred by SCI's local competitors - Fars and Sina - because SCI is nearly 120KM farther from the point of methanol supply. Since methanol accounts for nearly one third of the variable costs for producing amino resins (see Table 2-3), the slightly higher cost of acquiring methanol positions the company at a disadvantage in current local price wars. Overall, the company is at a slight disadvantage with respect to acquiring the raw material it needs for producing amino resins.

3.1.8 Extended working capital (Weak)

Positive working capital is the backbone of financial strength. Without it, SCI will not be able to give its customers payment terms that they could otherwise obtain from SCI competitors. In addition, healthy working capital is necessary to ensure the company's ability to continue operations and service related operational expenses and maturing short-term debt. Hence, working capital is an important KSF for SCI.

Before building its production plant, SCI developed a financial strategy to provide for sufficient working capital until such time as the company starts generating a positive cash flow. However, due to changes in the external environment during the construction phase of the initiative (discussed in section 3.1.6), the company used more cash than originally budgeted. As a consequence, SCI is now short on low-cost operating capital and is facing challenges in maintaining positive working capital.

Additionally, most of SCI customers, who are facing very similar financial challenges due to soaring inflation, are defaulting on their payment obligations. The default on payments has crippled SCI's cash flow. SCI's weak working capital situation can be noted by examining the company's 2009-2010 financial statements and rations in Table A-1, Table A-2, Table A-3 and Table A-4 included in the Appendices section. Out of SCI's total assets of $4.4M, roughly $1.2M, or 27%, is allocated to accounts receivables. The days receivable ratio is 171 days, which is much higher than the originally extended payment term of 90 days. SCI notes that the deviation is not attributed to deficiencies in collection processes but rather due to competitors extending payment

terms to customers. In 2010, the deviation between the expected and actual days receivables cost SCI $120,000 million, approximately 5% of the revenues of the company.

The obvious resolution to a cash shortage problem is to lengthen payables, shorten receivables, or inject cash into the company's financial system. Since the first two depend on market forces, SCI cannot shorten its receivable turnover or extend its payable turnover without adversely affecting its competitive position. Inevitably, the variance should be financed. The alternate sources of financing at this point in time are either from the owner's equity, or debt financing provided from the banks.

Examining the situation further has revealed that the owners are facing low liquidity in their personal assets and are no longer able to inject cash into the company. Moreover, debt financing, as noted earlier, would further increase the cost of capital and exacerbate short term debt obligations because of increased interest payments that would be required. What is certain is that the company would need to devise a solution for its cash shortage problem in pursuing further growth. Considering these facts, this study concludes that SCI does not currently possess this very important KSF. The company denotes that its working capital reserves are much lower than that possessed by its competitors.

3.1.9 Dependable operation (Medium – Strong)

Receiving a stable and predictable product performance and delivery is an inherent need of the market. Any volatility in the product performance or services associated with delivering the finished goods could expose customers' business operations to costly risks that could erode the cost advantage of an offering in the view of customers. Therefore, a dependable operation is important to the success of SCI in the amino resin market. As discussed in further detail in section 4.2.2, SCI currently offers industry comparable consistent product performance and delivery services that satisfy customer expectations. Therefore, this study assesses the position of SCI with respect to this KSF to be medium to strong.

3.1.10 Established quality (Medium)

According to Slack et al. (2004) "Quality is the consistent conformance to customers' expectations" and "it can mean different things in different operations." The importance of satisfying customer expectations renders quality as a critical KSF to SCI's success. The expectations and the levels at which these expectations are satisfied are discussed in detail in section 4.2.5. Overall, this study maintains that SCI ranks medium-high with respect to satisfying

the quality KSF. The position of the company with respect to this KSF is expected to improve over time as customers gain familiarity with SCI's new formula – this is further discussed in section 4.2.5.

3.1.11 Flexible operation (Strong)

In general, operational flexibility refers to the ability of a firm to modify its operation. This is often performed to offer product or service flexibility, mix flexibility, output volume flexibility, or delivery flexibility that customers demand (Slack et al., 2004). Based on this definition of flexibility, it must be determine if any of SCI's product, mix, volume, and delivery flexibilities may align with the current expectations of the market and the ongoing satisfaction of these expectations. In doing so, two factors are considered: the current needs of the amino resin market and the potential sources of competitive advantage that could facilitate the ongoing satisfaction of these market needs.

A review of the market characteristics, based on the external analysis conducted in section 2, reveals that one of the characteristics of the amino resin market today is that amino resins are demanded for a wide range of end applications. These applications include resins used in wood products, adhesives, surface coating and more – the complete range of applications are listed in Figure 1-2. In addition, examining the amino resin market further suggests that potential sources of competitive advantage could be attained through flexibility on product offering. Product flexibility allows amino resin producers to expediently introduce new products to respond to demand pulls; in addition, it would allow producers to push new products, alongside existing products, for existing applications or new, uncontested markets. This in turn allows a firm to capitalize on opportunities to exit defined boundaries of "Red Oceans" and create "Blue Oceans" as referred to by Kim & Mauborgne (2005). Therefore, product flexibility and mix flexibility are aligned with the market expectations and the ongoing satisfaction of such expectations; hence, operational flexibility becomes an important KSF. SCI's operational flexibility is thoroughly discussed in section 4.2.3. Overall, this study assesses SCI's operational flexibility to be strong.

3.1.12 Summary of strengths and weaknesses

Table 3-2 summarizes this study's internal assessment of SCI against the KSF's that the company needs to successfully compete in the domestic market.

Table 3-2: Summary of results of SCI's internal analysis against the company's KSFs for competing in the domestic market

KSF	Result of Internal Analysis
Automated production	Medium-Strong
Low-cost location	Strong
Production near customers	Medium
Strong industry network	Strong
Human resources	Medium – Strong
Knowledgeable and motivated human resources	Medium – Strong
Low-cost capital	Weak
Low-cost input	Medium – Strong
Working capital	Weak
Dependable operation	Medium – Strong
Established quality	Medium
Flexible operation	Strong

3.2 Western European Markets

SCI does not currently possess any operation in Western Europe. To enter this market, SCI must satisfy certain KSFs required for successful entry in this region. Therefore, the below assessment considers SCI as a new entrant rather than an incumbent. SCI's position with respect to the required success factors are discussed in the following sections and summarized in Table 3-3.

3.2.1 Extended working capital (Weak)

As thoroughly discussed in section 3.1.8, SCI's current operation faces financial hurdles and a looming cash crisis. It follows that the company is not currently in the possession of the working capital required for acquiring assets and resources required to initiate operations in new, foreign markets. Consequently, this study purports that the company is weak on this KSF required for entry into Western Europe. If the company continues to pursue its current strategies, it is unlikely that its working capital standings would change unless interest rates fall resulting in reduced interest obligations.

3.2.2 Industry network (Weak)

In order to successfully implement an international operation initiative, SCI needs to develop formative local relationships necessary for its day-to-day operations with different types of foreign entities in Western Europe. These entities include financial institutions, for generating

liquidity; recruitment firms and universities, for talent acquisition and exposure; regulatory bodies, to establish the necessary regulatory infrastructure; and, business bureaus, to keep abreast of industry changes and trends. Establishing these relationships is also essential for learning and understanding the company's external environment and bridging existing cultural gaps and developing congruity with the business ethics and values of the new stakeholders. Hence, establishing an industry network in Western Europe is an important KSF for SCI.

Unfortunately, though, UN and EU sanctions against Iran have isolated the country and reduced the frequency and effectiveness of any attempts at establishing direct contacts with international firms or prospects. Situational examples exist in which SCI aggressively pursued partnerships with European firms in the past to assess market needs or introduce its products. In these circumstances, the company received no response or, if it did receive one, the reception was lukewarm. These outcomes are attributed to uncertainties and perceptions of risks associated with dealings with Iranian companies. Although sanctions are targeted at government sectors that are suspected of supporting the country's nuclear program in a direct or ancillary capacity, the reputational loss of Iran in the international market is significant. This reputational loss coupled with the apparent political instability of the country has created a prohibitive bias against Iranian firms classifying dealings with them as high-risk undertakings. Overall, this study assesses that SCI possesses a weak position with regards to this KSF. As long as sanctions remain in effect, the company has weak chances of attaining this KSF in the future.

3.2.3 International relationships (Weak – Medium)

A strong international relationship is a precursor for establishing an industry network in a foreign country. Prosperous international relationships, in turn, require healthy international relationships at a macro level between countries. Therefore, existence of a healthy international relationship is an important KSF for SCI to succeed in international markets.

As noted previously, Iran is subject to various international sanctions that are aimed at hindering the country's nuclear power program. Although SCI is not directly targeted by these sanctions, Iran's increased economic isolation resulting from these sanctions has adversely impacted the company's ability in establishing relationships with potential international partners, customers or investors. Hence, this study, asserts that SCI's ability in fulfilling this KSF, which is a prerequisite for the KSF discussed in section 3.2.2, is weak to medium.

3.2.4 Cultural knowledge (Weak – Medium)

Successful business dealings that involve individuals from different cultural backgrounds require a strong level of cultural intelligence. Without cultural knowledge, cross-cultural communications, negotiations and even the simplest of dialogues could be subject to misunderstandings. Furthermore, lack of cultural knowledge undermines reputation and identity of the firm that could jeopardize business opportunities. It follows that cultural knowledge is also an important KSF for SCI to establish.

SCI's interaction with and understanding of the Western European culture is limited primarily to the founders' past business dealings with the region while working for Saravid Industrial Co. The production line of Saravid was purchased from Switzerland, and later Saravid sold some after-market optimizing modifications they had developed off the original design back to European firms. Through these transactions, the executive team gained experience in working and negotiating with teams from Switzerland, Germany, Belgium and Italy. However, exposure to and understanding of the Western European culture is extremely low within the non-executive team. Two prominent contributing factors to this trend include the increased cost of travel due to inflation that affects the Iranian middle class families and the increased restrictions, due to sanctions, that Iranians face in obtaining the required permits to visit foreign countries. Overall, this study assesses that the cultural knowledge within SCI is currently weak to medium. A weak financial position further reduces SCI's ability to invest in cultural learning opportunities for its staff.

3.2.5 Reliable remote team (Weak)

To successfully establish a remote operation, SCI needs to gather a performing team based in one of the Western European countries. This team would be needed to execute the day-to-day operations of the company including production, marketing, supply chain, logistics, finance, administration, and other operational aspects of the business. Therefore, establishing a reliable remote team is identified as a KSF for SCI.

The human resources necessary to execute this project are not currently assigned. Therefore, the company currently lacks this KSF. Establishing a reliable team would require SCI to invest time, establish selection and qualification processes, and allocate a certain level of financing to this project. However, the lack of a strong industry network (noted in section 3.2.2) to serve as a reference for hiring a team, and SCI's weak position with respect to its operating

capital would prevent further progress on this front. Furthermore, a poor international relationship between Iran and European countries, noted in section 3.2.3, and low level of cultural intelligence beyond the executive team reduces the potential success in selecting and dispatching a local team to Europe to manage SCI's remote operation. Therefore, this study concludes that SCI also lacks sufficient resources to accomplish this KSF in the short-term.

3.2.6 Access to distribution channels (Weak)

Entry in a new market requires access to reliable distribution channels to transport finished amino resin goods to consumers in target markets. Hence, access to distribution channels is identified as a KSF for entry into international regions. SCI currently lacks distribution channels to service clients in Western Europe. Furthermore, because of sanctions, establishing distribution channels outside Iran could be a challenging task: Sanctions introduce inherent risks into business transactions with distribution partners and potential clients; these risks could adversely affect the viability of long-term business relationships and, therefore, jeopardize chances of capitalizing on international opportunities. Overall, this study purports that SCI not only currently lacks international logistics but also faces reduced likelihoods of being able to establish international distribution channels due to incremental sanctions against Iran.

3.2.7 Available and knowledgeable resources (Medium)

Operating an international business unit successfully requires access to available and knowledgeable resources. Hence, access to available, knowledgeable resources is an important KSF for SCI in its pursuit of growth in Western Europe. In internally assessing SCI against this KSF, the knowledge and availability attributes of the required resources are reviewed separately.

SCI currently possesses very knowledgeable and experienced technical staff. The knowledge pool of this staff is mostly activity specific, not location specific; hence, the internal knowledge pool of the company can be utilized in the process of establishing operations in Western Europe. However, there exist certain types of knowledge that are location specific and not in the possession of SCI.

Legal knowledge serves as a good example: Although the company's legal resources are familiar with the rules and regulations affecting the company's operation in Iran, the company lacks the legal knowledge to fulfill the legal requirements of conducting business in Western Europe. This, however, does not pose a serious challenge as the company could perhaps gather such location specific knowledge through outsourcing. Due to execution of prior contracts

through Saravid Industrial Co., the management team is familiar with the channels of accessing this type of location specific knowledge for conducting business in the western European market. However, consideration should be given to the viability of past methods used to access location specific knowledge in Western Europe. It is possible that existing sanctions against Iran hamper the effectiveness of exercising past methods of acquiring the required resources for completing business transactions.

Aside from possessing the knowledge, resources must be available too. Most of SCI's current resources are exclusive to one region; i.e. they cannot be operating in Iran and Western Europe at the same time. This resource exclusivity could translate into requirements for the acquisition of a new team for entry into Western Europe. However, the weak position of SCI's working capital as well as weak international relationships and the resulting weak industry networks could hinder the company's ability to acquire new resources. In conclusion, this study claims that SCI partially fulfills the requirement of this KSF and assigns a medium rating to SCI's ability to establish this KSF.

3.2.8 Understanding customer needs (Medium)

In order for SCI to fully satisfy market expectations and generate demand for its amino resins in Western Europe, it must clearly understand the needs of the markets in which it wishes to compete. Therefore, understanding customer needs is identified as a KSF for pursuing growth in international markets. Some needs are tacit and can be inferred without communication with potential customers; however, some needs are explicit determining which require a more detailed study and collaboration with end users. For example, the need for a consistent, dependable performance is a tacit need; a consistent, dependable performance is a need in almost every market as it would lower operational risk for users. Likewise, meeting regulations can be classified as a tacit need: Regulatory compliance can be determined through studying applicable regulatory documents pertaining to the chosen market. In contrast, an example of an explicit need might be the need for a UF resin that contains a certain level of stabilizing additives. Such a need can only be determined through supplier-customer interactions.

