Foreign Direct Investment and the Internationalisation of South African Mining Companies into Africa

John Luiz and Meshal Ruplal[1]

Working Paper Number 194

November 2010

[1] Wits Business School, University of the Witwatersrand

Foreign Direct Investment and the Internationalisation of South African Mining Companies into Africa

John M. Luiz and Meshal Ruplal*

November 1, 2010

Abstract

The paper investigates the factors influencing the internationalisation of mining firms into Africa and the strategies employed. We focus on the FDI of South African mining firms because of the dominance of this country in the extractive resources industry for over a century. A semi-structured interview survey process consisting of written questionnaires and one-on-one interviews that incorporated both structured as well as open-ended questions was used. The structured questionnaire attempted to identify the entry-mode characteristics of the mining firms as well as the importance of the factors influencing the internationalisation of mining firms. The open-ended questionnaire was designed to be probing in nature, in order to identify how mining companies manage the factors deemed present in an operational context. More than 80% of South African mining firms by market capitalisation provided responses to the survey. The research revealed that security of tenure, political stability and the availability of infrastructure were the three most important factors influencing the internationalisation of South African mining firms out of the nine factors tested in the survey. The most widespread strategies used to manage these factors were political lobbying, bargaining and negotiation.

KEYWORDS;Theory of FDI and the MNE (Ownership-Location-Internalization), Mining, Africa, Factor Analysis, Incorporating Country Variables

JEL codes: F23, L72, O55

1 Introduction

The gradual relaxation of barriers to the free flow of trade and the easing of exchange controls has resulted in increasing numbers of South African companies competing with global multinationals in the post-1994 period. South African conglomerates have been part of the growing trend of multinational enterprises (MNEs) from emerging markets investing significant amounts in other developing countries, which has seen a rapid rise in South-South investment patterns (Goldstein, 2007). For example, South Africa is one of the largest investors in Africa - contributing 86% of FDI into Lesotho, 80% into Malawi, 71% into Swaziland, 58% into Botswana, 35% into Tanzania, and 31% into Mozambique between 1994 and 2003 (Grobbelaar, 2006: 50). Recently only China has come close to matching South African FDI into Africa, in its case with a particular focus on resources.

In the mining arena, South Africa has been a dominant player for over a century (see Fedderke and Pirouz, 2002). South Africa is ranked as the world's number one producer of the platinum group metals (PGM), number three producer of diamonds, number three producer of gold, and the sixth-largest producer of coal. South Africa held the position of the largest gold producer for

---

*Wits Business School, University of the Witwatersrand

more than a century. However, as reserves become depleted and ore bodies become deeper and more difficult to mine, South Africa's leading position has been eroded, to third place in 2009. Whilst there are examples of mining companies with historical roots in South Africa becoming global mining giants (such as Anglo American, BHP Billiton, De Beers), there are many large South African mining companies that have minimal or no international operations. Some examples include Harmony Gold, Pamodzi Gold, Kumba Iron Ore and Anglo Platinum. As ore bodies in South Africa have gradually deteriorated (especially in gold), major gold producers such as AngloGold Ashanti, Goldfields and Harmony Gold have been seeking new locations to maintain annual gold production to satisfy shareholder performance expectations.

The paper seeks to identify factors influencing the internationalisation of South African mining firms into Africa and the strategies they employ to manage these factors. It is structured as follows: The next section provides a literature review, which is followed by details on the methodology. Section 4 presents the results and analysis. Section 5 concludes.

2   Literature Review

This section begins with a general overview of global FDI trends, with particular emphasis on the extractive industries. This is followed by a review of the academic literature on internationalisation and entry-mode choice, from which the factors deemed important to the internationalisation of South African mining firms are elicited. The final literature section examines strategies used by firms to manage risks associated with the factors presented, from which further propositions are deduced.

UNCTAD (2007) reports that world FDI reached US$1.3 billion in 2007. It cites several significant transactions in the mining industry that contributed to these substantial FDI flows. Examples of mining sector activity include Brazilian-based Vale acquiring Canadian-based Inco in 2006; Swiss-based Xstrata acquiring Canadian mining giant Falconbridge and Rio Tinto acquiring Alcan in 2007. These deals in the mining sector were generally driven by the increased demand for resources emanating from China, which resulted in a commodity price boom. The FDI activities of extractive industries, such as mining, oil and gas, are differentiated from other industries because they are bound to locations where a specific ore body or oil or gas reserve exists. Even though an ore body is a necessary condition for FDI, this is not a sufficient condition to warrant investment in a foreign country. The World Bank & International Finance Corporation (2002) argue that countries may possess an abundance of natural resources, which is exogenous, but if a number of facilitating factors are not in place then mining companies will shun investment, even though valuable ore bodies may exist. Examples of mining companies foregoing lucrative projects include the abandonment by BHP Billiton of a rich nickel deposit on the Indonesian Island of Gag – after spending more than US$80million in exploration and development ("Renewable Resources Coalition", 2009); and the large-scale eschewing of the mineral-rich (gold, diamonds and non-ferrous metals) Democratic Republic of Congo (DRC) by global, diversified mining companies in general, due mainly to political uncertainty (Andrews, Bocoum & Tshimena, 2008).[1]

During the early twentieth century the primary sector accounted for the majority of the FDI flows as countries attempted to gain control of resources needed to grow their economies (UNCTAD, 2007). This subsequently declined sharply as manufacturing and services began to dominate FDI flows. However, in the past decade we have seen a significant recovery. FDI in the primary sector accounted for only 7% of total FDI in 1990 and increased to 12% of total flows in 2005. Commodity price increases resulted in this percentage increasing to 17% in 2008. In Africa the buoyant demand for commodities from 2005 onward saw high inflows of FDI, particularly to the resource-rich countries.

---

[1] The World Bank & International Finance Corporation (2002) report that there are currently 100 countries around the world in which mining occurs. Fifty of these countries can be classified as "mining countries". Not included in their list are countries that possess significant un-mined resources. They estimate that approximately four billion people live in the 50 countries that they classify as "mining countries".

Similar trends were seen in Latin America, which saw high inflows to the extractive industries (UNCTAD, 2009).

Table 1 shows the top ten countries for mining FDI in 2008. It shows that developed countries such as Australia, Canada and the US remain top contenders for investment (Ericsson and Larson, 2009). One-third of investment is committed to Latin America, where copper and iron-ore projects dominate. Africa has 14% or US$57 billion committed in new projects. Europe's growth in mining has occurred predominantly in Russia and Nordic countries. New mine development is concentrated in four metals, which account for 82% of investments (Ericsson and Larson, 2009). Copper, iron ore, gold and nickel have seen heavy investment, with demand from China for copper and iron ore, in particular, fuelling high commodity prices and subsequent investment by mining houses in new sources of production.

