

**The effect of China's Globalisation on the South African Coal Mining
Equipment (OEM) Industry**

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Abstract

The study looks at the mining equipment industry as coal mining equipment is a subsector within this industry. This study seeks to create an understanding of how the coal mining equipment industry in South Africa is affected by the emergence of China as a mining equipment supplier. China's globalisation is set to continue and will impact all industries. China's African Policy will also impact the African continent, as China will continue to invest and use Africa's mineral resources. Sourcing manufacturing in other countries should also be viewed as a strategic choice. Chinese companies are expanding their manufacturing presence in overseas markets which suggests that the right global strategy is driven by a number of factors and not cost alone.

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List of Abbreviations

Asia –Pacific Economic Cooperation	-	APEC
Billion	-	bn
British Thermal Unit	-	Btu
Chinese Communist Party	-	CCP
Country Commercial Guide	-	CCG
Department of Foreign Affairs	-	DFA
Department of Mineral and Energy	-	DME
Department of Trade and Industry	-	DTI
Dollar	-	\$
Forum on China Africa Cooperation	-	FOCAC
Foreign Direct Investment	-	FDI
Gauteng Economic Development Agency	-	GEDA
Gross Domestic Product	-	GDP
International Monetary Fund	-	IMF

National Development and Reform Commission – NDRC

New Partnership for Africa’s Development - NEPAD

Organisation for Economic Cooperation and Development – OECD

Original Equipment Manufacturers - OEM

People’s Republic of China - China

Republic of South Africa - South Africa

State Owned Enterprise - SOE

United States of America - US

Verband Deutscher Maschinen- und Anlagenbau i.e. Association of German Machinery
and Equipment Manufacturers - VDMA

United Kingdom of Britain - UK

World Trade Organisation - WTO

Chapter 1

Scope and Nature of Study

1.1 Introduction

This study deals with the investigation of the effect of globalisation of the People's Republic of China (China) on the coal mining equipment industry in the Republic of South Africa (South Africa). The impact of China's Africa policy plays a major role in the way in which Chinese companies do business in Africa. This study also focuses on China's globalisation and sourcing as a strategic option for manufacturing companies. The study looks at the mining equipment industry as coal mining equipment is a subsector within this industry. This study seeks to create an understanding of how the coal mining equipment industry in South Africa is affected by the emergence of China as a mining equipment supplier.

1.2 Problem Statement

China's growing at a rate of 10% per annum (Duckworth: 2005). In the next 10 to 15 years China is expected to become the second largest economy in the world overtaking the UK, Germany and Japan (Duckworth: 2005). China's government encourages local Chinese companies to become global players, by offering high quality products at competitive prices, by having significant export sales, and investing in, or buying Western companies thus developing new markets. In 2006 China is the world's largest consumer of commodities, due to it becoming a major manufacturer. China has the cheap labour, a pro-business environment, a productive work force and strong government support for keeping domestic manufacturing operations as inexpensive as possible.

China and Africa have a formal relationship which is governed by the Forum on China-Africa Cooperation (FOCAC). China has an official document titled: China African Policy, which expresses Chinese government's policy towards Africa and the measures to achieve them. The African Policy Paper proposes cooperation in various fields in the coming years. The African Policy Paper has a view to promoting the steady growth of China-African relations in the long term and bringing the mutually beneficial cooperation to a new stage. China import a variety of commodities like iron ore, gold, copper, diamonds and chrome from South Africa (Anon, 2007a). China is involved in a number of mining operations in South Africa, such as platinum, nickel and chrome ore.

China's export to and import from South Africa grew 45.5% and 60.9% respectively in 2004 (DTI, 2007). South African conglomerates such as mining houses Anglo-American and Khurnba Resources, brewers SAB-Miller and media company Naspers have a substantial presence in China. China's dependence on natural minerals is at the core of the China Africa Policy.

The effect of China's globalisation strategy has led to an increase in market diversification. It has also led to the formation of large private enterprises. Foreign investment in China has taken the form of strategic alliances through mergers, acquisitions and joint ventures. There has been an improvement in the technology of products from Chinese companies, due to the Chinese government supporting companies who transfer technology to gain market share in China.

China's exports are in labour intensive sectors that include clothing, footwear and electrical equipment. South Africa's trade relationship with China is characterised by light manufacturing i.e. apparel and textiles, footwear, bicycles etc. South Africa exports iron ore and diamonds to China. The Chinese embassy in South Africa indicated in 2006 that

China-South Africa trade and economic cooperation have grown rapidly. They also noted that 20 percent share in the China-African trade is with South Africa, hence making South Africa China's largest trading partner in Africa.

China's extraordinary economic growth (which will be elaborated on in Chapter 2) has come mostly from its trade and export dominance. A combination of low wages, specialised regional networks and product exporters has enabled China to become the global economy low cost supplier. China's role in the global economy is no longer defined by a single export driven economy. The low wages in China which has driven the low cost of products is now on the rise. In order to achieve sustainable growth in China, the Chinese government wants to reduce the country's reliance on foreign investment and demand.

In order for Chinese companies to develop in new markets they need to learn about customer requirements and competition. There are a number of factors that Chinese companies have to consider when entering new markets namely (Duckworth, 2006: 33):

- Convincing customers on the reliability of supply,
- Ensuring consistent quality of products,
- Building local relationships and overcoming cultural barriers,
- Understanding local regulations and standards
- Ensuring reliability and low risk i.e. products from China must work when they arrive in different countries.

China's machine building industry manufactures farm machinery, engineering machinery, instruments and meters, general machinery, heavy mining machinery, machine tools, electrical engineering equipment, bearings, master tools, food packing machinery and automobiles. The machine building industry is capable of providing the global mining industry in China with complete sets of high level equipment.

Global mining machinery demand will grow 9.3 percent yearly through 2009 (Anon, 2006f). The global mining machinery business is currently worth \$17.7 billion (Anon, 2006f). The leading industry players including Sandvik, Joy Global, Atlas Copco, DPT, Boart Longyear, Terex, Downer EDI, Bucyrus International, Caterpillar, and Metso. China has imported billions of dollars on advanced technologies and equipment for coalmine construction, development, transportation and processing over the last twenty years. This has enabled China to establish a complete system of research and development, geological exploration, mine construction, coal mining and processing, and mining machinery manufacturing. The rapid development of mining technology in China has enabled several Chinese companies to manufacture high technology mining equipment.

Companies, as a strategic action, would want to source from China in an effort to reduce costs of equipment and compete more aggressively in their domestic market. This has also led to companies sourcing without plans for assessing and managing suppliers in China. China is the largest consumer of commodities like copper, oil and gold. The huge Chinese global demand has consequences such as causing shortages and driving prices higher for other consumer countries. China is perceived to be a low cost supplier; this is changing due to currency concerns, logistical challenges and skilled labour shortages. The

cost of Chinese labour, which is the main driver of supplying low cost goods, is currently rising.

The risks associated with sourcing from China are skills shortages, logistics, economic instability and sustainable supply. Hence South African companies need to be realistic in their expectations when sourcing from China. Factors to consider when sourcing from China are (Nelson & Sisk, 2005): manufacturing costs, transport efficiency, lead time and scheduling stability, product design and technical capabilities.

South African mining companies need to develop their business strategies to accommodate the planned changes by the Chinese government in the machine manufacturing industry in China. The companies will need to focus on the global economy in order to understand the threats and opportunities associated with it. South African mining companies will need to integrate processes to achieve low cost country sourcing strategies and mitigate the risks associated to optimise the value chain of doing so.

1.3 Research Aims

1.3.1 Primary Objective

China's machine manufacturing plan will change the coal mining equipment industry. The global coal mining equipment industry is dominated by a few companies. These companies would need to take cognisance of China's growing coal equipment manufacturers due to China having one of the world's largest coal deposits. China's coal mining industry will influence trends coal mining trends in Africa due to the Africa's and China's strategic partnership.

It is important to gain an understanding in the coal mining equipment industry in China and South Africa. The trade relations between South Africa and China will change the sourcing of coal mining equipment. The Original Equipment Manufacturers (OEM's) of coal mining equipment have a dominant market position due to the branding of the equipment they supply and the technological advancement of the equipment they supply. The OEM'S of coal mining equipment do have a number of suppliers on their value chain who manufacture in China. The dominant OEM's of coal mining equipment are in mature markets namely United States of America (US), Europe and Japan. Manufacturing in these countries have been decreasing and hence the manufacturers of coal mining equipment need to consider China as a location for manufacturing. This research aims to explore the effect of the China's coal mining equipment industry on the global coal mining equipment industry.

1.3.2 Secondary Objectives

In order for the OEM's of coal mining equipment to retain their dominant market position they to gain market share in developing countries. The coal mining equipment industry in China is in a growth phase due to the demand for coal as an energy source. South Africa and China use coal as the primary source of their energy needs. The trade relationship between South Africa and China are complementary according to Dr Nkosazana Dlamini Zuma, Minister of Foreign Affairs of South Africa (DTI, 2007). This would aid bilateral trade between China and South Africa.

China has a number of state owned enterprises (SOE) which are guided by the government and given preferential treatment with regard to taxation. China intends to

develop machine/ equipment manufacturing SOE's to compete on a domestic and global level. The official news agency of the Chinese government published their machine manufacturing strategy; this is discussed in detail in Chapter 3 (Selko, 2006).

Sourcing from China is the focus of many multinationals. Chapter 2 discusses sourcing as a manufacturing strategy to reduce costs and improve profitability for large companies. Many companies are already sourcing parts or components from China and have close relationships with their vendors. The Chinese government encourages foreign investment in Chinese companies. There are tax benefits for companies to invest in China; in return technology is expected to be transferred to Chinese companies. Many large companies are also realising that there are barriers to investing in China and in order to source successfully from China a visible presence must be maintained. The coal mining equipment industry is a subsector of the mining equipment industry and very limited research is available on this sector.

1.4 Research Methodology

The research methodology consists of a broad investigation of relevant sources on the coal mining equipment industry. There are a number of factors which affects the global coal mining equipment industry; these factors are discussed in Chapter 3.

1.5 Theoretical Study

The theoretical research part consists of a broad literature review. The information obtain for the literature study is gathered by the following means of the Internet (online searches),

library searches, catalogue searches, article searches and interviews with knowledgeable persons, in the industry.

1.6 Trends in the global coal mining equipment industry

The data is obtained from various online sources. Information regarding the coal mining equipment industry is not readily available. The global manufacturers of coal mining equipment publicise very little on their industry and do not disclose information. The information gathered will show what forces are driving changes in the coal mining equipment industries and how this will affect South African mining companies as well. Information regarding the spend on coal mining equipment in Chapter 3 include both used and new capital coal mining equipment and equipment which is not the focus of this study.

1.8 Delineation of Study

This study focuses on the coal mining equipment industry from 2002 to 2006. The scope of this study focuses on the new equipment used to remove coal by the underground and opencast method of coal mining. This study focuses on the following types of mining equipment:

- Long wall systems i.e. Armoured face conveyors, Powered roof supports
- Continuous miners
- Shuttle cars, Battery haulers

- Roof bolters
- Feeder breakers
- Draglines
- Shovels/ Excavators

The companies which supply this type of equipment are well established in the coal mining industry and sell their equipment in all areas of the globe which mine coal. The coal mining equipment industry is not forthcoming with information regarding their industry and hence equipment/machine figures indicated in the study would have used and/or new equipment and equipment which is not the focus of this study. The information regarding the coal mining equipment industry is not freely available and very limited sources were found. There is a general lack of openness in this industry due to the coal mining equipment companies guarding their intellectual property and profit margins.

Information regarding the coal mining equipment industry in China was only obtained from one source, hence could not be confirmed. There are a number of coal mining equipment suppliers but there are no industry associations in China for these companies. The Chinese government does not publicise the size or growth of the coal mining equipment industry in China. Many coal mining equipment suppliers from China are exporting mining equipment to Africa, though not to South Africa. There is no publicly available information regarding the exports of coal mining equipment from China to Africa. In Chapter 2 the trade data

between China and South Africa is discussed, but it is clear that coal mining equipment is included in other data.

1.8 Layout of the Study

Chapter 1: Scope and Nature of Study

Chapter 2: Sourcing as an option for the manufacturing industry from a globalising China

Chapter 3: The Globalised Coal Mining Equipment Industry

Chapter 4: Conclusions and Recommendations

1.9 Summary

The focus in this study is on the coal mining equipment industry. There are limitations to this study as research is not freely available and limited for the coal mining equipment industry. China's globalisation is also a focus of this study. China's rapid growth is affecting all industries and changing the way global business occurs. Chapter 2 focuses on China's globalisation and sourcing as a viable strategic option for manufacturing companies. China has a formal Africa Policy, which affects the way in which it interacts with the African continent. China has grown its political and trade relations with South Africa and this is set to continue.

Chapter 2

Sourcing as an option for the manufacturing industry from a globalising China

2.1 Introduction

This chapter deals with effects of globalisation on South Africa and China, the trade relationship between South Africa and China and sourcing from China as a strategic decision for manufacturing companies. This chapter gives an overview of the type of relationship the two countries have in the global context. It also explores the manufacturing industry in both countries and how trade is fostered between South Africa and China. There is also an overview of the manufacturing relationship between the US and China, the reason for this being that major coal mining equipment suppliers is located in the US. Many major companies compel companies to move the manufacturing facilities to China.

2.2 Globalisation

2.2.1 Overview of Globalisation

Gregory Chow (2005) defines globalisation as the flow of goods and capital, information/technology and people across national borders. Chow (2005) indicates globalisation encompasses the movement of resources between nations. Globalisation reflects the growing interdependence of various countries and regions in the world and that it is a process that aims at integrating not just the economies of the world but their culture, technologies and systems of political governance (Hill, 2004:6; Bhagat, 2006:137). Smith and Doyle (2002) describe globalisation as the spread and connectedness of production,

communication and technologies across the world, and that this spread has involved the interlacing of economic and cultural activity. Michael Yahuda (2003) writes that globalisation has been used in many ways to outline changes in social, political and military spheres. Globalisation is understood to encompass the social, cultural, political and security dimensions (Deng & Moore, 2004:118).

Integration of economies is changing the way in which businesses operate and is restructuring the priorities of international economic institutions, business organisations, and lives of individuals, goals and objectives of national governments (Bhagat, 2006: 137). Smith and Doyle (2002) observe that large cooperation's operate across many different countries and have hence developed and marketed products that can be sold anywhere in the world. Michael Yahuda (2003) observes that these changes are developed from economic change where the basis of production and finance are said to have shifted from the confines of national boundaries to encompass the world.

Globalisation has spread due to the demise of communism; spread of capitalism and the institutional mechanisms that enable it has grown. The forces that drive globalisation are international forces of multinational companies, trade and demands of local populations (Yahuda, 2003). Globalisation creates growing inequalities between countries, social classes, and individuals (Bhagat, 2006: 137). Globalisation has placed considerable pressure on national governments to abandon state planning and various mechanisms of the centralised economy and undertake policy reforms to liberalise the economy (Bhagat, 2006: 138).

This movement is good for each nation in the long run but may have harmful effects in the short run for a segment of the population. Chow (2005) observes that there may also be environmental problems associated with new manufacturing facilities built in the course of globalisation, but this problem exists for domestically financed factories and for economic development in general. Economists try to balance the harm from possible damage to the environment with the gain in having more output. In general poorer countries are willing to accept some environmental degradation in exchange for economic development or more output but are aware of the damage which may be long lasting (Chow, 2005).

Globalisation can thus be defined as the as the interconnectivity between countries with regard to their economies, politics and cultures. Companies promulgate globalisation by operating in different countries to ensure their profitability. Chinese companies have alliances, joint ventures and agreements with companies and governments in the developing and developed worlds. China's government has formulated plans and policies to infiltrate industries and markets.

2.2.2 China's Globalisation

Exports from China can be found all over the world (Chow, 2005). William Holt (2005:1) indicates that China's economic success is associated with liberalisation and globalisation. China offers a market for foreign manufacturers. China has acquired economic dominance as a result of being an importer (Chow, 2005). Countries which import to China have increased their economic growth. Countries which China exports to are considering the imposition of restrictions on these imports .g. imposition of quotas on textiles from China, due to the markets being flooded by these imports and hence creating a decline in the

domestic industry. Chow (2005) indicates that foreign trade has aided economic growth in China in three aspects namely:

- International specialisation that takes place as each country produces the goods for which it has a comparative advantage in producing will enable the country to obtain more goods than by domestic production alone;
- Exports are a part of aggregate demand and an increase in aggregate demand helps increase the country's national output;
- Trade together with foreign investment has brought in modern technology and method of management that has increased productivity in China.

The flow of foreign direct investment in the form of physical capital has promoted China's economic growth (Chow, 2005). Foreign investment has provided physical and financial capital, technology and management skills to China. Foreign investment is not a factor in China's rapid growth, it's however a vehicle to propel growth. Chow (2005) specifies three factors which have enabled China to attract foreign investment i.e.:

- Abundance of high quality human capital that includes skilful and hardworking labourers and resourceful entrepreneurs;
- Sufficiently well functioning market institutions; and
- The position of a late comer that can adopt modern technology from the more developed countries.

As a result of these factors China has been able to export capital to less developed countries as well as the US. China welcomes foreign investment in its stock markets and also invests its capital in foreign markets (Chow, 2005). In December 2001, China was admitted into the World Trade Organization (WTO). In order to be admitted into the WTO China had to reform its economy to a free market economy that is more open to foreign investment and trade (Wen, 2005; Yahuda, 2003). The reform that China instituted gained the country acceptance into the WTO; they have also earned the praise of the World Bank and other economists who herald China as a great success story of economic globalization (Wen, 2005). Wen (2005) indicates that China has become a magnet for foreign investment and an export powerhouse.

Ronnie Chan (2005) indicates that China is expected to account for about 50 percent of the world's manufacturing capacity by volume. This equates to approximately 50 percent of the world's natural resources to be consumed in China. This implies that half of the energy required to produce goods will be spent there; every other plane or ship in the world will call on airports and ports in China; half of all merchandise one sees and uses will be made in China. In 2004 China surpassed the U.S. as the largest recipient of foreign direct investment in the world (Chan 2005).

Chan (2005) also indicates that Chinese companies are becoming well known globally and that they will become increasingly acquisitive overseas. China's domestic consumer market is big enough to develop domestic brands which may one day become global ones (Chan, 2005). China's economic growth is accompanied by notable regional and global consequences. China is now a foreign aid donor nation (Chan, 2005). China's acceptance

into international organisations such as the World Bank, IMF and WTO, will change the manner in which these bodies are governed and the rules that are extended to their members. This is seen as historic as these organisations were dominated by developed countries and a developing country will now have a significant impact on these organisations. China will have influence in the political arena as well e.g. facilitating peace in North Korea (Chan, 2005).

China's globalisation will have serious impacts on the poverty and inequality, labour and environment. Wen (2005) writes that China is experiencing the paradox of globalisation, as economic indicators may rise but poverty is increasing, jobs are lost and social inequities come to the fore. Michael Yahuda (2003) observes that China has benefitted from globalisation. Globalisation has facilitated China's integration into regional and international economies (Yahuda, 2003). China has become the poster child for successful globalisation for the World Bank (Yahuda, 2003). China's globalisation process was initiated by Deng Xiaoping (leader of the Communist Party of China from 1978 to 1992), as he laid the guidelines for his successors to follow economic reform as a condition to maintain high levels of economic growth. Deng Xiaoping's argument was that rapid economic growth would ensure the survival of the communist party. He believed that sustained economic growth could justify the party's claim that social stability was the prerequisite for economic development. It was on this basis that Deng argued that China had to attract more foreign investment and integrate itself more deeply into the international economy (Yahuda, 2003). This implied that China would also have to foster good relations with their neighbours and minimise conflict with the United States.

Deng and Moore (2004: 117) write that China's political elites recognise economic globalisation as a double edged sword. Globalisation is also seen as a driver of national economic growth and that it introduces new sources of economic vulnerability (Deng & Moore, 2004:117). China's political elites deal with issues such as capital flows, weapons proliferation, epidemics, terrorism, and cyber crime in terms of globalisation indicates the evolution of the country's views and its tumultuous quest for development, security and status during the last decade (Deng & Moore, 2004:117). China aspires to be one of the world's most influential and powerful countries; hence China's view on globalisation manifests in its assessment of the world order and structures its strategic position.

China's strategic thinkers believe that globalisation has manifested itself in transnational forces, international organisations and a great need for multilateralism (Deng & Moore, 2004:118). China's strategic choices are deigned to exploit globalisation as a way of making China rich, strong and reducing international fears of China's material power (Deng & Moore, 2004:118). China's leaders have assessed the sensitive foreign reactions to China's growing power and have actively pursued cooperative security, win-win economic cooperation and a multilateral approach to foreign policy (Deng & Moore, 2004:118). China's new foreign policy choice highlights the potential role of globalisation in transforming great power politics from the unmitigated struggle for supremacy of earlier ears to a more cooperative from of interstate competition that increase prospects for China's peaceful rise (Deng & Moore, 2004:118).

Chinese official's describe globalisation as the trend driven by advances in science and technology that were producing increased cross national flows of capital, goods and know

how (Deng & Moore, 2004:118). In terms of this globalisation was restricted to the economic sphere. China's government realised that globalisation would require reform and opening of their social, cultural, and political dimensions to compete effectively in the world economy (Deng & Moore, 2004:119). China also recognised that serious imbalances and inequities persisted in international systems.

Chinese analysts and political elites recognise that the US enjoys great advantages in utilising globalisation across military, technological, political and even cultural arenas to be dominant in the world (Deng & Moore, 2004:122). Deng and Moore (2004: 123) quote Zheng Yu as arguing that the rising trend of economic globalisation s led to an unprecedented level of economic interdependence, thereby effectively containing the possible escalation of regional conflicts to great power war. Zheng Yu also argues that it is difficult for one country to resort to economic coercion as a means to control the economic development of another country and economic globalisation has provided opportunities and favourable conditions for overall peace and development in the international community (Deng and Moore 2004: 123).