As of today, SCI has a good understanding of the tacit needs in the western European market. The company understands the importance of offering a dependable, consistent product quality to international customers. In addition, SCI's products satisfy the European standards stipulated in EN 13986 and EN 14342. However, because the company lacks prior history of

working with potential clients in Western Europe, it is not in possession of an exhaustive list of explicit needs for the western European market. Lack of human resources, as noted in section 3.2.7, could further impede the process of acquiring knowledge about explicit needs of prospects in Western Europe. Overall, this study assesses SCI's position against this KSF to be medium.

3.2.9 Summary of strengths and weaknesses

Table 3-3 summarizes this study's internal assessment of SCI against the KSF's that the company needs for successfully entering the markets in Western Europe.

Table 3-3: Summary of results of SCI's internal analysis against the company KSFs for entry into Western Europe

KSF	Result of Internal Analysis
Working capital	Weak
Industry network	Weak
International relationships	Weak – Medium
Cultural knowledge	Weak – Medium
Reliable remote team	Weak
Access to distribution channels	Weak
Available and knowledgeable resources	Medium
Understanding customer needs	Medium

3.3 Financial Analysis

SCI's fiscal 2010 financial statements are presented in Table A-1, Table A-2, and Table A-3 in the Appendices section. Furthermore, the financial ratios are calculated and presented in Table A-4 also in Appendices section. Throughout this study, these financial data are referenced where applicable to the topic under discussion.

4. Current State: Operations

Understanding SCI's internal strengths and weaknesses is important for proposing strategic alternatives for SCI's further growth. What is also important is an understanding of the current internal operations of the company leading to the production of its amino resins. This understanding helps determine whether the company's current operation characteristics match with the characteristics of the industry in which SCI plays. It also helps determine whether SCI's operation objectives are aligned with the KSFs listed in Table 2-7. In case of misalignments, this review provides a foundation for determining the operational shortcomings and identifying remedies to align operational objectives with the KSFs.

Operational management can be assessed through the 4V framework, which considers the dimensions of volume, variety, demand variations, and visibility (Slack et al., 2004). Thus, to assess SCI's operation, this study first examines the 4V dimensions of the amino resin industry. This examination facilitates determining, at a high-level, whether SCI's current operational structure, without regards to the actual performance of the firm, matches with the structure demanded by the company's external business environment. Next, after assessing the overall fit between SCI's operational structure and its external environment, using the industry KSFs, the important operational performance objectives are identified in section 4.2. From there, the match between the current internal operations of the company and the identified operational objectives is examined.

4.1 The 4Vs

Most operations have one attribute in common: they take some inputs and transform them into outputs. However, according to Slack et al. (2004), they vary on several important aspects that could affect the cost of products produced and, therefore, the competitiveness of a firm. These aspects include product volume, variety, variation in demand, and visibility. Successful competition depends on a fine balance between these characteristics – a balance that is also consistent with the preferences of the markets supported. Therefore, it is necessary to identify the industry 4Vs that guarantee meeting market requirements. Subsequently, the findings must be compared with the current balance between the 4Vs of SCI's operation to determine the overall fit between SCI's operation and the dynamics of the industry in which the company competes.

4.1.1 4Vs for the Domestic and Western European Amino Resin Industry

This study refers to Table 3-2 and Table 3-3 in chapter 3 to establish the desired configuration of the 4Vs in the domestic and international amino resin industries. As shown in these tables, consistent product performance is expected in both the domestic and western European markets. Satisfying this expectation requires a high level of process automation. Process automation, in turn, requires investment in machinery. To lower the resulting fixed costs attributed to individual output units, high volume output capabilities must be established. Accordingly, having high production capabilities is a prerequisite for offering consistent product performance at competitive prices and, therefore, necessary for competing in the amino resin industry. According to SCI, plant capacities below 30,000MT are not economical to operate if consistent product performance is to be maintained.

In addition to high volume output prerequisites, the amino resin industry calls for operations that can cost effectively manage demand variations. Other things constant, the domestic amino resin demand exhibits slight shifts in cold and hot months of the year. Although, economical instabilities due to sanctions may impact demand occasionally, in general, the amino resin demand trends are fairly stable and predictable year around. Efficient management of the amino resin demand fluctuations is needed to satisfy delivery and price expectations of the buyers of amino resins.

The amino resin industry also calls for operations that can support a range of customized amino resin products. From time to time, customers may request slight adjustments to amino resin formulae to satisfy performance expectations. The adjustments are often in the form of adding different additives to the resin formulae. According to SCI's CEO, production lines must support a minimum of fifteen product variations to successfully compete in the amino resin market domestically and internationally.

Lastly, the industry calls for operations that can maintain low visibility. Low visibility protects technological know-how and minimizes resources in direct contact with the market; this, in turn, reduces operating costs. Reduced operating costs further enable incumbents to offer competitive prices to amino resin customers. The current market trends indicate that, for most incumbents, sales forces are the primary parts of the operation in direct contact with the market. The rest of the operation consists of back-office activities performed at secured facilities.

The 4V configuration for successful competition in the domestic and western European amino resin industries are summarized in Figure 4-1. A point to consider is that, although the desired high output variety may suggest elevated production costs, in reality production costs could remain relatively low despite introducing variations into production. Customization requests along with high-volume requirements have transformed the amino resin industry to adopt mass customization processes where amino resins are tailored to individual customer specification. Yet these resins are offered at mass production prices – much like Dell's customized computers in the electronics industry. This outcome, which follows the mass customization theory, is not very consistent with Slack's 4V model. The 4V model proposed by Slack (2004) suggests that high variety leads to high cost while, through mass customization, variety could be offered while maintaining low prices.

In the following sections, this study examines SCI's 4V topology against the desired 4V configuration of the industry. In doing so, this study presents details of the internal processes where applicable to substantiate measurements along each of the V axes. Also, it is recognized that SCI does not currently possess any operations in Western Europe. Hence, the below assessment only considers SCI's operation in the domestic market.

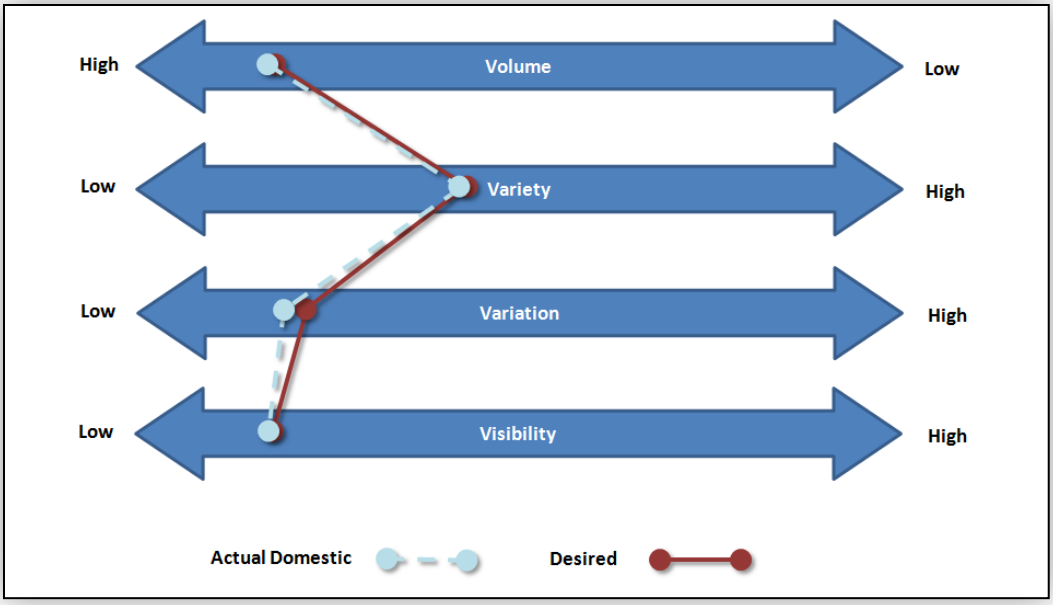


Figure 4-1: Desired 4V configuration to compete in Iran's and Western Europe's amino resin markets

4.1.2 Volume (High Match)

SCI's plant in Iran houses a fairly automated amino resin production line with a maximum utilization capacity of 30,000 MT. If fully utilized, this installed capacity can supply 25% of the total current amino resin consumption. This study asserts that SCI's installed output capacity match with the volume capability requirements of the industry. This assessment is not concerned about the fact that SCI's plant is currently underutilized.

4.1.3 Variety (High Match)

SCI's production process supports producing a wide range of amino resin product varieties that its customers demand. In fact, the company currently produces eighteen different varieties of amino resins through its production line. Furthermore, the company is working on producing new varieties in which new customers have shown interest. Overall, SCI production capabilities seem to closely match with the industry`s desired variety characteristic indicated in Figure 4-1.

4.1.4 Variation (Medium-High Match)

SCI is generally knowledgeable about the demand trends for its amino resin products. The company is well aware that during the hottest month of the year, demand declines. This decline in demand is attributed to the fact that amino resins are thermoset polymers the quality of which degrades when exposed to high temperatures during transportation. The demand also declines in the cold months of the year as roads become icy and transportation routes become affected.

SCI's current operations can accommodate the slight variations in demand if these variations are due to climate changes. However, due to labour laws, SCI cannot quickly adjust its human capital in response to occasional demand interruptions that result from instabilities caused by sanctions (see section 2.1.6). Subsequently, the company incurs occasional overhead costs. Overall, this study assesses the variation characteristic of the company's operation mostly consistent with the desired variation configuration shown in Figure 4-1. It must be noted that instabilities and labour laws impact incumbents equally. Furthermore, it must be noted that improving operational position along the variation dimension may be constrained by the existing regulations and the unpredictability of the impact of sanctions.

4.1.5 Visibility (High Match)

SCI runs its operations at secured facilities in Shiraz, Iran. Aside from the HQ office that performs administrative tasks, these facilities are inaccessible to the general public. From time to time, investors and high-profile clients receive a special tour of the factory. That is the extent to which production and R&D operations are externally exposed. Therefore, this study assesses that the visibility of SCI's operation measures low. This measurements is consistent with the industry`s 4V configuration demonstrated in Figure 4-1.

Overall, the above 4V assessment of SCI's operation asserts that the company's operational characteristics, viewed at a high level, are fairly well aligned with the characteristics that an operation must establish to successfully compete in the domestic amino resin industry. A visual representation of this assessment is provided in Figure 4-1. Should the company decide to establish operations in Western Europe, future assessments of potential operations would be necessary to ensure consistency between the industry 4V configuration and the actual 4V characteristics of the company`s future operations in the region.

4.2 Performance Objectives

Having established a high-level fit between SCI`s operation and that required by the industry, this study proceeds by quantifying SCI`s operational performance against the performance required to achieve market objectives. To this effect, five operational dimensions of cost, speed, quality, flexibility, and dependability, as discussed by Slack et al., 2004, are considered. In addition to absolute measurements, where applicable, available benchmark data is referenced for establishing realistic performance standards.

4.2.1 Cost (Market expectation: High; SCI performance: Medium)

As identified in table 7, obtaining low prices is a major factor in customers' decisions to choose amino resin suppliers; hence, this study asserts that establishing low cost operations highly matches with the expectations of the market and the company's KSFs. In sections 3.1.6 and 3.1.8, this study discusses that SCI is challenged by the need to acquire low cost capital and maintain a positive working capital, which has, in turn, significantly increased the company's cost of operations. This section, however, is primarily concerned with costs attributed to operational processes. Therefore, the discussions in the following subsections exclude financing costs and focus on examining other operational sources of cost.

4.2.1.1 Inventory

Inventory is identified as one of the contributors of cost in SCI's operation. For SCI, inventory costs come from two sources: raw material inventory and finished goods inventory. Currently, SCI maintains a low level of raw material inventory for at least 4 days of production – this helps the company to minimize fluctuations observed in the raw material markets. While the direct costs of holding this level of inventory are not significant, SCI faces several challenges to cost effectively obtain and maintain this inventory.

First, the prices of methanol and melamine exhibit a large volatility with the material being exclusively traded through auctions. Fluctuations in price could lead to situations where the company might purchase input material at peak prices leading to increased cost of input material. Second, supply trends for these chemicals are very irregular with fluctuations leading to undersupply periods. Undersupply situations could disrupt on-time deliveries which, in turn, could result in loss of reputational capital and future revenues. Lastly, methanol exhibits a high rate of evaporation. If not managed, evaporation of methanol could increase output unit costs.

To cost efficiently address the first two challenges, SCI has established two triggers to purchase and store its supplies of melamine and methanol. The first trigger is the inventory level; if available supplies are inadequate to support 4 days of production, the company initiates its purchasing process. The second trigger is the current price of the raw material. The company purchases and stores the material when the price is considerably lower than historical trends and is low enough to compensate for the opportunity cost of the funds rendered in advance to the supplier. Unfortunately, efforts to balance both triggers, sometimes, lead to missing opportune purchase calls resulting in zero inventory situations. Consequently, occasional production stalls occur and delayed deliveries result. As noted in section 4.2.2, such occurrences could reduce SCI's operational dependability which can prove costly to SCI. Despite this challenge SCI has maintained a 97% rate of successful delivery, which demonstrates that the company has effectively managed the risks associated with raw material shortages.

To address the third challenge, SCI has designed, assembled, and installed a floating screen in containers to reduce the exposed surface area of liquid methanol. This measure has significantly reduced methanol's evaporation rate; however, the evaporation effect is not eliminated entirely. There is still a noticeable difference in methanol consumption during warmer seasons compared to colder period per output unit which is attributed to methanol evaporation. To

mediate this issue, SCI utilizes smaller tankers for methanol storage during summer months to minimize the loss associated with methanol evaporation. Utilizing smaller storage volumes in the summer does not worsen supply shortage challenges because customers also tend to reduce their ordering frequency in warmer months – this is also explained in section 4.1.4. Overall, this study asserts that SCI has efficiently managed the cost associated with maintaining methanol and other raw inventory with minimum opportunities to improve.

