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# Factors influencing the selection of environmental inpact services in South Africa

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WITS BUSINESS SCHOOL
UNIVERSITY OF THE WITWATERSRAND

# FACTORS INFLUENCING THE SELECTION OF ENVIRONMENTAL IMPACT SERVICES IN SOUTH AFRICA

## RESEARCH REPORT

**AINSLEY SIMPSON: 9409334P**

A Research Report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration.

**JULY 2008**

## ABSTRACT

The environmental consulting industry in South Africa is still in a growth phase, and the dominant service offering is that of Environmental Impact Assessments (EIA). Understanding consumer behaviour in the purchase process of environmental services will enable service providers to effectively target and service their desired markets.

This research examined factors influencing the selection of EIA Consultants in South Africa, specifically in the pre-purchase phase. This included determining the nature of the service offering and the related perceptions of risk as well as the information sources consulted and criteria used as risk reducing strategies. The research was conducted by means of a structured written survey, which was completed by 77 respondents across South Africa.

The research revealed that EIA's are experience offerings, that is, they are easy to assess after the service has been rendered. It was also determined that the major factor contributing to the selection process is the multi-faceted nature of the service, as this can lead to negative reputation-based consequences. One such facet of EIA's is the length of time required to complete the process. Temporal risk was found to be the most dominant concern, followed by financial risk, specifically the incurrence of unforeseen costs. It was established that consumers consult personal non-marketer controlled information sources as a method of reducing risk; most notably, consultants known to the developers through previous experience. Reliability, represented largely by tangible criteria, and reputation, comprising less tangible criteria, were found to be the factors underlying the evaluation of environmental consultancies.

The research highlighted the need for EIA Consultants to understand the buying behaviour of their target market to effectively understand and manage perceived risks. Tangible indicators of reliability and reputation that address these risk areas must be a central theme in any direct marketing strategies developed. Furthermore, continuous improvement of processes and systems is essential such that a healthy reputation, based on sound experience, can be developed and maintained well into the future.

**DECLARATION**

I, Ainsley Simpson, declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other University.

Ainsley Simpson
July 2008

## DEDICATION

This Research Report is dedicated to my husband and best friend, Brett; I am so glad we travelled this journey together.

**ACKNOWLEDGEMENTS**

I wish to express my thanks to:

- Dr Geoff Bick for his guidance and encouragement through this research.
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## ABBREVIATIONS

| | |
|---|---|
| **ANOVA** | Analysis of Variance |
| **DEAT** | Department of Environmental Affairs and Tourism |
| **EIA** | Environmental Impact Assessment |
| **EPA** | Environmental Protection Agency |
| **GEDA** | Gauteng Economic Development Agency |
| **GPG** | Gauteng Provincial Government |
| **GDACE** | Gauteng Department of Agriculture, Conservation and Environment |
| **MEC** | Member of the Executive Committee |
| **MnTAP** | Minnesota Technical Assistance Program |
| **NEPAD** | New Partnership for Africa's Development |
| **PFMA** | Public Finance Management Act, 1999 (Act No. 1 of 1999) |
| **SAPDA** | South African Property Developers Association |
| **SAPOA** | South African Property Owners Association |
| **SoODQ** | State of Oregon Department of Environmental Quality |
| **UNEP** | United Nations Environmental Programme |
| **WDNR** | Wisconsin Department of Natural Resources |

# 1 INTRODUCTION

## 1.1 Purpose of the Study

The purpose of the study is to examine factors influencing the selection of Environmental Impact Assessment (EIA) Consultants in South Africa, specifically in the pre-purchase phase.

Theory has been applied to the research problem in order to make recommendations for targeting consumers and focus areas for improving environmental consulting practices.

## 1.2 Context of the Study

At the global scale, there has been a increasing level of awareness regarding environmental matters (Ghobadian, Viney, James & Jonathan, 1995; Case, 1999 and Schultz, 2000). Large international conferences have focused on pressing environmental agendas and contributed to a heightened level of responsiveness about the environment. Such events include the 1992 World Summit on Sustainable Development in Rio de Janeiro and in Johannesburg, South Africa in 2002, the Basel Convention (Switzerland, 1989), and the United Nations Framework Convention on Climate Change held in Kyoto in 1997. Furthermore, the Group of Eight Summit in Northern Japan in July 2008 will specifically include issues regarding global climate change (DEAT, 2008). For Africa, the Environmental Initiative, serves as a response by the New Partnership for Africa's Development (NEPAD), supported by United Nations Environmental Programme (UNEP), to the region's common and shared sustainable development challenges (UNEP, 2003).

Maxwell, Rothenberg, Briscoe & Marcus (1997) confirm that environmental management in the United States has become a legitimate theme in the strategic

and operational planning of manufacturing firms as a result of political, legal, social, cultural, technological and economic pressures. Many firms are modifying their behaviour, not only in response to government pressure, but also because improving environmental performance is perceived to be a business opportunity (Jay, 1990; Langrehr & Tatreau, 1992; Menon & Menon, 1997; Porter & van der Linde, 1995 and Zeffane, Polonsky & Medley, 1994 all cited in Polonsky, Brooks, Henry & Schweizer, 1998). More specifically, managers will have to transform into sustainability leaders to steer their organisations through a future with fewer and more expensive resources, whilst still enhancing performance and adding value to the bottom line (Acutt, 2008).

In South Africa, there have been calls by government for the business sector to realise that their response, or lack thereof, to environmental issues will have a long term effect on their profitability (Gauteng Provincial Government [GPG], 2005a; DEAT, 2007 and GPG, 2007). This sentiment is echoed in the literature (Klassen & McLaughlin, 1996; Ghanbari Parsa & Akhavan Farshchi, 1996; Russo & Fouts, 1997; Foster, Sampson & Steven, 2001 and Wee & Quazi, 2005) and is also extending to the broader public (Ghanbari Parsa & Akhavan Farshchi, 1996). A survey conducted by the European Environmental Commission revealed that one third of the erstwhile United Kingdom regards the environment as one of the most important problems that requires government attention, while over half the European Union (55%) regard protecting the environment and preserving natural resources as essential to economic development (Ghanbari Parsa & Akhavan Farshchi, 1996).

In South Africa, the Constitution, 1996 (Republic of South Africa, Act No. 108 of 1996) provides all citizens with the dual right to live in an environment that is not harmful to their health or well being and to have the environment protected for the benefit of current and future generations. The most enabling legislation, which created a notable shift towards the environment, is the Environmental Impact Assessment regulations of 1997, which were promulgated under the Environment Conservation Act, 1989 (Republic of South Africa, Act No. 73 of 1989). The Act

required that an Environmental Impact Assessment (EIA) be undertaken for certain activities that may have a significant detrimental effect on the environment. More rigorous EIA regulations under the National Environmental Management Act, 1998 (Republic of South Africa, Act No. 108 of 1998) replaced these in 2006. Development in the mining sector has largely been regulated by other legislation over the past decade (Minerals and Petroleum Resource Act, 2002 (Republic of South Africa, Act No.28 of 2002) and prior to that the Minerals Act, 1991 (Republic of South Africa, Act No. 50 of 1991).

Based on an environmental impact assessment, a decision will be made by the relevant provincial government department, or national department in certain circumstances, whether a development may proceed. The regulations also require that the developer, or applicant, appoint an independent consultant to undertake the assessment. Independence, in this instance, refers to a consultant having no financial or other interest in the project, other than complying with the regulations. It is a direct result of this legislation that the environmental consulting industry has flourished in South Africa.

The growth trends experienced by the South African environmental consulting industry are not unique. It was reported that the global environmental and facilities services market grew by 4.3% in 2004, to reach a value of $198.7 billion (Datamonitor, 2005) and by 6.2% in 2007 (IBIS, 2008). Similarly, reports from the US indicate that the sector has high potential (Frost & Sullivan, 2003), while several reports from the UK highlight the sectors' continued expansion (Caldwell & Smallman, 1996; MSI, 2003, ENDS, 2005, ENDS, 2007).