UNCTAD (2006) introduced the concept of the Geographical Spread Index (GSI), which seeks to capture both the number of foreign affiliates and the number of host countries in which a company has established its affiliates. The GSI[2] aims to provide a measure of the level of internationalisation of a firm. The higher the number of foreign affiliates as well as host countries, the higher the GSI value. Table 2 shows the Internationalisation Index as well as the GSI for the top 20 mining firms as reported by UNCTAD (2007). Eight of the top 20 mining companies featured are South African in some form and several others in the total list could – subject to some debate – be included as South African.

2.1 Internationalisation models

There are four dominant models regarding the internationalisation of firms: The Uppsala Internationalisation Model, The Transaction Cost Analysis Model, The Eclectic Model and the Resource Based View Model. We briefly describe each and relate its relevance to extractive industries. Constructs from these models are then used, in the next section, to extract factors affecting the internationalisation of South African mining companies.

2.1.1 Uppsala Model or Internationalisation Process Model

The Uppsala Model argues that firms increase their commitment in a foreign market in gradual sequential steps as market knowledge increases and uncertainty surrounding the foreign market decreases (Johanson & Vahlne, 2001). The sequence of entry is witnessed through a company initially using agents to market and distribute its product. Johanson & Vahlne (2001) and Erramilli (1991) argue that the experience factor forces firms to choose markets that are culturally similar to their home market. When firms' international experience increases, and they are able to estimate the risks and returns correctly, and understand the complexities of managing foreign operations, they become bolder in entering markets that are dissimilar. This boldness extends to increasing their commitment to resources and increasing their control of international operations. The Uppsala Model thus can contribute to our understanding of the process of internationalisation within mining companies. As for the direction of FDI, mining companies are resource seeking and will attempt to establish operations in countries where abundance of these resources can be found.

2.1.2 Transaction Cost Analysis (Internalisation Theory)

Anderson & Gatignon (1986) put forward a model based on Transaction Cost Analysis (TCA) to explain why a firm would own and operate a production facility in a foreign market instead of using licensing or supply agreements with local businesses already established in the foreign market

---

[2]The GSI aims to provide a measure of the level of internationalisation of a firm. It is defined as the square root of the Internationalisation Index (II) multiplied by the number of host countries. The Internationalisation Index (II) is the ratio of a TNCs foreign to total affiliates. Hence a TNC having a concentration of affiliates in one country will score a low GSI. The higher the number of foreign affiliates as well as host countries, the higher the GSI value.

(Ekeledo & Sivakumar, 2004). This model combines elements of contract law, industrial organisation and organisational theory. The default hypothesis of this model is that firms would choose a low level of control (ownership, resource commitment) unless proven otherwise, owing to the risks and costs being too high. The most efficient method in the long run is one that minimises the transaction costs involved for long-term efficiency. In the TCA Model, Anderson & Gatignon (1986) propose four constructs that affect the long-term efficiency of any entry mode (degree of control). These constructs are:

- Transaction-specific assets: these are specialised resource commitments (human and physical assets) that are required to establish a foreign presence.

- External uncertainty: this refers to the unpredictability of the external environment, such as political, economic and cultural factors. Anderson & Gatignon (1986) propose that firms with highly differentiated products will seek a high degree of control as the risk of agents/partners dissipating trade secrets is high.

- Internal uncertainty: this involves the inability or uncertainty of the firm to predict the performance of agents in foreign markets. When uncertainty exists in measuring foreign agents, Anderson & Gatignon (1986) suggest a higher degree of control is required.

- Free-riding potential: this is the ability to receive benefits without the need to bear cost associated with creating them.

Two constructs of the TCA Model may be particularly relevant to the FDI decisions of mining companies. These are the internal and external uncertainties.

2.1.3 Resource Based View (RBV)

The RBV paradigm holds that firms possess resources and capabilities that are heterogeneous and imperfectly immobile and that these differences lead to strategic competitive advantage (Barney, 1991). The resource-based theory views the firm, not the industry, as the source of competitive advantage (Ekeledo & Sivakumar, 2004). The RBV of an organisation holds that an organisation's resources and capabilities are more important than the structure of the industry in the organisation's attempt to gain competitive advantage. Firms seek to exploit their rare, valuable and inimitable resources (skills and assets) in an attempt to gain competitive advantage in the marketplace and thereby earn an above-normal rate of return (Barney, 1991; Tallman, 1991). Shapiro, Russel & Pitt (2007) found that the strategies of mining companies are largely homogenous[3]; hence, the RBV Model appears to have limited applicability in the study of factors influencing the internationalisation of mining firms.

2.1.4 Eclectic Theory (OLI)

Dunning (1988) developed the eclectic paradigm, which also became known as the Ownership, Location, Internalisation (OLI) model. Dunning (1988 p.1) described the Eclectic Model as "drawing on several strands of economic theory in order to provide a framework by which it was possible to identify and evaluate the significant factors influencing both the initial act of foreign production as well as the growth of such production". The OLI eclectic framework consists of three distinct sets of variables - ownership, location and internalisation - that firms will draw upon when selecting their entry mode. Ownership advantages are concerned with asset power, the degree of control and the management of risks that firms need to consider when making foreign investment decisions. Dunning

---

[3]These scholars hold that strategy is generic and largely determined by the environment, thus resulting in more strategic homogeneity. This would contradict the RBV model which sees diverse strategies emanating from inherent firm level competitive advantage.

(1988) argues that the size of the firm positively influences the entry mode. Larger firms with larger resources are able to absorb the initial cost of internationalisation and will opt for a higher degree of control such as being wholly owned rather than developing partnerships. However, Agarwal & Ramaswami (1992) found that firms without international experience will have difficulty managing the problems associated with foreign operations. These firms will overstate the risks associated with a foreign market and understate the returns, thereby making the choice of a lower degree of control or non-entry more probable.

For mining firms, the advantages associated with ownership will revolve around the ability of firms to secure additional resources and reserves in order to ensure the long-term security of supply and to dominate markets through scale factors (UNCTAD, 2007). The attempted takeover of Rio Tinto by BHP Billiton in 2008 is an example of mining companies seeking ownership advantages through the control of markets (Regan, 2008). Ownership advantages and the degree of control are also manifested in the degree of ownership that mining companies are allowed to have in foreign companies.

Investment risk, market potential/attractiveness as well as availability and cost of resources are factors that need to be considered under location-specific advantages (Agarwal & Ramaswami; 1992; Terpstra & Yu, 1988; Fedderke & Romm, 2006). In markets with high potential, Agarwal & Ramaswami (1992) cite the potential to develop long-term economies of scale and hence lower marginal cost of production as an attractive attribute that would entice firms to choose a high-control mode of entry. The stability of the political, legal and economic factors also mediates the location variable in the Eclectic paradigm.

2.2   Research propositions

The OLI Model is particularly useful both because it provides a synthesis of the other models and because it emphasises the ownership and location variables which is central to the study of the internationalisation of mining firms (also see Luiz and Charalambous, 2009). This is not to deny the importance of the other models but, given the nature of the mining industry and the fact that mines follow the geology, it becomes essential to understand how they deal with location and ownership factors.