As for the inventory of finished goods, SCI only inventorizes its mainstream product. SCI produces this product to stock and maintains an average of two customer orders in inventory. This study assesses the costs associated with this output inventory to be low, considering that it constitutes only 0.4% of SCI's current total production. Historical trends, also, indicate no waste associated with the output inventory. For products that exhibit low, medium, or volatile demand, SCI follows a make-to-order planning and control which results in no inventory on hand. The make-to-order planning and control process leads to longer lead times because production commences after an order is placed. However, this process leads to shipping of fresh, high-quality resins and eliminates the costs associated with stocking highly perishable products with unpredictable demands. We assess that SCI manages its finished goods inventory efficiently through considering the demand characteristics and perishability of its products as well as implementing make-to-order and make-to-stock planning and control processes.

4.2.1.2 Transportation

SCI does not own trucks and drivers for product deliveries to or from its factory; these resources are very costly to acquire. The high cost of integrating logistics has driven SCI, like its domestic competitors, to consider outsourcing options. After an analysis of outsourcing costs, SCI has determined that a combination of asset purchases and renting would provide the most cost effective transportation solution for the company. As a result, SCI currently owns wheeled isolated stainless steel containers, but rents trucks. The company now pays a transport rate of approximately ¢0.007 per kilogram per kilometer uniformly across the material it ships or receives. SCI's benchmarking suggests that competitors incur similar transportation costs through adopting similar logistics structures.

It is important to note that, overall, transporting the input material is less costly than transporting amino resins. The reason is that the shipping assets for transporting the feedstock for producing amino resins are less costly. Furthermore, the perishability of input material is lower

than that of amino resins. It follows that, because of long distances to northern customers and the need to transport amino resins over these distances, SCI incurs high logistics costs in servicing opportunities in the north, which, as discussed in section 3.1.3, presents the company with greater potential rents than the opportunities in the south.

SCI routinely negotiates new contracts with its transportation supplier. This ensures that the company receives competitive pricing for the outsourced portion of its logistics operation. Based on SCI's internal measures and the benchmarking data that SCI has gathered, this study maintains that SCI is efficiently managing the costs associated with transporting its finished goods or its input material considering its physical location.

4.2.1.3 Labour and Asset Productivities

A productive operation optimally utilizes its labour and equipment resources to minimize the costs associated with low productivity. Currently SCI's operation does not fully utilize its production equipment and runs at nearly 46% capacity. This underutilization results in average fixed costs that are not optimized. Achieving a low, average fixed cost depends on increasing sales which SCI currently seeks to establish.

In terms of labour productivity, staff levels are generally fully utilized and maintained at the minimum required to fully execute the order fulfillment process. However, the cost of labour per unit of output is not currently optimized. The cost of labour per unit of output can further decrease with increased utilization of capacity. Furthermore, occasional production stalls, due to lack of demand or interruptions in supply of raw material, increase cost of labour per unit of output. Production stalls reduce SCI's output volume. This reduction in output, however, is not followed by a reduction in labour because Iran's labour laws prohibit employers to temporarily dismiss staff without pay. Therefore, cost of labour per output increases. Production stalls, however, occur in less than 2% of circumstances and therefore do not affect labour productivity significantly. Lastly, occasional unexpected periods of high demand also increase the cost of labour per unit of output. Periods of high demand result in increased, overtime wages that must be paid to attain lead time promises. The net impact of high demand periods, also, is an increase in the cost of labour per unit of output.

Further automation has been examined as a solution to improve labour productivity issues. However, according to SCI, further automation can result in, at most, the reduction of 6

full time staff, equivalent of about $12,000 per annum. This is less than 4% of the total operating costs in fiscal year 2009-2010 (see SCI's income statement in Table A-1 in the Appendices) Considering the low cost saving associated with replaced production labour, the high cost of automation, and the catastrophic risks associated with increased automation, discussed in section 4.2.4, further automation is not considered a prudent choice to address labour productivity issues. Overall, this study asserts that further improvement to labour and asset productivity mainly depends on increased output volume which SCI is trying to achieve.

4.2.1.4 Payables and Receivables

A quick look at SCI's balance sheet in Table A-2 in the Appendices, indicates that SCI maintains a weak position with respect to its payables. High supplier power, noted in section 2.1.1, leads to demands of advance payments to suppliers well before funds are collected from customers. This is reflected in the relatively short days payable ratio of approximately 54 days versus the days receivable ratio of 171 days. Because the supplier market is a monopoly, there are no alternate sources of supply that would offer better payment terms. According to SCI's CEO, relationship building at the executive level between SCI and its suppliers seems to be the most apparent option that could help secure better payment options with the suppliers. Nonetheless, such relationship building efforts require time which SCI executives have so far found to be scarce due to their day to day involvement in operating the business.

With regards to SCI's receivables, most customers have been extended net 90 days payment terms. However, many of SCI's customers routinely default on these terms. Current market trends indicate that the domestic customers are leveraging their rather high market power, noted in section 2.1.5, to obtain even longer payment terms from SCI and other domestic amino resin suppliers. The demand for longer payment terms pressures SCI's operation due to its already weak capital position noted in section 3.1.8. SCI notes, however, that suppliers that offer generous payment terms and relax their collection efforts are heavily advertised by customers that receive such terms. In effect, the outstanding receivable amount serves as a marketing and reputational capital investment. In an effort to balance the costs and benefits of extended payment terms, SCI is not currently exercising aggressive collection practices. This decision is further fueled by observing that competitors have turned to offering unprecedented extended payment terms to customers. Nevertheless, soaring receivables could impact SCI's ability to service its long-term operational costs, such as asset depreciation, if the working capital of the company becomes insufficient to cover the average costs of the firm's operation.

4.2.1.5 Marketing

As discussed in detail in section 4.2.5, to assess their true performance, SCI's resin products require a set of tests different from those defined by legacy testing procedures. This situation has slowed adoption of SCI's amino resins. To mitigate the slow adoption rates, SCI has designed its products to be compatible with the production processes of current amino resin consumers. In addition, it is investing in educating its target market through a direct sales force. The costs associated with training the market have increased SCI's marketing costs per dollar above that of its competitors.

4.2.1.6 Summary of cost aspects of SCI's operation

Considering these cost aspects of SCI's operation, we assess SCI's position with respect to the cost objective to be medium. There is some potential for improving payment terms with suppliers and customers. The company needs to examine whether the benefits of not enforcing the payment terms is surpassing its cost. Furthermore, the mismatch between the characteristics of SCI's resin and legacy specifications increases marketing costs for SCI in the short run. Although the company cannot reduce these costs, such costs potentially increase SCI's transaction costs beyond those incurred by competitors. Lastly, the company's current location limits the extent to which the company could minimize its logistics costs in servicing the entire domestic market. High transportation costs weaken SCI's position with respect to the cost objective.

4.2.2 Dependability (Market expectation: High; SCI performance: Medium-High)

Section 3.1.9 establishes that dependability is an important KSF for SCI. Therefore, operational dependability ranks high in the list of performance objectives that that are aligned with the industry's KSFs. Dependability in an operation refers to operational stability and predictability. The operational stability and predictability that results from a dependable operation offers a consistent product performance and ensures finished goods are transported to customers reliably. This, in turn, allows firms to constantly fulfill customer expectations and, in time, build reputational capital.

In terms of consistent performance, SCI's products have consistently met SCI's internal product specification. As a result, SCI customers have been consistently able to satisfy the specifications applicable to their products. This study maintains that the consistency level for product performance is primarily attributed to SCI's production process automation. Any shortcomings, as noted in further detail in section 3.1.1, are attributed to manual processes that

remain in production. Table 4-1 summarizes SCI's manual production processes and the decision criteria used in each production step. Existence of these manual steps causes rare variances in product specifications leading to occasional delayed product deliveries.

Based on SCI's input, products that fall outside manufacturing specification have resulted in direct monetary losses of less than $10,000 in 2010 – nearly 2% of SCI's operating profits. In absolute term, the number of incidences, according to the company, is not alarmingly high and is routinely monitored by the quality assurance team to examine and control failure trends. However, in perspective, such failures at this stage of the company's growth could lead to potential, substantial loss of future revenues: SCI is a young company that is attempting to establish its brand. Because the company has not yet established a long history of offering consistent products, and is making history as it continues to operate, any inconsistencies at this stage could divert customers to old suppliers depriving SCI of profitable business opportunities.

Further automation has been considered as a potential solution. However, as discussed in section 4.2.1 and section 4.2.4, automation is costly and risky. Therefore, the company currently focuses on incentivizing its human capital to reduce errors through establishing a profit sharing scheme. With this scheme, production staff receives a portion of the profit attributed to fulfilling each order. SCI hopes that this incentive program further reduce failure rates and increase consistency of product performance while preserving cash for its other high-priority business initiatives.

Table 4-1: Manual production processes

Manual Activity	Decision Criteria
Release of Urea/Melamine input	Time / Viscosity
Adjustment of PH	Sample test
Checking viscosity during polymerization	Visual inspection of mixer amp meter

In addition, SCI's logistics exhibits a rather dependable behavior. The company has been able to achieve a 98% on-time delivery rate in 2010 through maintaining its maximum lead time of 48 hours, FOB customer's factory, for order sizes of approximately 30MT, the size of one tanker. SCI's logistics dependability is further improved by owning tanker assets. This helps avoid periods of tanker undersupply that could cause delivery delays.

Although SCI's logistics processes are dependable, they are sometimes affected by external factors beyond SCI's control. These factors primarily include poor weather conditions, poor road conditions, and volatility in the availability of input material. Cold weathers during the year could create poor driving conditions that could curb dependable deliveries within promised lead times. Moreover, in these months, snow or ice may block certain routes preventing on-time delivery of finished goods. During hot months, high temperatures could degrade product performance during transportation leading to product variances. Roads may be affected by unannounced constructions which could delay transportation at times. Lastly, access to feedstock, primarily methanol and melamine, may become limited occasionally leading to production stalls. In general, the noted factors result in delayed deliveries in 2% of the total number of shipments.

SCI does not currently have resources to mitigate risks associated with changes in weather or road conditions. However, the company currently mitigates the impact of feedstock shortages on its logistics processes by holding a small output inventory of its flagship product to buffer production interruptions. Although holding small output inventories may improve the risks associated with feedstock shortages, if feedstock cannot be obtained over extended periods, SCI could deplete its output inventory. Under such circumstances deliveries are affected. It is important to note that the impact of some of the external factors on logistics is reduced as consumers reduce orders in cold and hot months of the year.

4.2.3 Flexibility (Market expectation: High; SCI performance: High)

As discussed in section 3.1.11, operational flexibility is one of amino resin industry KSFs. Therefore Flexibility ranks high as an operational objective. To quantify SCI's operational flexibility, this study examines SCI's order fulfillment process.

The high-level flow process chart for SCI's order fulfillment is illustrated in Figure 4-3. This process consists of 15 steps. These steps largely remain consistent regardless of the product varieties that SCI produces. What varies is the throughput time of the order fulfillment process which changes by product line. As such, in order to quantify SCI's operational flexibility, it is important to review SCI's product lines and, subsequently, understand the production process for each.

Currently, SCI maintains two product lines: wood and laminate coating resins and wood adhesive resins; both are presently offered in liquid form and are produced in one production line with the same production process. The production process flow is illustrated in Figure 4-4, which

is an expansion of step 9 of the order fulfillment process flow in Figure 4-3. The production processes for both product lines treat raw material at a maximum batch size of 30MT and an average batch size of 27MT. This is aligned with the size of one shipment tanker. The bottleneck in both processes is sophisticated equipment called reactor. From mixing the raw material until the final resin syrup is cooled and harvested, all the processes take place in this machinery. Therefore, output is constrained by the processing speed of the reactor.

Although the production processes for the two product lines are similar, the throughput times of each process is different. Because wood and laminate coating resins must be transparent, the production parameters and production preparation for this class of resins differ from that of adhesive resins. Due to these differences, it takes maximum 8 hours to prepare and produce resins for wood adhesives; in comparison, it takes 11 to 12 hours to produce resins that SCI offers for wood and laminate coating applications.

The origin of the observed time difference relates to two production steps: the polymerization step and a flushing step – these steps can be found in Figure 4-4. The time to complete the polymerization step is determined by the level of viscosity to be achieved for each product line. Wood and laminate coating resins require an additional three hours in this step to reach a desired viscosity. Flushing step, which is only required for coating resins, also lengthens the production process. This step requires 2 MT of De Mineralized (DM) water and introduces a one-hour switchover time to the production of wood and laminate coating resins.

It is important to note that while the polymerization step takes place in the production of every resin, this is not the case for the flushing step. The flushing step only occurs at the beginning of the production of a batch of wood and laminate coating resin that follows a batch of a wood adhesive resin. Therefore, unlike polymerization, the effect of the flushing step on production time is variable. The variation in the polymerization step and sporadic insertion of line flushing steps in production, affects production throughput time. This, in turn, causes variations in the throughput time of the order fulfillment process.

While considering the circumstances that affect the order fulfillment throughput time, it is pertinent to note that steps 9 and 10 (production processes) are, sometimes, performed in advance for SCI's mainstream adhesive resin, as also noted in section 4.2.1. When suitable, the company is capable of storing inventory of this particular resin to smoothen the effect of

interruptions in obtaining input material on its lead time for this mainstream product. However, the amounts stored are generally small due to limitations imposed by the shelf life parameter of liquid amino resins - According to SCI, the shelf life of SCI resins range from one week to four weeks. Because of the short shelf life, the company does not currently stock inventory for low-demand products or products with high fluctuation in demand. Correspondingly, all resins, other than SCI's mainstream resin, are produced following a make-to-order model that executes all the steps in the order fulfillment process shown in Figure 4-3. As such the order fulfillment for these resins could take, at maximum, 14 hours longer than that for SCI's mainstream product. Figure 4-2 illustrates this point further.