Gauteng is the economic powerhouse of South Africa (GPG, 2005b and GPG, 2007). Ten percent of the Gross Domestic Product for the African continent and a third for South Africa's GDP is generated by Gauteng (Gauteng Economic Development Agency [GEDA], 2004). The growth in the South African economy (5.1% of GDP year-on-year [STATS SA, 2008]), coupled with Gauteng having the highest

population in the country (10.4 million people) (GPG, 2008), serve as major challenges to environmental quality as a constitutional obligation. The relationship between growth and the environmental industry can be seen in the number of EIA applications being submitted to government. Since 1998, there have been approximately 43,000 EIA applications submitted across South Africa (DEAT, 2006). In the financial year ending 2005, Khabisi Mosunkutu, the Gauteng MEC for Agriculture, Conservation and Environment, reported that the Gauteng Department of Agriculture, Conservation and Environment (GDACE) received more than 3000 environmental applications from developers, which represented a doubling in the annual number of EIA applications (GPG, 2005c).

### 1.3 The Problem and Sub-Problems

As the environmental consulting industry is still in a growth phase, and focussed mainly on rendering EIA services. Little information is thus available regarding consumer behaviour in the purchase process of environmental services, specifically EIA services.

The research problem is to examine factors influencing the selection of Environmental Impact Assessment (EIA) Consultants in South Africa, specifically in the pre-purchase phase.

The sub-problems in this study are as follows:

i. What kind of offering is an environmental consulting service, using the tangibility spectrum?
ii. What are the dominant risks associated with environmental consulting?
iii. What are the main reasons for appointing environmental consultants?
iv. What information sources are used in the selection process?
v. What criteria are used in the selection process?

## 1.4 Assumptions

i. The personal perceptions and biases of respondents have no impact on the validity of the study.
ii. The respondents have had sufficient experience with environmental consultants to complete a survey.
iii. The use of a survey has yielded sufficient data to undertake analysis and generate results.

## 1.5 Delimitations

This study focused on developers from all business backgrounds, public and private, but excluded the mining sector owing to the current regulatory framework.

The study may not be wholly applicable to all other environmental management services.

The study does not cumulate in a generic business or marketing strategy but rather recommendations that can be applied by environmental consultants in developing their future strategies.

## 1.6 Significance of the Study

The study is of relevance to the environmental consulting industry, as it provides insight into the behaviour of consumers requiring EIA services in South Africa. It also yields recommendations for targeting clients and focus areas for improving business practices.

This research explored the decision-making process applied by developers when selecting an environmental consultancy. In particular, it identifies the factors

developers consider when selecting consultants, how they determine whether the consultancy has or can provide these and whether they have sufficient information to inform their assessment and decision.

## 1.7 Subsequent Chapters

The following chapters are included in this report:

**Chapter 2:** Literature Review of relevant theory.

**Chapter 3:** Propositions derived from the literature to address the problem underlying the research.

**Chapter 4:** The research methodology, including the design, data collection and analyses undertaken.

**Chapter 5:** The results from the study are presented and analysed in this chapter.

**Chapter 6:** The research concludes with a summary of the findings and recommendations based thereon.

# 2 LITERATURE REVIEW

The literature review encompasses existing theory and information that relates to the various areas of interest associated with the study. These can be expressed as follows:

- The characteristics of services and the related risk dimensions; and
- Consumer behaviour for services, with specific reference to pre-purchase decision-making including:
    - Needs recognition;
    - Source of information used to reduce perceived risk and uncertainty; and
    - Criteria used in the evaluation and selection process.

## 2.1 Environmental Consulting as a Service

When contracting a service, a client typically purchases expertise and experience (Gallouj, 1997). Environmental consultants are professional service providers, which render a service that is largely intellectual in nature. Such service providers are typically known to have a professional qualification and a recognised identity (e.g. lawyer) and the service rendered is often advisory in nature, focused on problem solving and usually commissioned on a project basis (Dawes, Dowling & Patterson, 1993 in Corcoran & McLean, 1998).

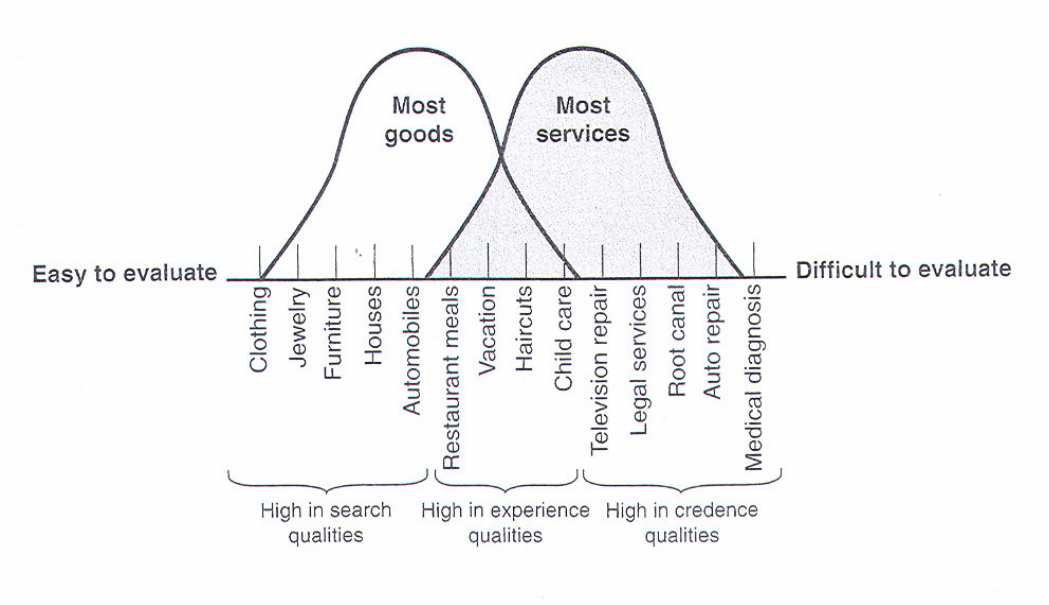
When procuring a service, decision makers are required to examine the nature of a service and acknowledge the importance of the relevant dimensions, if they are to achieve high service quality and profitability (Santos, 2002). The four service characteristics which have implications for consultancies are extensively cited in the literature (Gallouj, 1997; Lovelock, 2001; Kotler, 2003 and Zeithaml, Bitner & Gremler, 2006) and are equally applicable to environmental consulting services:

- Intangibility: the non-material nature of services;
- Inseparability of production and consumption: the direct contact between client and supplier and the implied participation of the client;
- Variability/heterogeneity: the service is dependant on who provides it as well as where and when it is provided, hence quality is highly variable on the service provider; and
- Perishability: services can not be stored, and when demand is high, it may not be possible to render consistent services.

### 2.1.1 Credence Offerings

The tangibility spectrum was developed by Shostack (1977) on the basis that very few products are totally intangible or purely tangible (Santos, 2002) (Figure 1).

**Figure 1: The Tangibility Spectrum.**




***Source: Zeithaml* et al*, 2006.***

Within this context, it is argued that search offerings, or services which have high search qualities, have tangible attributes that a client can touch, see and/or taste thus, these offerings are easy to evaluate prior to purchasing (Eklund, Mixon & Ressler, 1995; Zeithaml, 1981, Darby & Karni, 1973 in Gallouj, 1997; Lovelock, 2001; Kotler, 2003 and Zeithaml *et al*, 2006). However, the quality of some services/products can only be determined after the purchase of a service. These services are deemed to be experience offerings (Zeithaml 1981 in Gallouj, 1997; Eklund, Mixon & Ressler, 1995; Darby & Karni, 1973 in Gallouj, 1997; Lovelock, 2001; Kotler, 2003 and Zeithaml *et al*, 2006). Lastly, credence offerings are those where the client finds it difficult to evaluate the service even after it has been purchased and rendered. This situation arises because the client is forced to trust that the benefits have been delivered, even though it may be difficult to document them and/or the client does not have sufficient technical knowledge to assess whether the services have been suitably performed (Zeithaml, 1981 and Darby & Karni, 1973 in Eklund *et al*, 1995; Lovelock, 2001; Kotler, 2003 and Zeithaml *et al*, 2006). Gallouj (1997:47) describes this eventuality as a moral hazard, which refers to two possible situations:

1) *The client cannot observe the actions of the service provider. The latter can, if the need arises, claim that the (unsatisfactory) results obtained were due, not to poor performance on his or her part, or lack of involvement in the task that was assigned to him, but to contingent events that were out of his or her control. This can refer specifically to the intensity of work supplied by the service provider.*
2) *The client is able to observe the actions of the service provider, but lacks the ability to know whether the action is appropriate, since he is unable to observe the circumstances in which the action takes place. This situation is characteristic of services where expertise and advice are supplied.*

When considering the procurement of credence offerings, clients are most often faced with strong asymmetry of information, where the service provider has more

information and knowledge of the problem than a client does (Gallouj, 1997). It is noted by Gallouj (1997), that in some instances, certain services may fall within the 'experience offering' category, particularly following repeat purchases. However, purchasing a consulting service is most often a 'new buy', and it is therefore impossible to be completely confident in purchases, even if past experiences have been positive (Mitchell, 1994).