The internationalisation models present high-level constructs which can be used to elicit factors specific to the mining industry within the framework of the OLI paradigm. Previous work performed specifically in the mining industry on 39 mining TNCs in South East Asia (SEA) by Otto (1992) found that the majority of factors related to government policies or regulatory systems. However, important factors relating to the social licence to operate, which appears to be a very important feature from the literature survey, are omitted from Otto's study. Table 3 shows the 20 important factors listed by Otto re-classified in terms of Dunning's OLI Model, as well as the factors proposed for the current research.[4]

The ownership and internalisation advantage constructs of Dunning's Eclectic paradigm are treated together in this section. This is because of the inter-relatedness of the factors surrounding ownership restrictions placed by governments on mining companies and the choice (or rather the lack of it) of full control entry modes, which represents the internalisation factor.

2.2.1   Ability to control supply of commodity

According to UNCTAD (2007), one of the drivers for mining companies' internationalisation is market-seeking motives. This entails enhancing the control of the value chain and increasing negotiating power associated with a particular commodity. For example, Rio Tinto, BHP Billiton

---

[4]Through this mapping and clustering, we are able to reduce Otto's list of factors and yet still retain all the essential elements of his study. We are left with a list of seven factors which coincide with Otto. In the next section we work with nine factors (the seven revealed here) and two additional factors which emerge in the literature and may be relevant to the African continent.

and CVRD control more than 74% of the trade in iron ore, which gives these companies considerable power when negotiating contracts with customers ("EconStats", 2008). Shapiro, Russel & Pitt (2007) studied the strategic motives of 26 of the world's largest mining companies and found a high degree of homogeneity among them – implying that competition for market share and control of the supply chain is high.

Factor 1: The ability to increase control of the value chain is *very important* for South African mining firms when seeking countries in which to internationalise.

2.2.2 Restrictions in ownership levels

Dunning (1988) explains market imperfections that influence location decisions of TNCs. In the case of mining companies, market imperfections arise from both government legislation controlling ownership as well as social/community actions that threaten operations. UNCTAD (2007) cites the use of legislation to regulate the ownership in industries considered strategic. Examples cited by UNCTAD (2007) include Algeria, where state-run organisations must hold a minimum of 51% in any oil and gas enterprises. Other examples include the nationalisation of the Bolivian and Venezuelan oil and petroleum industries. The proposed nationalisation of Zimbabwean mines as well as legislation similar to South Africa's Black Economic Empowerment legislation, which requires local black-owned companies to own at least 26% of mining companies, will result in mining companies viewing these countries as less attractive from an investment perspective.

This factor covers both the ownership advantage and internalisation advantage according to Dunning's (1988) Eclectic paradigm. The internalisation advantage arises from firms deriving more benefit from owning and managing foreign operations than from dissipating ownership and control to host country firms. The level of ownership dictates the amount of management control that a mining firm can exercise. Restrictions in management control can affect the ability of mining companies to improve efficiencies and productivity by implementing best practices from other international operations.

Keim & Hillman (2008) argue that CEOs sometimes underestimate the power of governments to thwart deals or entry. Bargaining is often used as one tool to manage host country political risk. Grosse & Behrman (1992) indicate that this includes the use of psychology, ideology (philosophy), law, politics and ethical/moral systems by MNEs to achieve their goals. With respect to mining companies, bargaining is used as a tactic to reach agreement on licences, tenure, and taxation as well as access to infrastructure (water, electricity, rail, etc.).

The Obsolescing Bargaining Model (OBM) was widely adopted in the past to explain the dynamics of negotiation between MNE and host country. Eden *et al.* (2004) describe the OBM as a process whereby bargaining initially favours the MNE, which has choice with respect to FDI. Over time the assets of the MNE become locked or "hostage" due to investment in the host country. At this time the relative bargaining power shifts from the MNE to the host country. The host country then begins to impose more conditions on the MNE such as taxes and, in the extreme case, expropriation. Eden *et al.* (2004) developed an updated model called the "Political Bargaining Model" (PBM). Their model contains several key elements of the OBM and includes three core elements: similarity of goals and stakes, resources and constraints, as well as the bargaining outcome. Grosse & Behrman (1992) argue that the greater the agreement in the aims of each in the bargaining situation, the less the need for regulation or coercion to channel the activities of the MNE into directions that are desired by the government. The more divergent the goals the more difficult the bargaining process and the more likely that government regulation will be imposed to constrain the activities of the MNE.

Factor 2: Legislation restricting ownership levels of foreign mining operations is considered *very important* for South African mining firms.

2.2.3 Risk associated with country governance and political stability

Agarwal & Ramaswami (1992) argue that the risks of governments interfering in the repatriation of profits and the control of foreign assets will lead to firms adjusting their entry-mode strategies. Gatignon & Anderson (1988) add the construct of legal restrictiveness in a host country as a risk factor. The presence of country risk factors will lead to the need for greater flexibility and for lower control governance modes (Gatignon & Anderson, 1988; Kim & Hwang, 1992; Peinado *et al.*, 2007; Agarwal & Ramaswami, 1992; Erramilli, 1991; Anderson & Gatignon, 1986; Luiz, 2009).

Factor 3: Country political and governance stability is considered *very important* for South African mining firms when deciding to invest internationally.

2.2.4 Taxation and royalties

The revenue-sharing scheme between the TNC and the government can influence the participation of the TNC in the project. Revenue sharing takes the form of taxes and royalties payable to the government. UNCTAD (2007) cites governments' share of revenues as varying between 25% and 60% over the life of a mine for metal mines.

Cazurra-Cuervo (2008) argues that corruption acts as an irregular tax on business and increases the costs as well as the uncertainty regarding the operational costs of an affiliate. Doh *et al.* (2003) argue that the likelihood of encountering corruption in a host country is much higher than the risk of expropriation – yet the internationalisation literature has focused on the political risk facing MNEs rather than corruption. Kolstad & Soreide (2009) state that corruption related to natural resources has historically resulted in resource-rich countries being "cursed". The resources curse arises from mostly pervasive corruption in the form of either rent-seeking or patronage-seeking motives. They maintain that governments use rents earned from mining to pay for patronage from supporters in an attempt to stay in power longer. Kolstad & Soreide (2009) state that the natural industry itself has certain structural aspects that make the industry more susceptible to corruption than other industries. They point out that the large rents to be earned from resource-related projects make individuals within the industry susceptible to corruption. They also argue that, owing to the complex nature of contracts and negotiations, it is easier to conceal corrupt practices and this therefore makes the industry more susceptible to corruption.

Factor 4: The level of revenue sharing with host country governments is considered *very important* to South African mining firms when deciding to internationalise.

2.2.5 Security of tenure

Morgan (2002) cites security of tenure as a critical factor influencing foreign mining companies' decisions to invest in a country. A mining company needs to know that if a viable mineral deposit is found, it will obtain the necessary mining rights to the deposit. UNCTAD (2007) cites security of tenure as one of the top 20 factors influencing investment decisions by mining TNCs. Morgan (2002 p.167) cites the need for "fairness, consistency, accuracy and minimum discretionary powers. Issues should be efficiently administered, non-discriminatory, transparent and accountable."