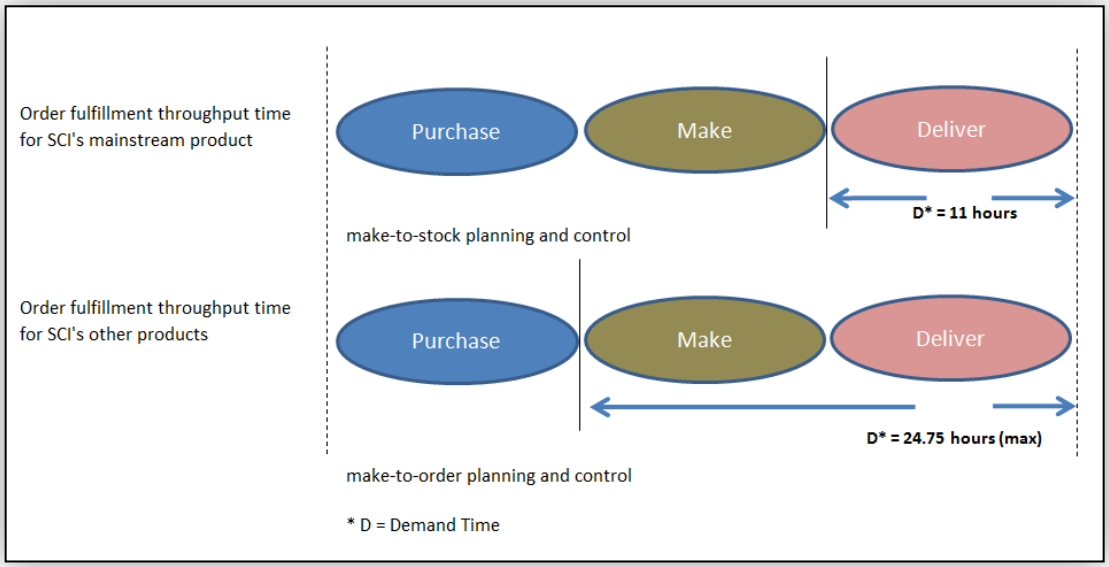


Figure 4-2: throughput time for SCI's mainstream product vs. the maximum throughput time of SCI's other resins (Slack et al., 2004)

In addition to timing variations and the line flushing step, which presently are the primary factors impacting the order fulfillment process, introduction of new UF, MF, or hybrid resin formulae also affect the order fulfillment process; but, these changes are assessed to be small. According to SCI, new formulae are expected to primarily impact step 9, the production process, and the introduced changes are expected to be confined to changes to ratios of input material and timing adjustments to the production processes. Fulfilling these changes is expected to require no more than the current human capital and machinery. SCI also notes that it possesses a pilot run

R&D resource separate from its mass production resources. The separation of resources for R&D and mass production allows the company to develop new resins without disrupting the mass production line thereby preventing R&D efforts to impact the company's current order fulfillment process.

The review of SCI's order fulfillment process and the parameters that affect this process form the basis for this study to quantify the flexibility of SCI's operation. It is maintained that, despite timing variations in the order fulfillment process for existing products, overall, SCI's order fulfillment process exhibits a high degree of uniformity in terms of process steps and resource utilization. This process uniformity across product lines reflects on SCI's current ability to produce a wide range of UF, MF, or other hybrid amino resins while utilizing similar processes, human capital, and equipment. In fact, today, SCI produces nearly 18 different varieties of amino resins utilizing same resources across production of its resins. The one-hour switchover time and establishment of only one production line do not prohibit SCI's ability to switch production between resins on demand, although, such transitions need to be managed for efficient use of limited resources. Overall, this study concludes that SCI possesses a high degree of mix flexibility. In addition, the company's separate R&D pilot run facility allows the company to perfect new formulae prior to mass production. Once prepared for launch, the company's production process is flexible enough to accommodate production of new resin formulae with the current equipment and human resources. Therefore, this study maintains that SCI also possesses a high degree of product flexibility.

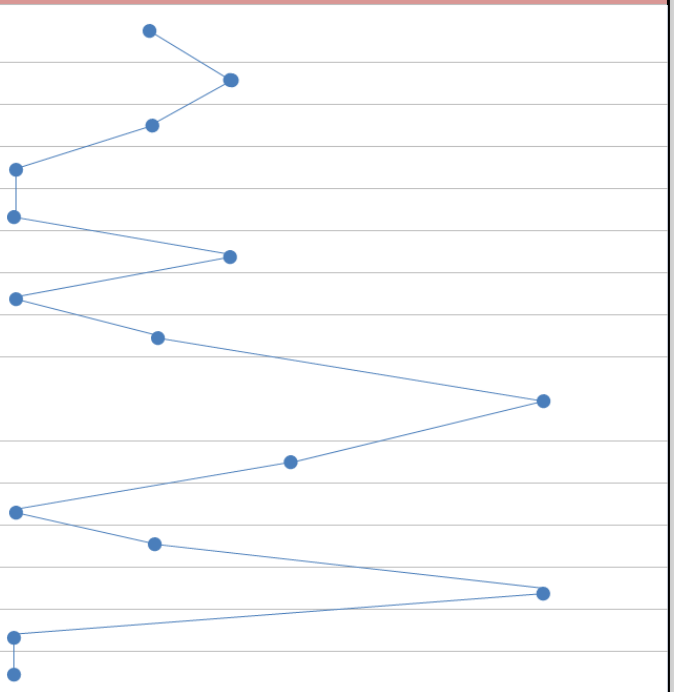
Sequence	Activity description from order to delivery	Time (Hrs)	
1	Order arrives at sales department and waits for approval	**1**	
2	Check order and put initials	**0.25**	
3	Wait for processing	**0.25**	
4	Approve and stamp (sales Manager)	**0.5**	
5	Send order form to factory	**1**	
6	Check and approve (plant manager)	**0.5**	
7	Send form to warehouse / production	**0**	
8	Wait for processing	**0.5**	
9	Production, lab. And Q.C.	**12: Coating resins 0-8: Adhesive**	
10	Store finished goods at the warehouse	**2**	
11	Notify transport company	**0.25**	
12	Wait for loading	**2**	
13	Weighing, loading and final weighing	**2**	
14	Complete delivery paperwork	**0.5**	
15	Send documents to sales office	**2**	
	Maximum order throuput time for MF	**24.75**	6 0 4 2 1 0 0 0 2
	Maximum order throuput time for UF	**20.75**	

Figure 4-3: SCI's order fulfillment flow process chart

Throughput Time:

UF and MUF for adhesion: ~ 8 hours
MF and UF for coating: ~12 hours

Cycle Time:

Process bottleneck is the reactor which is utilized throughout producing one batch.

Maximum Batch Size:

30 MT

Switchover Time:

0 hours - if producing adhesives
1 hour - if switching from adhesive resins to coating resins - coating resins must be transparent and the production line should be washed with water before production.

Note:

The process steps represented in dark blue utilize the reactor.

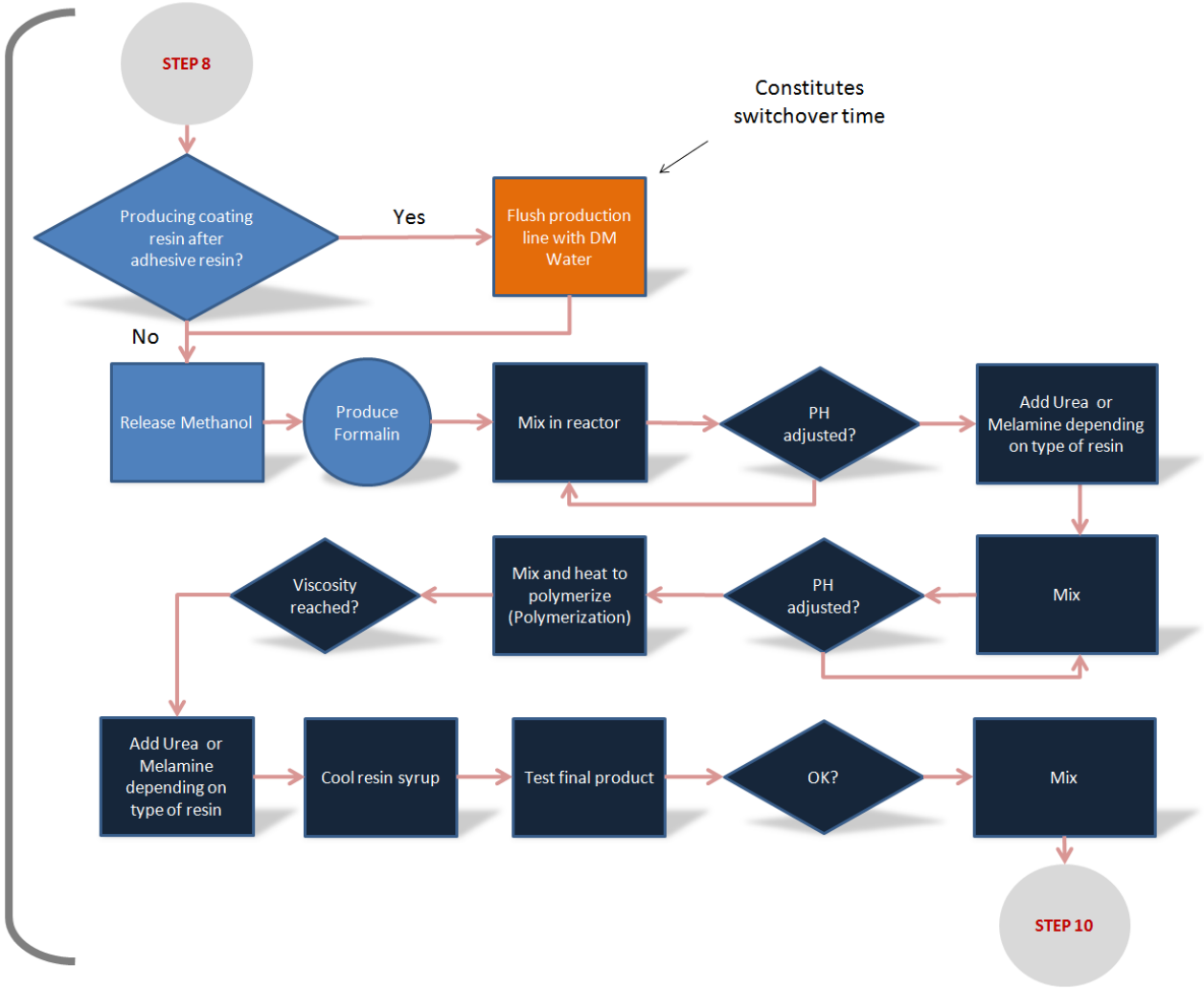


Figure 4-4: SCI's production process

4.2.4 Speed (Market expectation: Medium; SCI performance: Medium)

Speed does not rank high on the list of items that matter most to SCI's customers; therefore, it is not included in the KSFs noted in Table 2-7 and is not critically emphasized as a performance objective that SCI should establish. In reality, amino resin customers prefer price and dependable delivery over expedited delivery. They have already factored in the appropriate lead times into their ordering processes. Despite the assigned low priority to operational speed, SCI continually attempts to establish competitive operational speed without significantly increasing operational cost.

As mentioned in section 4.2.1, SCI currently keeps a set level of inventory for its mainstream, high-demand product; this has effectively reduced the order fulfillment throughput time for this product from nearly 21 hours down to approximately 11 hours. For all other products, SCI has adopted a made-to-order procedure and initiates the production cycle after receiving orders from its customers. For these products, current order fulfillment throughput times vary from nearly 21 to 25 hours for production of a batch of about 30 MT - The order fulfillment process flow chart is illustrated in Figure 4-3. To optimize asset usage and maximize speed, SCI has designed its batch sizes to match typical customer order sizes, which are around 27 MT; it has also matched the batch size with the size of the transportation containers, which can hold 30 MT of resins.

One process that lowers production speed is the infrequent need to switch the production line from producing adhesive resins to producing wood and laminate coating resins. As explained in section 4.2.3 and depicted in Figure 4-4, wood and laminate coating resins are clear, and the entire system needs to be thoroughly flushed with DM water before the line can be utilized for producing a batch of coating resins after producing a batch of adhesive resins. The cleaning process adds one hour to the throughput time of the order fulfillment process.

At this time, SCI cannot avoid this flushing process, as there is only one reactor in the facility in which all the chemicals are combined and the finished goods are produced. A potential solution to improve speed through eliminating the flushing step is for SCI to install two reactors - one for producing wood and laminate coating resins and one for producing adhesive resins. However, the quantity of orders the company currently receives from customers for coating resins does not justify the high cost of purchasing and installing an extra reactor.

Yet another process that currently lowers production speed is the manual processing of urea bags. SCI currently purchases urea in sealed bags. These bags are manually counted and opened in production. To expedite production, this step could perhaps be automated. However, as was mentioned in section 4.2.1, further automation is not currently a cost effective solution. Moreover, increased automation involves replacing the personnel that currently process urea bags with a conveyer belt that moves the raw urea to the production line. Utilizing conveyor belts require obtaining urea in bulk and, unfortunately, there are serious quality concerns with bulk urea offered through NIPC that holds a market monopoly domestically: During an SCI team's visit of urea's production line, it was observed that the conveyer belts moving bulk urea are installed adjacent to the conveyer belts moving ammonium nitrate. It was observed that when some of the material on the conveyor poured on the production floor, because ammonium nitrate closely resembles urea, the staff would shovel the fallen material and deposit it randomly on one of the belts without identifying to which belt the material belong. This situation may not pose a serious concern for the agricultural use of urea; however, it is a very serious source of concern to SCI because even infinitesimal amounts of ammonium nitrate in the reactor can cause a catastrophic explosion. Overall, potential gains against the risks and costs of automation render further automation unfavorable.

4.2.5 Quality (Market expectation: High; SCI performance: Medium)

As discussed in section 3.1.10, quality refers to satisfying customer expectations and, hence, quality becomes an important operational objective for SCI. The expectations of the amino resin buyers are noted in Table 2-7. In summary these expectations are:

1- Competitive prices
2- Proximity to suppliers
3- Consistent product performance
4- Consistent product delivery
5- Satisfaction of applicable tests and standards

Item 1 is discussed in detail in the following subsections and is assessed to be moderately met. Item 2 is discussed in detail in section 3.1.3 – Overall, SCI satisfies this item for customers in the south, not customers in the north. Section 3.1.9 discusses items 3 and 4 which are fairly well met by SCI. Lastly, Item 5 is reviewed in the following subsections - This item is assessed to be reasonably satisfied.