Proposition 1: Developers view environmental consultancy as a credence offering on the tangibility spectrum.

### 2.1.2 Intangibility

Intangibility is one of the fundamental characteristics of a service (Lovelock, 2001, Wolak, Kalafatis and Harris, 1998, Cowell, 1984 in Santos, 2002 ; Kotler, 2003 and Zeithaml *et al* 2006), the importance of which differs among the various service industries (Santos, 2002). 'Intellectual intangibility' is identified as the main problem a decision-maker faces in purchasing a consulting service, owing to the difficulty judging what is being offered (Lundsford & Fussell, 1993 in Corcoran & McLean, 1998). The difficulty in defining the outputs of services, and consultancy particularly, are compounded as the effects of consultancy services are not always immediately observable and therefore, measurable (Gallouj, 1997 and Corcoran & McLean, 1998).

For these reasons, it has been documented that in the case of consultancy services, the selection of a consultancy is complex and considered to be difficult (Gallouj, 1997 and Corcoran & McLean, 1998).

The level of selection complexity escalates as various challenges are involved; the consultancy cannot be realistically tested prior to the purchase and the buyer

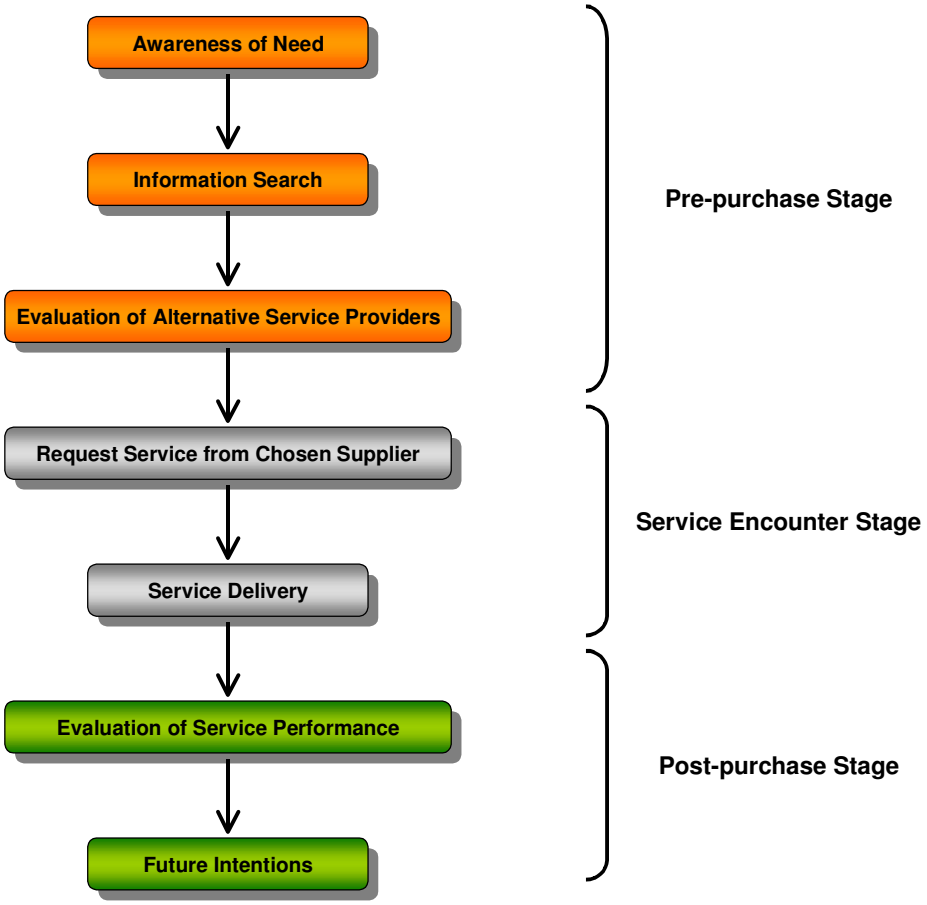
typically has limited experience with purchasing such a service (Corcoran & McLean, 1998). The multi-faceted nature of a service as well as the potential impact of the service itself (e.g. affect on a business including its reputation), are further challenges that affect purchasing confidence. Previous research into management consultancy services found that the combination of these factors make the purchase of services appear risky (Lovelock & Yip, 1996 and Lundsford & Fussell, 1993 in Corcoran & McLean, 1998). A challenge with specific relevance to the environmental industry is the risk of the government involvement in the process. The provincial or national government is the authority mandated to grant approval on an EIA application for development. Hence, the reliance on the environmental consultancy to satisfy the authorities is seminal in the purchase of these services.

Proposition 2: Developers perceive the selection of a consultancy to be risky because of the intangible nature of environmental consulting services.

## 2.2 Customer Behaviour Model for Services

An important area of consumer behaviour relevant to this research is how developers make decisions and the sequence of events that precede a purchase decision. The purchase process for services is defined as having three stages; pre-purchase, service encounter and post-purchase (Lovelock, 2001) (Figure 2). The decision to buy and use a service is made in the pre-purchase stage (Lovelock, 2001:124).

**Figure 2: The Purchase Process: Client Activities in Selecting, Using and Evaluating Service.**




*Source: Lovelock, 2001.*

### 2.2.1 Risk associated with Services

Consumer behaviour involves risk as any action will produce consequences that cannot be anticipated with certainty, and some of those, at least, are likely to be unpleasant (Stone & Grønhaug, 1993 and Sweeney, Soutar & Johnson, 1999 in Snoj, Korda and Mumel, 2004). Thus, clients are sensitive to the probability and extent of potential loss associated with a service (Taylor, 1974 in Macintosh, 2002)

and are motivated to reduce risk in the pre-purchase phase through more extensive search activities (Cox, 1967 and Beatty & Smith, 1987 cited in Macintosh, 2002 and Lovelock, 2001).

With specific reference to professional services, it has been widely cited that selection and use of service providers involves high levels of perceived risk, owing to the importance of professional services, the high time and financial costs involved, their intangibility and credence qualities, the limited number of objective evaluative criteria and the generally low purchase experience (Ewing, Caruana & Loy, 1999 and Baker & Faulkner, 1992; Hill & Neeley, 1988; Mitchell, 1994; Stock & Zinszer, 1987 and Wheiler, 1987 cited in Mitchell, 1998; McColl-Kennedy & Fetter, 1999 and Laroche, Bergeron & Goutaland, 2003).

Perceived risk is an important factor that strongly influences consumer behaviour (Laroche *et al,* 2003). In order to understand perceived risk, a multi-dimensional concept was suggested by Jacoby & Kaplan (1972) and was later refined by Murph & Enis (1986) for five different types of risk (Snoj *et al,* 2004). Time, a sixth risk, was later added to this list by Mumel (1999) (Snoj *et al,* 2004). It has been found that these six risk dimensions vary according to the purchase situation confronted as well as across purchasers and products (Stone & Grønhaug, 1993). The six risk dimensions are as follows:

- Performance/Functional risk - the risk that the product/service will not serve it's intended purpose;
- Financial risk - the risk of losing money and incurring unexpected costs (Ewing *et al*, 1999);
- Temporal risk - the risk of wasting time and incurring consequences;
- Social risk- how business colleagues may think and react (Ewing *et al*, 1999);
- Psychological risk - the risk of choosing the wrong product/service which may affect a clients ego (Ewing *et al*, 1999); and

- Physical risk - a risk that may cause personal injury to the client or others while using/consuming the product/service, including damage to possessions.

Mitchell (1998) and Mitra, Reiss & Capella (1999) state that, in general, it would appear that time, financial and psycho-social risks have face validity in most professional service context. Moreover, in the study conducted by Mitra *et al* (1999) on the constructs of perceive risk, information search and purchase intentions in the context of the services industry, performance risk was found to be of importance.