Factor 5: Security of tenure is *very important* to South African mining companies when deciding to invest in foreign countries.

2.2.6 Social licence to operate

Mining as an industry has negative connotations and is often seen as purely exploitative. Increased awareness of environmental and social issues has resulted in opposition to mining in many countries. The negative exposure and reputation damage can have far-reaching consequences for future projects as well as for acquisition of capital. The risk can also extend to lost opportunities as mining companies can sometimes be forced to abandon projects owing to pressure from communities

and/or environmentalists. This was seen in BHP Billiton's withdrawal from the Indonesian Island of Gag after the company had spent millions of dollars in prospecting and exploration ("Renewable Resources Coalition", 2009).

Hillman & Keim (2001) found that investing in corporate social responsibility (CSR) may be complementary to stakeholder value creation and may provide a competitive advantage to firms as resources may be created that differentiate the firm from competitors. Gifford & Kestler (2008) argue that mining companies seek to obtain local legitimacy in host countries via a deep understanding of social issues and the integration of programmes with the needs of the local environment. By adopting environmental and social standards higher than the local requirements, mining companies can create barriers to entry, which is a secondary benefit to investment in CSR programmes (Gifford & Kestler, 2008).

Factor 6: The ease with which South African mining companies can obtain a "social licence to operate" in a host country is considered *important* when considering internationalisation.

2.2.7 Cultural considerations

Socio-cultural distance or psychic distance is defined as the cultural, mainly linguistic, difference that exists between home and host country (Gatignon & Anderson, 1988; Peinado *et al.*, 2007). Management is expected to shy away from markets where home country practices and values cannot be easily transferred (Gatignon & Anderson, 1988). Johanson & Vahlne (2001) explain that the Uppsala Model uses psychic distance to predict that firms will first start to invade neighbouring (in a cultural sense) markets and as experience grows will gradually move to more culturally distant markets. Kogut & Singh (1988) argue that when home and host country cultures are distant, firms devolve operational responsibility to local partners who are able to improve relationships with the labour force, governments, suppliers and buyers. In the mining industry the ability to train local labour as well as transfer best practices across international operations is facilitated by close cultural ties. For South African mining firms with limited or no international operations, the Uppsala Model predicts that they will begin foreign investments in countries with cultural ties.

Factor 7: Cultural considerations are considered *less important* for South African mining firms when deciding to invest in international operations. [5]

2.2.8 Infrastructure considerations

UNCTAD (2007) cites the need for infrastructure such as electricity and water as necessities for extraction activities. Other infrastructure, such as roads, railways and ports, is required for the transporting of the bulk commodities such as iron ore and coal. Infrastructure is expensive and hence, if it is already available, it will reduce the capital cost of establishing an operation. Although the availability of infrastructure would prove advantageous to mining companies, it does not appear to be a critical factor in deciding whether or not to establish operations in a particular country, as relatively poor infrastructure is to be anticipated throughout most of the African continent (Luiz, 2010).

Factor 8: Infrastructure considerations are considered *less important* for South African mining firms when deciding to invest in international operations.

2.2.9 Foreign-exchange regulations

Foreign-exchange regulations can have a significant effect on the profitability and debt burdens of companies. Mining companies seek countries with stable exchange rates during the construction phase of a mine as it is common for expensive imported capital equipment to be used in projects

---

[5] See the methodology section for an explanation of the degree of relative importance of the investment factors.

(UNCTAD, 2007). During the operational phase of the mine, mining companies seek favourable exchange rates in order to increase profit margins.

Factor 9: Exchange rate considerations are considered *important* for South African mining firms when deciding to invest in international operations.

3   Research Methodology

A semi-structured interview survey process consisting of written questionnaires and one-on-one interviews that incorporated both structured as well as open-ended questions was used. The actual people chosen to be interviewed from each company were those in senior management that were the key decision makers, or at least part of the decision making process, in terms of foreign investment decisions in their respective firms - a senior Strategic Manager, COO or CEO. The structured questionnaire attempted to identify the entry-mode characteristics of the mining firms as well as the importance of the factors influencing the internationalisation of mining firms. The open-ended questionnaire was designed to be probing in nature in order to identify how mining companies manage the factors deemed present in an operational context.

The latter section of the structured questionnaire which used a Likert scale as a basis to determine the relative importance of each of the investment factors required a more involved statistical analysis before the data could be used and correctly interpreted. This is because the survey data captured is of an ordinal nature and cannot necessarily be assumed to be linearly correlated with the underlying attitudes of the Likert scale of the survey; i.e. one cannot directly and accurately interpret responses from the point scale without some mathematical means of normalising or rescaling it first. Stacey (2005) has developed a distribution-fitting approach which allows for the conversion of such data into a more representative form, which yields results of greater accuracy and validity than alternative methods. Hence this analysis has been used in this research to facilitate interpretation of the degree of relative importance of the investment factors. This allowed for each factor to be interpreted and ranked.[6]

When analysing the results of the distribution-fitting analysis performed on the survey data, Stacey's (2005) statistical methodology implies that the following interpretations needed to be made to identify factors as *very important, important* and *less important*. If the mean for an investment factor response was appreciably greater than zero ($\mu \quad >> 0$ as determined by the hypothesis test), then that factor is statistically significantly more important than the overall average importance of all the factors and can hence be interpreted as being *very important* relative to other factors. If the

---

[6]The approach calculates item means and standard deviations of the sample, rather than respondent-level data. Respondent-level data can however be generated from estimated threshold values and the estimated means and standard deviations. In the case of normal underlying distributions, the rescaled values can be calculated as the mean or expected value of the truncated normal distribution between the two threshold values. This is given in the formula:

$$Y_{k,j} = \frac{\int_{\tau_{k-1}}^{\tau_k} x.e^{\frac{-\left(x-\dot{\mu}\right)^2}{2\dot{\sigma}^2}}dx}{\int_{\tau_{k-1}}^{\tau_k} e^{\frac{-\left(x-\dot{\mu}\right)^2}{2\dot{\sigma}^2}}dx}$$

Where $Y_{k,j}$ is equal to the rescaled value for the kth ordinal response to the j survey item, and are the estimated mean and standard deviation of the normal distribution fitted to the responses to the jth survey item (Stacey, 2005: 21).

mean for an investment factor response was very close to zero, then it can be interpreted as being *important* (the average) relative to other factors. If the mean for an investment factor response was appreciably less than zero, then it can be interpreted as being *less important* relative to other factors.