4.2.5.1 Expectation to obtain low prices

Before resin manufacturers are considered for a business opportunity, they are assessed by customers to meet certain financial criteria. This step is primarily conducted by buyers' purchasing departments. The focus of these assessments is to evaluate the financial backing of amino resin suppliers to validate whether they could offer competitive prices and generous payment terms without aggressively enforcing collections.

As mentioned in sections 3.1.8 and 3.1.9, SCI is facing cash flow challenges and a low working capital. This situation positions SCI unfavorably against the company's competitors that maintain a strong financial position. As such, SCI currently faces challenges in satisfying supplier qualification processes. To appease customers, SCI does not currently aggressively pursue customers who breach their terms of payment as long as purchasing of input material is not interrupted because of cash locked in receivables. Overall the level at which this expectation is satisfied by SCI is ranked medium-high.

4.2.5.2 Expectations to satisfy applicable tests and standards

The wood industry has adopted a particular set of product specifications as the standard for testing all UF and MF resins prior to use. These specifications were set two decades ago to optimize wood manufacturing processes and adjust the end wood product specifications. Currently, amino resin consumers test purchased resins in their laboratory before using them in production lines to make sure all resins comply with these legacy specifications.

SCI's resins do not meet some of the established specifications considered standard in the industry. The company's resins are based on a new formula that allows wood manufacturers to maintain the same production processes, quality, and output volume while minimizing resin consumption per unit of output. However, this new formula requires a new set of tests to reflect the true performance of SCI products. Unfortunately, most of the wood manufacturing companies have standardized their manufacturing processes with the input resin material typically as the only variable into the production process. Because of standardization, it is difficult to convince wood producers to accommodate new testing procedures. In addition, the established perception of wood manufacturers is that the end products should meet the specifications that apply to the final product if the input resin meets the legacy specifications prior to production. Since SCI resins fail to pass these specifications, in the eyes of customers, they cannot result in production of wood products that pass final product specifications. Hence, SCI resins do not readily satisfy customers'

performance expectations. Ironically, the specifications currently used to test existing products were set 20 years ago by SCI's current CEO, who, at the time, was himself employed by one of SCI's major competitors.

Further troubling satisfaction of performance expectations is the existence of counterfeit products in the market that possess similar characteristics to SCI's resins. There exists a mutual characteristic between SCI resins and fake resins which has most impacted adoption of SCI's resins. This mutual characteristic is a high specific gravity. Because SCI's resins exhibit a high specific gravity, the customer's associate this observation with inferior quality of SCI's resins. To mitigate the misalignment between market expectations and actual product performance, SCI currently offers free samples, and provides trainings to customers to establish why SCI's product specifications differ from the widely adopted standards. SCI's goal is to convince the wood manufacturers to temporarily forgo pre-conceptions of SCI's resin and judge the performance of the resins by measuring the gained production efficiencies and the quality of finished wood products against applicable specifications. To date, there has been only one customer who temporarily denied purchase of SCI resins due to non-compliance of SCI's resins with the widely adopted legacy specifications. However, the same customer has approached SCI to obtain samples. This could suggest that market expectations are shaping to accept SCI resins as high performing products that do not meet legacy specifications and require new methods of testing.

Further to testing the performance of resins, the performances of the end wood products are also tested against defined specifications. These specifications vary based on the type of the products and their applications. In general, since SCI products consistently allow end products to fulfill applicable standards, they very well conform to this expectation. However, this occurs only after customers accommodate testing SCI's resins per procedures provided by SCI.

Although SCI resins improve production efficiencies compared to competing resins, it is important to note that, historically, production efficiencies were not affected by the usage of the different amino resins available in the domestic market. Therefore, the market is not aware that production efficiencies can be achieved by the choice of input material. This lack of knowledge has eliminated production efficiency as a parameter that could influence the selection of amino resins. Therefore, increased production efficiencies is not considered an expectation of the market and hence not relevant to the assessment of quality. Furthermore, because of low observability of

its benefits, production efficiency may only slowly become established as an important quality factor.

On average, this study assesses that SCI's quality, as a market supplier, is medium-high, a position that can be improved by further educating customers on SCI's product specifications. This position can further be improved through finding sources of low cost working capital to improve the financial standing image of the company.

The assessment of SCI's performance objective along the dimensions of cost, quality, speed, flexibility dependability, and quality completes the internal analysis of SCI. The results of this assessment are graphically shown in Figure 4-5. In chapter 5, these results along with the results of the external assessment are utilized to recommend strategies that SCI could pursue to achieve its long-term growth objective.

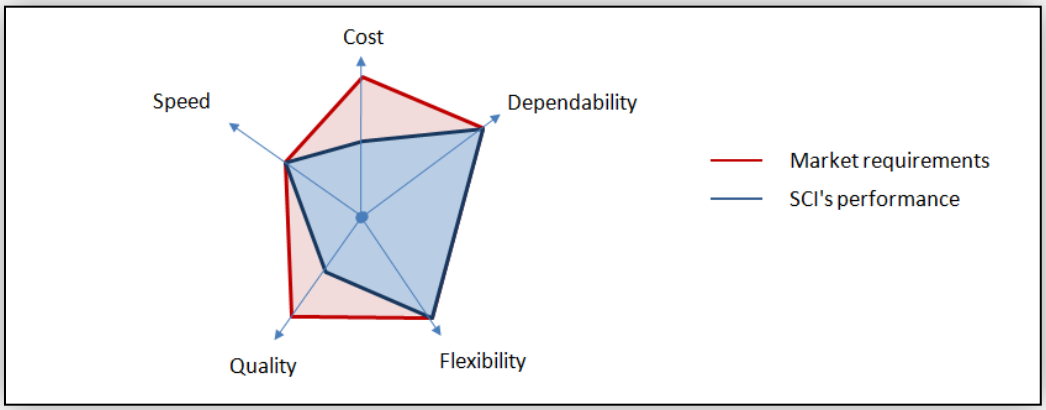


Figure 4-5: SCI's performance along the Cost, Speed, Quality, Dependability, and Flexibility axes compared against domestic market requirements

5. Generating Strategic Alternatives

Having examined SCI's internal and external business environments in previous chapters, this chapter proceeds with preparing a list of potential strategic alternatives that could help SCI achieve its primary goal of growing market share. To prepare this list, the current state of the business's internal and external environments should be carefully considered. Furthermore, the main issues currently challenging SCI's operation should also be identified. Accordingly, section 5.1 provides a summary of the results of the external and internal analysis of the company. Next, section 5.2 pinpoints the main issues that the company must address in order to be able to attain its long term growth objective. Lastly, section 5.3 draws on this information to formulate strategies that could address SCI's short-term operational challenges and support the company's pursuit of growing market share.

5.1 Summary of the current state

Chapter 2 presents a thorough assessment of the external business environments of SCI in Iran and Western Europe. Table 5-1 summarizes the current domestic market forces and their likely future trends. Similarly, Table 5-2 summarizes the market forces and likely future trends affecting competition in western European markets. Overall, the future state of the amino resin industry, both domestically and in Western Europe, is a stable growth; this assessment considers the industry growth forecasts, noted in section 1.2, and the limited number of substitutes for amino resins in their current applications, noted in section 2.1.2.

Table 5-1: Summary of domestic market forces

Market Force	Assessment
Rivalry	High and Stable
Substitutes	Low-Medium and Stable
Threat of Entry	Medium and Stable
Supplier power	High and Stable
Customer power	Medium-High and Stable

Table 5-2: Summary of market forces in Western Europe

Market Force	Assessment
Rivalry	Medium and Stable
Substitutes	Low-Medium and Stable
Threat of Entry	Medium and Stable
Supplier power	Low-Medium and Volatile
Customer power	Medium and Declining

Based on the analysis of the external environments in which SCI currently competes, or wishes to compete in the future, industry KSFs are established. The results are summarized in Table 2-7 under Section 2.2. Using the identified KSFs, chapters 3 and 4 presented an internal analysis of the company which assessed the synergy between internal operations of SCI and the identified KSFs.

The results of the internal analysis indicate that, in general, the current company's operational structure and objectives are aligned with that demanded by the market. However, the study signifies several weaknesses challenging the current operations of the company. These weaknesses, as discussed in further detail under section 5.2, exposes current operations to risks that could threaten the sustainability of the business. Furthermore, if not managed strategically, such weaknesses threaten the success of future growth initiatives.

5.2 Key Issues

As discussed in section 5.1, the internal study of SCI revealed several weaknesses. Most conspicuously, SCI's operation currently lacks a solid working capital, as discussed in section 3.1.8. The company holds approximately $93,000 in cash. Furthermore, the company currently struggles with the high cost of capital resulting in large interest payments on its short-term obligations. In the 2010 fiscal year, SCI incurred interest costs of nearly 30% of its $2.5 million total revenue.

If current strategies are pursued, the low cash reserves and high cost of capital, combined with high domestic rivalry and high consumer power could deplete the remaining cash reserves of the company in the form of receivables or marketing expenses. These expenses are not expected to decrease considering that the external domestic environment is anticipated to maintain a stable level of rivalry and customer power in the foreseeable future discussed in sections 2.1.1 and 2.1.5 respectively. Therefore, the likely future for SCI, if it pursues its current strategies, is paralyzed

cash flow that can result in failing to meet short-term debt obligations, which in turn could lead to bankruptcy.

Although SCI wishes to grow market share domestically and internationally in the amino resin industry, the current standing of the company is not well aligned with this goal. The low cash reserves of the company, current financial obligations, as well as the already negative debt to equity ratio hinders SCI from securing the financing required to cover the costs associated with initiatives to grow market share – either organically or through acquisitions. Furthermore, Iran's currently unstable socio-political environment, as discussed in section 2.1.6, has increased the transactional risk for foreign firms in dealings with Iranian firms. The introduced transactional costs further pressure SCI's current low cash reserves during its pursuit of market share growth. Therefore, this study suggests focusing on short-medium term strategies that would help the company to improve its current financial position while preparing the company to pursue future growth initiatives.

5.3 Goals and Justifications

As mentioned in 5.2, for the company to be able to efficiently strategize to reach its goal of increasing market share, it needs to first overcome the more immediate challenges regarding its financial standings. To address this issue, this study has identified two goals for SCI: a short term goal to be attained before pursuing long-term growth interests and a long-term growth objective. The two goals are explained below. Potential strategic alternatives that may help the company reach these goals are broadly identified in this chapter. A detailed analysis of each alternative is further discussed in chapter 6.

5.3.1 Short Term Goal

The financial statements and financial ratios of SCI (Table A-4 in Appendices) reveal that the company is suffering from an unhealthy debt to equity ratio of -1040 in the 2010 fiscal year. The retained earnings of the company in this fiscal year have been negative, mostly due to the fact that nearly 30% of SCI's income has been paid towards debt interest payments. Such high debt servicing costs coupled with high marketing expenses due to a history of high rivalry (discussed in section 2.1.1), increased customers' payment defaults, and major sums tied up in accounts receivable (discussed in section 4.2.1.4) positions SCI such that the company may find itself insolvent and unable to meet its debt obligations. Considering the current financial position of SCI, this study establishes a short term goal to be securing low cost working capital. Working

capital is needed for the company to meet its debt obligations and pay for its ongoing operating expenses. This working capital needs to be low cost so that the principal capital itself would not be consumed by its own costs.

The company could acquire low cost working capital via fund raising activities; however, the insecurity associated with the political and economic instability in Iran has driven domestic investors to look for investing opportunities outside the country. This could create some challenges for SCI in finding independent investors for a source of low cost liquid capital. However, low cost working capital may be obtained through forming partnerships with customers. If one of the financially strong wood manufacturers decides to vertically integrate with a resin supplier such as SCI, both parties could benefit. Vertical integration reduces the chances of supply interruptions and mediates the effects of asymmetric information. It also enhances the degree of coordination between the supply of input material and production. This alternative is examined more thoroughly in Chapter 6.

Another means by which SCI could secure liquid capital is increasing economic rents beyond current levels. This could prove difficult considering that SCI continues to compete on price for products very similar in principle to the ones produced by its competitors. As discussed in sections 2.1.1 and 2.1.5 and summarized in Table 5-1, the powers of competitors and customers both are generally high and are expected to remain high in the foreseeable future. In addition, as illustrated in Table 2-7 and discussed more thoroughly in Chapter 4, competitive advantage in the amino resin industry is currently established through gaining cost advantages. SCI cannot gain cost advantages because of its high cost of capital. However, the company could gain a valuable competitive edge if it could introduce a new type of product that satisfies certain specifications important to customers offered at a cost lower than available competing products. The potential for this strategy lies particularly with the production of MUF products which could be substituted for MF coating resins at lower cost. Obviously, this option is only prudent if it could be attained by investing the company's current assets into the necessary R&D without increasing the debt load. The viability and effectiveness of this option is analyzed in detail in chapter 6.

5.3.2 Long Term Goal

The long term goal of achieving market share growth is derived from the problem statement of this study stated in section 1.3. According to the problem statement, SCI is interested

in expanding its market presence and growing its market share domestically and internationally. Subsequently, this study identifies potential strategies that could support company's initiative to achieve its long-term goal. It is assumed that the company manages to overcome the more immediate short term challenge of low liquidity discussed in the previous section prior to executing any long-term strategies. The long-term strategies that this study proposes are discussed in more detail in chapter 6; however, the following paragraphs provide a brief overview of these strategies.

The first strategy is a continuation of the second strategy stated in the previous section: this strategy proposes that SCI produce a lower cost product that is not currently offered by its competitors. This new offering could potentially substitute the currently available higher cost alternatives. Overall, considering that SCI is currently the only manufacturer capable of producing MUF in Iran, this strategy seems to be a sound, long-term option. If executed successfully, it gives the company a first-mover advantage and allows the company to enter an arena that initially exhibits lower levels of rivalry and, hence, increased rents. The details of this long-term strategy are further discussed in chapter 6.

Another long-term strategy considered for growing market share is establishing production facilities near major customers or prospects. As identified in Table 2-7, exhibiting the industry's KSFs, customers place high value on proximity as it helps minimize their costs and risks. A deeper look into the viability and potential of this strategy is also included in Chapter 6.