Proposition 3: Developers are most concerned about financial, psycho-social and temporal risk when considering the procurement of environmental consulting services.

Mitchell (1998) and Mactinosh (2002) suggest that there are possibilities for segmentation on the basis of level and type of risk perception, which may ultimately influence marketing strategies and relationship management.

### 2.2.2 Needs Recognition

The buying process is initiated by an evoked problem (Grønhaug & Venkatesh, 1991). Once recognised, the problem or need can be resolved or met through the procurement of a product or service (Kotler, 2003). Responding to environmental challenges has always been a costly and complicated proposition for managers (Wally & Whitehead, 1994:46). It has been stated that three motives are cited for an organisation addressing environmental challenges (Caldwell & Smallman, 1996):

- Legislative requirements;
- Cost or competitive advantages; and
- Ethical or moral considerations.

It has been noted that although some firms have been proactive in becoming more environmentally responsible, there are still many firms who have been motivated to act solely because of external governmental pressure or legislative requirements (Polonsky, Brooks, Henry & Schweizer, 1998). Furthermore, Grønhaug & Venkatesh (1991) confirmed, in their paper on needs and need recognition in organisational buying, that regulatory agents and laws requiring organisational output can influence buying behaviour.

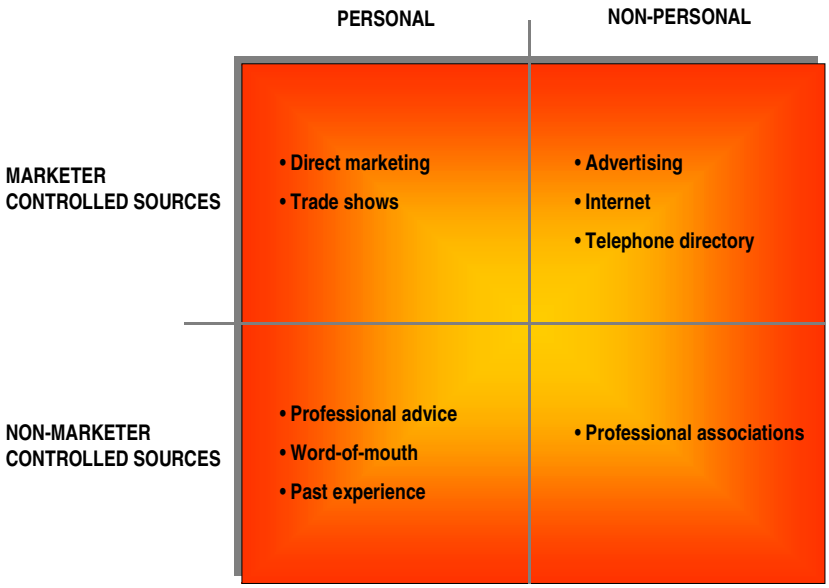
Proposition 4: The primary reason for procuring environmental consulting services is regulatory compliance.

### 2.2.3 Information Sources

Search is an effective means of reducing uncertainty and perceived risk (McColl-Kennedy & Fetter, 1999). There are several sources of information that can be utilised when embarking on a search for a service provider. Sources can be categorised using two dimensions; personal versus non-personal and marketer-dominated versus non-marketer dominated (Assael, 1995) [Figure 3].

Information sources, which can be used in the selection of service providers, were extracted from Bordeleau (1986), as cited in Gallouj (1997), and categorised using the model described by Assael (1995). This list has been integrated with supportive literature on the selection of environmental consultants specifically (see citations).

**Figure 3: Sources of Information**




*Source: Adapted from Assael (1995).*

Personal Marketer-Dominated

- Consider consultants that have made direct approaches to the organisation; and
- Participate in specialised conferences, seminars or meetings in order to be aware of the resources that are available.

Personal Non-Marketer Dominated

- Contact professional colleagues for suggestions (word-of-mouth);
- Seek advice from similar organisations in the industry that have previously utilised the services of consultants (Case, 1999; Minnesota Technical Assistance Program [MnTAP], 2002; Environmental Protection Agency [EPA], 2003; Challener, 2005 and Wisconsin Department of Natural Resources [WDNR], 2005);

- Consult particular groups who are well informed about the available resources, universities, councils, chambers of commerce, etc.; and
- Consult the list of consultants that have already rendered services to the organisation.

Non-personal Marketer-Dominated

- Consider the listings in the telephone directory/yellow pages (MnTAP, 2002; EPA, 2003; Challener, 2005 and WDNR, 2005);
- Utilise the internet in the search process (Case, 1999).
- Examine the advertisements placed by consultants in specialised journals and magazines (Case, 1999); and
- Consider the authors of specialised articles that have appeared in recognised journals or magazines.

Non-personal Non-Marketer-Dominated

- Consult the membership lists of various professional associations (MnTAP, 2002).

It is understood that information gleaned from personal sources is the most effective (Kotler, 2003). More specifically, clients seek and rely heavily on personal sources when purchasing services (Gustafson & Di Marco, 1973 in Gallouj, 1997 and Zeithaml *et al*, 2006) both internal and external to the decision-making organisation (Stock & Zinszer, 1987 in Corcoran & McLean, 1998). Previous research focusing on the selection of management consultants supports this view (Dawes *et al*, 1993 in Corcoran & McLean, 1998). Personal contact with the service provider, a marketer controller approach, is also cited as an important information source (Stock & Zinszer, 1987 in Corcoran & McLean, 1998).

Also of importance is prior working experience with the service provider (Gustafson & Di Marco, 1973 in Gallouj, 1997). Mass media and comprehensive non-personal information cannot communicate information regarding experiences and in general, is not readily available for services. Thus, there is a strong tendency, which favours personal non-marketer controlled sources (Zeithaml *et al*, 2006).

Proposition 5: Developers rely on personal non-marketer controlled information sources when investigating environmental consultancies.

In services marketing literature, it has been noted that the demand for information about increases as the price of the service/products increases (Laband, 1991 in Eklund *et al,* 1995) as well as in instances where price is negatively related to purchase frequency, as with some experience and credence offerings (Eklund *et al,* 1995).

### 2.2.4 Criteria used in the Decision-Making Process

Criteria are essential in signalling quality in instances where it is impossible for a client to obtain exhaustive information on the characteristics of a consultant (Gallouj, 1997). In the pre-purchase phase, these criteria are used to inform the decision-making process.

Numerous authors have highlighted the importance of reputation as a criterion in the purchase of services (CRCI-ERMES, 1989; Dawes *et al,* 1992 and Redman & Allen, 1992 all cited in Gallouj, 1997; Haynes & Rothe, 1974; Parasuraman & Zeithaml, 1983; and Stock & Zinszer, 1987 in Corcoran & McLean, 1998 and Ewing *et al*, 1999). Reputation also acts as an implicit contract, and from a service providers perspective, is a basis for attracting new clients (Gallouj, 1997), through potentially

reducing perceived risk (Ewing *et al*, 1999). However, Ewing *et al* (1999:125) note that smaller firms and opportunists, are likely to use less reputable consultants, if they faced budget constraints because such professionals were deemed to charge lower fees.

Following on from reputation, the past experience of the service provider is the next most important criterion (Stock & Zinszer, 1987 and Moore & Schlegelmilch, 1994 in Corcoran & McLean, 1998; Cooper, 1978; Coxe, 1980; Hebson, 1989; Yoon, Guffey & Kijewski, 1993 and Shenson & Nicholas, 1997 in Ewing *et al*, 1999). Numerous authors have coupled experience with technical competence in the process of selecting a service provider (Bordeleau, 1986; SVP Etudes, 1991; Dawes *et al*, 1992 and Day & Barksdale, 1992 in Gallouj, 1997). It has been found that in the absence of sufficient knowledge of the competencies of competing service providers, it is probable that the client may not choose the most appropriate service provider (De Bandt, 1995 cited in Gallouj, 1997).

Professional affiliations have also been cited as pertinent criteria in the choice of a service provider (Gustafson & Di Marco, 1973 and Redman & Allen, 1992 in Gallouj, 1997). This notion is supported by Eklund *et al* (1995), who made specific reference to licensing or certification, where offerings exhibit credence characteristics, especially for those products/services that are high in price. Hence, certification**,** a voluntary process whereby a professional organisation measures the competences of its members, is a signal frequently used by service providers (Gallouj, 1997).