There are hundreds of mining and exploration companies in South Africa. However, the vast majority are considered junior mining companies without the wherewithal to invest in international operations. Therefore, the sample population was limited to the list of mining companies belonging to the Chamber of Mines of South Africa (COMSA). COMSA companies are large mining companies with substantial operations in South Africa, with many already having international operations or the potential to expand internationally. A further distinguishing factor used in the definition of "South African mining companies" was the location of the companies' first public listing. In the quest for international finance many South African companies have dual offshore listings, with the London Metals Exchange (LME) and the Toronto Stock Exchange (TSE) being popular locations. Securities exchange requirements dictate that companies should have a head office in the location of the primary listing. Therefore, several South African mining firms have already become global mining houses with official head offices located offshore, even though the companies were born in South Africa. For this reason COMSA companies whose first listing was on the Johannesburg Securities Exchange (JSE) will be considered South African. There are 41 mining companies registered with COMSA. By nature of the sample population the sampling method can be considered as non-probabilistic and purposive. The representatives of companies interviewed represented approximately 83% of the mining market by capitalisation on the JSE ("Sharenet", 2010) and this is considered a fair representation of the total population of mining companies in South Africa.

4   Results and Analysis

Respondents' choice of entry mode varied, depending on the risk appetite of the mining company. Generally, respondents favoured setting up operations without the use of the joint venture partner to ensure operational control and to maximise profits. Analysis of the responses showed that this response was independent of the size of the company. This is in contrast to Dunning's (1988) predications that smaller companies would seek joint venture partners owing to their inexperience in international operations. One respondent indicated that joint venture partners would be sought for non-mining activities such as upstream material supply and downstream logistics. However, in some countries such as China, Zambia, Peru and Zimbabwe local partners are mandatory. In cases where a joint venture partner cannot be avoided, the quality of the partner is very important. Respondents indicated that partners needed to be able to demonstrate the value add they bring to the equation, including political capital.

Several guidelines for managing joint venture partners can be put forward from the responses received. Respondents indicated that workplace accountability should be emphasised. The roles and responsibilities of each party should be scoped, jointly developed and agreed upfront, and accountability for that function must be enforced. Respondents indicated that they managed these roles and responsibilities through oversight and assurance audits. However, they cautioned that the manner in which the oversight role is executed must not be seen to be authoritarian, as the local partner, who is normally closely linked with the government, could be offended, leading to repercussions.

4.1   Factors influencing the internationalisation of South African mining firms

The data gathered for studying the factors influencing the internationalisation of South African mining firms were ordinal-level data. The Distribution-Fitting Algorithm developed by Stacey (2005)

was used to transform the data in order to rescale the ordinal-level data to interval-level data for analysis. Table 6 shows the results of Stacey's Distribution-Fitting Algorithm, where the standard-ised means are shown. Two sets of results emerge from the rescaling of the results. Firstly, the mean value for each factor can be interpreted to determine the importance of the factor and, secondly, the p-values indicate which factors are statistically significant to an Alpha value of 5%.

After standardising the results using Stacey's Distribution-Fitting Algorithm, three factors emerged as very important factors influencing the internationalisation of South African mining firms: security of tenure, political stability, and availability of infrastructure were statistically significant findings. South African mining companies use factors such as security of tenure and the stability of the host country political system and policies as predictors of future risk. Respondents indicated that much attention is paid to managing these factors with the host country government.

Factors deemed important were the restriction in ownership levels, social licence to operate (or CSR issues) and revenue sharing. It appears that mining companies are able to manage these factors through direct negotiation with host country governments as well as communities and action groups. The key point is that these factors are to a large extent within the mining company's control. In addition, the cost of managing these factors can be factored into the investment calculations upfront and, as long as a positive net present value (NPV) is obtained, companies are willing to accept the reduced revenues resulting from revenue sharing and restricted ownership levels as well as the added cost of ensuring community and environmental issues.

Interestingly, securing control of supply, exchange rate fluctuations and host country cultural similarities with South Africa emerged as less important. The ranking of the factors is presented graphically in Figure 1.

4.2 South African mining companies' approach to managing key internationalisation risks

4.2.1 Managing political risks and host country governments

Analysis of the responses received showed that four factors are managed using similar strategies. The factors are security of tenure, political stability, restrictions in ownership levels and the level of revenue sharing. For the purposes of this discussion these four factors will be categorised as host country risks.

It is clear that South African mining firms rely on relational corporate political activity as a first approach to managing political risk, with the CEO playing a leading role in building relationships with host country governments. Relationships are built by using direct and indirect means. In some cases direct contact with host country governments is not possible. The use of trade delegations was also cited as a means of lobbying and relationship building. It was therefore suggested that a government affairs department be established in the host country well before exploration for an ore body begins.

Respondents indicated that brand building was also important. Eden *et al.* (2004) describe brand building as the need to "seek local legitimacy". They argue that foreign firms are seen as outsiders. Hence, they need to seek local acceptance or legitimacy before seriously negotiating with host country governments on issues such as mining licences, taxes and security of tenure. As mining firms are seen as wanting to exploit the natural resources of a country, there is a need for political lobbying to demonstrate and convince the host country that the principles and values under which the company operates are based on sound mining practices. This brand building occurs gradually over time and precedes mining operations by many years. As an example, one respondent indicated that his company needed to build trust with the government in the DRC and did this by initially establishing a plastic recycling plant. The company paid local communities to pick up strewn plastic shopping bags for recycling. The recycled plastic was used to manufacture pipes that were then used to transport water to local communities, near the mine that the company was interested in. Several

respondents indicated that their company's business strategies involved being seen as the "partner of choice" by host countries. The use of relational political activity could result in the mining company being invited to participate in new mining projects in the host country.

4.2.2 Dealing with host country laws and regulations

When assessing host country laws, respondents indicated that clarity of the law was of critical importance. "Opaque regulations", as one respondent put it, resulted in that mining company refusing to invest in Tanzania. The detailed content of the law, whether friendly to investment or not, appeared to be secondary to the clarity of the law as local operations could adapt operations to the detailed contents of laws. Respondents highlighted the importance of being able to argue any regulation in a court of law. They indicated that their companies preferred operating in host countries with Anglo-Saxon law as opposed to French law. This was in part because their regular legal council was familiar with Anglo-Saxon law and in part because they perceived French law to be less clear and not based on precedent. Respondents also stated that they preferred to deal with host countries where it was possible to go to an international court of arbitration if necessary. Countries with international treaties, especially with South Africa, were favoured in order to minimise political risk.

Stability of law over time was also cited by many respondents as important. Respondents argued that, although laws are not expected to be cast in stone, at the time of investment they would assess the "long-term political risk trajectory". Predictability is the key parameter when assessing the long-term risk trajectory. The case of Australian mining firm Rio Tinto was cited, which required mining laws to remain unchanged for a specific period before agreeing to invest in South Africa's Phalaborwa Mining Company. One respondent explained that his company was risk averse and therefore only ventured into new territories if a major mining company was present or if they could convince junior mining companies to establish operations before stepping in. However, three respondents did not view long-term political stability as important and argued that shareholders invested in their firms precisely because they valued volatility and the high upside it could bring. An example given of a South African mining firm that invested in politically volatile countries included Impala Platinum, which invested in Zimbabwe during its recent turmoil.

In negotiating with host country governments, respondents generally cited the need to develop proposals that emphasised the mutual benefit of the MNE – host country relationship. This is in keeping with the OBM and PBM models cited in the literature.