Deng and Moore (2004: 123) write that China's analysts and policy makers believe that economic globalisation creates the open economic system necessary for China's growth. Globalisation also forces China to live up to its international commitments, offers opportunities to express its discontent, to take measures to defend its economic interests and to assert a leadership role in global governance Deng and Moore (2004: 123). China's admittance in the WTO is seen as a means to influence the international economic system (Deng and Moore 2004: 124). In September 2003 at the WTO ministerial meeting in

Cancun, Mexico, China indicated their concern about fairness. The Commerce Minister of China, Lu Fuyuan assessed that the positions of developed against developing countries, concluding that “their obligations are not balanced and their gains are not equal (Deng and Moore 2004: 124).

China uses an increasingly wide variety of economic platforms, including the WTO, the Asia-Pacific Economic Cooperation (APEC) forum, and various UN agencies, to actively manage the course of globalization (Deng and Moore 2004: 125). China has also learnt that that non-traditional threats can put at risk China’s security environment and impact critical concerns in social stability, national unity, and economic development (Deng and Moore 2004: 128). China’s international behaviour is increasingly motivated by a desire to maintain the status quo by seeking stable relations with the US as the world’s sole current superpower and by promoting China’s gradual rise in the international system (Deng and Moore 2004: 129). China recognizes that globalization promotes extensive involvement in multilateral organisations both at the regional and global levels. These can encompass a wide range of trade issues, including disputes over steel tariffs, textile quotas, and antidumping duties.

China has a vast number U.S. debt, such as Treasury securities, is minimal in comparison to U.S. investment in Chinese factories. The US debt that China has, has created an unusual relationship in which the rising power, developing China, provides both exports (second-leading supplier) and loans (second-leading foreign holder of government debt) to the superpower, the industrialized United States (Deng and Moore 2004: 132). China’s economic ties with the United States are seen as weakening any impulse the United States

may have to view China as a rival that needs to be contained (Deng and Moore 2004: 132). Globalization by no means negates competition, but in today's increasingly globalized world, rules and institutions may moderate competitive politics. Chinese experience with and perceptions of globalization show that globalization has facilitated its status quo (Deng and Moore 2004: 134). China's steady rise in international and regional prominence has justified its cooperative diplomacy.

It can be concluded that China intends to maintain its growth rate and hence infiltrate all major markets and industries in the world. This will change the current manner in which business is done on a global scale. Multinational companies would need to factor in China as a global player when formulating strategies. They would need to also gain market share in China, as China has a burgeoning domestic industry.

2.2.3 China's Economy

China's economy is adopting market economy mechanisms and a reduced government role. The Chinese industry is largely based on state and collective ownership, marked by increasing technological progress and productivity. Private ownership of production assets is now legal in China, although major non-agricultural and industrial facilities are still state owned and centrally planned. Restraints on foreign trade are relaxed and joint ventures are encouraged by the Chinese government. Since China's reform the income level of the Chinese people has been increasing and their personal assets have been continually growing.

The rapid growth in China is generated by several factors, but chiefly the low cost of labour (Nassimbeni & Sartor, 2006:333). Nassimbeni and Sartor (2006:333) observed that since 1979, the Chinese government initiated a series of reforms that have paved the way for economic growth. Some of these initiatives are the granting of incentives and facilities for foreign investments, creation of logistic platforms able to make intercontinental transport easier, ignoring international complaints regarding the pervasive problem of the violation of property rights (and the enormous environmental impact of their production) so as not to hinder the first phase of industrialization, linking the exchange rate of their currency to the dollar so ensuring a monetary stability and obtained favourable conditions for entrance into the WTO. They have heavily invested in research, thus determining rapid growth of the technological profile of Chinese companies (Nassimbeni & Sartor, 2006:334).

Technology transfer by importing whole plants, equipments and designs are an important means of progress in China (Anon, 2007a). The major industrial centres in China are in Liaoning Province, Beijing-Tianjin-Tangshan area, Shanghai, and Wuhan. Mineral resources include reserves of iron ore, adequate to abundant supplies of nearly all other industrial minerals (Anon, 2007a). Outdated mining and ore processing technologies are being replaced with modern techniques. China still has many problems namely unemployment, diverse development from a territorial point of view, inadequacy of the legal system, exposure of the credit system, insufficiency of infrastructures and environmental pollution (Nassimbeni & Sartor, 2006:334).

China became a WTO member in 2001. China entered into many bilateral trade negotiations with more than 30 economies around the world since 2001 (Dailami, 2007).

Foreign direct investment inflows to China have shifted from the manufacturing sector to the financial and real estate sectors, partly reflecting greater access by foreigners to investment in the banking and insurance sectors in compliance with WTO accession requirements (Dailami, 2007). The WTO Annual Report for 2007 indicated that China's trade growth continued to outstrip other major traders. China's merchandise exports grew by 27 percent (Bachetta et al, 2007). In 2006 the United States of America's (US) exports exceeded China's exports. China has enhanced its role as a leading supplier. Low and lower middle income countries have seen their share of world exports of textiles and clothing increase noticeably. Emerging developing countries, including the newly-industrializing Asian economies and Mexico, lost market share in the textile industry (Bachetta et al, 2007). Overall, in 2006, the least-developed countries increased their shares of developed countries' textiles imports. The fact that China, India and Bangladesh performed well also means that millions of low-income workers benefited (Bachetta et al, 2007). China's middle class has an enormous appetite for consumer goods (Brown, 2005).

The WTO recognised that China had taken considerable activities to reform its economy, and trade liberalisation has encouraged rapid growth in China. China has taken major steps, especially in the run up to its WTO accession, to streamline its trade policy regime, revising and updating a large number of laws in the process (Bachetta et al, 2007). Reform has resulted in a remarkable transformation of the Chinese economy. Real economic growth has been at some 9 percent over almost two decades, resulting in an eleven-fold increase in per capita income between 1978 and 2005 (Bachetta et al, 2007). Brown (2005) also observes that China has grown by approximately 9 percent annually for the last fifteen years.

The Global Development Finance Report for 2007 indicated that growth in China for 2006 was 10.7 percent (Dailami, 2007). The percentage of China's population living below the poverty line has declined from 73 percent in 1990 to 32 percent in 2003 (Bachetta et al, 2007). China is required to reform the system of tax incentives formerly offered to foreign investors as part of the "open door" development strategy. Measures are proceeding concurrently to progressively widen the tax base, in order to compensate for steadily increasing pressures on the fiscal balance while not exacerbating the country's growing wealth gap (Anon, 2007a). Trade and investment reforms have resulted in China becoming the world's third largest trader and one of the largest recipients of foreign direct investment (Bachetta et al, 2007). China's tax system is complicated and, like the country's legal system, is a recognised target of government reform. Key problems include overlap between local and national taxes, arbitrary and obscure local taxes, frequent changes to tax regulations and inconsistent collection (Anon, 2007a).

China still has a number of challenges to overcome. These include growing income inequalities and the need for job creation, while continuing and deepening economic reforms (Bachetta et al, 2007). China has a large growing internal market of 1.4 billion people to support its factories (Brown, 2005). The Chinese government has indicated that in addition to meeting its goal of annual average GDP growth of 7.5 percent over the next five years, attention would be paid to agriculture, rural development and farmers' incomes, balanced regional development, technological innovation, energy conservation and environmental protection (Bachetta et al, 2007).

China experiences low worker productivity due to insufficient agricultural machinery and other modern inputs. Most agricultural processes are still performed by hand. China has a very small area of arable land (just above 10 percent of total area) in comparison to the size of the country and population (Anon, 2007a). China's provinces along its coast have twice that of the country wide average (Brown, 2005). China is self sufficient in all energy forms. Coal and petroleum has been exported from China since the early 1970's (Anon, 2007a). Coal reserves in China are among the worlds largest. Mining technology is inadequately developed but has greatly improved.

China has also decreased measures on their borders including the tariff and export restrictions (Bachetta et al, 2007). Foreign trade in China is growing rapidly in size and importance. Trade is controlled by the Ministry of Foreign Economic Relations and Trade, subordinate units, by the bank of China, and the foreign exchange arm of the central bank (Anon, 2007a). There has been substantial decentralization and increased flexibility in foreign trade operations. Exports from China include but are not limited to textiles, petroleum and foodstuffs. Leading imports include machinery, transport equipment, manufactured goods and chemicals (Anon, 2007a).

The WTO indicated to China that the issue of transparency in policymaking and implementation, the use of certain measures on imports and exports, especially anti-dumping and countervailing, standards, export taxes and rebates needed further development. Bureaucracy and corruption are major obstacles to conducting business in China (Anon, 2007a). The bureaucracy is overbearing and cumbersome, and corruption pervades the party. Officials often expect 'sweeteners', and have been known to charge for

duties within the public domain. The infrastructure is gradually improving. Despite this, foreign companies are still able to take advantage of the more transparent business environment of Hong Kong when they invest in the growing Chinese economy (Anon, 2007a).

China indicated that trade and related laws had also been extensively reviewed and amended where necessary, to meet its WTO commitments (Bachetta et al, 2007). The WTO noted that direct intervention by the Chinese government in the economy has declined but that indirect measures were still used to “guide” investment in certain sectors, particularly in manufacturing, including the steel and automotive sectors (Bachetta et al, 2007). Power remains centralised in the Chinese Communist Party (CCP), ensuring a stable political environment (Anon, 2007a). No change in the current structure of the government is envisaged in near or medium term, although in the longer term, political stability will depend on continued economic progress and the diversification of growth across the country.

China’s intellectual property laws require much further development and enforcement. China indicated that they had set up a complete legislative and enforcement mechanism for intellectual property rights and had raised public awareness of intellectual property rights (Bachetta et al, 2007). The Chinese government has recognised that the former Communist legal system provides little support for a rapidly evolving market economy, and has drawn up and or enacted a number of changes in recent years. Specific investor concerns include the protection of intellectual property rights, contract enforcement and divergent regulations across provinces and between government departments.

New laws have addressed concerns over intellectual property, and have sought to rationalise the process of legal implementation across different government departments (Anon, 2007a). The WTO observed that China's demand for natural resources and energy, could also be better met through a more open and transparent policy on investment in this sector. The WTO observed that liberalization in services sector of China's economy had been slower than in other areas and encouraged China to continue to relax ownership and entry requirements and to strengthen regulation. China has to continue to reform the financial sector, to ensure a better allocation of resources. China's banking sector will partially privatise introducing better risk management and loans based on commercial rather than political decisions and market forces across all manufacturing sectors will continue to push less competitive companies into bankruptcy.

Labour inflation in more developed regions of the country will push up wage costs; increased international political pressure on its monetary policy will result in a gradual appreciation of the Yuan. China's industry is very competitive in manufacturing and will remain so for the next decade. As the Chinese economy continues to restructure, its input costs will escalate and its price competitiveness will begin to erode. But as Chinese industry rapidly moves up the value chain, so its exports will be of greater value and result in new trade management challenges to its trading partners.

China has one of the world's highest growth rates (Anon, 2007a). China's potential must be evaluated against the challenges that the economy still faces, as it completes its shift to a market economy standing. The government has followed a dual-track transformation program, allowing private sector growth while following a gradual shrinking of the state

sector. As a result, the state still has considerable presence in the industrial sector and a dominant presence in the banking sector (Anon, 2007a). Meeting these challenges, while sustaining growth at a rate sufficient to absorb the shocks caused by restructuring, will define policy in China.

Aggressive transformation of the state industrial and banking sectors will increase unemployment and risk banking-sector crisis, which could cause social unrest and disrupt economic growth. China has structural problems which could be detrimental to their long-term economic growth potential if it is not attended to (Anon, 2007a). The state banking segment generates a depressed private consumer demand which is a misrepresentation. China's ongoing high investment has raised the investment-GDP ratio near unsustainable levels; there is a risk of an investment slowdown in the short term (Anon, 2007a). However, the structural nature of the consumer demand weakness makes it unlikely that investment slowdown could be cushioned by a private consumption boom.

China's phenomenal economic expansion has continued, despite government efforts to slow down rapidly moving sectors of the economy, and the country continues to attract more foreign direct investment (FDI) than any other nation. However, a wide spectrum of risk factors continues to play an influential role in China's growth prospects. Among these, the problems of corruption, unemployment and economic inequality pose the most immediate risks of sparking political-social unrest, although the likelihood of government instability remains low. Over the longer term, resource pressures brought on by the migration of hundreds of millions of rural residents to urban areas will also play an increasingly central role in the formulation of domestic policy, especially with regard to

water, waste disposal, pollution and health and welfare benefits. China's tax and legal systems are evolving, but remain short of providing transparent or uniformly enforced best practices for foreign investors. Persistent cross-Strait tensions with Taiwan remain the mainland's most immediate security issue, but over the longer term, competition with Japan for leadership and resources is the most likely source of external tensions.

2.2.4 Globalisation and its effect on the South African economy

A comprehensive globalisation index is calculated by the Foreign Policy Magazine, which includes the level of economic integration, technological connectivity, political engagement and personal contact (Anon, 2007c). The 2005 Foreign Policy Magazine Globalisation ranked South Africa 48th; this is behind six other African countries (Anon, 2007c). The ranking shows that South Africa is not very well integrated into the global community relative to other countries. This may be due to South Africa not being in the global arena as long as other countries have.

Tariff, non-tariff barriers and capital controls have all been decreasing, which is in line with the global trend. This is due to the downward pressure that globalisation places on tariff structure and capital controls to maintain global competitiveness. Exports of goods and services as a percent of GDP have only increased slightly from 24 percent in 1990 to 28 percent in 2003 as per the Human Development Report, and South Africa's share in the world trade has remained around the 0.5 percent mark since 1995 (DTI, 2007). This shows that South Africa is maintaining its share of exports in the rapidly increasing global exports and thus is not being marginalised by the process of globalisation.

Duckworth (2005) indicates that China's economy is expected to become the second largest after the US, in the next ten to fifteen years. The Chinese encourages local companies to become global companies. In order for Chinese companies to globalise they would need to invest, form joint ventures and buy Western companies and this will have consequences for South Africa. Thabo Mbeki stated that the *"Eastern ascendancy will stress the world's system. There will be oil wars; water wars; and wars of greed. America, Europe, China and perhaps India will struggle via proxies or directly to control Africa's wealth. Africans too will fight Africans for resources. There will be wars for the treasures of Africa"* (Anon, 2006e). The Mbeki doctrine is that Africa must be peaceful if investment is to flow (Anon, 2006e).

South Africa needs to attain global economic growth via a stable environment to attract foreign investment. South Africa would benefit from globalisation through increased trade and investment. Hence South Africa's relationship with China becomes prevalent as China goes global and the relationship between the two countries strengthens.

2.3 Case Study of China and the US Manufacturing Industry

Manufacturing in its essence is taking raw materials and labour, and producing products that can be sold in high quantities, with quality, to generate good return on the investment. Manufacturing technology has expanded rapidly on a global scale in the last decade. Many countries have mastered the methods, the quality processes, the execution systems and software. There are fundamental changes in international business structures and deployment of global capital. The manufacturing sector remains significant in leading economies worldwide, but faces major issues such as cost competitiveness, product

innovation and how to compete in an increasingly global market. Leading international suppliers question the location of the operations and/or manufacturing facilities.

In the world innovative design and product development are vital to gain a competitive advantage over competitors. In the world context design and development can be done in locations that are not necessarily tied to the operations or manufacturing facility, example Intel builds semiconductor fabrication plants in many different worldwide locations. Many automation companies build products wherever it suits their business needs. Automation of manufacturing facilities reduces dependency on labour skills and availability. Hence companies need to consider proximity to material sources, and/or proximity to markets, plus lowest cost with the best quality when building a new manufacturing facility.

In the US manufacturing is tending to migrate away for a variety of factors. One of the major factors contributing to this is the negative image of manufacturing. PLC inventor, technology guru and author Dick Morley suggests that the idea that manufacturing is somehow bad has caused jobs to be driven out (Pinto, 2007). No community in North America really wants a new assembly plant, a printed board facility or a semiconductor enterprise due to the bad perception of manufacturing industries in the U.S.

In the U.S. today, big factories are despised and penalized with high taxes, strict zoning regulations and infinite bureaucracy. NIMBY (Not in My Backyard) attitudes are driving manufacturing offshore (Pinto, 2007). Ireland, China, Korea, Hong Kong and many other countries seem to be inviting industry with open arms and deferred taxes.

China is considered a choice location for manufacturing for a variety of industries, due to (Pinto, 2007):

- Continually increasing manufacturing prowess
- Significant cost advantages (beyond just labour cost)
- Good, repetitive quality
- Worldwide market-share – 50 percent of cameras, 30 percent of air conditioners and televisions, 25 percent of washing machines, 20 percent of refrigerators
- One private Chinese company makes 40 percent of all microwave ovens sold in Europe
- The city of Wenzhou, Eastern China produces 70 percent of the world's metal cigarette lighters
- Wal-mart – Buys \$18 billion from China, providing a direct link to the US consumer

Chinese imports are brought into countries at low US manufacturing costs. This is changing the economies of many countries but particularly the US. In the US it is estimated that manufacturing companies would need to cut their costs by 30 percent to retain their customers. Historically there has been intense competition between the US and China, but the new Chinese competition is dramatically different; they are about half the price. This has been a big factor in the loss of about 2.7 million manufacturing jobs since 2000 in the US. America's trade deficit with China keeps soaring to new records. It's likely to be more

than \$150 billion in 2004, and about 12 percent of that through on of the world's biggest retailers: Wal-Mart. All the other large retailers (Target, Home Dept, Sears, K-Mart) are following suit. In order for US companies to compete with China they need to create new business models. Due to the low manufacturing costs of China, US companies will not be able to compete successful by just reducing costs.

The US, countries in Western Europe and Japan are industrialised nations which assumed that they would lead in knowledge-intensive industries while developing nations would focus on lower skills and lower labour costs. However China has changed the assumptions by competing on very low wages and high technology. The benefits of the relationship with China are enormous. After years of struggling to crack the Chinese market, US multinationals like General Motors, Procter & Gamble and Motorola are finally reaping rich profits. They're making products such as cell phones, shampoo, autos, and PCs in China and selling them to the Chinese middle class – about 100 million people, a group that should more than double in size by 2010.

US companies are outsourcing components and hardware from China, thus improving their profits and return on capital. China's demands for raw materials and commodities have driven prices up globally, thus creating a benefits windfall for steelmakers, miners, and lumber companies globally. There is an enormous US trade deficit of which China is the largest and fastest-growing part. US consumers splurge on Chinese-made goods, and the US deficit is a record 6 percent of GDP (Pinto, 2007). The trade shortfall and US budget deficit is lowering the value of the dollar. China keeps its currency pegged to the US dollar at an undervalued level, which creates a problem for the US (Pinto, 2007).

The US' industrial base has been worn down to dangerous levels in all sections of industry. China manufacturing industry is adding state-of-the-art capacity in cars, specialty steel, petrochemicals, and microchips. These Chinese manufacturing facilities are intended at meeting demand in China. If China's growth recesses, China will export, thus flooding international markets and impacting the US.

U.S. companies are not spending a large amount on new facilities. There has been a decline in the number of engineers in the US, which impacts the US industry adversely. The number of Chinese engineers is growing annually. The work ethic of young workers and managers in China is that they are willing to work 12-hour days and weekends to achieve productivity and thus please customers.

Chinese manufacturers are riding this wave by spending more time on worker training and enterprise soft ware management. Chinese manufacturers indicate that innovation is a major objective. In a recent survey of Chinese and U.S. manufacturers by Industry Week, 54 percent of Chinese companies cited innovation as one of their top objectives, while only 26 percent of U.S respondents did (Pinto, 2007). Approximately 91 percent of US manufacturing facilities are more than a decade old, vs. 54 percent in China (Pinto, 2007).

It is assumed that there are large amounts of unspent money in China from its global exports. Currently the Beijing government has tight control over conversion of the Yuan currency, which is pegged to the US dollar. The Chinese government holds about 10 percent of outstanding U.S. Treasury securities, second only to Japan. It is estimated that the Yuan is undervalued by about 30 percent and a revaluation will diminish China's U.S. debt by a third (Pinto, 2007).

It is clear U.S. manufacturing companies are looking to China to reduce their costs and improve their profit margin. China offers multinational companies abundant labour resources which are skilled and whom come at a lower cost. China welcomes manufacturing companies, as this aide's foreign investment and growth in China. China is quickly becoming a manufacturing hub for all industries and also has laid plans to attract manufacturing companies.

2.4 Trade Agreements between Africa and China

2.4.1 Africa and China's Strategic Partnership

China's "Africa Policy" was introduced in January 2006; it aims to support economic development in Africa via numerous manners, including economic assistance and debt relief (Government of China, 2006). According to Muekalia (2004: 5) China's economic growth rate has seen the country rise to global leadership position, resulting in many analysts to consider its regional and international objectives. China's distinctive position in the global village of nations means that it is able to identify with both the developed and developing worlds. China has modified its foreign policy from confrontation to co-operation, from revolution to economic development and from isolation to international engagement. It has recently begun capitalising on its connection with the developing world, witnessed in increased, Sino- Africa relations in the form of high-level official exchanges, trades and co-operation with African countries. It is reasoned that China sees Africa as a partner in the achievement of its strategic goals, namely: energy trade and geopolitical interests (Muekalia, 2004:6).

China has made remarkable economic recovery in the past three decades, by achieving record economic growth rates. China has become the second largest recipient of the world's investment capital. Throughout the 1990's China sought to strengthen its relations with individual African countries ranging from political, economic, and military, to co-operation on multilateral issues (Muekalia, 2004:6). An emphasis was put on oil producing countries and those with growing economies. In April 2000 the presidents of China and South Africa signed the Pretoria Declaration. The Pretoria declaration in essence calls for increased co-operation in economic areas and in international affairs with a view to creating a new political and economic order between the two countries.