Other signals or attributes of service quality that have been cited in the literature include (Gallouj, 1997):

- Formal qualifications;
- Publication and participation at conferences;
- Advertising;
- Direct communication;

- Location within a prestige area (e.g. in a CBD);
- Price; and
- References.

Bundles of attributes together represent a certain level of service quality, which provide utility to a client (Caruana, Money & Berthon, 2000 and Snoj *et al*, 2004). Consultancies are assessed and selection decisions are made by the assessing the potential value different combinations of criteria/attributes will yield.

Globally, there are many different sets of guidelines regarding the types of attributes that should be included in a search exercise conducted for environmental consulting services. These have been collated and tabulated (Table 1).

**Table 1: A summary of criteria/attributes that can be used when selecting an Environmental Consultant.**

| Criterion | Supportive Literature |
|---|---|
| **Professional and ethical reputation** | Case (1999), ENDS (2001) and Challener (2005). |
| **Extent of working experience (# years, # clients)** | SoODEQ (2001) and WDNR (2005) |
| **Knowledge and understanding of applicable legislation** | State of Oregon Department of Environmental Quality [SoO DEQ] (2001), Minnesota Technical Assistance Program [MnTAP] (2002), EPA (2003), Challener (2005) an WDNR (2005). |
| **Organisational structure and size (sufficient resources)** | Case (1999), ENDS (2001) and Business link (2006). |
| **Location** | ENDS (2001), ENDS (2003) and Challener (2005). |
| **Direct experience with projects similar in scope and nature (sector specific experience)** | Case (1999), ENDS (2001), SoODEQ (2001), MnTAP (2002), ENDS (2003), EPA (2003), Challener (2004), WDNR (2005) and Business link (2006). |

| | |
|---|---|
| **Project management ability (e.g. regular updates, managing subcontractors)** | ENDS (2001), Business link (2006) and WDNR (2005). |
| **Experience and good relationships with relevant authorities** | SoODEQ (2001), Challener (2005) and WDNR (2005). |
| **Extent of subcontracting and related commissions** | MnTAP (2002) and Business link (2006). |
| **Staff turnover** | SoODEQ (2001) and Business link (2006). |
| **Necessary expertise/skill** | ENDS (2001), MnTAP (2002), ENDS (2003), Challener (2005) and Business Link (2006). |
| **Professional qualifications** | SoODEQ (2001), MnTAP (2002), EPA (2003), Challener (2005), WDNR (2005) and Business Link (2006). |
| **References from previous clients** | Case (1999), ENDS (2001), MnTAP (2002), WDNR (2005) and Business Link (2006). |
| **Registration with Professional Bodies** | ENDS (2001), MnTAP (2002), ENDS (2003), EPA (2003), Challener (2005) and WDNR (2005). |
| **Professional indemnity insurance** | Case (1999), MnTAP (2002), EPA (2003), ENDS (2003), Challener (2005), WDNR (2005) and Business Link (2006). |
| **Quality Management System (ISO 9001) and/or Environmental Management System (ISO 14001)** | ENDS (2003), Challener (2005) and Business link (2006). |
| **Excellent communication skills (verbal and written)** | Case (1999), SoODEQ (2001), ENDS (2001) and Challener (2005). |
| **Potential conflict of interest** | SoODEQ (2001) and Challener (2005). |

From the theory and these sources, the following proposition is derived:

Proposition 6: Reputation and previous experience are the most dominant criteria used by developers when selecting environmental consultants.

## 3 PROPOSITIONS

Based on the literature review, the propositions to be investigated are summarised as follows:

Proposition 1: Developers view environmental consultancy as a credence offering on the tangibility spectrum.

Proposition 2: Developers perceive the selection of a consultancy to be risky because of the intangible nature of environmental consulting services.

Proposition 3: Developers are most concerned about financial, psycho-social and temporal risk when considering the procurement of environmental consulting services.

Proposition 4: The primary reason for procuring environmental consulting services is regulatory compliance.

Proposition 5: Developers rely on personal non-marketer controlled information sources when investigating environmental consultancies.

Proposition 6: Reputation and previous experience are the most dominant criteria used by developers when selecting environmental consultants.

# 4 RESEARCH METHODOLOGY

## 4.1 Introduction

In order to assess the consumer behaviour in the EIA market, exploratory research was conducted. This approach was adopted owing to the lack of extensive existing information regarding these services specifically. This research was conducted over the period 2006 to 2008.

The study method was quantitative with data collected by means of a survey developed as the measuring instrument. Data collected were analysed to determine the behaviours that underlie the responses relating to the selection process. These results were then used to validate the propositions ensuing from the literature review. Further analysis was facilitated through the application of various statistical methods.

## 4.2 Research Population

The research population included developers in South Africa that have or may undertake EIA applications. The sample was further categorised, as appropriate, based on business background, the prominent type of development undertaken and total cost of development.

## 4.3 Sample Size and Selection

Developers known to the author were contacted directly through the use of an existing database. The South African Property Owners Association (SAPOA) and the South African Property Developers Association (SAPDA) were also requested to distribute the questionnaire. A sample of 77 respondents was obtained.

## 4.4 Sampling Methodology

Convenience sampling occurred with public and private sector developers being requested to complete the survey and forward it onto colleagues who also wished to participate. Each respondent indicated their desire to receive a summarised version of the findings of the research and all respondents were thanked for their participation.

This sample was selected as they were all likely to have had exposure to the process of selecting environmental consultants and their experiences should be readily recollected.

## 4.5 Data Collection

### 4.5.1 Overview

The data collection method used was communicative, comprising a structured written survey. Thus, the data generated is primary data. The response period was ten working days, in the last quarter of 2007.

### 4.5.2 Measuring Instrument

The measuring instrument was a survey developed in English comprising nine questions in the following sections (Appendix A):

- Section 1: Respondent Information
- Section 2: Evaluating Environmental Consulting Services
- Section 3: Perception of Environmental Consulting Services
- Section 4: Consideration of Risk
- Section 5: Motivation

- Section 6: Sources of Information
- Section 7: Selection Criteria

Each question/statement represented a construct, which was derived from the literature review, the objective being to test the propositions presented in Chapter 3.

#### 4.5.3 Administration

The survey was administered in electronic format through electronic mail. Responses were received via facsimile, by hand and returned through email. Respondents indicated that the survey took no longer than ten minutes to complete.

### 4.6 Reliability and Validity

The validity of an instrument refers to how well it measures what is under investigation, while reliability is concerned with the accuracy and consistency of the instrument.

#### 4.6.1 Internal Validity

The content validity ensures that a research problem is adequately addressed through the use of a measuring instrument. To achieve this, the survey used was informed by a literature review, which considered international research on the selection of services providers as well as environmental consultants.

Construct validity was sought through the use of a pilot test (refer to 4.7). Pilot respondents were requested to justify their choices and elaborate on their understanding of each construct. The length of time taken to complete the survey was also monitored to reduce the likelihood of respondent fatigue. Subsequent to the

pilot test, ambiguities were addressed to make the questionnaire clearer and more understandable.

### 4.6.2 External Validity

External validity is concerned with the ability of the research to be generalised across persons, settings and times. This would require the use of a random and representative sample. This study used a convenience sampling approach. There is however, no reason to suggest that the sample is not representative of the developer community in South Africa.

### 4.6.3 Reliability

As far as possible, ambiguities and jargon were avoided through the application of a pilot study (refer to 4.7). The researcher administered all surveys and any queries received were addressed in writing. Hence, equivalence was addressed and any confusion resulting from instructions, format or language was clarified immediately and consistently.

## 4.7 Pilot Test

The survey used was developed specifically for this research, and thus had not been used in the past or tested for validity and reliability. The survey was tested on a sample of five developers from the existing database available to the researcher. These participants were specifically excluded from the sample selected for the actual research.

The purpose of the pilot test was to eliminate any ambiguities from confusing statements or instructions, and to establish whether the format and language used is

clear, understandable and concise. Changes made to the draft questionnaire included additional instruction for the completion of sections 6 and 7 and an explanatory example for question 7. Cost intervals for question 1.3 were also increased.