Yet another long-term strategy is to enter Western European markets. However, this study asserts that SCI would be critically challenged if it decides to plan entry into Western Europe at this point. As shown in Table 3-3, internally, SCI maintains a rather weak position on many aspects for entry into Western Europe. Planning to resolve the weaknesses requires presence of a positive socio-political environment. Unfortunately, Iran's international socio-political environment is currently unstable due to sanctions against the country. The changing nature of the socio-political environment involving Iran at this point creates challenges in planning activities necessary to improve on the identified weakness points. Therefore, considering the volatility in the socio-political environment surrounding Iran's international affairs and the risks such volatilities could pose on SCI's international operation, this study does not advocate allocating resources to the direct pursuit of international initiatives until more stability is observed

in Iran's international socio-political environment. However, international opportunities could still be targeted indirectly.

One identified approach could involve establishing alliances with domestic customers that already have an international presence or are interested in and can afford creating a presence in the Western European market. By providing amino resins that would satisfy the much stricter formaldehyde emission standards of the European markets, SCI could support its customers' to produce wood products that they can sell to western European buyers. Because the products adhere to western European standards, they are expected to face reduced adoption challenges. This in turn could grow the market share of SCI wood customers leading to increased gains for SCI from international opportunities. Chapter 6 examines the potentials of this strategy in more detail.

6. Analysis of Strategic Alternatives

As explained in chapter 5, prior to pursuing any long-term growth plans, SCI needs to address its cash flow problems in the short term. Therefore, this chapter is broken down into two sub sections: the analysis of short-term strategies, the primary goal of which is to improve the cash standings of the company, and the analysis of long-term strategies, the primary goal of which is growing market share, partly to increase plant utilization. The short-term and long-term strategies along with their respecting goals are summarized in Table 6-1. The following sections present the results of the analyses for the strategies that were broadly introduced in chapter 5.

Table 6-1: Summary of short-term and long-term strategic alternatives and primary goals

Short-term alternatives

		Alternative 1	Alternative 2
Primary Goal	**Weight**	**Partnership with a customer (score out of 5)**	**New product (score out of 5)**
Obtain low-cost working capital			

Long-term alternatives

		Alternative 1	Alternative 2	Alternative 3
Primary Goal	**Weight**	**New Product (score out of 5)**	**Production near customers (score out of 5)**	**Alliance with customers (score out of 5)**
Grow market share				

6.1 Short-term

The primary goal of pursuing short-term alternatives is to raise low-cost working capital. However, it must be determined how much low-cost working capital is needed. To answer this question, a target and an assumption are considered: The target is that SCI must reduce its interest expenses to reach a state of zero profitability in the next two years at which point it will pursue one of the long-term strategies that are discussed in detail in section 6.1.3. The assumption is that the company is unable to liquidate its current A/R in the next year as a source of low-cost operating capital considering the challenges it is currently facing in reducing its days receivable, as explained in section 3.1.8. Based on this assumption and considering SCI's financial data presented in the Appendices, for SCI to achieve a state of zero profitability in two years, the company needs to gather approximately $2.3 million over two years at zero interest rate.

To do so, two viable short-term strategies are identified: 1- Partnering with existing customers 2- Attaining profitability through introduction of new products. To choose between these strategies, the impact of each alternative on the primary short-term goal must be assessed and compared.

Based on the available information and the background material gathered, this study readily approximates that each alternative could equally provide SCI with the low-cost capital it needs. Therefore, the cash goal alone may not be sufficient to accurately determine the suitability of one alternative over another. To help assess the alternatives more accurately, three secondary goals, which are also impacted by the alternatives, are used. These secondary goals are the cost of pursuing the alternative, the risks associated with undertaking the alternative, and the alignment between the chosen short-term strategy and the long-term growth strategies discussed in chapter 5. All of these secondary criteria are established through direct communication with SCI's CEO. Table 6-2 illustrates the short-term alternatives and the primary and secondary goals against which the short-term alternatives are measured.

The weights allocated to each criterion are also indicated in Table 6-2. The primary goal is assigned the highest weight as the name suggests. Second, minimizing risks is assigned the next highest weight. The rationale behind this ranking is that SCI must raise the funds it needs to pursue its long-term growth initiatives. Therefore, any risks that might inhibit obtaining the needed cash could severely affect the short-term and long-term operation of the company. Between the remaining criteria, the alignment with long-term strategies is assigned a higher weight. This can be supported by considering that the long-term goal of the company is to pursue market share growth. If any of the short-term plans interfere with the long-term objective, the long-term direction of the company will be impacted. Lastly, cost is assigned the lowest weight. This study assumes that SCI wishes to minimize the cost of acquiring the cash it needs for addressing the issues with its current cash standing. It is important to note that cost in this context is not the cost of financing itself, as the goal is to secure low-cost capital. Rather it is the cost of processes the organization should go through to secure the low cost working capital. These costs, in general, are assessed to be of lesser impact on SCI's operation than the impact of misalignments between short-term and long-term initiatives. Therefore, in perspective, cost is assigned the lowest weight in assessing short-term strategies to raise low cost capital. With the weights of each criteria established, each short-term strategic alternative is now assessed against each of the three criteria.

Table 6-2: Recommended short-term strategies and assessment criteria

		Alternative 1	Alternative 2
	Weight	**Partnership with a customer (score out of 5)**	**New product (score out of 5)**
Primary Goal			
Low-cost capital	50		
Secondary Goals			
Minimize Risk	35		
Alignment with long-term growth plans	10		
Minimize Cost	5		

6.1.1 Alternative 1: partnership with an existing customer

It is expected that, if executed successfully, SCI can access the low-cost capital it needs through selling company shares. Therefore, a score of 5 is assigned to this alternative along the dimension of satisfying the primary goal.

This alternative involves several types of cost: first, it involves legal costs that might be incurred to draft and execute formal agreements. In addition, time and resources must be allocated to finalize the details of the agreement between SCI and the existing customer that wishes to pursue backward integration. The change in the structure of the company, also, may require time and effort to manage the impact of the change on the organization. Lastly, the company must forfeit nearly 19% of its shares, according to Table A-5, to obtain the funds it needs. Forfeiting shares leads to opportunity costs associated with potential future rents. Overall, this study assesses the impact of these costs to be low to medium and, as a result, allocates a score of 4 to the cost of this strategic alternative.

In terms of the involved risks, this alternative poses a number of risks to SCI's current operation and future plans: First, although domestic firms do not own patented technologies, as noted in section 2.1.2, a formal partnership exposes the know-how of the company and increases the risk of losing potential technical advantages that the company might currently possess, or may acquire in the future. This could threaten the sustainability of future rents. Second, costs might be incurred in the form of reduced productivity that might result from cultural clashes or process incompatibilities between SCI and SCI's investing customer. Third, any misalignments between

the goals of the new partners and SCI's management could prohibit the company from pursuing its long-term growth plans. And, lastly, the company may not be able to recoup the costs of searching for a suitable partner if it turns out that customers are unwilling to integrate backwards – if this happens, the company would be worse off than it would be if it had not pursued any partnerships. Such risks reduce the attractiveness of this alternative for obtaining the capital that SCI needs in the short-term. Overall, this study assesses the risks associated with this strategy to be medium and therefore assigns a score of 3 to the ability of this alternative to minimize risks.

Finally, in terms of alignment with future growth plans, this alternative may or may not be in alignment with the long-term goals of the company: If the investing customer is well positioned domestically and internationally such that SCI could leverage the reputational capital of the investor to further penetrate the resin market, then, perhaps, selling shares to existing customers could help SCI on its future growth path. Furthermore, if the investing firm's input demand could highly utilize the installed production capacity of SCI allowing the company to increase plant utilization and establish presence and reputation in the second-tier wood market, then such a partnership could also be aligned with the growth plans of the company. However, if investments are made contingent on offering resins exclusively to an investing customer that will not offer reputational advantages to SCI in the future, such a contract could prevent SCI from pursuing its growth plans. Furthermore, if the wishes of the partner clash with those of SCI's management team, that could also create misalignments between this strategy and the primary long-term objective of SCI. To score this criterion, we assume that SCI pursues well established customers if this alternative is to be exercised. Overall, this study allocates a score of 3 to this alternative noting that a high score implicates a well established alignment with long-term growth strategies.

Table 6-3 summarizes the above assessment of forming partnerships with existing customers for obtaining low-cost working capital. The weighted average score of this alternative is calculated to be 4.05/5.

Table 6-3: Scoring the short-term strategic alternative of forming a partnership with a customer

	Weight	Alternative 1 Partnership with a customer (score out of 5)
Primary Goal		
Low-cost capital	50	5
Secondary Goals		
Minimize Risk	35	3
Alignment with long-term growth plans	10	3
Minimize Cost	5	4
Weighted average score:		**4.05**

6.1.2 Alternative 2: New Product

In this alternative, the company would explore the production of a new tier of product to minimize price wars with its competitors over selling existing products. In this proposed alternative, the performance of the new product must be sufficient for the majority of the existing applications of amino resins. At the same time, it must be significantly cheaper than current resin substitutes so that any cost reductions is greater than the decrease in WTP due to minor reduction in performance. It is believed that meeting important specifications at lower cost could drive demand for the new product which, in turn, could generate rents for SCI to resolve its cash problems.

To implement this alternative a high cost product must be identified that can readily be replaced with a cheaper alternative that SCI can manufacture. Currently, MF resins are the most expensive amino resin products in the market. As mentioned in Chapter 2, MF resins are dominantly used in applications where heat and moisture resistivity are required. One such application is production of coatings for laminates which constitutes the primary market for MF resins domestically. A potential substitute for MF resins is MUF resins. MUF resins could provide durability levels very close to that of MF resins (Bono et al., 2008). Furthermore, MUF resins are much cheaper than MF resins as they use less melamine and more urea, a less expensive feedstock. MUF resins also allow satisfying formaldehyde emission requirements

currently satisfied through using more expensive MF resin alternatives. Additionally, as noted in 2.1.2, SCI is capable of manufacturing MUF. Therefore, MUF seems to be a viable cost-effective substitute for MF resins as well as a strong candidate for cost-effectively meeting formaldehyde emission regulations.

In terms of generating low cost capital, this study holds that implementing this strategic alternative provides SCI with the capital the company needs in two years: Because SCI has already implemented a MUF formula that it believes can be mass produced and the company already possesses the human resources and capital required to produce MUF in mass volumes, this study estimates that SCI could launch MUF within six months. Furthermore, since SCI would be the sole producer of MUF in Iran for some time, this study estimates that, in 18 months, the company could convert 50% of the current domestic MF market to use MUF. The MF market is estimated at 15,000 MT per year according to the data presented in Figure 1-5 and Figure 1-6 in section 1.2. Based on an estimated 30% cost reduction over MF resin alternatives and a gross margin of 30% (SCI, personal communication, July 2, 2011), and considering that MF resins are currently traded at nearly $1,700 per MT domestically according to SCI, the contribution margin that the company could earn over two years totals nearly $2.7 million. Since this total exceeds $2.3 million – the quantitative objective of raising low-cost working capital as noted in Table A-5 – this study assigns a score of 5 to the impact of this strategic alternative on the primary short-term goal.

The costs of implementing this alternative are estimated to be low-medium. R&D and marketing expenses are the primary sources of cost associated with this strategic option. The R&D costs are incurred as result of the need to invest current liquid assets into R&D to devise and test a method to mass produce the product. Additionally, opportunity costs may result from sharing scarce resources, such as the reactor, as discussed in section 4.2.3, between R&D and production. The sharing of scarce resources could sacrifice sales revenues that otherwise could be realized if interruptions were avoided. Marketing costs, also, will need to be incurred to drive adoption of the new MUF product.

It should be noted that costs are somewhat reduced considering that SCI already possesses dedicated intellectual and technical resources required to perform the necessary R&D activities. In addition, the company has an established small production facility separate from its mass production line. This could minimize the impact of sharing reactor's time between R&D and

mass production. Moreover, SCI's production, as discussed in section 4.2.3, is flexible and compatible with producing MUF resins. In addition, since the production line is not fully utilized at the moment, the human and equipment resources could be planned in such a way to minimize the impact on day-to-day production. This study maintains that SCI incurs minimal costs in pursuing this strategy; hence, a score of 4 is assigned to the impact of this strategic alternative on the secondary goal of minimizing cost.

There are several risks associated with adopting this strategic alternative. First, the company may face challenges in establishing a mass production process for MUF. Resolving these challenges may require R&D investments exceeding the company's available cash. If financing requirements exceed the amounts that the company can supply, SCI's currently low cash reserves would be depleted; this, in turn, adversely impacts not only the current operations of the company but also the chance of success in pursuing its long-term strategies. Second, the company may underestimate the resistance of the market leading to slow adoption of MUF. Based on market feedback, the current estimates suggest that MUF has great potential to replace MF resins offering a much lower cost and comparable performance. The fact remains, however, that the SCI may face some resistance to adoption and such resistance need to be overcome through educating customers about how the product will impact their operations and what adjustments would be necessary for adopting MUF. Market education requires time and resources that SCI may not possess because of the expenses incurred during the development of MUF. Lastly, SCI faces the risk of losing the first mover advantage to a competitor adopting and implementing this strategy before SCI. MUF is a well known product in the international markets and it is only a matter of time before the domestic wood manufacturers and resin producers begin using and manufacturing this line of product. Considering the above, this study assesses the risk factors associated with this alternative to be close to medium and, therefore, a score of 3 is assigned to this alternative along the dimension of risk.

In terms of alignment with long-term objectives, this strategy seems to be very well aligned with the long term goal of growing market share as it could convert and capture most of the current MF market. This option is also discussed as one of the alternatives to meet the company's long term goal in Section 6.2. Hence, a score of 5 is assigned to this alternative along the dimension of alignment with long-term strategies. The assessment of this short-term alternative is summarized in Table 6-4; the overall score associated with this alternative is 4.25/5.