According to Theunissen (2005) South Africa's position as the economic powerhouse of Africa has not always won it accolades. However, a recent International Monetary Fund working paper titled "the implications of South Africa's economic growth for the rest of Africa" shows that South Africa's economic strength is actually rubbing off on the rest of the continent. Van der Wath (2007) says that China is the largest outward investor among developing countries though annual foreign direct investment flows of US \$2bn to \$3bn/year are dwarfed by its \$45bn to \$55bn inward investment. According to incomplete statistics, 674 Chinese companies were operating in Africa by June 2004, with a total contracted investment of \$1.5bn (Van der Wath, 2007). In addition, China has signed investment protection agreements with 26 African countries. Thus far South Africa has invested more in China than China has in South Africa. South Africa's department of Foreign Affairs says that Chinese cumulative FDI into South Africa by June 2004 was around R 500m, while FDI from South Africa into China was about R4bn (Van der Wath,

2007). Most of the Chinese investment projects in South Africa so far have been in textiles, agriculture, banking, mining, electronics, communications and transportation.

Van der Wath (2007) indicates that the Chinese government has set the stage for this development through central planning and the development of Chinese corporate champions that can compete on the world stage. Increased political interaction has been one factor in China's increased interest in the African continent. Van der Wath (2007) highlights three key reasons why Africa's share of Chinese cumulative FDI (16.4 percent) far exceeds its share of Chinese trade (2.1 percent) i.e.:

1. The important factor is that Africa is rich in commodities such as oil, iron ore and chrome that China needs to feed its expanding economy.
2. Second access to African markets may be attractive to African markets may be attractive to internationalising Chinese consumer goods firms.
3. Third, Van der Wath (2007) says: "*Chinese technology, know-how and capabilities can (for now) compete more effectively in the relatively backward developing country context of Africa (compared to Europe or North America).*"

Davies (2006) highlights securing access to raw materials as the key driver in Chinese investment into other countries but down plays the relative attractiveness of Africa's consumer markets to China's companies. Van der Wath (2007) believes that China sees Africa as strategically important and has "elevated the region in terms of outward investment focus". To back this up, Africa is the continent most frequently visited by China's leaders and South Africa is possibly the country most visited by China's senior

government officials. Davies (2006) indicates that Chinese investment in South Africa is relatively low compared to other parts of Africa. That's partly because most of South Africa's mineral rights are already being exploited and so it's easier to acquire natural resources assets, including energy, in other parts of Africa. Davies (2006) estimates that between 15 percent and 20 percent of China's energy requirements are now sourced from Africa.

China's increased interaction with the Africa continent presents an opportunity for a valuable contribution to Africa's growth and development. During his visit to South Africa President Hu Jintao of the People's Republic of China, at the beginning of 2007, articulated China's foreign policy as a policy based on non-interference in the affairs of other countries.

China does co-operate with Africa on many issues in the United Nations. Since 2000, China's trade with Africa has nearly tripled to US\$39, 8 billion in 2005. Trade between China and Africa reached \$55.5 billion in 2006, an increase of 40 percent year-on-year. China exported \$26.7 billion to Africa, an increase of 43 percent over the previous year, while China imported goods worth \$28.8 billion from Africa, up 37 percent. Raw materials and agricultural products are still major African exports to China, and the export of high-tech products is also increasing (DFA, 2007).

By the end of 2005, China had invested \$6.27 billion in 49 countries in Africa, in sectors such as trade, production and processing, resource development, transportation, agriculture and development of agricultural products (DFA, 2007). According to trade analysts, trade between China and Africa could reach US\$110 billion in the near future

(DFA, 2007). China is now Africa's third largest commercial partner after the US and France, and second largest exporter to Africa after France. It is notably ahead of former colonial power Britain in both categories.

China's role in Africa is conducted under the Forum for China Africa Co-operation (FOCAC). In January 2006 China had already released a policy document on Africa that clearly indicated out their policy of engagement with Africa. During the FOCAC meeting in Beijing, November 2006, it was agreed that NEPAD should be the overall framework within which China-Africa relations would be developed. It was also agreed to create favourable conditions to grow China-Africa trade in a more balanced manner (DFA, 2007).

China and African countries have made great efforts in recent years to explore new forms of co-operation, particularly between enterprises. However Africa and China still have great potential, which should be properly managed and strategically directed for their mutual benefit (FOCAC Beijing Action Plan (2007-2009)).

At the FOCAC in November 2006 China and Africa indicated that globalization currently presents more challenges and risks than opportunities to the vast number of developing countries. It was thus agreed between Chinese and African officials to strengthen the existing co-operation between China and African countries in all fields. It was agreed to intently explore new ideas and strategies to develop the respective economics and enhance capabilities to participate in globalization.

China's interactions with Africa are governed under the Forum for China Africa Co-operation by the following principles:

- equality and mutual benefit ;
- diversity in form and content;
- emphasis on practical results;
- pursuit of common progress and;
- amicable settlement of differences.

The officials at FOCAC have agreed to improve the existing bilateral consultation mechanisms to strengthen inter-governmental links, explore new areas of co-operation, and closely monitor the progress in their existing co-operation and share experiences in order to enhance their mutually beneficial partnership. China and Africa have bilaterally agreed to continue to review and conclude agreements as necessary, with a view to encouraging preferential market access for products from African countries into China.

China and Africa have agreed to promote positive interaction with relevant trade and commercial organizations and assist in the establishment of effective communication links between such organizations in China and Africa, in order to ensure that they play an active role in the development of the economies. The Chinese government has indicated continued support to co-operate with and provide development assistance to African countries, focusing on the promotion of local industries, sourcing of local materials and the creation of employment. Such development assistance should support national policies of African countries and be awarded in consultation with national governments.

Projects will be aimed at the utilization of local expertise and materials, the creation of local employment and the development of human resources of African countries (FOCAC). FOCAC has underlined the principles in which Africa and China relations will operate. The areas covered are political, economic, and social cooperation. This will imply that relations between China and South Africa will strengthen as China considers South Africa to be the most dominant African country.

2.4.2 South Africa's relations with China

Dr Nkosazana Dlamini Zuma, Minister of Foreign Affairs of South Africa, indicated in her keynote address, at the Nafcoc Annual Conference in October 2007 that bilateral trade between South Africa and China is growing rapidly and that there is huge potential for further growth (DFA, 2007). The Minister indicates that South Africa's and China's economies were complementary and would aid the growth of bilateral trade between the two countries. The Minister indicated that there is a trade deficit in favour of China in 2007 and that China is committed to working together with South Africa to create a win-win economic situation and improving the structure of bilateral trade by promoting South Africa's exports to China in terms of higher value added products.

Martyn Davies (2007), director for research and strategy at consultancy Emerging Market Focus, says that China's investments into South Africa have in the form of:

1. Normalisation of diplomatic relations in 1998 saw state owned enterprises, such as Shanghai Industrial Development Corporation, invest in a range of light manufacturing companies (Davies, 2007).

2. Some initial investments were unsuccessful due to a lack of knowledge about South Africa and products not being marketed or positioned correctly.
3. A number of larger projects is now beginning, fuelled by the close interaction of the Chinese and South Africa governments, especially through the Bi-national Commission set up to facilitate mutual trade and investment.

Van der Wath (2007) says that China's existing African investments have only been the start of a broader trend, which will see Chinese companies changing the "trader mentality" for an "integrated international business strategy". South Africa is the most economically dominant country in Africa. Much of the economic growth in South Africa occurs in Gauteng. The government of South Africa has established Gauteng Economic Development Agency (GEDA),

The GEDA has established a virtual mining initiative with China, whereby if a Chinese company needs mining equipment or any other mining needs, a request can be made to GEDA, which will in turn facilitate contact with appropriate Gauteng based suppliers (Naidu, 2006). These business opportunities include but are not limited to the following (Anon, 2006b):

- A Chinese company that needs mining equipment or any other mining requirements can approach GEDA, which will set up contact with Gauteng-based suppliers.
- A GEDA initiative recently led to China's largest manufacturer of gas-detection devices, which supplies 80 percent of China's mines, entering into a venture with a Gauteng-based gas-detection manufacturer.

- South Africa is China's largest trading partner in Africa, and trade and tourism links between the two nations are growing rapidly and profitably for South African businesses.
- South African conglomerates such as mining houses Anglo-American and Khumba Resources, brewers S.A.B-Miller and media company Naspers have a substantial presence in China.
- Sasol and a consortium of Chinese companies including the Shenhua Group signed a Letter of Intent last year on the feasibility study of the first phase of a coal-to-fuel conversion programme.
- South Africa's Sappi, the world's largest fine-paper producer, invested US\$ 58-million in an expansion project in China.
- Chinese investors have brought television sets and other home appliances manufactured with Chinese investment and technology to the South African market, where they have secured a niche.
- New and expanded Ferro-chrome joint venture projects include investment from JISCO (Jiuquan Iron & Steel Corporation) and the second phase of China Iron & Steel Industry and Trade Group.

If South African companies want to have a global presence, the Chinese market would be the first step in this direction since China is considered to be one of the core economies of the global economy.

2.4.3 South Africa's Trading Relations with China

The South African Country Commercial Guide (CCG) presents a comprehensive look at South Africa's commercial environment, using economic, political and market analysis (Anon, 2007d). The CCG indicates that (Anon, 2007d):

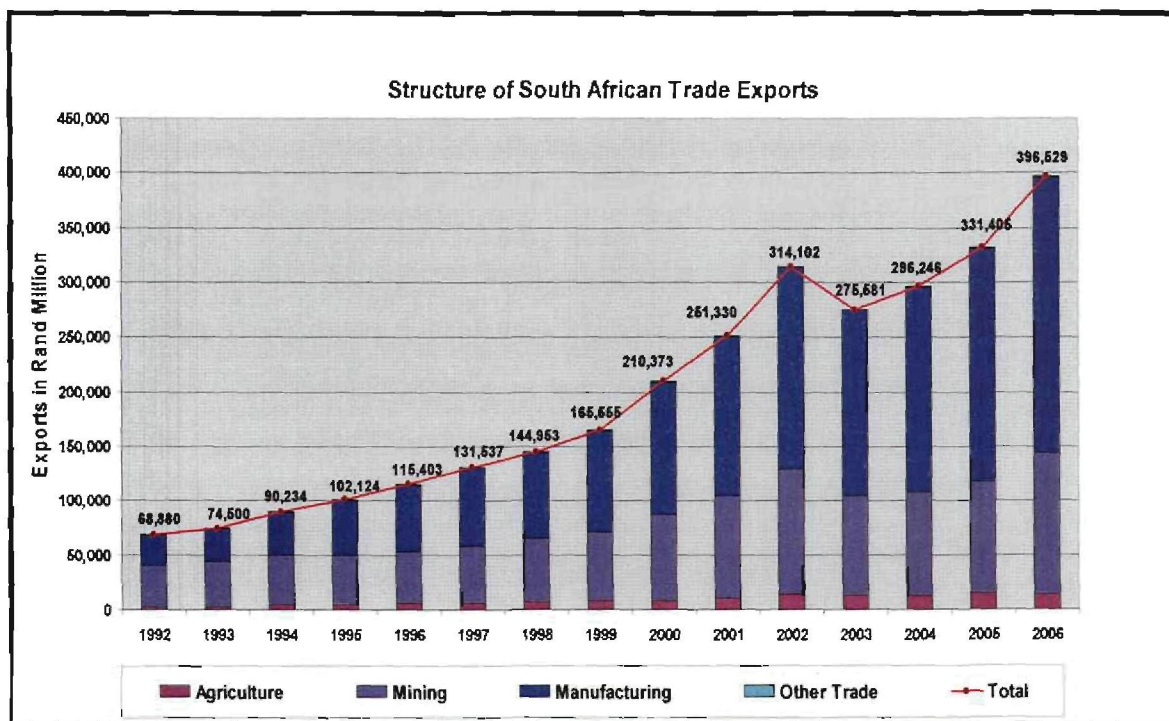
- The United States is the third largest source of South African imports (9.4 percent), after Germany (17.1 percent) and China (10.2 percent), and it is followed by Japan (8.5 percent) Saudi Arabia (6.6 percent) United Kingdom (6.6 percent) and France (5.2 percent);
- The United States is the largest portfolio investor in South Africa and the second largest source of foreign direct investment (FDI) in South Africa, after the U.K. (Total U.S. FDI is \$5 billion with total FDI in South Africa at the end of 2005 amounting to \$ 76.9 billion.
- The mature nature of the South African economy is reflected in the mix of economic sectors: agriculture (incl. fishing and mining): 9 percent, manufacturing industry: 24 percent; and the services sector: 66 percent.
- The national retail consumption patterns reflect the disparate nature of the economic status of its citizens, ranging from basic needs (e.g., condensed milk) to high-end durable consumer goods (e.g., luxury vehicles).

The continued growth in GDP for over ten years has increased the attraction of South Africa as an investment and marketing platform. Extensive structural reforms have spurred

a boom in the services industry as well as in merchandise exports. Structural reforms in general have also increased the economy's diversification and openness, bolstering its resilience to external shocks.

South Africa's total exports to in 2006 were R 396,529 million. Sixty three percent of these originated from the manufacturing sector (DTI, 2007). Total exports are broken down per sector, as per the graph below. From figure 2.1 It is clear that manufactured items have been exported more so than any other items.

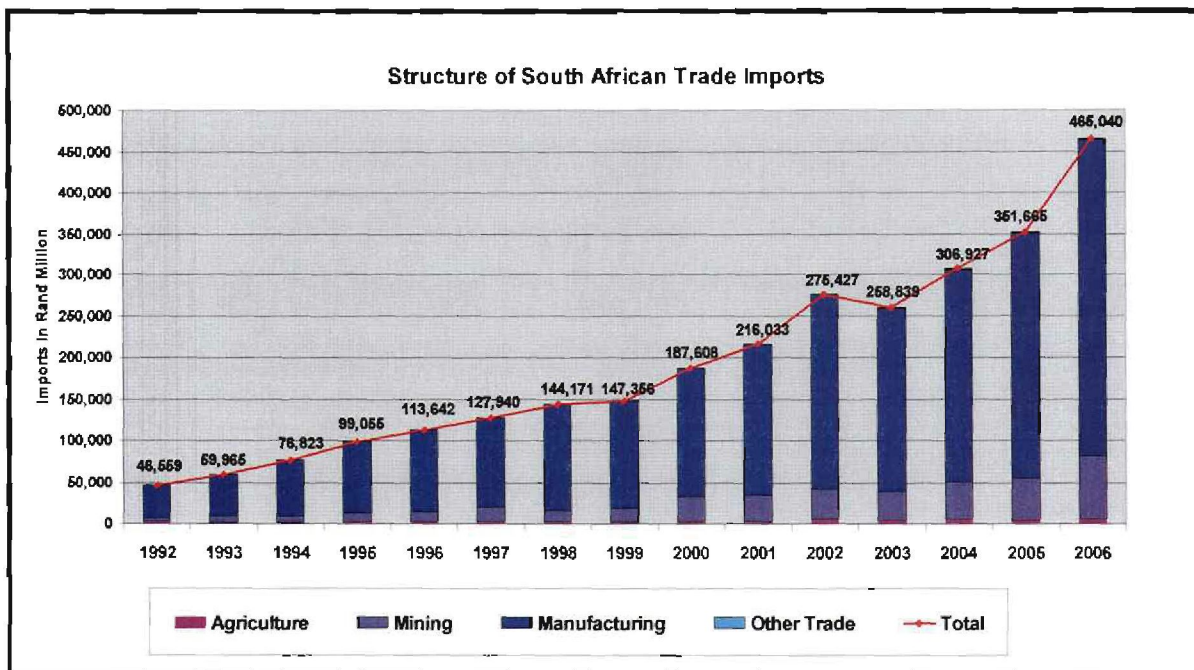
Figure 2.1: Structure of South African trade exports (DTI, 2007)



South Africa's total imports in 2006 were R465 040 million (DTI, 2007). Eighty two percent of these imports originated from manufacturing sectors (DTI, 2007). Total imports are broken down per sector as per graph below. Trade Data in the graph below is from the

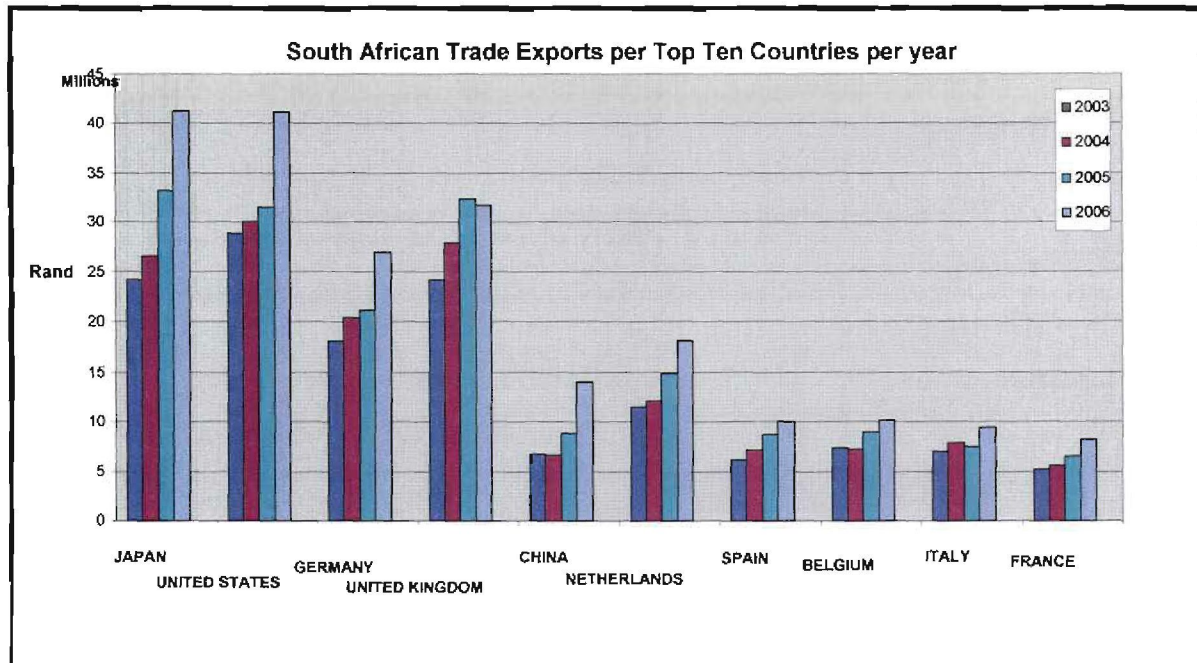
South African Statistics webpage. Figure 2.2 shows that manufactured imports are imported into South Africa more so than any other items.

Fig 2.2: Structure of South African trade imports (DTI, 2007)



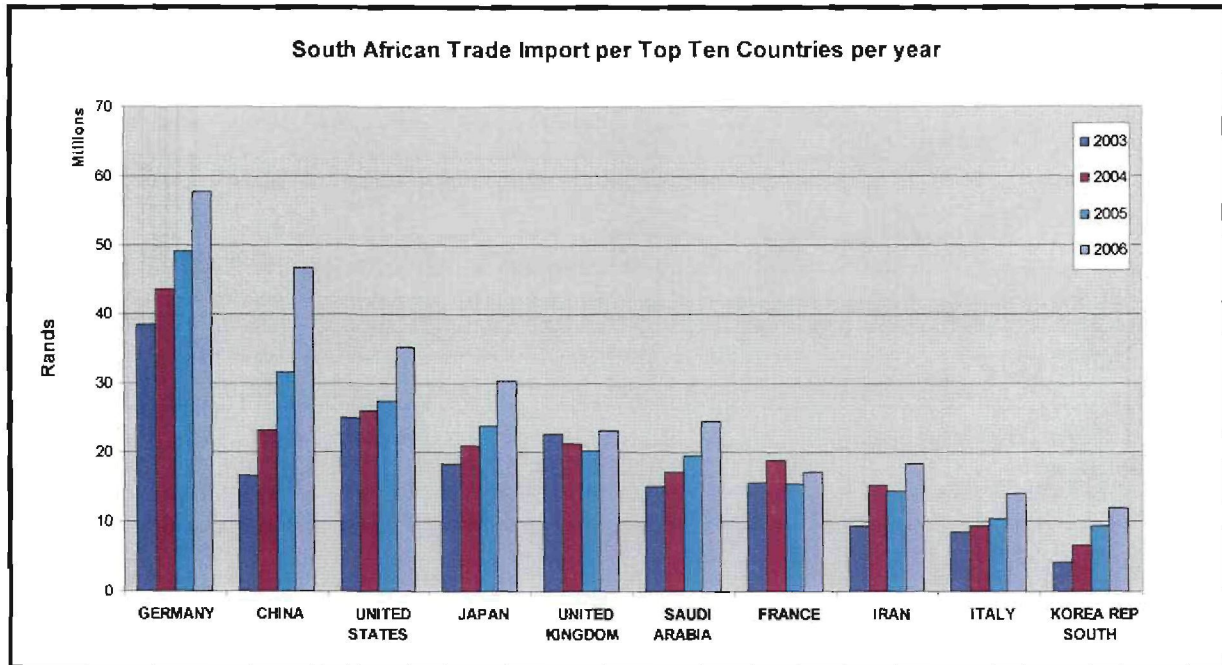
It is clear from figures 2.1 and 2.2 that more manufactured items are imported than exported. Figure 2.3 shows the top ten countries that South Africa exports to. South Africa's biggest export country is Japan, as indicated in figure 2.3.