4.2.3 Dealing with corruption

Generally, respondents indicated that their companies adopted a no-tolerance approach to corruption. Several pointed to industry charters such as the EITI as well as company-specific policies or values. For example, respondents from Anglo American, Goldfields and African Rainbow Minerals made specific reference to company values, including integrity and ethics. One respondent admitted to using "agents" when dealing with arbitrary corruption such as customs officials requiring bribes when importing machinery. The agent inflated the cost of the service to include the additional "charges" and the company treated this as a supplementary tax.

It is possible to map the strategies used by South African mining firms when dealing with corruption to the framework put forward by Doh *et al.* (2003). From the responses received it was determined that South African mining firms chose avoidance, laws and agreements and corporate codes of conduct to deal with arbitrary corruption in host countries. Nevertheless, the strategy of using third-party agents to deal with pervasive corruption appears to be missing as a strategy in the work of Uhlenbruck *et al.* (2006).

4.2.4　Dealing with the lack of infrastructure

Generally, respondents indicated that their preference was not to invest in major infrastructure. This was because of the high capital costs associated with infrastructure such as roads, rail roads, ports and power stations. The NPV of a project would be negatively affected if such infrastructure was financed by the mining company. One exception to this rule appears to be investment in water supply infrastructure. Respondents indicated that water was a critical commodity to ore processing. Owing to the relatively low cost of water infrastructure, mining respondents indicated a willingness to invest in drilling wells or installing pipelines.

If forced by circumstance to develop major infrastructure, respondents indicated several strategies that could be used. Engaging the host country government would be a starting point. A compelling case is presented to the host country government, illustrating the macroeconomic benefits of infrastructure and specifically the benefits beyond the mining project. In addition, other potential users of the infrastructure are approached to create a coalition or joint venture in the infrastructure project. In many cases this includes local mining competition.

Generally, infrastructure is provided on long-term concession to mining companies by host country governments and needs to be returned once the concession expires. Therefore, the host country government needs to approve projects and is generally involved in some way with the funding of the development. Respondents prefer to fund such projects through the host country government, the International Finance Corporation or World Bank. Respondents indicated that other mechanisms such as "build operate transfer" and private-public partnerships or hybrid deal structures could also be used, but these are not currently being employed.

It appears that because South African mining companies are not allowed to own or operate infrastructure in South Africa and have to rely on state-owned enterprises, they are reluctant to invest in infrastructure in foreign countries and are perhaps forgoing lucrative opportunities. One respondent indicated that this was an area where South African mining firms are lagging their international peers and where they could become more aggressive. An example was provided of the Moaetse coal fields in Mozambique, where the lack of a rail road has deterred South African mining firms from exploiting this valuable ore body. A Brazilian firm, CVRD, has agreed to invest in the construction of a rail road and has hence received a mining licence.

Respondents indicated that a new development was the arrival of the Chinese in Africa, seeking resources. The Chinese have been offering to construct infrastructure such as roads, power stations and rail roads for host country governments in exchange for resources. However, respondents indicated that they did not see this as a threat as they claim that host country governments have come to realise that the quality of the infrastructure provided by the Chinese is sub-standard, with a short life span.

4.2.5　Additional factors

An additional factor that was highlighted by all respondents as important is the level of skills in the host country. They indicated that specifically mining and engineering skills are considered important, but other skills such as human resources and financial skills are also required. Overall, respondents pointed out that although the cultural similarity with South Africa was unimportant, two aspects of the local host country culture, namely work ethic and language, are considered significant. Past projects have shown the skills level as well as the language barrier to be an important factor affecting the mine start up time and consequently negatively affecting the financial projections of the project. Over the longer term the establishment of training centres assists with skilling locals. Respondents indicated that, in instances where the Chinese have entered a host country, they have usually brought their own labour. Host country governments generally frown upon this strategy as it means the local community does not benefit from skills development or employment and the local economic and social goals of the government are not achieved.

5   Conclusion

The results of this study, when compared with the predictors of internationalisation in Dunning's (1988) OLI Model, found strong agreement with at least one of the three variables. Location is an important factor, as was witnessed by the importance given by respondents to host country political risk. Therefore, the commonly held view that mining companies are bound by the location of ore bodies is ill conceived. This study has shown that, although South African mining companies require the presence of an ore body, it is not a sufficient condition for investment. Owing to the high capital investment requirement, South African mining firms evaluate the potential risk of a host country before committing to investment.

The second predictor of Dunning's (1988) Eclectic Model states that internalisation of resources is a critical factor for the internationalisation of firms. Dunning (1988 p.3) states that "without the advantages of internalization much of the direct foreign investment would be replaced by international transaction of resources on a contractual basis". Although South African mining companies prefer full-control entry, they are generally willing to share ownership if legislation requires local partners. The sharing of ownership is dependent on the mining company meeting its required rate of return on invested capital. South African mining companies have become accustomed to local Black Economic Empowerment laws that stipulate ownership of mines by previously disadvantaged individuals and hence this has reduced their risk aversion to similar laws in other countries. Dunning (1988) as well as Agarwal and Ramaswami (1992) state that internalisation is preferred to prevent proprietary knowledge from being disseminated. This study has found that the internalisation and ownership are factors in the OLI framework that are not a good fit for the mining industry. Mining is not considered a technology-intensive business and hence in most cases there exists very little technological competitive advantage to protect. Differentiation in the mining industry is achieved through operational cost reduction, which is achieved mainly through operational discipline.

The Uppsala Model appears to be a better predictor of mining firms' internationalisation than the Eclectic Model. This study has found that South African mining firms need to establish a significant presence in a country and gain local legitimacy before attempting to gain land or mining rights. This is akin to gaining market knowledge as described in the Uppsala Model. Market knowledge, including knowledge of the actors and decision makers in a country, is essential if a mining company is to interact successfully with governments of a host nation. African business in general requires investment in long-term relationships both with local partners and host governments and this needs to precede mining operations.

This study has highlighted the importance that mining still plays within the world economy and FDI flows, and has analysed differences between mining FDI requirements and other sectors. It has emphasised the long-term nature of mining investment and the problems that this presents when doing business in African countries, with their relatively high levels of political and economic instability. The South African mining industry is particularly interesting as firms are chasing ore bodies and do not always have the luxury of choosing to do business in ideal countries. Instead they have to find ways of managing high risk. The strategies they employ provide an abundance of lessons for other firms wishing to exploit the rapidly increasing opportunities within Africa.

References

[1] Agarwal, S. & Ramaswami, S. (1992) Choice of Foreign Market Entry Mode. *Journal of International Business Studies*, 23(1), 1-27.

[2] Anderson, E. & Gatignon, H. (1986) Modes of Foreign Entry. *Journal of International Business Studies*, 17(3), 1-26.

[3] Andrews, C., Bocoum, B. & Tshimena, D. (2008) *Democratic Republic of Congo Growth with Governance in the Mining Sector* (Oil/Gas, Mining and Chemicals Department), Washington: World Bank. (43402-ZR)

[4] Barney, J. (1991) Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99-120.

[5] Cazurra-Cuervo, A. (2008) Better the devil you know: Types of corruption and FDI in transition economies. *Journal of International Management*, 14(1), 12-27.