Table 6-4: Scoring the short-term strategic alternative of producing a new product

	Weight	Alternative 2 New product (score out of 5)
Primary Goal		
Low-cost capital	50	5
Secondary Goals		
Minimize Risk	35	3
Alignment with long-term growth plans	10	5
Minimize Cost	5	4
Weighted average score:		**4.25**

6.1.3 Status Quo

Since 2008, the strategies of the company have failed to address SCI's financial challenges which have further weakened the company's position to compete in the domestic amino resin industry. According to Table A-1 exhibiting the company's income statement for the fiscal 2010, the company has suffered net losses in the noted fiscal year indicating that current revenues have not been sufficient to service current expenses, let alone providing the company with low-cost capital. SCI also notes that its net income has been negative over the past three years and the company currently maintains a negative Retained Earnings balance of approximately -$300,000. As discussed in section 5.2, it is anticipated that continuing such strategies could further burn the company's cash which, in turn, could lead to the insolvency of SCI's business. Overall, this study holds that pursuing current strategies would fail to generate low-cost capital for the company and, hence, a score of 0 is assigned to the impact of the current strategies on the primary short-term goal.

Furthermore, current strategies expose the business to the risk of insolvency and subsequent reduction of market share. As such, a score of 2 is assigned to the impact of current strategies on minimizing risk. The current strategies are also assessed to be misaligned with the company's primary long-term goal of growth as further growth depends on low-cost operating capital which current strategies have failed to generate. Therefore, a score of 0 is assigned to the alignment of current strategies with the long-term growth of the company. Lastly, it is understood that, except for potential opportunity costs, pursuing current strategies do not burden SCI with

additional operating costs such as acquisition of property, equipment, human resources, or technology. Therefore a score of 5 is assigned to the impact of current strategies on minimizing cost. Table 6-5 summarizes the assessment of pursuing current strategies for achieving short-term goals.

Table 6-5: Scoring current strategies for achieving short-term goals

	Weight	Status quo (score out of 5)
Primary Goal		
Low-cost capital	50	0
Secondary Goals		
Minimize Risk	35	2
Alignment with long-term	10	0
Minimize Cost	5	5
Weighted average score:		**0.95**

6.2 Long-term

The strategies discussed in section 6.1 are intended to address the immediate cash problems that SCI faces. In this section, however, long-term strategies that SCI could utilize to achieve a sustainable growth are examined. Throughout the examination of the long-term strategies, it is assumed that SCI has addressed its cash problems via one of the two short-term alternatives discussed in section 6.1 and, hence, the company is financially sound enough to pursue one of the long-term growth strategies broadly discussed in chapter 5.

To choose a long-term strategy, this study assesses the impact of each long-term alternative on the primary long-term growth goal. However, comparing strategies purely based on their impacts on growth prospects would suffer from a high level of uncertainty. Broadly speaking, it is anticipated that each alternative, if executed successfully, allows SCI to achieve growth; but, the level of the growth cannot be accurately determined based on the available information. To increase the likelihood of selecting a sound strategic option, this study includes three additional sub goals that are also impacted by the choice of alternatives. These criteria include the cost of pursuing the alternative, the risks associated with pursuing the alternative, and the sustainability of the fulfilled growth, which are chosen considering SCI's management

preferences. Including these sub goals in the assessment allows for a more accurate comparison of the alternatives by factoring in data that can be more accurately assessed.

The primary goal, sub goals, and the assigned weights are illustrated in Table 6-6. The primary goal, as the name suggests, receives the highest weight. Next, risk is assigned the second highest weight. The rationale is that SCI prefers to minimize risks of failure as it pursues growth opportunities. Sustainability is ranked third: obtaining sustainable rents after investing in growth opportunities is important to SCI. And, lastly, the company prefers to minimize the costs of pursuing the growth opportunities.

As for assigning scores, the scoring scheme for cost and risk follows the same logic as that established for the short-term goals: low score assigned to risk or cost criterion suggests a high risk or a high cost respectively. However, low score to growth or sustainability would imply low growth potential or low levels of sustainability. The following subsections present the detailed analysis of each alternative and use this scheme to score each long-term alternative.

Table 6-6: Recommended long-term strategic alternatives and assessment criteria

		Alternative 1	Alternative 2	Alternative 3
	Weight	**New Product (score out of 5)**	**Production near customers (score out of 5)**	**Alliance with customers (score out of 5)**
Primary Goal				
Growth	50			
Secondary Goals				
Minimize Risk	30			
Sustainability	15			
Minimize Cost	5			

6.2.1 Alternative 1: New Product

This option is also discussed as a short term alternative to provide the company with low cost liquid capital through increasing profit. In addition to short term advantages, this strategy offers long-term growth benefits to SCI. Because SCI will maintain a potential monopoly in the MUF market, the company could capture substantial market share in the long run. In addition, as discussed in section 6.1, MUF is cheaper than MF; therefore, over time, introduction of MUF could convert most of MF resin market to MUF market – a market that does not exist today in the domestic market. Another potential long-term advantage of this alternative is offering a resin that

can replace UF resins in applications that must achieve compliance with formaldehyde emission standards. Because MUF products exhibit lower formaldehyde emission rates than UF resins, buying SCI's MUF enables prospects to cost-effectively produce compliant finished goods and export them to regions that demand adherence to regulations pertaining to formaldehyde emission levels. Because of these reasons, MUF consumption in the industry could increase, which, then, increases SCIs market share as the sole provider of MUF resins. In addition, following this strategy could provide SCI with reputation capital that could further help the company grow. If any of SCI customers establishes itself as a capable producer of compliant products in the domestic and international markets, the customer's market accolades could reflect positively on SCI and its products. This, in turn, could attract more customers towards working with SCI. Lastly, this strategy presents SCI with further future growth opportunities. After SCI has proven itself capable of consistently producing a high quality MUF product, the potential exists for the company to implement strategies, such as franchising their technology to customers who would like to further drive down their cost by backward integration of the MUF production. SCI could establish a subsidiary, through which it would sell and implement the technology. This could further benefit SCI by increasing market penetration and introducing switching costs that would allow the company to sustain its long term rents.

The primary advantage of MUF lies with its strong potential to create an uncontested market for a class of low cost resins that offer the performance of MF resins at significantly lower cost. The notion of creating uncontested markets is further supported in the book "*Blue Ocean Strategy"* written by Kim & Mauborgne (2005). This idea is to not directly fight competition in existing markets, called red oceans, but to create new markets, called blue oceans, and make competition irrelevant – at least, over a certain period of time. The comparison between the characteristics of red oceans and blue oceans are shown in Table 6-7. The strategy canvas prepared for MUF, shown in Figure 6-1, suggests that because MUF can deliver a similar performance to MF resins at significantly lower cost, it is a viable option for creating uncontested markets by converting the existing MF markets to consumers of MUF. This could offer SCI strong long-term growth potentials. Furthermore, MUF appears to be a very cost-effective alternative to MF resins in converting UF based products into their regulatory compliant counterparts. Considering the potential for growth associated with this alternative, a score of 5 is assigned to the impact of this strategic option on SCI's growth objective. The cost and risk

considerations are already discussed in section 6.1 and the scores associated with each are 4 and 3 respectively.

Table 6-7: Red Ocean vs. Blue Ocean strategy (Kim & Mauborgne, 2005, p. 18)

Red Ocean Strategy	Blue Ocean Strategy
Compete in existing market space	Create uncontested market space
Beat the competition	Make the competition irrelevant
Eploit existing demand	Create and capture new demand
Make the value-cost trade-off	Break the value-cost trade-off
Align the whole system of a firms's activities with its strategic choice of differentiantion OR low cost	Align the whole system of a firms's activities with its strategic choice of differentiantion AND low cost

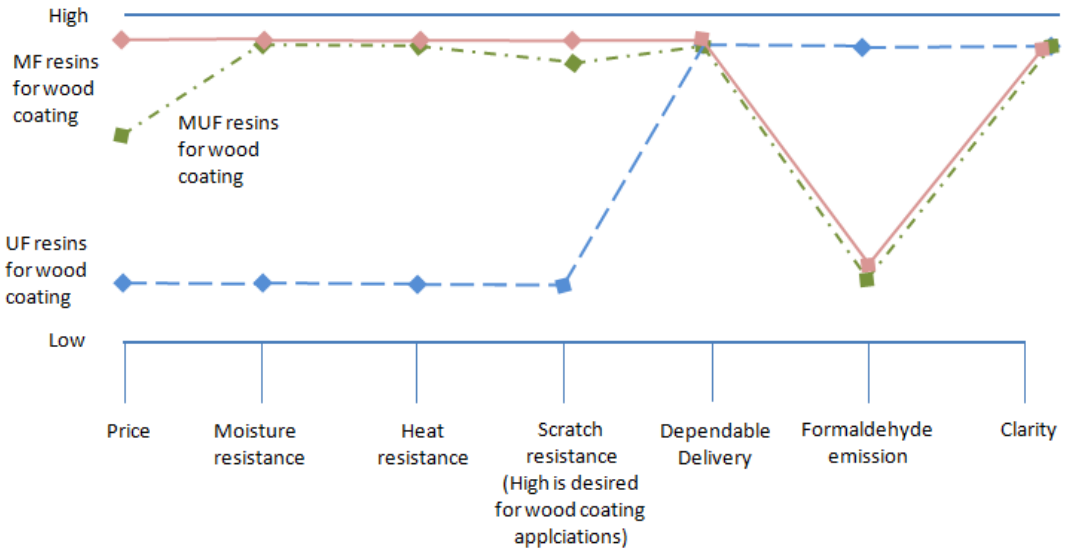


Figure 6-1: The strategy canvas for MUF (Bono, 2008; Bono, 2003; SCI, personal communication, July 2, 2011)

With regards to the sustainability of this strategy, it must be noted that intellectual property rights are not pursued nor are they enforced in Iran. The chances that competitors will try to adopt the same strategy, especially if it proves to be lucrative, are quite high. However, as mentioned in section 4.1.1, visibility is low in this industry, and releasing MUF into the market would not expose the know-how of producing MUF with it. Despite low operational visibility that can enhance sustainability of rents, it may be just a matter of time before competitors introduce similar products to the market. Most competitors already posses the specialized assets

needed to produce MUF. The obstacles mainly include finding, testing, and perfecting a suitable formula, and devising a process for mass production. Sustainability could be improved if SCI implements strategies that would increase switching costs. These strategies could involve seeking long term contracts, which are not common in the industry today. Alternatively, as mentioned in the previous paragraph, they could involve forming a subsidiary through which the company would franchise its technology know–how and lock customers by selling the technology specific equipment to franchisees. This latter strategy, however, should be pursued after SCI has established itself as a reliable MUF manufacturer and has gained considerable reputational capital in the field. Overall, this study evaluates the sustainability of captured market share through this alternative to be medium and assigns a score of 3 to the impact of this strategic option along this dimension. Table 6-8 summarizes the results of the assessment of this strategic alternative.

Table 6-8: Scoring the long-term strategic alternative of producing a new product

		Alternative 1
	Weight	**New product (score out of 5)**
Primary Goal		
Growth	50	5
Secondary Goals		
Minimize Risk	30	3
Sustainability	15	3
Minimize Cost	5	4
Weighted average score:		**4.05**

6.2.2 Alternative 2: Production near customers

Yet another long-term strategy that SCI could pursue to achieve growth is establishing an operational unit near customers in the north. This strategy allows SCI to satisfy the proximity criteria important to the amino resin market, as discussed in section 2.2. It also allows SCI to achieve a stronger cost advantage by reducing the costs and risks associated with transporting amino resins to northern customers. This study anticipates that proximity to northern customers, resulting in lower transportation costs, would highly facilitate the adoption of SCI's amino resin in the domestic market. However, it creates limited potential for SCI to grow internationally. Therefore, on the dimension of growth potential – the primary goal - this option ranks high and is assigned a score of 4.

Although the potential for this strategy is high, there are several risks associated with pursuing this option. First, establishing a new operational unit in the north is a lengthy process. In the most likely scenario, it would take nearly 3 years to establish a new production facility in the north. Such a long timeframe exposes SCI to the risk of existing competitors establishing similar facilities in the northern region – particularly competitors with stronger current financial positions. Second, Iran's inflation rates are volatile. This volatility, along with the long timeframe required to implement the project, may result in budget estimation inaccuracies. The inaccuracies in estimation could, in turn, result in SCI not securing sufficient funds to cover the cost of the project and the operating capital for the new business unit, thereby, exposing the company to future operational risks. Based on the identified potential uncertainties, this study assesses the risks associated with this alternative to be high and, as a result, assigns a score of 2 to the assessment of this alternative along the risk dimension.

Examining the costs of this alternative reveals significant expenses associated with this alternative. As discussed in section 2.1.2, the cost of establishing a new business unit can reach as high as $8 million. Additionally, this amount should be supplemented with the funds necessary for compensating the human capital needed to run the new facility. As of today, SCI is not capable of arranging a capital amount of this magnitude for the proposed business unit. Also note considering is that this cost is much higher than the cost of undertaking the other available long-term alternatives. Therefore, this study assesses the cost of this alternative to be high and assigns a score of 2 to this long-term strategic option.

The sustainability associated with this alternative is not very attractive either. Some of SCI competitors are financially strong. Therefore, it is likely that SCI's commitment to establishing new operations close to customers in the north would be followed by similar tactics on the part of SCI's competitors. Although, as explained in section 2.1.5, northern demand is currently assessed to be strong, future potential entry into the northern market could increase local supply in the north, subsequently reducing supplier power in the region. Increased supply along with routine price competitions, further discussed in section 2.1.1, could lead to price wars over market share in the north; these price wars, in turn, threaten the long-term sustainability of captured market that SCI could obtain from pursuing this alternative. Therefore, this study assesses the sustainability of captured market share through pursuing this option to be low to medium and assigns a score of 2 to this strategic alternative along the sustainability dimension. Table 6-9 summarizes the assessment results for this strategic alternative.