Fig 2.3: Structure of South African trade exports per top ten countries (DTI, 2007)



Exports to China are rising and according to trade data from the South African Revenue Service. A country breakdown of the data for the first half of 2007 shows the value of exports to China rose 195 percent, compared with the same period last year, to R15.3 billion. Total first-half exports grew about 38 percent to R235.5 billion (DTI, 2007). Figure 2.4 shows the top ten countries South African imports from, are indicated in the graph below. It is clear from figures 2.3 and 2.4 that South imports more from China than it exports to China.

Fig 2.4: Structure of South African trade import per top ten countries (DTI, 2007)



China is the fastest-growing source of imports in the first half of 2007, with growth of more than 44 percent to R26.1 billion (DTI, 2007). This placed it in second place behind Germany, which sold R32.2 billion worth of goods to South Africa in the period.

Figure 2.5 show South Africa's top ten exports to China. Mineral resources are the biggest exports from South Africa to China. Coal mining equipment exports would be in the vehicles, aircraft, vessels and associated transport and in the machinery and mechanical appliances sectors as indicated in Figure 2.5.

Fig 2.5: Structure of South African trade exports to China (DTI, 2007)

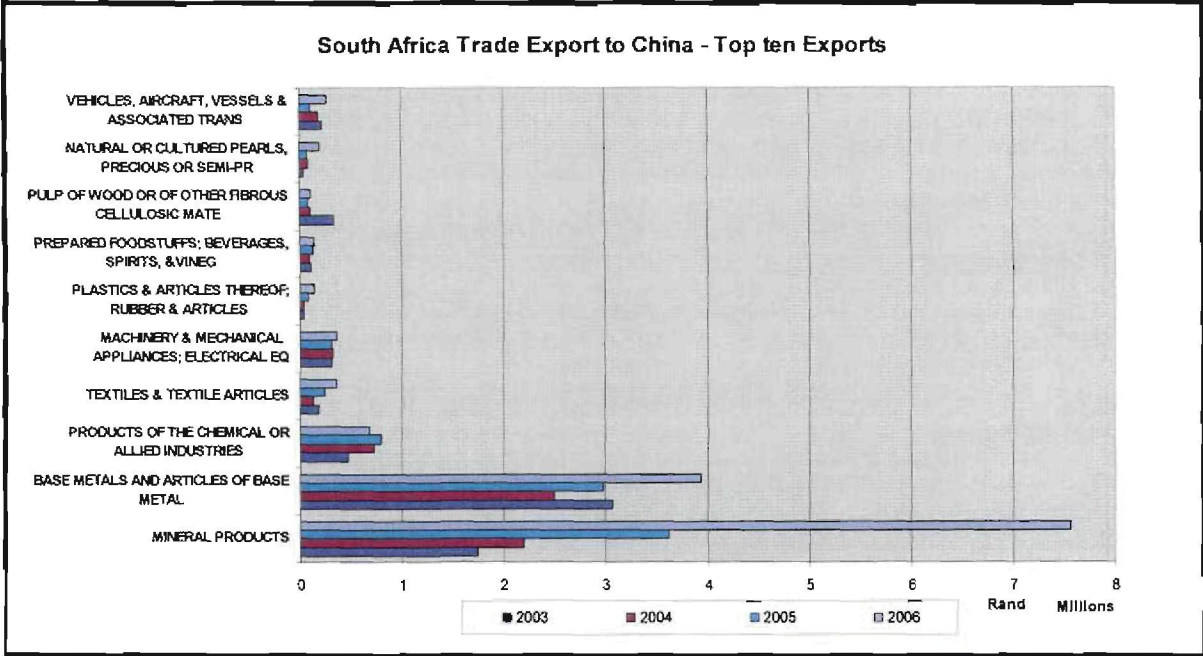
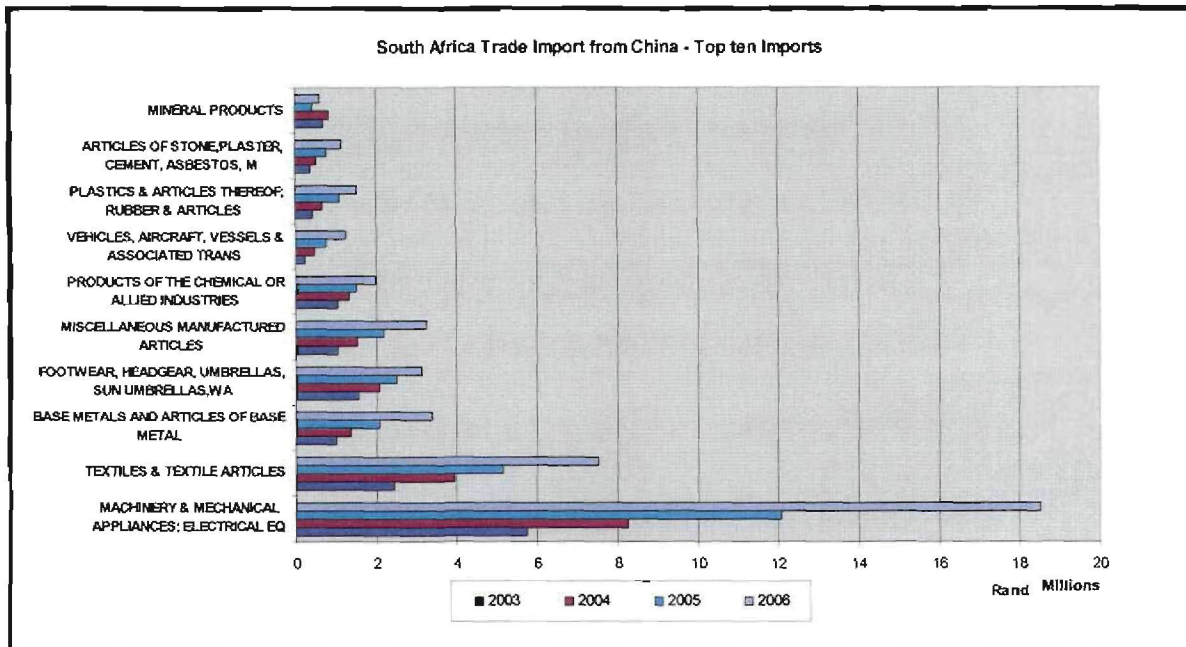


Figure 2.6 shows South Africa’s top ten imports from China. Coal mining equipment imports would be in the vehicles, aircraft, vessels and associated transport and in the machinery and mechanical appliances sectors as indicated in Figure 2.6. There is very limited buying of coal mining equipment from China by South Africa.

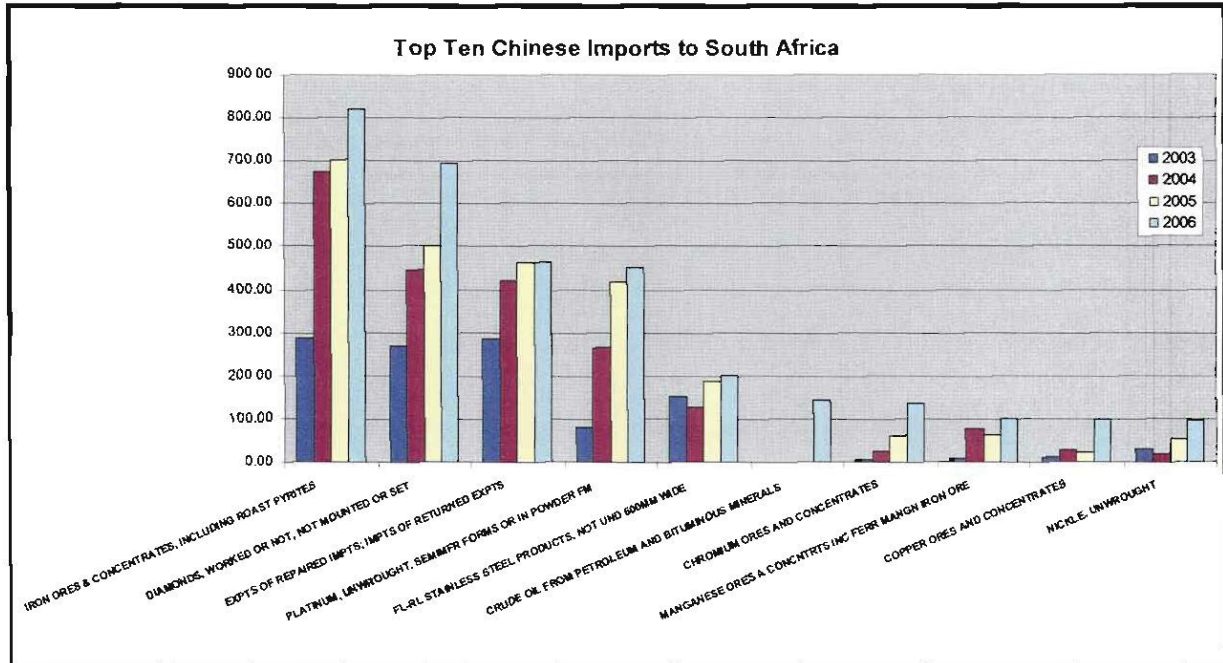
Fig 2.6: Structure of South African trade imports to China (DTI, 2007)



From the figures above it can be seen that raw materials are the leading exports from South Africa to China. Imports from China are dominated by machinery, mechanical appliances and electrical equipment. This trend is not forecasted to change any time soon. There has been a 53 percent increase in imports from China for machinery, mechanical appliances and electrical equipment, from 2005 to 2006 (DTI, 2007).

Chinese trade data does not directly reconcile with South African Trade Data. Chinese customs reports that South African imports to China were worth two and a half times the figures reported by the South African Revenue Service (Anon, 2007e). Figure 2.7 shows the top ten Chinese imports to South Africa. The imports in Figure 2.7 are largely mineral resources.

Figure 2.7: Top ten Chinese imports to South Africa (Anon, 2007e)



China trade data indicates that the top ten imports from South Africa are (as per the Figure 2.7):

Iron ores & concentrates, including roast pyrites
Diamonds, worked or not, not mounted or set
Exports of repaired imports; imports of returned exports
Platinum, unwrought, semi-manufactured forms or in powder forms
FI-RI Stainless Steel Products, Not Und 600mm Wide

Crude oil from petroleum and bituminous minerals
Chromium ores and concentrates
Manganese ores, concentrates including ferrous manganese iron ore
Copper ores and concentrates
Nickel, unwrought

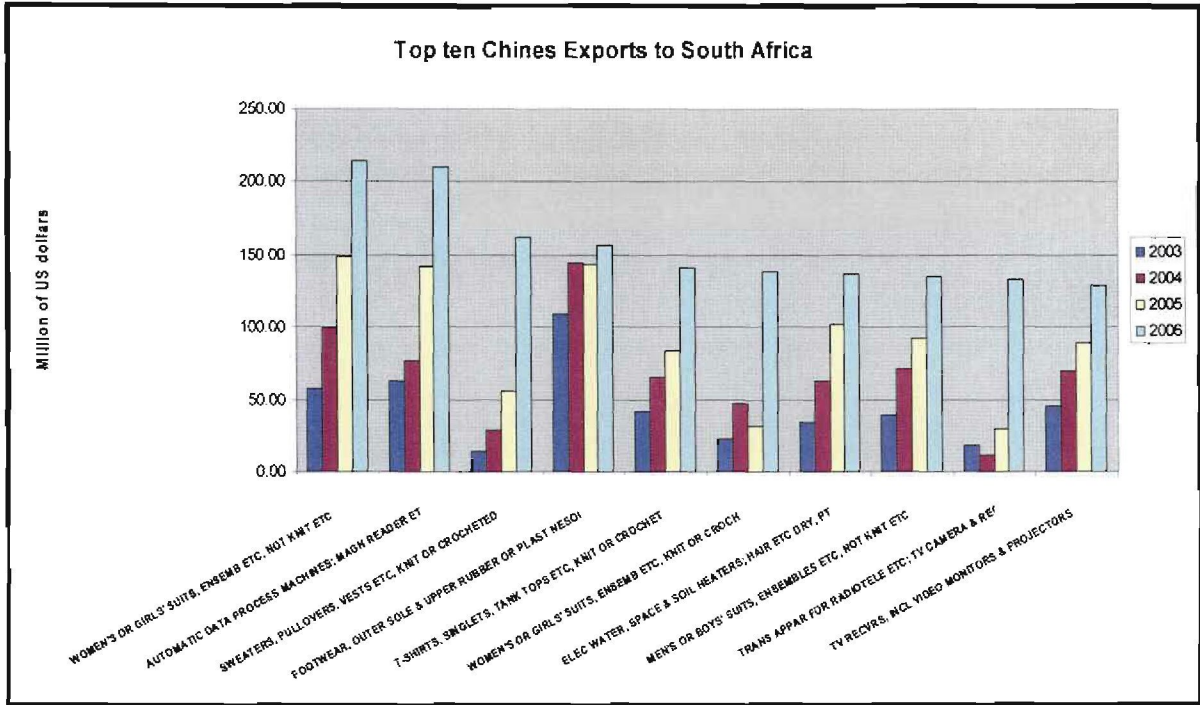
Figure 2.8 shows Chinese trade data for the top ten exports to South Africa are (Anon, 2007e):

Women's or girls' suits, ensemble etc, not knit etc
Automatic data process machines; manganese reader etc
Sweaters, pullovers, vests etc, knit or crocheted
Footwear, outer sole & upper rubber or plastics
T-shirts, singlet's, tank tops etc, knit or crochet
Women's or girls' suits, ensemble etc, knit or crochet
Electric water, space & soil heaters; hair to dry, pt

Men's or boys' suits, ensembles etc, not knit etc
Trans apparatus for radio and television etc; TV camera & recorders
TV receivers, including video monitors & projectors

The imports from China to South Africa are largely textile based. The data indicates that no heavy machinery or equipment is imported from China to South Africa

Figure 2.7: Top ten Chinese imports to South Africa (Anon, 2007e)



The discrepancies between S.A trade data and Chinese trade data may arise due to shipping costs and no data is available for the trade of platinum and diamonds. The South African Yearbook 2006/2007 reports: "China's economic system is the world's third largest. South Africa is its main trade partner in Africa, accounting for 20.8 percent of total China-Africa trade. More than 80 Chinese companies have entered South Africa since 1998, and Chinese FDI to South Africa came to some US\$199.3 million in 2004. South Africa's FDI to that country amounted to US\$700 million in 2004 (excluding offshore investments by S.A.B Miller, and Anglo American, among others)." South African companies are looking for sourcing opportunities in China and this will grow the imports from China to South Africa. There are very few highly technology goods being imported from China and this will change in the future as China rolls out the plans for their manufacturing industry.

2.5 Outsourcing in the Secondary Economy Sector of manufacturing in the mining industry as a business option

2.5.1 Sourcing overview

Kotabe and Murray (2003, 7) writes that global competition drastically shortens the life cycle of products, and companies need to market their products on a global scale. Swenson (2004, 107) writes that as outsourcing grows, many firms will relocate their production facilities, when wages and costs in the current location rise above those in the current location. Sourcing globally has become a strategic decision that is influenced by the capabilities to compete (Kotabe & Murray, 2003, 7). Low cost is a prime advantage in foreign sourcing (Lowson, 2001:62).

Kotabe and Murray (2003, 7) write that in a highly competitive environment many manufacturers begin either to produce in lower cost locations or outsource components and finished products from low cost producers on a contractual original equipment manufacture basis. Sourcing from other countries can involve lower costs or enable access to new markets, but creates risks due to lack of intellectual property protection or differences in legal and regulatory environments (Konana & Tanriverdi, 2004). The aim of global sourcing is for a company to exploit its own and its supplier's competitive advantages and the comparative location advantages of various countries in global competition (Kotabe & Murray, 2003, 8).

The sourcing methods used by companies are different in terms of cost, benefit; risk characteristics and companies do not use the same methods for all their processes. Manufacturing companies have all at one time or another looked at which activities need to be done by themselves and which can be done by supplies, vendors, and /or contractors within their own countries or from other countries. In order to in and outsource optimally the company must be proactive (Freytag & Kirk, 2003, 141). It is not only a question of how to mix one's own and the supplier's performance of tasks; the company must also decide on future activities to be sourced and by whom.

In relation to the company's future development, it is important to link strategic sourcing if the company is to observe the idea of performing what it does best, and leave the rest to other companies (Freytag & Kirk, 2003, 141). In this connection it is necessary to involve at least three areas related to the company's future activities in its sourcing considerations: technological forecasting, market monitoring, and ongoing customer contact. For both

product and production, the company's technological platform is crucial for its survival. Overall competitive situation and the development of customer demands, etc. are critical for the company's ability to adapt to the market tendencies (Freytag & Kirk, 2003, 142).

Sourcing from vendors offers benefits such as specialization and economies of scale through demand aggregation scale (Konana & Tanriverdi, 2004). Sourcing from vendors can reduce product development cycle, let companies focus on their core competencies, improve service quality as sourcing providers are often more responsive to incentives. Sourcing may also be used as a means to do business when insecurity arises from economic cycles. When the economy is in a down cycle condition changes for the worse, sourcing contracts can be terminated while in-house employees are retained (Konana & Tanriverdi, 2004). Sourcing can make companies vulnerable to risks, outsourcing essential activities can lower barriers to entry for competitors of the company. Companies can also lose organizational knowledge and contractual risks may be due to opportunistic behaviour of the vendor.

The reason many companies source from other countries is the availability of low cost talent and inputs, exposure to new markets and benefits from location specific advantages such as tax holidays (Konana & Tanriverdi, 2004). Companies, which source from other countries need to understand the business environment in those countries. Some companies may have already established a presence in other countries and need to invest in those countries as a requirement by government to continue doing business in those countries. If developing country outsourcing assembly is typified by low-skill assembly activities performed by low-wage workers, it may not be difficult for firms to

compare their options across developing country locations (Swenson, 2005:110). In today's global economy, few companies can afford to neglect major emerging economies such as India and China, which provide not only rich resources and cheap labour, but also growing markets (Konana & Tanriverdi, 2004).

Sourcing from other countries have risks such as physical infrastructure, the quality of labour, distance (i.e., language, culture, legal, time differences) and the political environment will counter the advantages of wage differential and highly available labour pool in foreign countries (Konana & Tanriverdi, 2004). Cross-country factor cost differences may create an incentive to engage in outsourcing, as firms decide where to complete the different production stages/design, materials extraction, parts production, and assembly that are required for the creation of a final product (Swenson, 2005:110). Konana & Tanriverdi (2004) observe that the risks of unstable government, policy shifts in taxation and regulation, or outright expropriation may induce the firm to seek safeguards by sourcing the services from host-country vendors As with trade in final products, comparative advantage determines the ideal country placement for each production stage (Swenson, 2005:110). Sourcing decisions are expected to respond to country cost conditions, hence sourcing production to other countries will respond quickly or significantly to all cost changes.

Konana & Tanriverdi (2004) have defined four distinct sourcing mechanisms i.e. domestic in sourcing, offshore in sourcing, domestic outsourcing, and offshore outsourcing. Konana & Tanriverdi (2004) describe domestic in sourcing as a business process is which is governed by the firm and located at a domestic site, i.e., in the home country of the firm.

This is the traditional sourcing mechanism used by firms (Konana & Tanriverdi, 2004). The firm uses its own employees, physical premises and equipment for running the process (Konana & Tanriverdi, 2004). It maintains full control over the process. Konana & Tanriverdi (2004) describe offshore in sourcing, as a business process is governed by the firm and located in an offshore subsidiary of the firm. This is an emerging sourcing mechanism. Macroeconomic conditions make it attractive to produce services of a business process in a certain offshore country as discussed earlier in geographic scope (Konana & Tanriverdi, 2004). A firm may consider leveraging its existing subsidiaries in that country or setting up brand new subsidiaries for the purpose of providing the services from the offshore sites to the domestic sites of the firm.

Konana & Tanriverdi (2004) describe domestic outsourcing, as a business process which is governed by a vendor who is located domestically in the home country of the firm. The process is conducted mainly by the employees of the vendor, or by employees transferred permanently from the client (Konana & Tanriverdi, 2004; Lawson, 2001:62). Konana & Tanriverdi (2004) describe offshore outsourcing, as a business process which is governed by a vendor who is located in an offshore country. It is similar to the domestic outsourcing in that the firm contracts out the services of a process to an external vendor (Konana & Tanriverdi, 2004; Lawson, 2001:62). Due to macroeconomic differences between the home country (e.g., US) and the offshore country (e.g., India), the cost of the process is likely to be lower (Konana & Tanriverdi, 2004). Lawson (2001:64) indicates that there are many hidden cost in offshore outsourcing and that these cost are insubstantial.

There are various types of hybrid sourcing arrangements such as joint ventures and strategic alliances that combine elements of both in sourcing and outsourcing mechanisms (Konana & Tanriverdi, 2004). There is evidence that firms switch among various sourcing mechanisms (Konana & Tanriverdi, 2004). Firms moved processes to domestic outsourcing partners, and switched to offshore outsourcing or offshore in sourcing over time as cost advantages became compelling. Typically, they use a hybrid form (e.g., strategic alliance or joint venture) of sourcing mechanism, which blends features of their existing and prospective sourcing mechanism to discover benefits, costs, and risks of the new sourcing mechanism (Konana & Tanriverdi, 2004). Such hybrid sourcing mechanisms allow the firm to share the benefits and risks with the potential vendor. After learning the risks, culture, and business practices, firms may decide different sourcing mechanism (Konana & Tanriverdi, 2004).

Developing country sourcing decisions should respond more vigorously to cost changes, since the fixed costs of search are proportionately smaller than they are in cases where highly skilled and highly specialized assembly facilities are required (Swenson, 2005:110). Competitive advantage can be mainly realized by reinforcing and enhancing supply management activities and by developing new arrangements to deal with supply markets (Arnold, 1999, 167). Sourcing necessitates sufficient information and organisational infrastructures, effective coordination mechanisms, and logistic capabilities. Sourcing from other countries does pose some dilemmas such as cultural and communication barriers, longer lead times, higher transport costs, and risks associate with transactions involving distant and different systems.