[6] Doh, J., Rodriguez, P., Uhlenbruck, K., Collins, J. & Eden, L. (2003) Coping with corruption in foreign markets. *Academy of Management Executive,* 17(8), 114-127.

[7] Dunning, J. H. (1988) The Eclectic Paradigm of International Production: A restatement and some possible extensions. *Journal of International Business Studies*, 19(1), 1-31.

[8] *EconStats* [Online] (2008) Retrieved February 1, 2009, from http://www.econstats.com/rt_ironore.htm#producers

[9] Eden, L., Lenway, S. & Schuler, D. (2004) *From the Obsolescing Bargain to the Political Bargaining Model* (Bush School Working Paper #403), Texas, Bush School. (403)

[10] Ekeledo, I. & Sivakumar, K. (2004) International market entry mode strategies of manufacturing service firms: A resource-based perspective. *International Marketing Review*, 21(1), 68-101.

[11] Ericsson, M. & Larsson, V. (2009) E&MJ's Annual Survey of Global Mining Investment. *Engineering and Mining journal*, 210(1), 24-28.

[12] Erramilli, K. (1991) The Experience Factor in Foreign Market Entry Behavior of Service Firms. *Journal of International Business Studies*, 22(3), 479-501.

[13] Fedderke, J.W. & Pirouz, F. (2002) The Role of Mining in the South African Economy. *South African Journal of Economic and Management Sciences*, 5(1),1-34.

[14] Fedderke, J.W., and Romm, A. (2006) Growth Impact and Determinants of Foreign Direct Investment into South Africa, 1956-2003, Economic Modelling, 23, 738-60.

[15] Gatignon, H. & Anderson, E. (1988) The Multinational Corporation's Degree of Control over Foreign Subsidiaries: An Empirical Test of a Transaction Cost Explanation. *Journal of Law, Economics & Organization*, 4(2), 305-336.

[16] Gifford, B. & Kestler, A. (2008) Toward a theory of local legitimacy by MNEs in developing nations: Newmont mining and health sustainable development in Peru. *Journal of International Management*, 14(1), 340-352.

[17] Goldstein,A. (2007) *Multinational Companies From Emerging Markets.* Houndmills, Palgrave Macmillan.

[18] Grobbelaar, N. (2006): "The trading and investment environment in Africa." In Luiz, J. (ed) *Managing Business in Africa: Practical Management Theory for an Emerging Market.* Cape Town: Oxford University Press, Chapter 2.

[19] Grosse, R. & Behrman, J. (1992) Theory in international business. *Transnational Corporations*, 1(1), 93-126.

[20] Hillman, A. J. & Keim, G. (2001) Shareholder Value, Stakeholder management and Social Issues: What's the bottom line? *Strategic Management Journal*, 22(2), 125-139.

[21] Johanson, J. & Vahlne, J. (2001) The Mechanism of Internationalisation . *International Marketing Review*, 7(4), 11-24.

[22] Keim, G. & Hillman, A. (2008) Political environments and business strategy: Implications for managers. *Business Horizons*, 51(1), 47-53.

[23] Kim, C. & Hwang, P. (1992) Global Strategy and Multinationals Entry Mode Choice. *Journal of International Business Studies*, 23(1), 29-53.

[24] Kogut, B. & Singh, H. (1988) The Effect of National Culture on the Choice of Entry Mode. *Journal of International Business Studies*, 19(3), 411-432.

[25] Kolstad, I. & Soreide, T. (2009) Corruption in natural resource management: Implication for policy makers. *Resources Policy*, 34(3), 214-226.

[26] Luiz,J. (2009) Institutions and Economic Performance: Implications for African Development. *Journal of International Development*. 21: 58-72.

[27] Luiz,J. (2010) Infrastructure Investment and its Performance in Africa over the Course of the Twentieth Century. *International Journal of Social Economics*. 37(7/8): 512-536.

[28] Luiz,J. and Charalambous,H. (2009) Factors Influencing Foreign Direct Investment of South African Financial Services Firms in Sub-Saharan Africa. *International Business Review*. 18: 305-317.

[29] Morgan, P. G. (2002) Mineral title management – the key to attracting foreign mining investment in developing countries? *Applied Earth Sciences, Section B: Transactions of the institute of Minerals and Metallurgy*, 111(3), B165-B170.

[30] Otto, J. (1992) A global survey of mineral company investment preferences. In UNDP & ESCAP (Eds.), *Mineral Investment Conditions in Selected Countries of the Asia-Pacific Region*, 1st ed., New York, United Nations, Chapter 5.

[31] Otto, J., Andrews, C., Cawood, F., Doggett, M., Guj, P., Stermole, F. (2006) *Mining Royalties: A global study of their impact on investors, government and civil society*, Washington DC, The World Bank.

[32] Peinado, E., Pla - Barber, J. & Hebert, L. (2007) Strategic Variables that Influence Entry Mode Choice in Service Firms. *Journal of International Marketing* , 15(1), 67-91.

[33] Regan, J. (2008, August 22) Australia regulator targets iron ore in BHP-Rio bid [Online]. *Reuters*. Retrieved February 14, 2009, from http://www.reuters.com/article/mergersNews/idUSSYD25802820080822

[34] *Renewable Resources Coalition* [Online] (2009) Retrieved January 26, 2009, from http://www.renewableresourcescoalition.org/index.htm

[35] Shapiro, D., Russel, B. I. & Pitt, L. (2007) Strategic heterogeneity in the global mining industry. *Transnational Corporations*, 16(3), 1-34.

[36] *Sharenet* [Online] (2010) Retrieved January 23, 2010, from http://www.sharenet.co.za/jse/Mining_Index/

[37] Stacey, A. G. (2005) The reliability and validity of the item means and standard deviations of ordinal level response data. *Management Dynamics*, 14(3), 2-25.

[38] Tallman, S. B. (1991) Strategic Management Models and Resource-Based Strategies among MNEs in a Host Market. *Strategic Management Journal*, 12(Special Issue: Global Strategy (Summer,1991)), 69-82.

[39] Terpstra, V. & Yu, C. (1988) Determinants of Foreign Investment of US Advertising Agencies. *Journal of International Business Studies*, 19(1), 33-46.

[40] Uhlenbruck, K., Roriguez, P., Doh, J. & Eden, L. (2006) The impact of corruption on Entry Strategy: Evidence from Telecommunication Projects in Emerging Economies. *Organization Science*, 17(3), 402-414.

[41] UNCTAD. (Ed.). (2006) *World Investment Report FDI from Developing Transition Economies: Implications for Development* (E.06.II.D.11), New York, United Nations Publication.

[42] UNCTAD. (Ed.). (2007) *World Investment Report 2007, Transnational Corporations, Extractive Industries and Development* (WIR2007), New York, United Nations Publications.

[43] UNCTAD. (Ed.). (2009) *World Investment Report Transnational Corporations, Agricultural Production and Development* (E.09.II.D.15), New York, United Nations Publication .