## 4.8 Data Analysis

The results from the survey were collated in an Excel spreadsheet by the researcher. Care was taken in ensuring that that all the data was captured correctly. Random spot checks were taken on the surveys captured. A variety of statistical methods, both descriptive and inferential, were applied to the data obtained for each section of the survey. When determining significance, the 95% confidence interval was applied throughout this research, as this limit is deemed appropriate for exploratory research.

### 4.8.1 Section1: Respondent Information

The demographic information was assessed using descriptive statistics, i.e., frequency counts, medians and dispersion as ranges.

### 4.8.2 Sections 2, 3 and 4: Service Characteristics and Risk Dimensions

When researching marketing and behavioural sciences, perception is often measured by means of a questionnaire employing an ordinal verbal scale, such as a Likert scale (Stacey, 2005). This was the approach adopted for sections 2, 3 and 4. These sections were concerned with evaluating environmental consulting services, perceptions of environmental consulting services and the consideration of risk, respectively.

In order to evaluate the data statistically with improved reliability and validity, rescaling of the data from ordinal to interval scale was undertaken using a Normal Distribution Fitting Algorithm (Stacey, 2005). This included the calculation of item means and standard deviations.

Using a t-distribution for a single population mean, data were transformed into a standardised measure from which probabilities were then calculated.

A one-way ANOVA was used to test difference between the population means of the business sectors. Similarly, a two-tailed t-test was used for assessing variance within the total cost of development categories.

### 4.8.3 Section 5: Motivation

The data gleaned from section 5 regarding the mains reasons for appointing EIA consultants is qualitative and nominal in nature. The extent of statistical method that can be applied is thus limited. Notwithstanding, frequency counts were used to interpret the results.

### 4.8.4 Sections 6: Sources of Information

Section 6 of the survey was concerned with the sources consulted when selecting an EIA consultant. This data was assessed using parametric methods. Parametric statistical testing, to is underlain by the assumption that input data is interval in nature.

Data analysis aimed at interpreting the rank order data, which is a response type widely used in marketing research (Stacey, 2006). To estimate underlying parameters of survey items that were partially rank ordered by respondents, the population item means and standard deviations of the ordinal data were estimated

using a computationally intensive approach; the Shotgun Stochastic Parameter Estimation Algorithm described by Stacey (2006).

Following the analysis of the rank ordered data, single population t-tests were applied as well as a two-sample t-test for testing the difference between two population means for the total cost of development categories. Again, a one-way ANOVA was used for determining the variation between the population means of the business background sectors.

### 4.8.5 Sections 7: Criteria used in Decision-Making

The analysis of the constant sum rankings was done using factor analysis. Factor Analysis is used to identify dimensions or factors that explain the correlations among a set of variables (Malhotra, 1996), in this instance, selection criteria.

Common factor analysis was the approach applied in order to examine the dimensions underlying the pre-purchase behaviour of developers when selecting environmental consultants. These dimensions were then compared with the selection criteria that were identified through the literature review, to determine whether the proposition should be accepted or rejected. Several procedures are suggested for determining the number of factors. Three methods were utilised, accordingly to Malhotra (1996):

- Eigen values – only factors with Eigen values great than 1.0 are retained, the other factors are hence, not included in the model;
- A scree plot, both before and after varimax rotation[1] – a plot of the Eigen values against the number of factors in order of extraction. The shape of the

[1] An orthogonal method of rotation that minimises the number of variables with high loadings on a factor, thereby enhancing the interpretability of the factors (Malhorta, 1996).

plot is used, where the break in the steepness of the slope represents the numbers of factor; and

- Percentage of variance – the cumulative percentage of variance extracted by the factors; where at least 60% of the variance is accounted for by the factors extracted.

## 4.9 Statistical Terminology

The following key is useful for the explanations that follow in section 5, regarding statistical analyses:

| | |
|---|---|
| $\mu$: | Represents the average. |
| $\sigma$: | Represents the standard deviation, which is a measure of variability (the square root of the variance). |
| p-value | Represents the observed level of significance. The confidence interval selected was 95%, which is appropriate for exploratory research. |
| z-value | The test statistic for a normal distribution. The z-value indicates the number of standard errors by which a sample mean differs from a population mean, and is used to determine the P-value and significance of the findings. |
| t-value | The test statistic for a t-distribution (one and two-tailed). The t-value indicates the number of standard errors by which a sample mean differs from a population mean, and is used to determine the P-value and significance of the findings. |
| F-Ratio | The test statistic for one-way ANOVA test of equal means. |

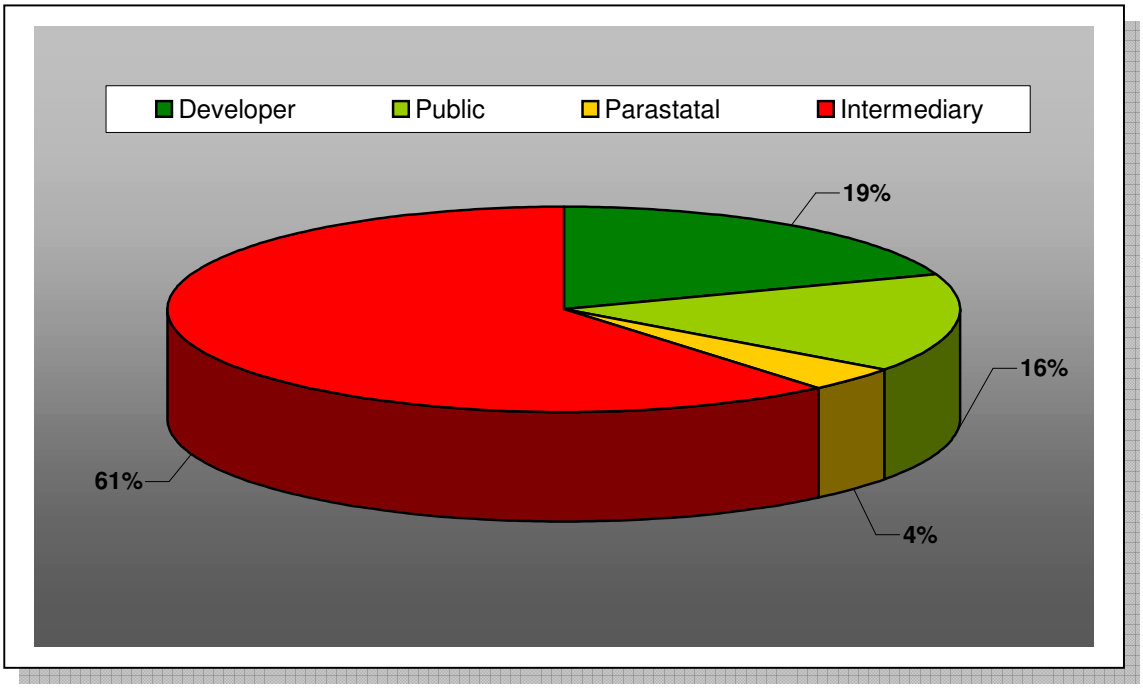
# 5 PRESENTATION AND ANALYSIS OF RESULTS

## 5.1 Demographic Results

### 5.1.1 Business Background

The business background of the majority of respondents (61%, and representing the mode) was that of an Intermediary (Figure 4). That is, these respondents are not ultimately responsible for a development but make the appointment of environmental consultants on behalf of developers, e.g. Engineers, Town Planners and Project Managers. Developers (19%) and the Public Sector (16%,) followed as the next most represented, with respondents from Parastatal backgrounds comprising 4% of the sample (Figure 4). All further analysis focussed on the three dominant background sectors; Developers, Public Sector and Intermediaries.