Table 6-9: Scoring the long-term strategic alternative of producing near customers

	Weight	Alternative 2 Production near customers (score out of 5)
Primary Goal		
Growth	50	4
Secondary Goals		
Minimize Risk	30	2
Sustainability	15	2
Minimize Cost	5	1
Weighted average score:		**2.95**

6.2.3 Alternative 3: Alliance with customer(s) to indirectly penetrate international market

This option addresses the company's interest in establishing a presence in the international market. As mentioned in Chapter 5, the company currently is not well positioned to directly target international markets. However, this study has identified a potential to indirectly establish market presence through collaboration with a customer that has international presence. The idea is that SCI forms an alliance with a stable wood manufacturing company which has already established international relationships. Through this alliance, SCI could compensate for its weaknesses with respect to some of the KSFs required to compete internationally. By providing high quality resins to its ally, SCI could strengthen the position of the customers' products in international markets, such as the markets in Western Europe. Subsequently, SCI could capture rents through increased, second-tier demand that result in increased production of wood products. Ideally, if the allied wood manufacturer manages to establish itself as a high quality wood product provider internationally, it is possible that SCI receives visibility as a reliable and high quality resin supplier in international markets. This visibility could attract international customers to SCI as a resin supplier of choice. The level of growth achieved, however, is directly dependant on the success of the customer's growth into international markets, the degree of the network created, and the extra volume of wood production created by customer's international presence. Also important to note is that this alternative could further lead to establishing SCI as a domestic resin producer whose resins comply with strict international standards. Such a reputation is valuable if domestic wood manufacturers turn to servicing export

markets in the future. Considering the above, this study assigns the score of 4 to the growth potentials of this alternative.

The costs associated with this alternative are primarily associated with the costs of searching and forming an alliance. However, this alternative has much lower costs compared to the costs of directly attempting to penetrate a new market, establishing a new facility, or conducting R&D to introduce new products. Therefore, this study assesses that the relative costs are low and hence assigns a score of 5 to the impact of this alternative on the secondary goal of minimizing cost.

Risks associated with this alternative are twofold: First, alliances are informal and not binding; hence, they could prove unstable. There is no contract to be enforced. Second, it is very hard to determine the market potential as there is limited access to second tier customers particularly in international markets. Because of these uncertainties, this study assigns the score of 2 to the risk factor.

With regards to sustainability, as mentioned above, alliances are not enforceable. There would be no practical means of ensuring continued relationship between the parties. Without establishing switching costs, the allied partner could partner with other equivalent resin manufacturers. Consequently, this study assesses the impact of this strategic alternative on sustainability of captured market share to be low to medium and, therefore, assigns the score of 2 to this impact. Table 6-10 summarizes the results of the assessment of this strategic alternative.

Table 6-10: Scoring the long-term strategic alternative of forming an alliance with a customer

		Alternative 3
	Weight	**Alliance with customers (score out of 5)**
Primary Goal		
Growth	50	4
Secondary Goals		
Minimize Risk	30	2
Sustainability	15	2
Minimize Cost	5	5
Weighted average score:		**3.15**

6.2.4 Status Quo

The current strategies of the company have failed to provide SCI with certain KSFs that the company needs to successfully compete and prosper in the amino resin industry over a long term. As discussed in section 3.1, two of these KSFs are access to low cost capital and access to extended working capital. As discussed in sections 3.1.6 and 3.1.8, these have not been satisfied through pursuing the current strategies of the company. As of the end of fiscal 2010, SCI held approximately $93,000 in its bank account. Furthermore, the company ended 2010 with a negative net income and a negative Retained Earnings balance of nearly -$300,000. Because these KSFs are not satisfied through the execution of current strategies, it is expected that the company would not be able to achieve a sustainable advantage through exercising current strategies. Therefore, a score of 0 is assigned to the impact of the current strategies on the primary long-term goal of growth and, accordingly, the secondary goal of sustainable growth.

In addition, as also discussed in section 5.2, current strategies expose the business to the risk of insolvency. The current debt to equity ratio of SCI is -1040. The high debt load could prevent the company from acquiring the resources it needs to grow or survive high domestic competition further discussed in section 2.1.1. Consequently, a score of 2 is assigned to the impact of current strategies on minimizing risk.

On a positive note, as also discussed in section 6.1.3, pursuing current strategies do not burden SCI with additional costs associated with acquiring new talents, assets, or technologies. Overall, a score of 5 is assigned to the impact of current strategies on minimizing cost. Table 6-10 summarizes the assessment of pursuing current strategies on achieving the long-term goals.

Table 6-11: Scoring current strategies for achieving long-term goals

	Weight	Status quo (score out of 5)
Primary Goal		
Low-cost capital	50	0
Secondary Goals		
Minimize Risk	30	2
Sustainability	15	0
Minimize Cost	5	5
Weighted average score:		**0.85**

6.3 Summary and Comparison of the Strategic Alternatives

Although the analysis of the short-term and long-term alternatives presented in this chapter are by no means comprehensive, it pinpoints the areas of concern and evaluates several short-term and long-term strategies that SCI may wish to consider in its pursuit of market share growth. These strategic alternatives, which are discussed in sections 6.1 and 6.2, are summarized in Table 6-12 and Table 6-13. To facilitate comparing the strategic options in each of the short-term and long-term categories, the weighted average score assigned to each alternative is also included. In each category, the option with the highest weighted average score is preferential. This system of comparison forms the basis for drafting the final recommendation of this study.

A close review of Table 6-12 and Table 6-13 reveals that the strategy to introduce MUF as a new product is assigned the highest weighted average score under both long-term and short-term strategy categories. Under the short-term category, the score assigned to this strategy is 4.25; under the long-term category, this strategy receives a score of 4.05. Since these scores rank highest in their respective categories, this study recommends introducing MUF as a strong strategic option that can enable SCI to address its short-term challenges and attain long-term growth.

Table 6-12: Summary of the weighted average scores for the short-term alternatives

		Short-term Alternative 1	Short-term Alternative 2	
	Weight	**Partnership with a customer (score out of 5)**	**New product (score out of 5)**	**Status Quo (score out of 5)**
Primary Goal				
Low-cost capital	50	**5**	**5**	**0**
Secondary Goals				
Minimize Risk	35	3	3	2
Alignment with long-term	10	3	5	0
Minimize Cost	5	4	4	5
Weighted average score:		**4.05**	**4.25**	**0.95**

Table 6-13: Summary of the weighted average scores for the long-term alternatives

		Long-term Alternative 1	Long-term Alternative 2	Long-term Alternative 3	
	Weight	**New Product (score out of 5)**	**Production near customers (score out of 5)**	**Alliance with customers (score out of 5)**	**Status Quo (score out of 5)**
Primary Goal					
Growth	50	5	4	4	0
Secondary Goals					
Minimize Risk	30	3	2	2	2
Sustainability	15	3	2	2	0
Minimize Cost	5	4	1	5	5
Weighted average score:		**4.05**	**2.95**	**3.15**	**0.85**

7. Strategic Recommendations

The strategy recommended, both to address SCI's short-term challenges and to pursue long-term growth, is the development of a new product. The new product recommended is MUF. The primary advantage of MUF lies with its strong potential to create an uncontested market for a class of low cost resins that offer the performance of MF resins at significantly lower cost. If successfully implemented, this strategy would result in both short term profitability and long term growth for SCI. This strategic option is thoroughly described in sections 6.1.2 and 6.2.1.

In recommending this alternative, it is noted that introducing MUF to achieve both short-term and long-term objectives brings additional advantages that are not considered in the analysis presented in chapter 6. If pursued as both a short-term and a long-term solution, the cost of this strategy needs to be considered only once. This cost must be compared with the total cost of other short-term and long-term strategic alternative pairs and not the cost of short-term or long-term alternatives separately. Doing so would position the cost of this strategy more favorably against the cost of other alternative pairs. In addition, with this alternative, the changes that SCI need to manage would be significantly minimized because of higher synergies. In effect, the company needs to focus its resources on implementing a single strategy rather than a short-term and, subsequently, a long-term strategic option.

Although not thoroughly discussed, it may be possible to combine long term strategic alternatives. For example, SCI could establish a production line close to a potential major customer and supply them with UF, MF and MUF; or, it could produce MUF and form alliance with its customers that supply Western European markets. Some of the prospective combinations could provide SCI with improved potential for sustainable growth. However, based on the current resource level of the company, this study recommends that these combinations, if pursued, be implemented one after another because pursuing the proposed strategies in parallel requires additional resources: In calculating the capital requirement to support long-term strategies discussed in section 6.1, this paper assumes that the short-term and long-term alternatives are to be implemented by the 43 individuals employed and current assets owned by the company. Furthermore, the scope of each proposed strategic option is expected to fully utilize the currently available resources of the company. Unless more funds are secured via short-term strategies to support additions to staff or assets, implementing the proposed long-term strategies in parallel may deplete the company of the initial capital raised in the short term. This would then leave the

company with insufficient funds to complete its long-term growth plans. The resource constraints make the proposed long-term strategic options mutually exclusive.

In summary, this study was given a problem statement by SCI, indicating the company's desire to grow market share domestically and internationally. In response, this study reviewed the external and internal business environments affecting SCI's business. Based on this assessment, a number of industry KSFs were identified and strengths and weaknesses of the company with respect to the identified KSFs were noted. To mitigate the weaknesses and to prepare the path for SCI to achieve growth, several short-term and long-term strategies were proposed and assessed. Among these strategic alternatives, introducing MUF was assessed to offer the greatest growth potential for SCI. It is hoped that the recommendation of this study would prove beneficial to SCI's future endeavors.

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A. Appendices

Table A-1: SCI's 2009-2010 Income Statement

Shiraz Chemical Industries Company Income Statement, Fiscal Year Ended December 2010

Revenues	IRR	25,248,849,995
Cost of Goods Sold		11,736,155,945
Gross Margin	**IRR**	**13,512,694,050**
GM%		53.5%
Operating expenses		
Wages		3,084,673,232
Rent		57,000,000
Selling expenses		222,189,880
Maintenance		298,365,122
Utilities		678,244,392
Earnings before Interest, Tax, Depreciation and Amortization (EITDA)	**IRR**	**9,172,221,424**
Depreciation		4,850,634,788
Total operating expenses		9,191,107,414
Operating profit or Earnings before Interest and Taxes (EIT)	**IRR**	**4,321,586,636**
Interest expenses		7,564,300,000
Profit before taxes (ET)	**IRR**	**(3,242,713,364)**
Income tax expense		-
Net Income	**IRR**	**(3,242,713,364)**
Profit (Loss)%		-12.8%

Note: All numbers are noted in IRR (Iranian Rials). 1 Dollar = 11700 IRR as of June, 8, 2011[5].

[5] http://www.cbi.ir/default_en.aspx

Table A-2: SCI's 2009-2010 Balance Sheet

Shiraz Chemical Industries Company Balance Sheet, Fiscal Year Ended December 2010

Assets		
Current assets		
Cash	IRR	936,528,090
Accounts receivable		11,835,095,047
Less, Uncollectibles		269,500,000
Inventory		2,412,677,000
Total current assets	**IRR**	**15,453,800,137**
Property, plant and equipment		
Propety		554,923,000
Buildings		2,365,645,000
Less: Accumulated depreciation		(146,028,400)
Equipment		30,561,322,000
Less: Accumulated depreciation		(4,704,606,388)
Total property, plant and equipment	**IRR**	**28,631,255,212**
Other assets		
Automobiles		140,000,000
Know-how		150,000,000
Total other assets	**IRR**	**290,000,000**
Total assets	**IRR**	**44,375,055,349**

Shiraz Chemical Industries Company Balance Sheet, Fiscal Year Ended December 2010

Liabilities and shareholders' equity		
Current liabilities		
Accounts payable	IRR	1,732,566,863
Wages		3,084,673,232
Short-term debt		1,774,473,269
Total current liabilities	**IRR**	**6,591,713,364**
Long-term liabilities		
Bank loans		37,826,055,349
Total long-term liabilities	**IRR**	**37,826,055,349**
Shareholdrs' equity		
Contributed capital		3,200,000,000
Retained earnings		(3,242,713,364)
Total shareholdrs' equity	**IRR**	**(42,713,364)**
Total liabilities and shareholders' equity	**IRR**	**44,375,055,349**

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Note: All numbers are noted in IRR (Iranian Rials). 1 Dollar = 11700 IRR as of June, 8, 2011[6].

[6] http://www.cbi.ir/default_en.aspx

Table A-3: SCI's 2009-2010 Cash Flow Statement

Shiraz Chemical Industries Company Cash Flow Statement, Fiscal Year Ended December 2010

Cash flow from operations		
Net income	IRR	(3,242,713,364)
Noncash expenditures		
Depreciation		4,850,634,788
Net working capital		936,528,090
Cash available for investing and financing activities	**IRR**	**2,544,449,514**
Cash flow from investing activities		
Equipment purchases		(911,862,250)
Automobile purchases		(50,000,000)
Sale of old equipment		-
Cash available from investing activities	**IRR**	**1,582,587,264**
Cash flow from financing activities		
Divident s paid		-
Mortgage payments		-
Loan payments		-
Repurchase company stock		-
Net cash flow	**IRR**	**1,582,587,264**

Note: All numbers are noted in IRR (Iranian Rials). 1 Dollar = 11700 IRR as of June, 8, 2011[7].

[7] http://www.cbi.ir/default_en.aspx

Table A-4: SCI's financial ratios based on 2009-2010 financial statements

Financial Ratios	
Profitability Ratios	
Gross Margin%	53.5%
Net Operationg Income %	17.1%
Net Profit %	-12.8%
Liquidity Ratios	
Current Ratio	2.3
Quick Ratio	2.0
Leverage Ratios	
Debt/Equity Ratio	-1,039.9
Operating Ratios	
Days Payable	53.9
Days Receivable	171.1
Days Inventory Carried	75.0
Cash Flow Ratios	
Cash Flow Cycle	1.2
Cash Flow Debt Coverage Ratio	1.0

Table A-5: Summary of financial analysis for fund raising

Fund Raising Analysis		
Asset Valuation	IRR	120,000,000,000
To achive zero loss, interests should be reduced by this amount	IRR	3,242,713,364
Therefore, need to reduce long-term debt by	IRR	18,015,074,243
Difference between current liabilities and current assets excluding AR and Inventory. This amount is needed to cover SCI's operation costs for two year from today assuming the same amount is collected from A/R in the second year.	IRR	(4,540,572,893)
Money to raise to cover short term liabilities and decrease interest payments to break even	**IRR**	**22,555,647,136**
Shares to sell to raise		**19%**