2.5.2 Low Cost Sourcing

Companies in South Africa have been investigating sourcing products and overseas to reduce overall costs and compete more aggressively at home. Many large mining houses in South Africa rate low cost country sourcing a top priority and have set targets to achieve spend with low cost country suppliers. The reason for low cost country sourcing is to achieve cost savings.

Consumer companies view countries like China and India as being lower in cost, huge numbers in consumers and impressive GDP growth rates. Companies invest in developing countries because they offered cost savings to manufacturers. In 2006 foreign direct investment in the developing world increased by 13 percent to an estimated \$274 billion (Forrest, 2005). China, India and Brazil are the top three investment destinations of choice. Local regulations were the most important consideration for those contemplating an investment. The emerging country's regulatory regime concerning foreign investment is the most influential factor when making an investment decision. Also important to the consumer markets companies are the effectiveness of legal systems, a country's GDP demographics and improving income trends.

The developing country's governmental policies certainly have a major effect on investment decisions. If a government chooses to restrict the investment of a foreign country or to set guidelines, such as requiring a local partner, the structural nature of the investment may be affected. There also may be other interferences e.g. some internet companies can only operate in China if they agree to certain content restrictions. Aligning expectations between partners in emerging markets is important to investors. Different standards concerning

shareholder rights are most important when companies invest in emerging companies. Other factors that influence investment in emerging markets are different cultural styles concerning management, less transparency in book keeping record and government involvement in employment issues.

Different market segments, products, and locations offer interesting strategy considerations. Emerging market countries have young populations and, in the case of India and China the worlds largest populations, as well as a growing middle classes and GDP growth rates. GDP grew from \$879 billion in 1996 to \$2.26 trillion in 2005 (Forrest, 2005), capitulating it to the world's fourth largest economy after the US, Japan and Germany. Chinese government officials have forecast that actual foreign direct investment will reach \$100billion yearly throughout the current Five Year Plan (2006 -2010). China's competitiveness is both region and sector specific (Forrest, 2005). China's exports are primarily in labour intensive sectors that include apparel, footwear and electric equipment.

2.5.3 Outsourcing Manufacturing to China

Nassimbeni and Sartor (2006:334) observed that the US.A. Japan, South Korea, Germany, The Netherlands and the United Kingdom have been making the most of the sourcing opportunities available in China. A number of obstacles must be overcome in order to create and manage a sourcing channel in China i.e. language, cultural and geographic distance, coordination of an international logistic net, transfer of technological capabilities and managerial praxes, and quality monitoring at source.

According to David Lei (2007:21) labour costs and fewer technically skilled people in the US have many US firms outsourcing their activities to companies in lower cost countries like China. Giorgio Brusati (2007) observes that labour is cheaper in China than the West. Many US companies are sourcing their core manufacturing activities to China and in so doing have been forced to transfer and surrender key technologies to their Chinese partners and suppliers to gain access to the Chinese market (Lei, 2007:21; Brown, 2005). The technology transfer enables Chinese companies to compete with foreign companies in the global market. It is far easier to outsource simpler products, than sophisticated high technology products as it requires close cooperation and continuous knowledge sharing. There are suitable local manufacturers of varying sizes in almost all sectors of industry, especially in the textile and automotive sectors (Brusati, 2007). Hence outsourcing equipment would need to occur in a complex manner via co-production agreements and strategic alliances (Lei, 2007: 22).

The co-production agreements create dependence between the two companies and can lead to the deterioration of the original company to innovate, develop new processes and products. Strategic alliances may result in the supplier learning vital skills and technologies from their partner as it gains access to the partner's core technologies, knowledge and skills (Lei, 2007:22). Many companies in the US use outsourcing due to the shortage of skilled labour, and investment in leading edge manufacturing equipment and facilities. Outsourcing to China allows companies to take advantage of the relatively cheap, increasingly specialized, local workforce without bearing the costs of establishing a production facility (Brusati, 2007). The costs of the necessary authorisations, export license and export agency makes outsourcing the cheaper choice. Investment in manufacturing

equipment and facilities does require the retraining of employees, which takes times, and in some cases may lead to job redesign. This can become a problem in mature industries where organised labour occurs.

Companies in Japan have also outsourced manufacturing and design activities to Chinese companies. Outsourcing does lead to companies' core competencies and knowledge base deteriorating. To remain competitive companies need to innovate, allocate resources, develop products and earn profits in an approach that emphasizes its core competencies and knowledge base. A company needs to continuously reinvest in its core competencies if it is to build new sources of competitive advantage as industries evolve and new technologies permeate across industry borders (Lei, 2007:23). Technology flows freely in China as the Chinese government does not enforce intellectual property rights stringently, hence even local Chinese companies can compete globally (Brown, 2005).

Companies should not rely on outsourcing as one of its main initiatives to reduce costs, as it can weaken the company's ability to invest in core competencies, cause unintentional knowledge and skills transfer that can restrict companies' strategic choices and diminish its distinctive competencies as fewer resources are invested internally (Lei, 2007:25). Suppliers that manufacture and assemble core components, gain important economics of scale and in some cases may reverse engineer core components in order to improve them for its own use and sale in the domestic market. Companies protect themselves by breaking up projects so that value added systems engineering occurs in the manufacturers home based country , whilst they outsource mechanical engineering, electrical engineering,

and manufacturing to different vendors in China, this ensures that an entire product cannot be reversed engineered in China (Brown, 2005).

Companies which outsource to suppliers in other countries, give their suppliers the leverage to procure better contracts from them. Suppliers who have the manufacturing facilities, product testing, and core skills and systems integration to produce the components can change the industry. This is achieved by the supplier wanting to move up the value. To move up the value chain the supplier will branch out into more complex design, manufacturing activities, technology and new markets. In order to maintain the relationship with the supplier the company will provide more technology and product designs to the supplier. Suppliers who have acquired the manufacturing capability on the products can now disentangle themselves from the outsourcing relationship, thus use the knowledge it has acquired to other business ventures. In order to sustain the relationship between the supplier and the company, the cooperation required involves simultaneous competition to learn new skills from one another.

Much of China's growth can be attributed to outsourcing, as foreign companies seek to produce and sell goods in the world's most populous country. Many foreign companies have large manufacturing capabilities in China in order to produce goods for the global and Chinese market. China has produced much of the world's toys, textiles, industrial fasteners and low cost consumer electronics (Lei, 2007:26). China is also becoming a major supplier in the steel, machinery, telecom equipment, electric tools, refrigerator and other high added products industry. Low labour costs and modern technology aided by lax intellectual

property laws have made China a manufacturing powerhouse and hence it has been able to achieve efficiencies of scale in its domestic market (Brown, 2005).

Strategic alliances and outsourcing arrangements have enabled many Chinese industries to become more efficient and competitive in a short period of time. In 2006 China has a far larger trade surplus with the US than Japan (Lei, 2007:26). The manner in which companies engage and manage their outsourcing partners in China is vital to their success (Cohen & Stonich, 2004). This implies that each partner needs a clear definition of what is required of them and this should be clearly defined in legal contract documents. However much of China's exports in the high technology sectors represent the final stage assemble of electronic products based on components produced in the US, Europe, Japan and elsewhere.

Foreign companies have imported high tech components to their subsidiary plants in China for final testing, packaging and assembly before export to their final destinations. Chinese companies have been acquiring skills and technology in the automotive, semiconductor and telecom equipment industries, and can thus design and manufacture their own product lines.

China is an attractive manufacturing platform to foreign companies due to its low-cost labour, rising base of skilled engineers and the rapidity with which Chinese organisations can invest in new manufacturing and distribution facilities (Lei, 2007:27). It becomes even more attractive as investment in new manufacturing and distribution facilities is done with state sponsored bank capital.

Privately owned Chinese companies are much smaller than its Japanese and South Korean counterparts. Privately owned Chinese companies compete with the state sector for talent and capital. The Chinese government owns many core state sector organisations that possess core/sensitive technologies or provide vital inputs into the economy. There is an imbalance of development in the different industries, sectors and regions in China.

Privately owned companies in China are more competitive than the larger state owned enterprises. The larger state owned enterprises fall behind in terms of fostering management systems, organisation processes and product development capabilities, which are needed to compete in fast moving, free market environments (Lei, 2007:27). The interior provinces of China receive less foreign direct investment than the provinces on the Pacific Coast.

Foreign direct investment provides a flow of new technologies, exposure to advanced management systems and opportunities to learn about next generation products and processes. Foreign companies which are seeking to penetrate and compete in the Chinese market are perceived to be a threat as they begin to purchase Chinese companies. The investment policies formulated and directed by Beijing may not be entirely aligned with those promulgated by individual provinces and municipalities (Lei, 2007:28).

Cohen and Stonich (2004) indicate that the main reasons companies outsource is to save money and link to this are other reasons namely achieving greater production flexibility, expanding capacity, improving product quality, enabling better focus on core competencies, reducing investment in capital assets, and achieving a global manufacturing presence. Outsourcing is viewed as a preferred mode for attracting, demanding and

gaining access to leading edge technologies from foreign firms as the “price “of entry to the Chinese market by the Chinese government (Lei, 2007:28). Outsourcing is also seen as an economic platform that speeds the introduction of new technologies and investment funds to its vast interior. Outsourcing is also viewed as a means to accelerate the Chinese economy to a mixed economy that relies on state influence and “indicative guidance” to direct resources into strategic industries.

Companies in mature markets are experiencing a decline in growth and for this reason they want to invest and sell in China to sustain growth and earnings. Hence foreign companies make strategic alliances with Chinese companies to exchange technology for market access. The Chinese government has a number of barriers to foreign companies who do not partner with domestic company. The exchange of technology for foreign companies in China can present risks, as Chinese companies will demand cutting edge techniques, materials and processes which will make them direct competitors to the foreign companies (Lei, 2007:28). Another challenge foreign company's face in China is the protection of their intellectual property rights. The Chinese legislation regarding intellectual property rights is very weak and copyrights, patents and trademarks are violated in every industry.

China's growing market shares in steel, electronics, telecom equipment and information technologies will have an influence on pricing and product development in various industries. Intellectual property protection will remain a critical concern for foreign companies wanting to invest in China. When outsourcing to China companies need to ensure that their products or components are well suited to manufacturing in China (Cohen & Stonich, 2004). Cohen and Stonich (2004) observe that products, which are mature do

not require leading-edge manufacturing capabilities are the most likely to result in near-term cost savings if moved to China.

Quaint and Shorten (2005) have identified factors which make China competitive for global manufacture. These are:

- Labour – China's wage rates are market determined with vast differences across regions. Organised labour has little influence over the wage rates and working conditions of the labour force. But as China's economy becomes more market related as inflationary forces have an impact on labour costs.
- Currency value- China is emulating historical Asian development model- export value driven supported by an undervalued currency. The success of Japan and the newly industrialised economies was underwritten with the political and (not reciprocal) economic support of the US. The global economy may be different but China seeks to shape market conditions to its own benefit through monetary policy that up until now have been mostly able to withstand external political pressure.
- Cost of Capital- The state owned Chinese banking sector has traditionally provided low capital costs to exporting companies that have state ownership. Although privatisation of the Chinese economy is largely completed process, minority equity ownership by the state is often retained in order to allow the firm to access cheap capital through the state banking system.

- **Manufacturing Capacity-** A legacy of centrally planned economy is political rather than market determined investments. China's manufacturing industry was quota driven regardless of market demand. In every traditional industry China suffers from over capacity. Three decades of economic reform have yet to remove these overcapacities. Price deflection results in too many products chasing too few consumers. These products are then exported into the global market. This factor is the major driver of competitiveness of China's manufacturing industry.

It can be concluding that in order for companies to stay competitive they should seriously consider outsourcing to China, whilst maintaining high quality standards. Outsourcing may result in companies becoming leaders in their industry but this can only be achieved if all cost is evaluated and strategy is determined before taking the outsourcing route. Companies which outsource to China must be fully cognisant of the fact that they will need to transfer technology and in so doing will create competitors in their industry.

2.6 Summary

This chapter discussed globalisation and its effects on South Africa and China the economy of China and South Africa and how agreements made at FOCAC will facilitate future trade relations. China's globalisation is set to continue and will impact all industries. China's African Policy will also impact the African continent, as China will continue to invest and use Africa's mineral resources.

Sourcing manufacturing in other countries should also be viewed as a strategic choice. The trade between China and South Africa is currently in China's favour, as China is importing

more to South Africa, than vice versa. The imports from China are typically low in technology. There are issues to be considered when sourcing from China and companies would need to fully assess whether moving manufacture will be gainful in the long run. Risks need to be identified before sourcing from China and mitigating actions need to be plan, though many of the risks are associated with hidden costs. This Chapter also discussed trade data between China and South Africa in an attempt to show that technologically advanced equipment is being imported from China.

This chapter provided an insight as to why US companies would need to move their manufacturing facilities to China and this will have direct implications for the coal mining equipment companies. The coal mining equipment suppliers would also need to consider China as a manufacturing option to reduce their costs and improve their profit margins.

Chapter 3

The Globalised Coal Mining Equipment Industry

3.1 Introduction

This chapter deals with the coal industry and coal mining equipment industry the global coal mining industry is in a high growth period due to the demand for energy in the developing worlds. The demand for coal mining equipment is intensifying, due to the demand for coal for energy production. China has one of the world's largest coal deposits thus suppliers of coal mining equipment are prosperous in China, as indicated in Table 3.1 from the International Energy Outlook 2007 (Doman et al, 2007)

Table 3.1: World Recoverable Coal Reserves as of January 1, 2003 (Doman et al, 2007)

Region/Country	Bituminous and Anthracite	Subbituminous	Lignite	Total
World Total	528.8	298.1	170.9	997.7
United States ^a	123.7	110.3	33.5	267.6
Russia	54.1	107.4	11.5	173.1
China	68.6	37.1	20.5	126.2
India	99.3	0.0	2.6	101.9
Other Non-OECD Europe and Eurasia	50.1	18.7	31.3	100.1
Australia and New Zealand	42.6	2.7	41.9	87.2
Africa	55.3	0.2	*	55.5
OECD Europe	19.5	5.0	18.8	43.3
Other Non-OECD Asia	1.4	2.0	8.1	11.5
Brazil	0.0	11.1	0.0	11.1
Other Central and South America	8.5	2.2	0.1	10.8
Canada	3.8	1.0	2.5	7.3
Other ^b	1.8	0.4	0.1	2.3

^aData for the United States represent recoverable coal estimates as of January 1, 2008.
^bIncludes Mexico, Middle East, Japan, and South Korea.
 *Less than 0.05 billion short tons.

This chapter focuses on new coal mining equipment used for removing coal from its geographical location. It provides for what type of equipment is included and excluded in

this research of this paper. The demand for coal is forecasted to grow; hence the demand for mining equipment will also grow.

3.2 Coal Mining Sector

3.2.1 Types of coal mining

Coal is mined via two methods i.e. underground mining and open cast mining. The method by which coal is mined is determined by the geology of the coal deposit. Approximately 60 percent of the world's coal is mined by underground mining methods (Anon, 2005a). Two main methods of underground mining is used to mine coal i.e. room-and-pillar and long wall mining. Room-and-pillar mining is done by cutting a network of 'rooms' into the coal seam and leaving behind 'pillars' of coal to support the roof of the mine. The pillars can contain up to 40 percent of the total coal in the seam (Anon, 2005a). The pillars of coal can be recovered at a later stage. This is done by means of 'retreat mining', where coal is mined from the pillars as workers retreat. The roof is then allowed to collapse and the mine is abandoned.

Long wall mining entails the complete removal of coal from a section of the seam using mechanical shearers. In order for long wall mining to be successful careful planning is done to ensure advantageous geology exists throughout the section before development work begins. Self advancing, hydraulically powered supports temporarily hold up the roof while coal is extracted. Once the coal has been extracted from the area, the roof is allowed to collapse. Over 75 percent of the coal in the deposit can be extracted in this manner (Anon, 2005a).

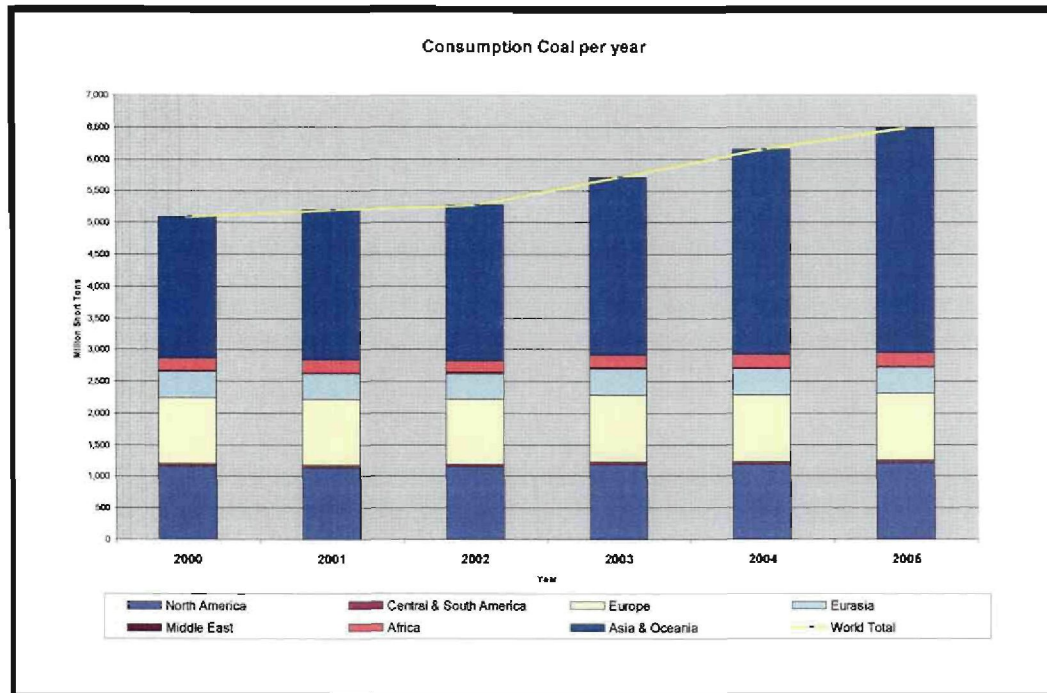
Open cast mining is used only when the coal seam is near the surface, making this an economically viable method of coal mining. Open cast mining method recovers a greater percentage of the coal deposit than underground mining. Substantial opencast mines can cover large regions of many square kilometres. Open cast mines use very large pieces of mining equipment, namely draglines, which remove the overburden; power shovels; large trucks, which transport overburden and coal; bucket wheel excavators; and conveyors (Anon, 2005a).

Open cast mining is carried out by the removal of the overburden of soil and rock, which is first broken up by explosives. Once this has been removed by draglines or by shovel and truck, the coal seam is exposed. The coal seam is then drilled, fractured and methodically mined in strips. The coal is then loaded on to large trucks or conveyors for transport to either the coal preparation plant or direct to where it will be used (Anon, 2005a).

3.2.2 International Coal Industry

The coal industry has moved from a domestic business to a global export business (Doman et al, 2007). The coal industry influence has moved to the new worlds, and the east has become a leader in the coal mining industry. Three of the top four coal producing nations namely China, India and Australia lie in the Asia Pacific Region. It is estimated that 45 percent of world coal production is sourced in the Asia Pacific region. China and Australia are respectively the largest and second most important coal exporting countries. Figure 3.1 indicates the consumption of coal per year per Region. It is clear from figure 3.2 that the Asia and Oceania region has grown rapidly from 2000 to 2005; this is fuelled by demand for energy in China and India.

Figure 3.2: Consumption of Coal per year per Region (Doman et al, 2007)



The consumption of coal is forecasted to increase by 74 percent from 2004 to 2030 according to the International Energy Outlook 2007 (Doman et al 2007). The International Energy Outlook 2007 also forecasts a 44percent increase from 2005 to 2030 on international coal trade (Doman et al, 2007). Coal's share of total world energy consumption is projected to increase to 28 percent in 2030; this ensures that coal will remain a key ingredient for those supplying the world electricity markets (Doman et al, 2007).

The International Energy Outlook 2007 forecasts the largest increases in coal consumption are likely to happen in China (Doman et al, 2007). China is expected to satisfy most of the increase in its coal demand from domestic mines rather than imports. Coal exporting countries characteristically have significant reserves of high quality coal and production

capacity greater than their own domestic demand needs. In 2005, 55 percent of the world's exports of steam coal were imported by Asian countries, and their share is projected to rise to 61 percent in 2030 (Doman *et al*, 2007). The top four exporters of steam coal in 2005 were Australia, Indonesia, China, and South Africa (Doman *et al*, 2007).

The international coal market has the potential to be influenced by China, either as an importer or an exporter. The price of coal will increase if China's imports increase significantly, as it may be difficult for other countries to find adequate coal supplies at affordable prices. If China were to export considerably less coal, other coal exporting countries would find new markets in countries such as Japan, Taiwan, and Korea, which are used to receiving coal from China (Doman *et al*, 2007).