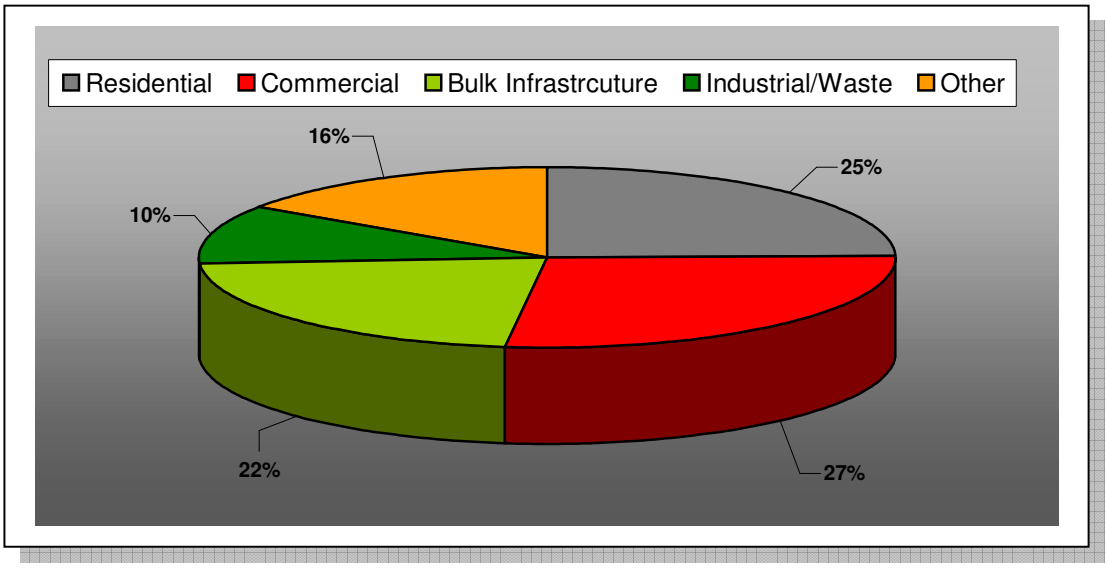
**Figure 4: Composition of the study sample based on business background.**



### 5.1.2 Predominant Type of Development

Commercial development was the most frequently cited form of development undertaken (27%) with residential (%25) and bulk infrastructure (22%) following as the next most represented development types (Figure 5). Bulk Infrastructure represented the mode. Industrial/Waste related development was the least represented form of development within the sample (Figure 5). Types of development listed in the 'Other' category, comprising 16% of the sample, were *inter alia* energy and airport-related development.

**Figure 5: Composition of the study sample based on the predominant type of development undertaken.**



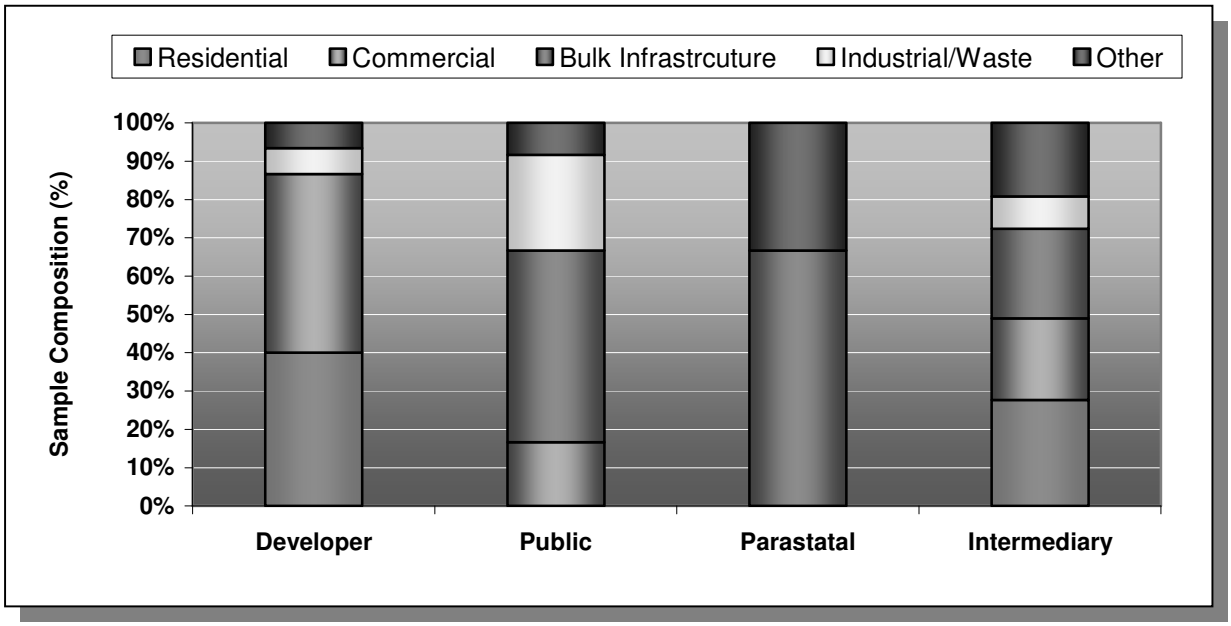

The types of development undertaken within each of the categories of business background varied. Developers are rarely accountable for the installation of bulk service, hence it follows that this was not listed as a form of development undertaken by this sector (Figure 6). The developer respondents are primarily engaged with residential and commercial development, with commercial development being the mode.

The Public Sector did not cite residential development as an area for which they are accountable. This is understandable as the Department of Housing, did not participate in the study and this is the area for which they are mandated. The provision of bulk infrastructure, or basic service provision, is a key area priority throughout South Africa. In Gauteng alone, 51% of the 2008/9 budget will be invested in infrastructure projects (GEDA, 2008) and was the mode, being cited as the most frequent form of development (Figure 6).

In the Parastatal category, bulk infrastructure was the mode, and represented 67% of the development undertaken by this sector of the sample. The 'other' category comprised the remaining 33% of the development types (Figure 6).

Intermediaries are involved in all types of development, with residential being the mode and comprising (28%) of the sample, followed by bulk infrastructure (23%) and commercial (21%) (Figure 6).

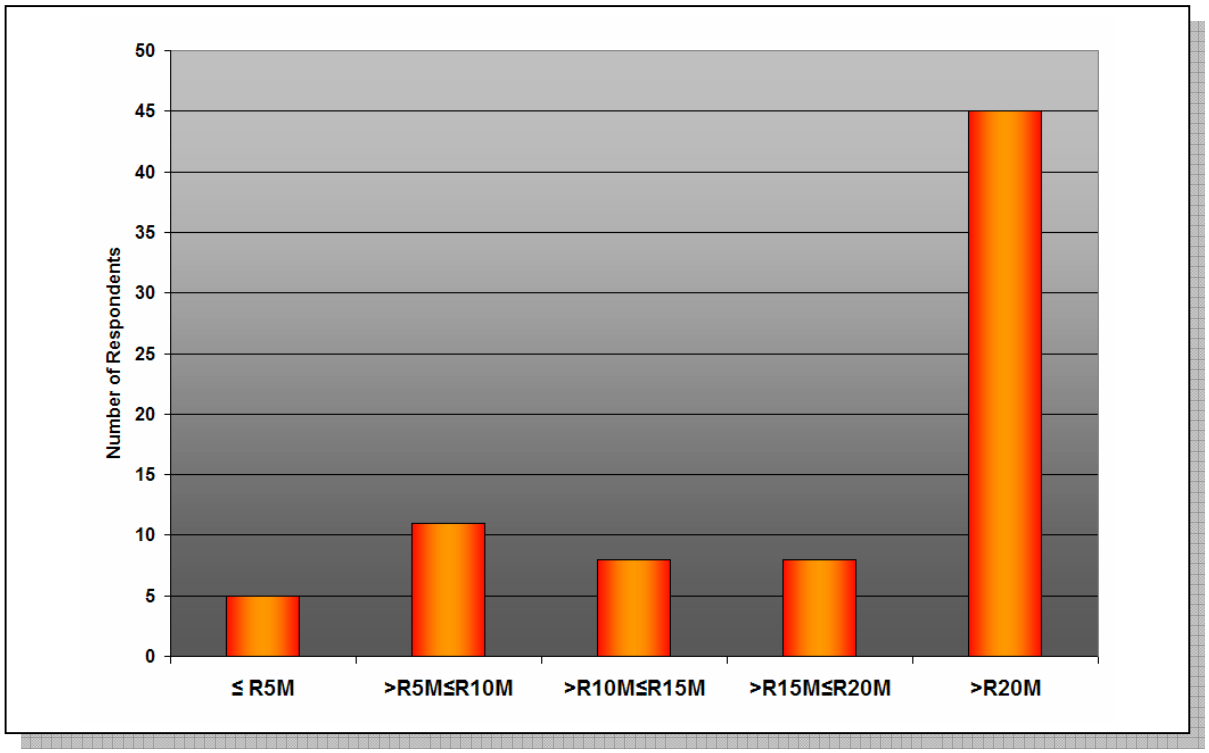
**Figure 6: Composition of the study sample based on the predominant Type of Development undertaken by each category of Business Background.**