[44] World Bank International Finance Corporation. (2002) *Treasure or Trouble* (Mining and Development), Washington DC, International Finance Corporation.

Table 1 - Top ten countries for mining investment 2008

	Country	Investment (US$ billion)	Share (%)	Rank (2007)
1	Australia	53	13	1
2	Canada	44	11	2
3	Brazil	39	10	3
4	Russia	35	9	7
5	Chile	28	7	4
6	Peru	28	7	6
7	South Africa	22	6	5
8	United States	18	4	8
9	The Philippines	11	3	9
10	Papua New Guinea	8	2	12
		286	68	

Source: Ericsson and Larsson, 2009

Table 2 - Global Spread Index and Internationalisation Index of top 20 mining companies (by turnover)*

	Number of home country operations	Number of foreign operations	Number of countries	II	GSI
Xstrata	0	92	14	100%	100.0
Rio Tinto	30	75	22	71%	34.8
Newmont	2	14	8	88%	21.2
Barrick Gold	8	20	8	71%	12.6
Vale	20	18	13	47%	12.3
AngloGold Ashanti	8	13	9	62%	11.5
Anglo American	40	40	11	50%	11.0
BHP Billiton	27	33	9	55%	9.9
Norilisk Nickel	11	9	5	45%	4.5
De Beers	6	12	3	67%	4.2
Freeport McMoran	7	5	4	42%	3.4
Goldfields	4	5	3	56%	3.4
Teck Cominco	8	8	3	50%	3.0
Antofogusta Minerals	3	3	3	50%	3.0
ARM	11	6	3	35%	2.2
Grupo Mexico	3	2	1	40%	0.8
Impala Platinum	5	2	1	29%	0.6
Harmony Gold	12	3	1	20%	0.5
KGHM Polisk	3	0	0	0%	0.0
Lonmin	3	0	0	0%	0.0

Source: UNCTAD, 2007

* Companies with South African roots are denoted in bold italics

Table 3 - Mapping of Otto (1992) vs OLI framework vs current research factors

Otto (1992) factors influencing mining investment in SEA	Dunnings OLI framework	Factor in current research	Factor number
Geological potential for target mineral	Ownership advantage	Control of value chain	1
Measure of profitability	Ownership advantage	Control of value chain	1
Security of tenure	Location advantages	Security of tenure	2
Ability to repatriate profits	Location advantages	Risks associated with country governance and political stability	3
Consistency of mineral policies	Location advantages	Risks associated with country governance and political stability	3
Company has management control	Internalisation advantages	Restrictions in ownership levels	4
Mineral ownership	Ownership advantage	Restrictions in ownership levels	4
Realistic foreign-exchange regulations	Location advantages	Exchange controls	5
Stability of exploration/mining terms	Location advantages	Risks associated with country governance and political stability	3
Ability to pre-determine tax liability	Location advantages	Level of revenue sharing with host country	6
Ability to pre-determine environmental obligations	Location advantages	Social licence to operate	7
Stability of fiscal regime	Location advantages	Risks associated with country governance and political stability	3
Ability to raise external financing	Location advantages	Risks associated with country governance and political stability	3
Long-term national stability	Location advantages	Risks associated with country governance and political stability	3
Established mineral titles system	Location advantages	Security of tenure	2
Ability to apply geological techniques			
Method and level of tax levies	Location advantages	Level of revenue sharing with host country	6
Import-export policies	Location advantages	Risks associated with country governance and political stability	3
Majority equity ownership held by company	Ownership advantage	Restrictions in ownership levels	4
Right to transfer ownership	Ownership advantage	Restrictions in ownership levels	4
Internal conflicts	Location advantages	Risks associated with country governance and political stability	3
Permitted external accounts	Location advantages	Risks associated with country governance and political stability	3

Table 4 - Results of the distribution-fitting algorithm with respect to the factors influencing the internationalisation of South African mining firms

	Supply Chain	Restricted Ownership	Political Stability	Revenue Sharing	Security of Tenure	Social Activism	Culture	Infrastructure	Exchange Rates
Observed									
Strongly disagree	2	0	0	0	0	0	6	0	1
Disagree	5	2	0	5	1	5	6	1	8
Neither	4	6	2	8	3	3	3	4	2
Agree	5	4	6	3	2	6	1	5	4
Strongly agree	1	5	9	1	11	3	1	7	2
	17	17	17	17	17	17	17	17	17
Solver parameters									
M	-0.291	0.335	0.802	-0.142	1.093	0.092	-1.119	0.600	-0.312
Σ	0.939	0.698	0.513	0.535	1.067	0.762	1.199	0.691	0.896
Expected									
Strongly disagree	1.406	0.048	0.000	0.056	0.100	0.228	5.878	0.013	1.296
Disagree	6.155	2.317	0.144	5.053	1.224	4.020	6.354	1.170	6.373
Neither	4.224	4.674	1.788	7.276	2.024	5.060	2.410	3.460	4.393
Agree	3.023	5.447	6.165	3.871	3.140	4.527	1.382	5.523	3.010
Strongly agree	2.191	4.514	8.903	0.744	10.512	3.165	0.975	6.833	1.928
$\chi 2$ contributions									

	Supply Chain	Restricted Ownership	Political Stability	Revenue Sharing	Security of Tenure	Social Activism	Culture	Infrastructure	Exchange Rates
Strongly disagree	0.251	0.048	0.000	0.056	0.100	0.228	0.003	0.013	0.068
Disagree	0.217	0.043	0.144	0.001	0.041	0.239	0.020	0.025	0.415
Neither	0.012	0.376	0.025	0.072	0.470	0.839	0.144	0.084	1.304
Agree	1.293	0.384	0.004	0.196	0.414	0.479	0.106	0.050	0.326
Strongly agree	0.648	0.052	0.001	0.088	0.023	0.009	0.001	0.004	0.003
9.31810615	2.420	0.905	0.175	0.413	1.048	1.793	0.273	0.175	2.115

Solver thresholds			Standardised thresholds						
τ_1		-1.5943	τ_1	-1.62377					
τ_2		-0.4219	τ_2	-0.51161					
τ_3		0.18303	τ_3	0.06223					
τ_4		0.77146	τ_4	0.62042					

Standardised parameters									
M	**-0.39**	**0.21**	**0.65**	**-0.25**	**0.93**	**-0.02**	**-1.17**	**0.46**	**-0.41**
Σ	**0.89**	**0.66**	**0.49**	**0.51**	**1.01**	**0.72**	**1.14**	**0.66**	**0.85**
t-value	**-1.79**	**1.28**	**5.51**	**-2.00**	**3.77**	**-0.14**	**-4.25**	**2.88**	**-1.97**
p-value	**0.0928**	**0.2190**	**0.0001**	**0.0636**	**0.0019**	**0.8926**	**0.0007**	**0.0115**	**0.0671**
Index	1	2	3	4	5	6	7	8	9
Alpha	**5%**								
Chi-test p-value	**1.0000**								

Figure 1 - Ranking of the factors influencing the internationalisation of South African mining companies