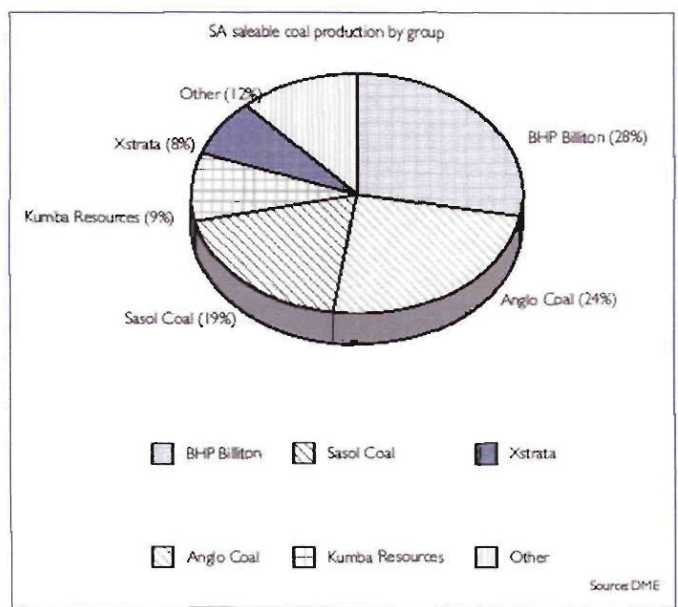
3.2.3 South Africa's Coal Mining Industry

South African mining companies are amongst the most prevalent in the world, and local mining activities account for a considerable section of Gross Domestic Product (GDP). South Africa's mining industry is dominated by Gold, PGM, Diamonds, Coal and Vanadium. South Africa's energy sector is dominated by coal. It is estimated that 77 percent of South Africa's primary energy needs are provided by coal. Coal is expected to remain the dominant energy source in South Africa owing to the relative lack of suitable replacements to coal as an energy source (Doman *et al*, 2007). Coal is mined at exceptionally favourable costs and thus ensuring development of a considerable coal-mining industry in South Africa.

Although coal is used extensively in South Africa, 28 percent of South Africa's production is exported, primarily through the Richards Bay Coal Terminal (Doman et al, 2007). South Africa is the fourth-largest coal exporting country in the world. South Africa's coal mining operations vary in size from large operations to small scale producers. Coal mining operations supply coal mainly to electricity and synthetic fuel producers.

The South Africa Year Book 2006/2007 indicates that the coal-mining industry is highly concentrated, with six companies, namely Ingwe Collieries (BHP Billiton), Anglo Coal, Sasol Mining, Eyesizwe Coal, Kumba Coal and Xstrata Coal accounting for 91percent of the saleable coal production (DME, 2007:431). Figure 3.3 indicates the split of saleable coal per company as indicated by the Department of Minerals and Energy (DME) in South Africa.

Figure 3.3: South African saleable coal production per mining house



The DME (2007:431) indicates that approximately 51 percent of South African coal mining is done underground and 49 percent is produced by open-cast mining methods. The large mines produce about 70 percent of coal output. The production of electricity in South Africa is one of the cheapest in the world. The beneficiation of coal, particularly for export, results in more than 65Mt of coal discards being produced every year (DME, 2007:431). It is estimated that 21 percent of the run of mine coal produced is exported, and 21 percent is used locally (excluding power-station coal). The rest is not saleable and is discarded.

The remainder of South Africa's coal production supplies various local industries (DME, 2007:431):

- 62 percent is used for electricity generation;
- 23 percent for petrochemical industries (Sasol);
- 8 percent for general industry;
- 4 percent for the metallurgical industry (Mittal); and
- 4 percent is purchased by merchants and sold locally or exported.

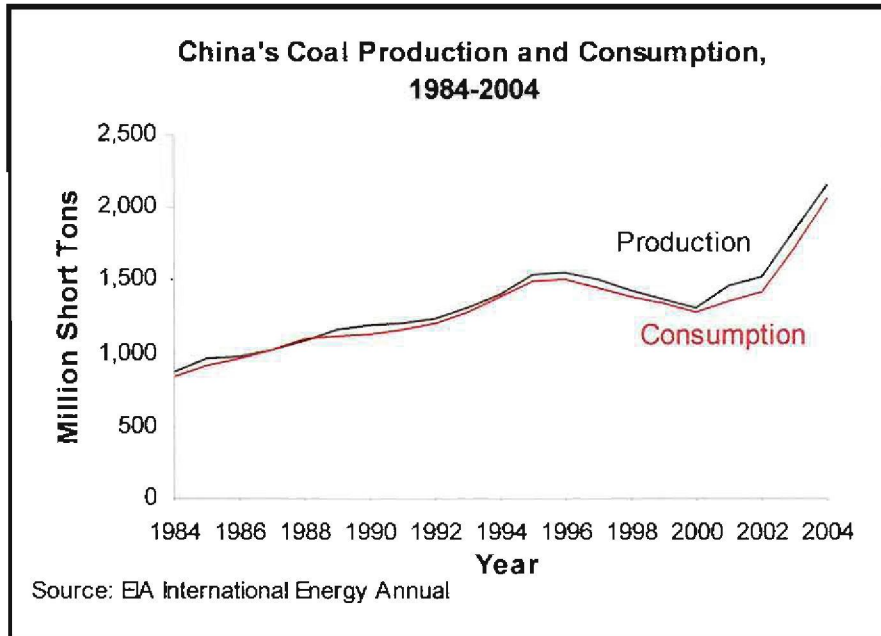
South Africa's coal reserves plays a vital role in the economy, this is illustrated by the fact that Eskom ranks first in the world as a steam coal user and seventh as an electricity generator. Sasol is the largest coal-to-chemicals producer. South Africa's coal deposits are fairly thin with thick seams, which make them easier and cheaper to mine. At the present production rate, there should be more than 50 years of coal supply left in South Africa

(DME, 2007:431). Equipment used to extract coal from South African mines is sourced from international Original Equipment Manufacturers (OEM).

3.2.4 China's Coal Mining Industry

Coal is a major energy resource in China it is estimated that 70 percent of the energy consumption in China is fuelled by coal (Anon, 2007b). Coal fuels 78 percent of power generation, 60 percent of raw chemical material, and 36 percent of household commercial energy (Anon, 2007b). Approximately 28 percent of the world's annual coal production comes from China (Anon, 2007b). In 2004, China's coal production reached 2 billion tons (Anon, 2007b). China has put plans in place for coal to provide at least 50 percent of China's energy requirements (Anon, 2007b). These plans ensure that the coal industry remains an area of focus in China's economy. Figure 3.3 indicates China's coal production and consumption from 1984 to 2004, it is clear from this graph that coal production and consumption is steadily rising in China and this is fuelled by the rapid growth in China.

Fig 3.3: China's Coal Production and Consumption from 1984 to 2004



Coal exports from China in 2003 amounted to 93 Mt, 8.5 percent increase from 2002 (Anon, 2007b). Exports are mainly sent to South Korea and Japan. China has plans to establish ten large mining enterprises, each capable of producing more than 50 Mt of coal per year (Anon, 2007b). China has become an importer of coal due to the intense development of the country's economy.

In order to produce coal more efficiently China is becoming more open to foreign investment in the coal sector, predominantly in the modernisation of active large-scale mines and the development of new ones. Coal producing mines in China are located in 27 jurisdictions, which include provinces, autonomous regions and municipalities directly under the control of central government. The China National Coal Import and Export Corporation is the main Chinese partner for foreign investors in the coal mining segment.

The National Development and Reform Commission (NDRC) of China exposed a plan to restructure China's coal sector in February 2006 (Anon, 2007f). The NDRC plans to decrease the fragmentation in the coal industry, with the objective of launching five to six massive corporations in China's major coal-producing provinces and closing down all minor coal mines by 2015 (Anon, 2007f). The Shenhua Group, Yanzhou Coal Mining Corp., Datong Coal Corp. and Shangxi Coke Group Co are four main producers of coal in China, with an annual production exceeding 40 Mt. These mining companies contributed 14.8 percent of coal production in 2003 (Anon, 2007f). The Shenhua Group is the leading producer of coal in China. The China Coal Import and Export Group is the major coal export channel of China, which plans to export 30.35 million tons of coal per year (Anon, 2007f).

The Chinese government, under the NDRC's directives, plans to combine the coal industry into large state-owned holding companies and seek to raise capital through international stock offerings. The state-owned Shenhua Group is the model for this vision. The state-owned Shenhua Group is China's largest coal company by production. Factors driving this trend are the numerous small local coal mines where inefficient management, insufficient investment, outdated equipment, and poor safety records. These factors prevent the full utilization of coal resources. The objectives to consolidate the coal industry are to raise total coal output, attract greater investment and new coal technologies, and improve the safety and environmental record of coal mines. China is becoming increasingly open to foreign investment in the coal sector, in an effort to modernize existing large-scale mines and introduce new technologies into China's coal industry. The type of foreign investment focus China would like to have is on new technologies with efficiency and environmental

benefits, including coal liquefaction, coal bed methane production, and slurry pipeline transportation projects.

Safety in coal mines has been a chief concern in China with more than 6 000 fatalities in 2003 (Anon, 2007f). It has been estimated that Yu50 billion is needed to improve mine safety technology. The government has invested Yu4 billion and plans to invest a further Yu4 billion in an effort to help some major state-owned coal producers to improve mine-safety technology (Anon, 2007b).

3.3 Coal Mining Equipment Industry

3.3.1 Types of Equipment used in coal mining

This study focuses on the equipment used to remove coal from the earth and excludes:

- Explosives (propellants, and prepared) and assoc. devices
- Ventilation (air, vacuum pumps, compressors, fans etc.)
- Cutting edge consumables (wear parts & drilling)
- Grinding mills (balls, iron/steel: cast and forged)
- Spray & Dispersing (leaching)
- Pad and pad liners & rubber products

- Machinery to sort, screen & wash mineral products (incl. crushing, grinding)
- Flotation, Filtration & Thickeners
- Industrial, laboratory, furnaces, ovens, incinerators
- Refractory supplies, converters, ladles, ingot moulds: for metallurgy
- Conveyor Systems
- Pumps for Liquids
- Valves, taps, tanks & boilers
- Hydraulic and Pneumatic Systems
- Pipe work
- Health & Safety
- Drilling Equipment

The scope of this study focuses on new equipment used to remove coal by the underground and opencast method of mining. Underground mining uses the following types of equipment:

- Long wall systems i.e. Armoured face conveyors, Powered roof supports

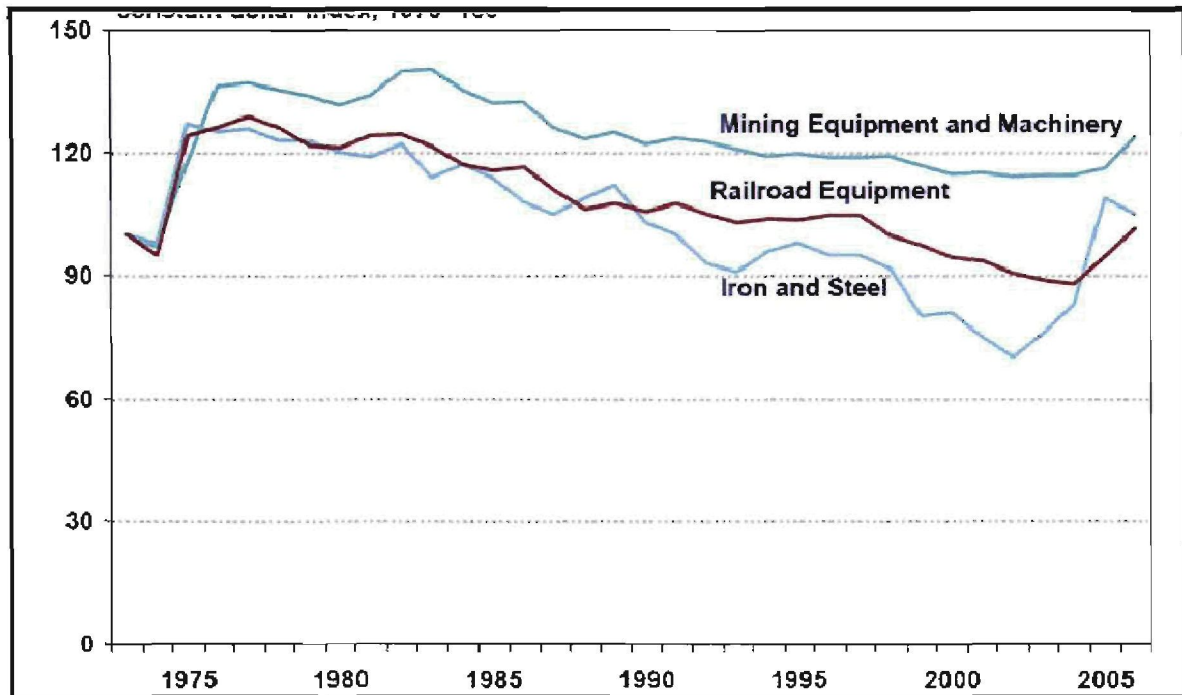
- Continuous miners
- Shuttle cars, Battery haulers
- Roof bolters
- Feeder breakers

Open cast mining uses the following types of equipment:

- Draglines
- Shovels/ Excavators

The coal mining equipment suppliers are present in all major coal regions of the world. Open cast and underground mining equipment rely on machinery made from steel to produce coal efficiently. The original equipment manufacturers of mining equipment do not make their costs public, but many of the major mining companies have indicated in their annual reports that they are susceptible to higher costs for machinery purchases as a result of increases in the cost of steel. Figure 3.4 shows the relationship between steel and iron prices and mining equipment and machinery. There is a direct relationship between these as steel and iron is used to manufacture mining equipment and machinery.

Figure 3.4: Change in iron and steel, mining equipment and Machinery and Railroad Equipment Costs from 1973 to 2006 (Anon, 2007b)



3.3.2 Heavy Coal Mining Equipment Industry

The Coal Equipment Buyer, Issue 1, estimates a US\$20billion a year coal equipment market. Most of the world's mining machines are built in the U.S. or Europe, and many of the largest ones are made by Joy Global and Bucyrus, based in Milwaukee and South Milwaukee, respectively (Freeman, 2007). The area is also home to many smaller, privately held companies that sell parts and services to the major manufacturers. Global demand for specialised mining machinery and equipment is projected to increase 9.3 per cent per year till 2009 to US\$27.5bn (Freeman, 2007).

The Original Equipment Manufacturers (OEM) coal mining equipment is:

Underground mining equipment:

- Joy Mining Machinery
- DBT a Division of Bucyrus International
- Sandvik Mining and Construction

Open cast mining equipment:

- Bucyrus International
- P& H Minepro Service a Division of Joy Mining Machinery
- Caterpillar
- Hitachi
- Komatsu
- Terex

The underground coal mining equipment industry has experienced cyclicity. The primary drivers of the cyclicity are commodity prices (particularly coal prices) and coal production levels. The cyclicity of original equipment sales is driven principally by commodity prices, product life cycles, competitive pressures and other economic factors affecting the mining industry such as company consolidation (Anon, 2006g; Anon, 2007g). OEM's of coal

mining equipment are susceptible to conditions in the coal mining industry. Other drivers of the coal mining equipment industry cyclicalities are the product life cycles and new product introductions. Decline in mining activity is likely to lead to a decrease in demand for new mining machinery.

Open cast mining equipment are used in mining copper, coal, iron ore, oil sands, silver, gold, diamonds, phosphate, and other minerals and ores (Anon, 2006g). This equipment can also be used in the non-mining industrial segment. Open cast mining equipment is also vulnerable to cyclical movements in the mining and construction markets. Original equipment sales are determined to a large extent by commodity prices. Higher commodity prices normally lead to the expansion of existing mines, opening of new mines or re-opening of less efficient mines (Anon, 2006g; Anon, 2007g). The service, provision of spares and rebuilds of coal mining equipment is much less cyclical. Reductions in commodity prices can result in the exclusion of coal mining equipment from mining production, and thus decrease demand for parts and services. Increases in commodity prices can result in greater use of equipment and thus increase requirements for more parts and services.

OEM's sell their equipment principally to large global and regional mining companies. OEM's operate their domestic and foreign operations under highly competitive market conditions. In order to be competitive OEM's products and services need to be competitive in price, quality, service and delivery (Anon, 2006g; Anon, 2007g; Anon, 2006h). OEM's compete with similar products made by a number of established and emerging worldwide manufacturers of coal mining equipment. OEM's of coal mining equipment compete with a

large number of regional suppliers for maintenance, rebuild, services and replacement parts of their equipment.

An OEM's location is not a significant advantage or disadvantage in the coal mining equipment industry. However the OEM needs to have repair and rebuild capability near the customer's operations. OEM's base their competitiveness on supplying superior products, dependability and service which lowers the overall cost of production for their customers.

OEM's procure electric motors, gears, hydraulic parts, electronic components, castings, forgings, steel, clutches and other components and raw materials from outside suppliers (Anon, 2006g; Anon, 2007g; Anon, 2006h). OEM's thus develop strategic relationships with their suppliers and in some cases a single supplier is used to source certain components and raw material. OEM's procure raw and semi-processed steel, castings, forgings, copper and other materials from a number of suppliers. In addition, component parts such as engines, bearings, controls, hydraulic components and a wide variety of mechanical and electrical items are purchased from a group of pre-qualified suppliers (Anon, 2006g; Anon, 2007g; Anon, 2006h).

Worldwide steel prices rose in 2006 in reaction to greater demand caused by continued higher consumption in emerging market countries, such as China. Due to the continued increases in steel prices, steel price increases and surcharges are still being added both directly and indirectly by suppliers of castings, forgings and other products (Anon, 2006g; Anon, 2007g; Anon, 2006h). This drives the finished product of OEM's higher.

OEM's international operations are subject to many uncertainties, and a significant reduction in international sales affects their profitability. International operations of OEM's are affected by various political, economic and other uncertainties which could adversely affect the OEM's business. The Joy Global 2006 Annual Report indicates that the risks faced by the OEM's international operations include (Anon, 2007g):

- international political concerns and pressures;
- international trade difficulties;
- regional or country specific economic downturns,
- fluctuations in currency exchange rates, e.g. the Australian dollar, British pound sterling, Brazilian real, Chilean peso, Canadian dollar and South African rand;
- increased risk of litigation and other disputes with customers;
- unexpected changes in regulatory requirements, e.g. Black Economic Empowerment requirements in South Africa;
- higher tax rates and potentially adverse tax consequences including restrictions on repatriating earnings, adverse tax withholding requirements and double taxation;
- difficulties in protecting intellectual property rights e.g. China;

- financial systems in some countries have longer payment cycles and there is difficulty in collecting accounts receivable;
- complications in complying with a variety of foreign laws and regulations;
- costs and difficulties in integrating, staffing and managing international operations, especially in rapidly growing economies such as China;
- transportation delays and interruptions;
- natural disasters and the difficulty in recovering from them, especially in countries prone to earthquakes, such as Indonesia, India, China and Chile;
- uncertainties arising from local business practices and cultural considerations;
and
- Customs concerns and changes in trade policy or tariff regulations.

OEM's future success depends in part upon their ability to protect their intellectual property. OEM's rely predominantly on nondisclosure agreements and other contractual arrangements and trade secret law and, to a lesser extent, trademark and patent law, to protect intellectual property. The laws of some countries do not protect proprietary rights to the same extent as U.S. laws. OEM's manufacturing operations are dependent upon third party suppliers, making them vulnerable to supply shortages and price increases.

Large amounts of raw material and processed inputs including steel, engine components, copper and electronic controls are used to manufacture coal mining equipment. OEM's revenues can be constrained by their manufacturing capacity. OEM's also need to secure supply of commodities like copper and steel, which is critical in the manufacture of coal mining equipment (Anon, 2006g; Anon, 2007g; Anon, 2006h). Increases in raw material prices are passed on by the OEM's to their customers e.g. steel, as these prices cannot be maintained by the OEM.

OEM's develop strategic relationships e.g. just in time deliveries of many raw materials and manufactured components, with suppliers in order to reduce material costs and inventories. This does pose some risk to OEM's as unanticipated delays in delivery by suppliers, including those due to capacity constraints, labour disputes, impaired financial condition of suppliers such as weather emergencies or other natural disasters, may adversely affect their ability to satisfy customers on a timely basis (Anon, 2006g; Anon, 2007g; Anon, 2006h).

Coal mining equipment customers are large global mining companies that have substantial bargaining power and require coal mining equipment to meet high standards of availability, productivity and cost effectiveness. Coal mining equipment customers go out on competitive tenders where the OEM is expected to compete on the basis of various factors, including performance guarantees and price. Demand for coal mining equipment may be adversely affected by regulations affecting the mining industry or energy companies.

The mining operations of global mining companies are geographically varied and are subject to or impacted by a wide array of regulations in the jurisdictions where they

operate, including those directly impacting mining activities and those indirectly affecting their businesses, such as applicable environmental laws and an array of regulations governing the operation of energy companies (Anon, 2006g; Anon, 2007g; Anon, 2006h). Changes in regulations and laws result in the operation of mines being disrupted or curtailed by governmental authorities, this the high cost of compliance with mining and environmental regulations may also induce customers to discontinue or limit their mining operations, and may discourage companies from developing new mines. Additionally, government regulation of energy companies may unfavourably impact the demand for coal to an extent that such regulations cause energy companies to select alternative energy sources and technologies as a source of electric power. These factors result in the demand for coal mining equipment declining and/or altering the patterns of the coal mining equipment market.

Labour disputes and increasing labour costs could negatively affect OEM's. Many of the OEM's major domestic and foreign operating businesses are parties to collective bargaining agreements with their employee. OEM's need to develop new technologies in order to remain competitive (Anon, 2006g; Anon, 2007g; Anon, 2006h). The mining industry is a capital-intensive business, with extensive planning and development necessary to open a new mine (Anon, 2006g; Anon, 2007g; Anon, 2006h). Mining projects are dependent on the efficiency with which the mine operates; hence technological improvements in coal mining equipment must meet customers' expectations, and /or the industry's expectations on mine productivity.

OEM's of coal mining equipment are dependent on the demand for coal. The pursuit of the most cost effective form of electricity generation continues to take place throughout the world. If a more economical form of electricity generation is discovered or developed or if a current replacement source of energy such as nuclear power becomes more widely accepted or cost effective, the demand for mining equipment could be negatively affected. The most common legal issues OEM's encounter are those of product liability, employment, environmental issues, and commercial matters (Anon, 2006g; Anon, 2007g; Anon, 2006h). OEM's do undertake contractual obligations, warranties and guarantees in connection with the coal mining equipment parts and services they sell. Claims and obligations do arise out of these and can result in significant potential liability.

The sale of mining equipment entails inherent risks and other claims, as a result of this OEM's have product liability insurance covering certain types of claims (Anon, 2007g). Insurance can be expensive, and the OEM's may not always be able to purchase insurance on commercially acceptable terms, and may be limited to cover all losses experienced by customers.

Skills retention by the OEM's has a direct effect on the quality of product offered by the OEM. Competition for people is intense and OEM's do poach highly skilled employees from one another. Skilled employees are vital in the OEM business, as product reliability and the technical know-how provided by these employees provide the OEM with a competitive edge in their industry.

The demand for coal mining equipment continues to be robust as there is an increase in demand for coal, copper and iron ore, which reflects global economic growth. The demand

for commodities in China ensures that the Chinese mining industry becomes more mechanised to produce more effectively. The Bucyrus 2006 Annual Report indicates that be a continued demand for their equipment due to the following factors (Anon. 2006g):

- China's industrial complex and related infrastructure continues at a rapid pace;
- Copper prices have recently seen some pullback but continue to be well above production costs, and iron ore prices are expected to increase
- Current oil prices continue to support additional developments in the oil sands of Canada;
- the resurgence of the domestic US coal market

The Energy Information Agency reports that there are more than 150 coal fired power plants being contemplated in the US. US coal mining companies are thus refurbishing and upgrading their fleets and recommissioning their draglines, hence creating resurgence in the coal mining equipment market in the US. OEM's of coal mining equipment also realise that demand for their products is concentrated in the developing countries. Hence many OEM's have started strategic relationships with localised companies and have had to evaluate the benefits of moving some of their manufacturing processes to these countries. There has been a shift towards consolidation of underground and open cast mining equipment industry e.g. Joy Mining Machine has bought P & H Minepro and Stamler; and Bucyrus International has bought DBT (Anon, 2006g; Anon, 2007g; Anon, 2006h). Bucyrus bought

DBT in 2006. DBT is an OEM of underground mining equipment. DBT is also well established in China thus making it an important acquisition for future business to Bucyrus.

3.3.3 International Mining Equipment Industry Overview

Global demand for specialized mining machinery and equipment (including separately sold parts and attachments) is projected to increase 9.3 percent per year through 2009 to \$27.5 billion (Anon, 2006a). The prices of mineable commodities e.g. metals like copper, silver and gold began to stabilise around 2002-2003, and then surged in 2004 and continued into 2006 (Anon, 2006a). Hence spurring mining companies to intensify their operations to mine metal ores, and thus generate a healthy demand for products like mining machinery. Coal remains in demand as an alternative source of energy in an era of high oil and gas prices, while demand for industrial minerals (clays, sand and gravel, stone and a myriad of others) has benefited from the general upsurge in commodities markets (Anon, 2006a). Despite maturity in their markets (owing much too dwindling local mineable reserves), the largest producers of mining equipment are generally found in the US and the industrialised nations of Western Europe, as well as Japan. Such countries have a long history and extensive expertise in the development of capital equipment industries of all types, which many have leveraged in mining machinery. In addition, numerous countries have invested into mining equipment production due to the presence of large resources. Among the most notable of these are Australia, Canada, China, India and South Africa.

Producers of mining equipment are based in the US, the industrialised nations of Western Europe and Japan. Mining equipment markets are mature in these regions as their mining industry is mature. The producers of mining equipment are well established and have

extensive expertise in the development of mining equipment. Mining machinery and equipment suppliers have benefited substantially from the rapidly expanding infrastructures of China and India. Many developing markets e.g. Indonesia, Malaysia, Thailand, Brazil and Poland are less mechanized and are in the process of upgrading their capabilities, which should provide further to demand growth in the mining equipment industry. Table 3.2 contains data which reflects the world demand for mining equipment. The biggest demand for mining equipment is from the Asia / Pacific region which is driven by China's and India's investment in coal as an energy source.

Table 3.2 World Mining Equipment demand (Anon, 2006a)

WORLD MINING EQUIPMENT DEMAND (million dollars)					
Item	1999	2004	2009	percent Annual Growth	
				04/99	09/04
World Mining Equipment Demand	11205	17660	27500	9.5	9.3
North America	2580	3275	4425	4.9	6.2
Western Europe	2945	4075	5550	6.7	6.4
Asia/Pacific	3125	5750	9875	13.0	11.4
Rest of World	2555	4560	7650	12.3	10.9

The German engineering federation (VDMA - Verband Deutscher Maschinen- und Anlagenbau i.e. Association of German Machinery and Equipment Manufacturers) rates the outlook for the mining machinery manufacturing market in coming years as good to excellent, especially as the worldwide demand for energy and raw materials is continuing to drive up commodity prices and, consequently, the profits of mining operations. As a result, there is sufficient capital for capacity expansions and the renewal of existing technology. Another development that would strengthen the mining machinery market is that nearly all the major markets are reporting increasing energy demand. According to VDMA this development promises good prospects for the mining industry in the coming years, as it would mean an increased demand for commodities such as coal and uranium.

3.3.4 China's Coal Mining Equipment Industry

Chinese manufacturers supply around 90 percent of coal mining equipment, while only 10 percent imported from foreign countries, such as U.S., Germany, U.K., South Africa, and Japan. China imported around US\$ 3 billion of coal mining equipment from the U.S. in the past seven years, accounting for about two thirds of China's imported coal mining equipment. The OEM's of coal mining equipment are very competitive in supplying heavy coal mining machines, systems, and clean-coal technologies (Anon, 2007f). The Chinese government encourages the purchase of domestic coal mining equipment. If domestic equipment and technology are unobtainable, foreign alternatives are not overly expensive, and Chinese companies turn to imports.

China, over the past two decades has imported billions of US dollars on advanced technologies and equipment for coalmine construction, development, transportation, and

processing. In doing so China has managed to create a complete system of research and development, geological exploration, mine construction, coal mining and processing, and mining machinery manufacturing. In terms of technology Chinese manufacturers have to catch up with their international counter parts. The Chinese coal equipment manufacturers have gained technology quickly and have been able to manufacture high-tech mining equipment, such as super-power electric haulage shearers, hydraulic support systems, and armoured face conveyers. The coal mining equipment industry in China is approximately ten to fifteen years behind the industry leaders with respect to mining efficiency, equipment quality, environmental protection of mines, safety and health, etc.

To deal with this problem, most large, state-owned coal mining companies in China are implementing structural reform to improve production results. The NDRC exposed a plan to restructure China's coal sector in February 2006. The NDRC plans to decrease the fragmentation in the coal industry, with the objective of launching five to six massive corporations in China's major coal-producing provinces and closing down all minor coal mines by 2015 (Anon, 2007f). These large coal-mining companies plan to improve productivity, safety, resources and utilization efficiency by using state-of-the-art technology and equipment. This infrastructure improvement provides tremendous opportunities for OEM's of coal mining equipment to sell equipment and technology.

As China modernizes its mining infrastructure, imports of foreign produced equipment are expected to increase. In order to meet the rising demand of coal mining equipment, China purchased over US\$2.4 billion worth of foreign coal mining products in 2006, a 24percent increase over the 2005 volume (Anon, 2007f).

3.3.5 Heavy Coal Mining Equipment Market in China

Major coal mining companies in China have greater financial ability and interest in acquiring coal mining equipment because of improved productivity. Large coal mining companies in China import certain coal mining equipment and systems to increase production capacity. Shearers and road headers come from U.S., U.K., Germany, South Africa, and Japan. The advanced technology in the coal mining equipment from the U.S. and European suppliers are known for high quality and reliability. Table 3.3 indicates the heavy mining equipment market in China. The data in table 3.3 obtains data on all types of coal mining equipment and this may not be limited to the focus of this study.

Table 3.3 Heavy mining Equipment Market in China (Anon, 2007f)

	2002	2003	2004
Total Market Size	1513	1846	3443
Total Local Production	1398	1695	3083
Total Exports	165	189	259
Total Imports	280	340	619
Imports from U.S.	58	53	102

(In millions of US dollars)

U.S. companies have their greatest competitive advantage in supplying heavy coal mining equipment and systems. This includes shearers, road headers, hydraulic support systems, and armoured face conveyors. In the last 7 years i.e. from 2000 to 2006, the total volume for U.S. coal mining equipment exported to China was around US\$3 billion, which accounts for about two thirds of China's imported coal mining equipment (Anon, 2007f).

Major Foreign Coal Mining Original Equipment Manufacturer Companies in China:

- Joy Mining Machinery
- DBT
- Caterpillar
- Bucyrus International

OEM's of coal mining equipment supply customers in China with equipment to mine copper, iron ore and coking coal. China's machinery industry is one of the industries where foreign investment has been most actively engaged in. Foreign investment started to flow to China's machinery industry in 1981. The machinery industry experienced a stage of great development in terms of foreign direct investment from 1990 to 2000, during which the number of projects of foreign direct investment reached 15,310 and the contractual value of foreign investment reached US\$20.720 billion, increasing 133 and 122 times respectively over the record set from 1985 to 1990 (Anon, 2007f).

The world's top 500 multi-national companies whose mechanical products dominate the market have invested in China. The sales revenue for foreign invested machinery enterprises amounts to 30 percent of the total sales revenue of the machinery industry and their export value amounts to over 50 percent of the total export value of the machinery industry (Anon, 2007f). The main sources of foreign investment at present are from developed countries, including Japan, Germany, France, the U.S., Australia and newly industrialized countries, like Korea and Singapore. According to official statistics, in 2001 the number of foreign invested projects in the machinery industry reached 2,473 and the contractual value of foreign investment reaches US\$5.68 billion (Anon, 2007f).

According to sector estimates, mining machinery to the value of €20-billion was sold worldwide in 2006, excluding equipment for the oil and gas industries (Freeman, 2007). The three largest machinery manufacturing countries are Germany, the UK and the US, which account for 40 percent of world trade. The VDMA reports that the main markets for mining equipment are China, the US and Russia, while Iran also has a growing appetite for mining machinery. The VDMA indicated that China has risen to the world's fourth producer of mining equipment. They have also noted that China is a big importer of high-tech mining technology, which benefits the OEM's as it lessens the competition. In order for this situation to continue the technological development of China's own mining machinery manufacturing industry will have to improve.

There is no significant barrier to imports of mining industry equipment in China. Although the Chinese Government encourages domestic purchases, there are no import quotas or restrictive inspection requirements for imported coal mining equipment. Trading

companies and local agents, however, remain an important option to consider. With careful selection, training and constant contact, OEM's can obtain good market representation from a local trading firm, many of which are authorized to deal in a wide range of products. Local agents in China who handle internal distribution and marketing offer relatively low-risk representation.

Representative offices are the easier type of offices for foreign firms to set up in China, but they are limited by law to performing liaison activities only. They cannot sign sales contracts, directly bill customers or supply parts and after-sales service for a fee. The machinery manufacturing sector provides the fundamentals and support to sustain a healthy development of the coal industry. Chinese policies encourage coal machinery manufacturers to ride on the global relocation of manufacturing base, seizing the opportunities when foreign manufacturers enter the market.

International OEM's enter the market with advanced technology, which in turn enhances the country's coal development. China focuses on importing technology while bringing in high technology equipment, and throughout the course, strives to turn this knowledge into its own to promote its self-reliant innovations, which accelerates its move to raise its own manufacturing standards. This initiative provides the coal sector with advanced, reliable, and a complete set of equipment.

The Chinese government intends to revive its machine manufacturing sector, this is discussed in detail later on in this chapter. The intention of the Chinese is to have an independent means to develop major equipment that would gradually make the country self-sufficient in machine design, manufacturing and operation. China would strive to

acquire core technology and system integration technology through coordinated research programs. The government would improve its policies and regulations, including fiscal, scientific and industrial policies, to support research and development, while creating a better market environment for fair competition.

The Ministry of Finance and the NDRC will work out preferential import tariff policies for domestic machine manufacturers that need to import spare parts and raw materials to build the key products. At the same time, the duty-free policy for the import of whole and complete machine packages will be abolished. The government will encourage the purchase and use of China-made equipment in state key projects, saying that an insurance mechanism would be established to allow manufacturers, users and insurance companies to share the risks. The document recommends accelerating the establishment of rules and regulations concerning the machine industry based on foreign experiences, so as to ensure its smooth development. It says the government needs to create conditions for Chinese machine producers to compete internationally (U.S. Government)

3.3.6 South African Coal Mining Equipment Industry

South Africa has a diversity of mining technologies used by the major mining companies. These mining technologies are reliant upon US, European and Japanese manufacturers of OEM coal mining equipment. These manufacturers use these circumstances by offering more suitable systems and services, also by proving the concept and commercializing the product or by implementing systems for technology transfer (Anon, 2006f).

The technological demands in the South African mining sector are high due to the prevalence of hard-rock ore and the challenges of deep-level mining. Since 1992 there have been significant changes to the mining industry in South Africa. The most influential of these changes have been the shifting of importance from gold to platinum, a rationalized labour force, and the internationalization of South African mining companies. Although the industry has experienced significant reductions in labour, the total investments in mining have increased due to the increased mechanisation of the mining industry (Anon, 2005b).

Mining companies manage up to 14,000 suppliers on their vendor lists and/or supplier base. This vast network of original equipment manufacturers, component manufacturers and distributors form the vital supply chain used by mining firms (Anon, 2005b). However, the number of suppliers providing coal mining equipment is limited. The suppliers of coal mining equipment are international companies that have regional operations in South Africa. The coal mining equipment used by South African mining companies is imported into South Africa by the mining companies.

When Terex Africa Ltd (an international supplier of surface mining equipment) was bought by Imperial Car Rental in 2006, the Competition Commission of South Africa found that the market share for distribution of surface mining equipment in South Africa to be:

Table 3.4: The estimated market shares for distribution of surface mining equipment

Market Shares

The estimated market shares for distribution of surface mining equipment

Table 1

Name of Competitors	Market Shares (%)
Caterpillar	45
Komatsu	20
Hitachi	10
Liebherr	10
Terex Africa	10
Others	5
Total	100

Table 3.4 shows that Caterpillar has the biggest market share of surface mining equipment in South Africa. Caterpillar is a well known brand and is considered to provide good quality equipment. Underground coal mining equipment suppliers in South Africa are dominated by Joy Mining Machinery and DBT a division of Bucyrus International. The industry for underground mining equipment is closed and hence only speculations can be made about market share in this respect.

3.4 Implications for the Future

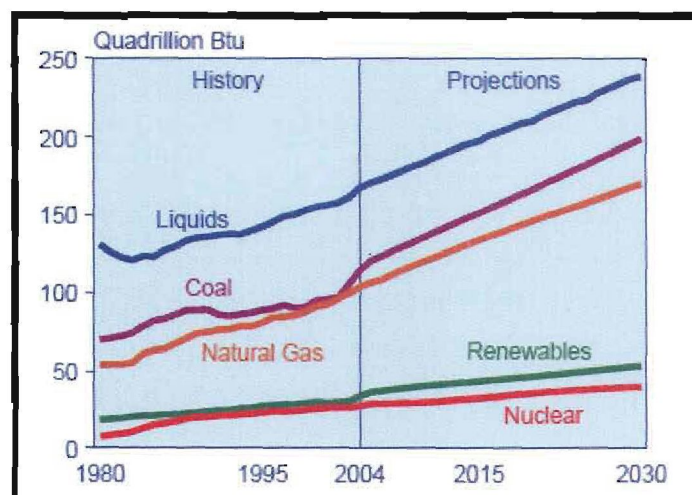
3.4.1 Trends and forecasts for the of coal demand

The demand for coal has grown by 62 % from 1975 to 2005 (Brendow, 2005). Coal is the fastest-growing energy source worldwide (Doman et al, 2007). Coal is more cost competitive, as it is cheaper to mine than other fossil fuels. The International Energy Outlook 2007 forecasts that coal consumption will increase from 114.5 quadrillion Btu in

2004 to 199.1 quadrillion Btu in 2030, at an average annual rate of 2.2 (Doman et al, 2007).

The demand for coal is expected to grow by 53 percent up to 2030 (Brendow, 2005). Coal's share of total world energy use is projected to increase from 26 percent in 2004 to 28 percent in 2030 (Doman et al, 2007). Figure 3.5 below indicates the natural resources used to generate electricity and forecasts this till 2030. The demand for coal is forecasted to continue growing strongly.

Figure 3.5 World Marketed Energy Use by Fuel Type, 1980-2030 (Doman et al, 2007)



World coal consumption of coal increased sharply from 2003 to 2004, largely because of a 17-percent increase on a Btu basis in non-members of the Organisation for Economic Co-operation and Development (OECD) in Asia (mainly, China and India) (Doman et al, 2007). Coal is estimated to generate two thirds of the world electricity and the industrial sector accounts for most of the remainder. China's industrial sector is projected to account for about 78 percent of the total net increase in industrial coal uses worldwide (Doman et al,

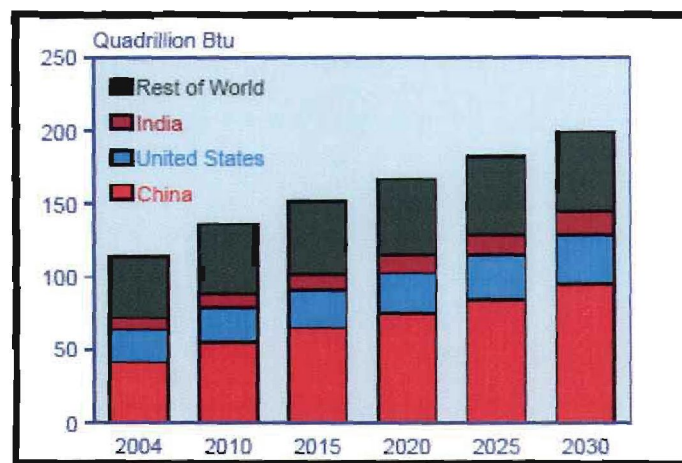
2007). China has profuse coal resources and a principal position in world steel production. Coal and natural gas are projected by the International Energy Outlook 2007 to account for 80 percent of the total growth in world electricity generation from 2004 to 2030 (Doman et al, 2007).

World coal consumption increased sharply from 2003 to 2004, largely because of a 17 percent increase on a Btu basis in non-OECD Asia (China and India) (Doman et al, 2007). World coal consumption increased sharply from 2003 to 2004, largely because of a 17 percent increase on a Btu basis in non-OECD Asia (China and India) (Doman et al, 2007). China and India will account for almost four-fifths of the incremental demand for coal (Lauzon et al, 2007). This has resulted in coal's share of total world energy use to increase from 25 percent in 2003 to 26 percent in 2004. The increase in demand for coal will arise from power plants, which will absorb in 2030 some 74 % of coal supplies, against 66 % in 2000 (Brendow, 2005). The prices of oil and natural gas are expected to continue rising, hence making coal a more attractive fuel for countries with access to abundant coal resources.

The U.S., China, and India are in good positions to replace the use of more expensive fuels with coal, and together the three nations account for 86 percent of the expected increase from 2004 to 2030 in coal consumption (Doman et al , 2007). The coal mining and electricity industry becomes ever more global with the rising demand for coal (Brendow, 2005). The International Energy Outlook 2007 forecasts a decrease in coal consumption for OECD Europe and Japan, because population growth is slow or declining, electricity demand growth is slow, and natural gas and nuclear power are likely to continue providing

significant amounts of electricity (Doman et al, 2007). Figure 3.6 graph below indicates the consumption of coal per region of the world; it is clear that China's demand for energy will also drive its increased coal consumption.

Figure 3.6: World Coal Consumption by Region, 2004-2030 (Doman et al, 2007)



The International Energy Outlook forecasts that world coal consumption will increase by 74 percent from 2004 to 2030, international coal trade increases by 44 percent from 2005 to 2030, and coal's share of world energy consumption increases from 26 percent in 2004 to 28 percent in 2030 (Doman et al, 2007). The largest increase in coal consumption is projected for China in the produced and consumed domestically sectors. China and India account for 72 percent of the projected increase in world coal consumption of coal from 2004 to 2030 (Doman et al, 2007).

Strong economic growth (averaging 6.5 percent per year in China and 5.7 percent per year in India from 2004 to 2030) is projected for both India and China and hence the increase in their demand for energy, particularly in the industrial and electricity sectors, is expected to

be met by coal. Coal use in China's electricity sector is projected to increase from 22.7 quadrillion Btu in 2004 to 55.9 quadrillion Btu in 2030, at an average rate of 3.5 percent per year (Doman et al, 2007). In comparison, coal consumption in the U.S. electricity sector is projected to grow by 1.7 percent annually, from 20.3 quadrillion Btu in 2004 to 31.1 quadrillion Btu in 2030 (Doman et al, 2007). Western demand for coal is expected to grow conservatively (Lauzon et al, 2007). It must be kept in mind that carbon constraining policies would lead to a decline in coal demand (Brendow, 2005).

The demand for electricity in China is expected to accompany its rapid economic growth, and an additional 497 gigawatts of coal-fired capacity (net of retirements) is projected to be brought on line in China by 2030, requiring large financial investments in new coal-fired power plants and associated transmission and distribution systems (Doman et al, 2007). Nearly one-half (45 percent) of China's coal use in 2004 was in the non-electricity sectors, primarily in the industrial sector (Doman et al, 2007). China was the world's leading producer of both steel and pig iron in 2004 (Doman et al, 2007). Over the projection period, coal demand in China's non-electricity sectors is expected to more than double, increasing by 20.9 quadrillion Btu (Doman et al, 2007). Coal remains the primary source of energy in China's industrial sector, primarily because the country has only limited reserves of oil and natural gas. Africa's coal consumption is projected to increase by 2.6 quadrillion Btu from 2004 to 2030 (Doman et al, 2007). The Chinese government is actively promoting the development of a large coal-to-liquids industry and this will increase the demand for coal.

South Africa uses 94 percent of the coal consumed on the African continent and is expected to continue to account for much of the increase in Africa's total coal consumption

in both the electricity and industrial sectors (Doman et al, 2007). Increasing demand for energy in South Africa, has led to a decision by Eskom (state owned electricity supplier) to restart three large coal-fired plants (Camden, Grootvlei, and Komati) that have been closed for more than a decade (Doman et al, 2007). The plants, with a combined generating capacity of 3.8 gigawatts, are scheduled to return to service in 2007 (Doman et al, 2007).

Recent power shortages and the general lack of spare generating capacity in Southern Africa have led to increased interest in new coal-fired power projects not only in South Africa but also in Mozambique, Zimbabwe, Tanzania, and Botswana (Doman et al, 2007). In Africa the use of coal is increasing in the industrial sector, as it is being used in the production of steam and process heat for industrial applications, production of coke for the steel industry, and production of coal-based synthetic liquids. Currently, there are two commercial- sized coal-to-liquids plants in South Africa (Sasol II and Sasol III). These plants supply about 28 percent of the country's total liquid fuel requirements (Doman et al, 2007). The two plants together are capable of producing 150,000 barrels of synthetic liquids per day. In addition to overall energy demand and the price of coal, many factors have the potential to influence different countries' ability and interest in exporting and importing coal. They include mine productivity, inland transportation infrastructure, and the port capacity of both importing and exporting countries. Shifts in public policy, as well as environmental concerns related to either coal production or coal consumption, can affect the amounts of coal traded. Uncertainty in the outlook for international coal trade includes potential changes in each of those factors (Doman et al, 2007).

Coal's comparatively favourable resource base and its price competitiveness could make chemical processing into synfuels and gas a growth market for coal. Under market conditions, coal-based synfuels could cover by 2050 some 14 % of world transportation fuel consumption (Lauzon et al, 2007). Leading energy companies have indicated that in the next five years i.e. from 2008 to 2012 there will be "Coal Renaissance" on a global scale (Lauzon et al, 2007). There is an increasing readiness in India, China, Russia and the U.S. to reinvest into coal extraction and to rely on coal in a significant way over the medium term (Lauzon et al, 2007).

3.4.2 The future of China's Machine Manufacturing Industry

China intends to have a highly competitive equipment/machine manufacturing sector by 2010, according to a June 28 Xinhua report (Selko, 2006; Anon, 2006d; Anon2006e). The intention of the Chinese government is to have companies that are capable of manufacturing major machines/ equipment with their own intellectual property rights (Selko, 2006; Anon, 2006d). The Chinese government intends to set up a technological innovation system based around a group of enterprises, and gradually form an industry of major machinery, new and high-tech equipment, basic and general machinery (Selko, 2006; Anon, 2006d). The Chinese government intends these machines/equipment to have many features and to be branded machinery for clean and efficient power-generation, large and complete sets of petro-chemical equipment, major coal mining machinery, large shipping vessels, high-speed trains, large precision high-speed numerically-controlled machine tools and key equipment for integrated circuitry are the targeted key categories (Selko, 2006; Anon, 2006d).

The Chinese government plans to provide a package of support measures including research programs for these companies with the ultimate goal of making China "self-sufficient in machine design, manufacturing and operation" (Selko, 2006; Anon, 2006d). The Ministry of Finance and the National Development and Reform Commission will work out preferential import tariff policies for domestic machine manufacturers that need to import spare parts and raw materials to build the key products. At the same time, the duty-free policy for the import of whole and complete machine packages will be abolished (Selko, 2006; Anon, 2006d).

China intends to revitalise its equipment/ machine manufacturing industry during the 2006-2010 period (Anon, 2006c). The five-year development guidelines indicate that the Chinese Government will be focusing on (Anon, 2006c).

- Large high-efficiency clean generating equipment: million kilowatt-grade nuclear power generating units, supercritical thermal power generating units, gas-steam combined cycle generating units, integrated gasification combined cycle generating units, large cycle fluidized-bed boilers, large hydropower generating units and pumped storage generators, large air-cold units, and large wind-driven generators.
- Super high voltage power transmission equipment: technology for manufacturing key equipment for 500 kilovoltage and 750 kilovoltage direct current transmission facilities, and development of complete equipment for 1,000 kilovoltage alternative current and 800 kilovoltage direct current power transmission.

- Complete set of large ethylene equipment: localization of million ton-grade ethylene equipment and complete sets of equipment for paraxylene, terephthalic acid and polyester.
- Large coal chemical equipment: equipment for liquefaction and gasification of coal, and coal-to-alkene equipment.
- Comprehensive coal mining equipment: large comprehensive underground mining, conveyance and dressing equipment, and large open-cut mining equipment.
- Large metallurgical equipment: large continuous rolling mills for cold and hot rolled steel sheet, and complete sets of plating equipment.
- Large shipping equipment: large offshore oil engineering equipment, 300,000-ton ore and crude oil ships, 10,000-TEU or bigger container ships, liquefied natural gas tankers, and supporting equipment for high-tech, high-value added ships and large-power diesel engines.
- Rail transport equipment: mastering the core technology and commercial production of trains that travels 200 kilometres or more per hour and new subway cars.
- Equipment for environmental protection and comprehensive utilization of resources: large environmental protection equipment for air pollution control, treatment of urban and industrial wastewater and solid waste; and equipment

for the utilization of sea water and treatment of discarded unserviceable motor vehicles.

- Numerical-control machine tools: improving the standards of large, precision, high-speed numerical-control equipment and numerical-control systems as functional parts (Anon, 2006c).

China's national 10th Five-Year Plan indicates that China will improve its machinery industry's structure to:

- accelerate the development of products which are badly needed;
- to develop quite a few big corporation groups which are competitive in the world market;
- to enhance the whole machinery industry so as to improve its competence to support national economy
- and lay a solid foundation for the vitalization of machinery industry in 2010 (Anon, 2006e).

The national 10th Five year Plan indicates that the main tasks for the machinery industry are to:

1) Adjust product structure. China will make full use of high and new technologies and information techniques to rebuild and develop the mechanical manufacturing industry.

Support will be provided to big corporations so as to help them accelerate product restructuring, help them apply new techniques, new equipment and new-developed products in order to promote the technical advancement and industrial upgrading of the whole sector (Anon, 2006e).

2) Accelerate industry reorganization. China will promote the strategic reorganization of the machinery and automobile industries to cultivate a number of large-scaled corporation groups which are competitive in the world market. China will also support the development of some medium or even small-sized corporations whose products are unique or well-known to accelerate construction of the specialized production system (Anon, 2006e).

3) Promote industry reform. China will establish a corporate management structure according to the requirements of modern corporation system and accelerate introduction of the shareholding system in State-owned corporations. Multi-source capital structure will be encouraged and development of the economic components with different ownerships will receive government support (Anon, 2006e).

4) Enhance the level of management and administration. With China's entry into the WTO and the development of economic globalization, China will try to make full use of two markets, two resources and enhance cooperation with foreign corporations in the fields of finance, technology and human resources. China will export more mechanical products and encourage domestic corporations to establish factories abroad and to take part in international market competition (Anon, 2006e).

The national 10th Five year Plan indicates that the objectives of the machinery industry are to focus on:

1) The output volume

2) Product and technology restructuring

The annual growth rate of the machinery industry averages about 10 percent. In the year of 2005, the output value of the machinery industry will account for 26 percent of the total industrial output value. The contribution of the machinery industry to the gross domestic product will be improved further. The added value of the machinery industry will account for more than 6 percent of the gross domestic product. The amount of foreign exchange earned by machinery industry through exports will reach US\$83 billion, which will account for 28 percent of the total amount of the national export. The labour productivity will doubled that reached in 2000. Its rate of return on capital will be higher than the average level of the national industry as a whole (Anon, 2006e).

The Chinese government intended that by the year of 2005, the imbalance between supply and demand in the machinery industry will be changed. A majority of the equipment which is needed by agriculture, electric power, metallurgy, nonferrous metal, petroleum, petro chemistry, light industry, textile industry, and coal industry and transportation construction will be supplied by the domestic machinery industry. The quality of the equipment will be stable and reliable and the performance of the main products will be close to the advanced level in the world (Anon, 2006e). The gap between the production of

the basic mechanical parts and the whole set of the large-scaled equipment will be narrowed considerably (Anon, 2006e).

By 2005, 10 to 15 large-scale corporation groups will be preliminarily set up and they will have independent intellectual property rights, be competitive in the world and become the backbone of the machinery industry (Anon, 2006e). The internal structure of the corporations will be changed to give greater importance to research & development, sales and service while the processing ability, which is relatively stronger, will be optimized (Anon, 2006e).

China's machine manufacturing plan will impact on the global coal mining equipment industry. The OEM's of coal mining equipment would need to factor this into their strategies for the future. China has achieved all goals it has set previously and hence it is a certainty that the machine manufacturing industry in China will be firmly developed by 2010.

3.5 Summary

This chapter discussed the global coal mining industry and coal mining equipment industry. The coal mining equipment industry is linked to the demand of coal, since coal is in demand as an energy resource in the developing worlds, the coal mining equipment industry is benefiting greatly. Many coal mining equipment suppliers are based in the industrialised nations and hence their markets there are in a mature phase. It would become beneficial for these companies to develop strategic relationships in the developing worlds, as their energy demands are rising.

Coal mining equipment is technologically very advanced and with China making tremendous strides to strengthen their manufacturing industry, it could mean other avenues from which South Africa can import coal mining equipment. This chapter also discusses the mining industry to indicate that certain requirements need to be met before large coal mining equipment can be sourced from China. Chinas plan for its machine manufacturing industry will create competition in the coal mining equipment industry and this will in turn affect the South African coal mining equipment industry.

Chapter 4

Conclusions and Recommendations

4.1 Introduction

This Chapter seeks come to a conclusion on the sourcing of coal mining equipment from China. The primary market for coal is the electricity generation industry in China and South Africa. Capital costs for new coal mining equipment in China and South Africa vary only slightly. The differences in coal geology, mine characteristics, in place coal mining equipment and other local conditions results in a difference in the costs of production of coal. Hence coal mining equipment has provided a method by which mines can produce coal at lower costs. Coal mining equipment companies have sold equipment to China. In order to reduce the costs of manufacturing such equipment, outsourcing to China may present a feasible option. The reduction of manufacturing costs will present an opportunity for South African mining companies to reduce the cost of coal production.

4.2 Conclusions

4.2.1 Trade relationship between China and South Africa

South Africa's exports to China are capital intensive whilst imports from China are labour intensive. The South African Government has committed itself to trade with China. The two countries have committed to mutual investment, optimising trade structure and to ensuring sound and smooth development of bilateral trade. South Africa and China have aligned their views on interacting with one another and in terms of global politics. The relationship between the two is set to strengthen.

China does view South Africa differently from other African countries, this can be seen in the GEDA initiative. The GEDA initiative presents an opportunity for coal mining equipment suppliers in South Africa to gain market share in China. This will entail a sharing of technology between the two countries. It is important to note that South Africa does not have any well known manufacturers of coal mining equipment and localised coal mining companies source the majority of their coal mining equipment from well known global players.

4.2.2 South African Coal Mining Equipment Market

The underground coal mining equipment industry in South Africa is dominated by Joy mining Machinery. Surface mining equipment industry in South Africa is not dominated by any company. South Africa mining companies have strong links with the suppliers of coal mining equipment. These strong links have been long established and are maintained to ensure the availability of the equipment for production. Coal mining equipment is fairly standardised across the industry as both underground and surface mining equipment specifications are fairly similar from the OEM's of coal mining equipment. Bucyrus International is the leading manufacturer of draglines used for coal mining globally, the majority of their business is derived from the rebuild, service and maintenance of existing draglines.

The coal mining equipment industry has been consolidated to a large extent with a few companies dominating the industry. Leading coal mining equipment suppliers have bought other OEM's so that they can provide coal mining equipment for both underground and surface mining. The consumables of coal mining equipment have a large number of

suppliers. Some of these suppliers are approved by the OEM and others are not. The number of coal mining equipment OEM's are becoming smaller due to consolidation of the industry and to the technology advances on technology in the coal mining equipment. Mining companies in South Africa have strategic alliances with the OEM's of the coal mining equipment, resulting in a reduction of OEM's supplying coal mining equipment.

OEM's of coal mining equipment have built a brand with regard to coal mining equipment; hence mining companies tend to have a preference for well known brands. The global OEM's of coal mining equipment are innovative with regard to technology on their equipment. The OEM's are known for providing quality products, which is endorsed by the major coal mining companies. There is strong competition between the suppliers of surface mining equipment (excluding draglines).

There is a recent trend among mining companies in South Africa to buy a whole suite of machinery for a particular mining site from one OEM. This is done to ensure that the machine availability is at a high rate to meet production forecasts and due to estimating the total cost of ownership for the life of the machine. There is a trend for South African mining houses to share key performance indicators with the OEM's of coal mining equipment to achieve production targets. There is a world wide trend to enter into cost per ton agreements/contracts to ensure that the OEM has a stake in the production of coal. Cost per ton agreements operate such that the production of coal is directly linked to the availability of the machine/equipment to produce coal. The OEM charges the mining company a cost per ton of coal mined, this cost includes the service and maintenance of the coal mining equipment/ machine. Cost per ton agreements differ in terms of scope from one mining company to the next in that some companies may link labour, parts,

services, maintenance, rebuilds and training to the cost per ton mined whilst other mining houses may pay for training or labour etc separately.

It is difficult to enter the coal mining equipment industry as large amounts of capital is required to manufacture equipment and technology is expensive. The OEM's have strategic relationships with suppliers of technology e.g. Siemens, ABB, for the control systems used in coal mining equipment. The coal mining equipment industry has a slow growth rate due to the coal mining being cyclical nature. The coal mining equipment industry has not seen dramatic changes but there have been vast improvements with regard to improving the life of the machine thus increasing productivity levels at coal mines. Coal mining equipment companies need to supply equipment to leading mining houses in order to be profitable. The high costs of coal mining equipment make it difficult for mining companies to change coal mining equipment regularly. Thus the life of machines is dependent on the use of the machine and the service and maintenance done on the machine, the life span can be between 10 and 15 years.

Coal mining companies in South Africa have moved towards a total cost of ownership strategy when purchasing coal mining equipment. The Chinese coal mining equipment suppliers fall short as they do not have the technology or on site service capability in South Africa for coal mining equipment. However with China's government wanting to strengthen its machine manufacturing industry by 2010, there could be significant new coal mining equipment manufacturers entering the global market and thus increasing the level of competition in the coal mining equipment industry.

4.2.3 Market entry into South Africa for Chinese Coal Mining Equipment Suppliers

South African mining companies prefer to deal with a local contact or distributor with local warehousing capacity to guarantee the chain of supply when dealing with an international supplier. Availability of technical staff and localised availability is considered by South African mining companies when contracts are awarded. Black Economic Empowerment (BEE) compliance by suppliers is not essential, but is recommended. Mining companies prefer to work with BEE compliant companies, as they have BEE targets to meet. The South African government does take into account BEE compliance when awarding new mineral rights.

South African mining companies generally require that all suppliers are registered as vendors on their vendor bases. Prospective suppliers of products and services are required to submit a comprehensive application form and these applications are audited by independent companies. Large orders are usually put out to tender. Tenders are normally posted on the company websites or approved and registered vendors are emailed directly. A closed tendering process is generally used, and only registered and approved vendors are invited to tender.

There is a trend for mining companies to base procurement decisions on the total cost of doing the business with a supplier. This takes into account the cost of an item or service, plus all the other associated costs such as cost of installation and maintenance before making a final decision.

4.24 Global Mining Equipment Suppliers and Outsourcing

The global OEM's of coal mining equipment have all initiated some form of business relationship with China. The trend is for the OEM's to develop joint ventures, strategic contracts and cooperation agreements to manufacture component and/or parts for coal mining equipment. Components and/or parts are outsourced for the following reasons:

- to have flexibility in manufacturing of parts ;
- to have the ability to match capacity of manufacturing with demand;
- to ship replacement parts directly from the manufacturer to regional distributors;
- to have speed of delivery of replacement parts and lower handling costs of parts;
- to lower over all cost of manufacturing parts;
- to meet demands of customers; and
- utilise the ability of joint ventures partners to add value to equipment.

The global OEM's of coal mining equipment are reluctant to move the manufacturing of coal mining equipment to China due to their intellectual property rights not being adequately protected in China. The global OEM's of coal mining equipment realise that *their business is a niche market and that if they are to remain industry leaders they need to protect the architecture of their products.*

China has made many purchases from the global OEM's of coal mining equipment and is renowned for their re-engineering capabilities. Hence China will become more adept at manufacturing coal mining equipment. If the global OEM's of coal mining equipment are to

retain their positions of leadership they need to make strategic business decisions to be better than their competitors. Global competition is increasing and in order to remain leaders in industry the OEM's of coal mining equipment need to expand their business in new markets without straying from their core competencies.

OEM's of coal mining equipment are in a position of global dominance which has made them risk averse. With China laying out plans for establishing a group of competitive machine manufacturing companies by 2010, OEM's of coal mining equipment need to see this as an opportunity to gain a larger market share in the global mining equipment industry. The OEM's of coal mining equipment need to leverage strengths like employees, modernised manufacturing facilities, brand awareness, reliability, availability, quality and global distribution networks to gain advantages over their competitors.

4.2.5 Effect China's Globalisation on the Coal Mining Equipment Industry

The costs of labour in China are rising. The Chinese government is actively pursuing sustainable growth, and in order to do so China would like to reduce its dependence on foreign investment. The Chinese government has targeted the development of technology led sectors and high value capabilities to do so. The Chinese government is focusing on the creation of knowledge led, innovation orientated economy supported by greater domestic consumption.

This impacts companies in every industry and will affect South Africa's global suppliers of coal mining equipment. Global OEM's of coal mining equipment should see China's large coal reserves as an opportunity to test new products and technologies. Leading

manufacturers will see the influence that Chinese coal mining companies will have on global trends and products in the coal mining industry.

As Chinese coal mines become more mechanised, and safety aware they will influence trends globally. This is coming to the fore as indigenous standards are developed in China as it cultivates its own technology industries and diminishes its reliance on foreign technology. China's globalisation strategy is increasing its influence in industries and economies. China has targeted developing countries in Africa and Latin America due lessons learned from their own emerging economy. Chinese manufacturers have been able to gain advantages over Western competitors by leveraging their price advantage, and their understanding of emerging markets.

Chinese companies have been active in Western countries by forming strategic partnerships with companies in order to gain technology and market share. Innovation is a key focus area for China and there are tangible plans by Beijing to increase R & D spending as a percentage of GDP from 1.3 percent IN 2005 to 2 percent by 2010 (Sleigh & Von Lewinski, 2006). China has a large number of science and engineering researchers, which is critical to fuel the development of technology and innovation. China's low cost manufacturing advantages might be offset by the time to market implications of extended supply chain is in over seas markets. Companies that aspire to high performance need to consider the ramifications of relocating some of their productions to even lower cost countries in the region or moving away from the coastal regions and to low cost regions in the west and north of China.

Chinese companies are expanding their manufacturing presence in overseas markets which suggests that the right global strategy is driven by a number of factors and not cost alone. Products developed with Chinese companies in conjunction with foreign companies are introducing these products to overseas markets. OEM's who choose to operate in China must acknowledge the advantages given to local Chinese companies and take advantage of it. Competition between Chinese companies is going to intensify and global companies need to be aware that this will have an influence in industry.

4.2.6 Trends for the Coal Mining Equipment Industry

The demand for coal as an energy source is forecasted to grow. Coal is more cost effective to produce electricity, as it is cheaper to mine than other fossil fuels. The coal mining equipment industry will remain profitable as long as there is a demand for coal. The coal mining equipment industry is directly affected by the demand for coal and the cost of steel and iron (as this is used to manufacture the equipment). China's demand for steel and iron will also drive the prices of coal mining equipment up.

If coal mining equipment manufacturers were to manufacture equipment in China, the rest of the world would still pay global prices for the equipment. China's plans to have a highly competitive equipment/machine manufacturing sector by 2010 and will create competition in a market dominated by few global OEM'S of coal mining equipment. The Chinese government has identified comprehensive coal mining equipment i.e. large comprehensive underground mining, conveyance and dressing equipment and large open-cut mining equipment as a focus area.

4.3 Recommendations

The global OEM's of coal mining equipment need to factor in the plans of the Chinese government for machine manufacturing companies in their strategies. In order for the global OEM's of coal mining equipment to remain competitive, alliances with the Chinese companies must be made to ensure that technology and innovation is continuous. China has a large engineering skills base which global OEM's of coal mining equipment can tap into and use to their benefit.

South African mining houses have begun to investigate the sourcing of coal mining equipment from China. It is evident that there is some way to go before the coal mining equipment will be sourced from Chinese companies due to technology constraints. However the Chinese government has set plans for their machine manufacturing industry which will change the nature of the global coal mining equipment industry.

The cost drivers for coal mining equipment are largely steel. Metals like copper and other materials are smaller cost drivers in the manufacturing of coal mining equipment. The steel industry in China will play a significant role in the costs of manufacturing coal mining equipment. This should be taken into consideration by the global OEM's of coal mining equipment and should be seen as an opportunity for growth. There is technological advancement in control systems from Chinese manufacturers, which the global OEM's of coal mining equipment, can use to influence their costs.

Many of the suppliers in the value chain of coal mining equipment have alliances with Chinese firms and are manufacturing their components in China. In order to benefit from this global OEM's of coal mining equipment need to consider manufacturing facilities in

China to shorten their value chain. Currently components/parts are being manufactured in China and are sent to the OEM's for assembly.

South African mining companies need to develop strategies for improved production that will accommodate the changes in the machine manufacturing industry in China. They will also need to strengthen their relationships with the OEM's of coal mining equipment to benefit from the changes that China will have on the global coal mining equipment industry.

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