### 5.1.3 Total Cost of Development

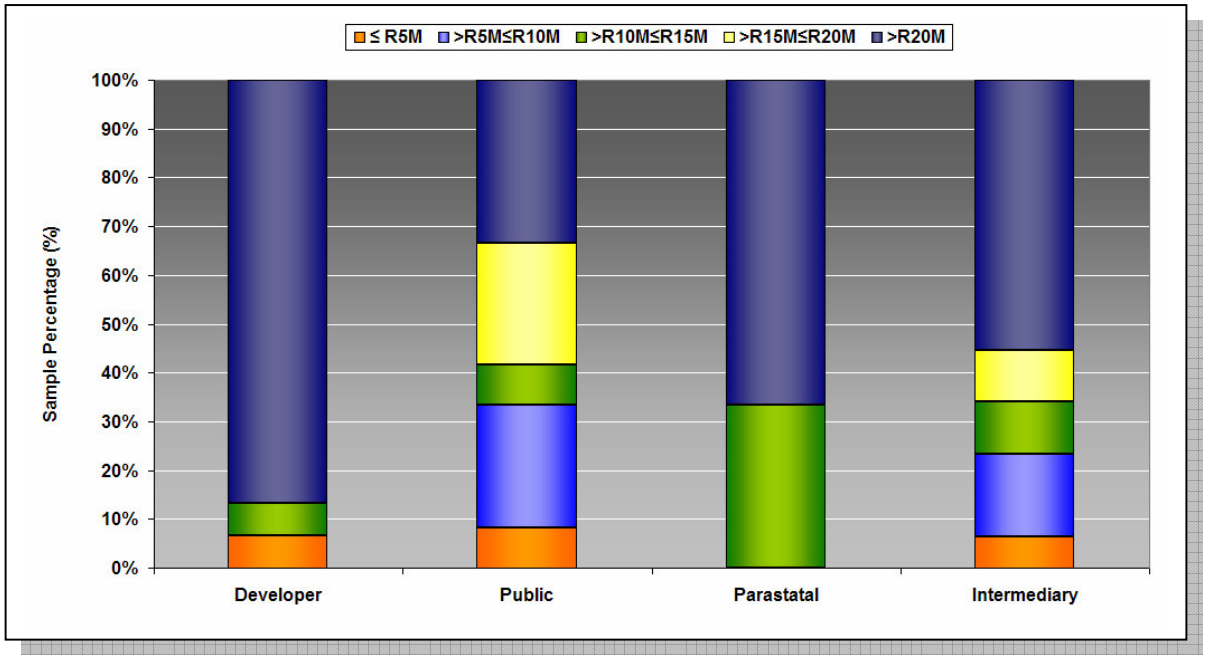
The mode and median for the total cost of development was 5, representing the class >R20 million (Figure 7). This outcome was also obtained when the responses within the business background categories were considered (Figure 8).

**Figure 7: Composition of the study sample based on the cost of the development undertaken.**




Based on these findings, all further analyses using cost as a determining factor was considered in two cost categories; cost ≤R20 million and cost >R20 million. In reviewing the data based on this categorisation, the Public Sector then varied from the trend previously described with the median and mode then falling within the 'below R20 million category' (Figure 8).

**Figure 8: Composition of the study sample based on the cost of development undertaken by each category of business background.**



## 5.2 Proposition-Related Results

### 5.2.1 Nature of EIA Services

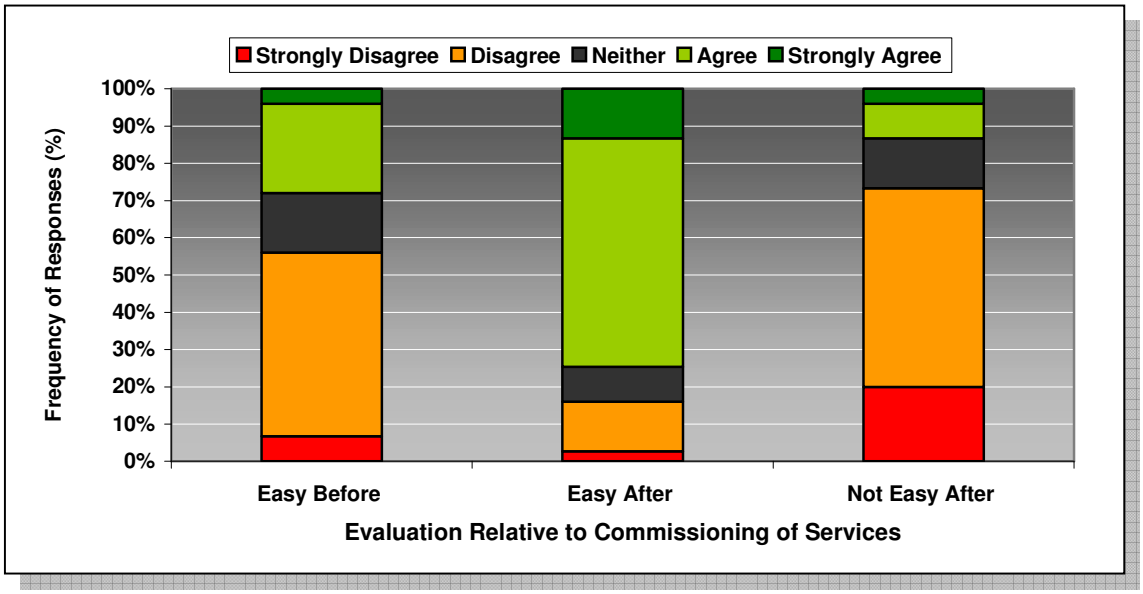
The first proposition being tested is that developers view environmental consultancy services as a credence offering on the tangibility spectrum.

Credence offerings are those where the client finds it difficult to evaluate the service, even after it has been purchased and rendered (Lovelock, 2001). Respondents were requested to indicate their perception of the ease with which consultancy services can be evaluated before and after commissioning.

From the sample, 56% of respondents indicated that EIA services were not easy to evaluate before commissioning, either strongly disagreed 7% or through disagreement 49% (Figure 9). However, 75% of respondents expressed that services were easy to evaluate after commissioning (13% agreed strongly, and 68% agreed with the sentiment) (Figure 9). These sentiments were echoed again when testing if respondents found it difficult to evaluate the quality of EIA services after receiving the services of an environmental consultant; 73% disagreeing with this statement (20% accounting for strong disagreement) (Figure 9).

The results from the t-tests revealed that when testing whether EIA consulting services are a search offering, the responses are significantly below the average indicating disagreement with the statement that evaluation is easy before services are commissioned (Table 2). Hence, EIA consulting services do not appear to have tangible characteristics that can be tested prior to commissioning and are thus, not considered to be offerings high in search qualities.

**Figure 9: Distribution of responses relating to the ability to assess the quality of EIA Services.**




Respondents indicated their significant agreement with the statement that the evaluation of EIA consulting services is easy after commissioning (μ= -0.47, P=0.00), demonstrating that these services are located on the right-hand side of the tangibility spectrum, and can be considered to be experience offerings (Table 2). Furthermore, respondents significantly disagreed with the statement that the evaluation of EIA consulting services is not easy after commissioning (μ= -0.79, P=0.00), that is; it is easy for clients to evaluate the service after purchase or commissioning (Table 2). Thus, the respondents in the sample do not view environmental consulting as a credence offering on the tangibility scale. However, Gallouj (1997) indicates that in some instances, certain services may fall within the experience offering category, particularly following repeat purchases. Approximately 60% of the sample was familiar with the selection and appointment of EIA consultants (Tables 5 and 6).

**Table 2: Statistical Results regarding the nature of EIA Services.**

| | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **The evaluation of EIA Consulting Services is:** | | | | | |
| is easy before commissioning (Search Offering) | -0.47 | 0.79 | -5.12 | 0.00 | **Yes** |
| is easy after commissioning (Experience Offering) | 0.31 | 0.80 | 3.41 | 0.00 | **Yes** |
| Not easy after commissioning (Credence Offering) | -0.79 | 0.90 | -7.65 | 0.00 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

Additional analysis was undertaken to assess whether previous experiences appointing EIA consultants changed the view of whether the services are experience or credence offerings. Regardless of a developer's previous experience, all were found to view EIA consulting services as experience offerings at the 95% confidence interval (Table 3).

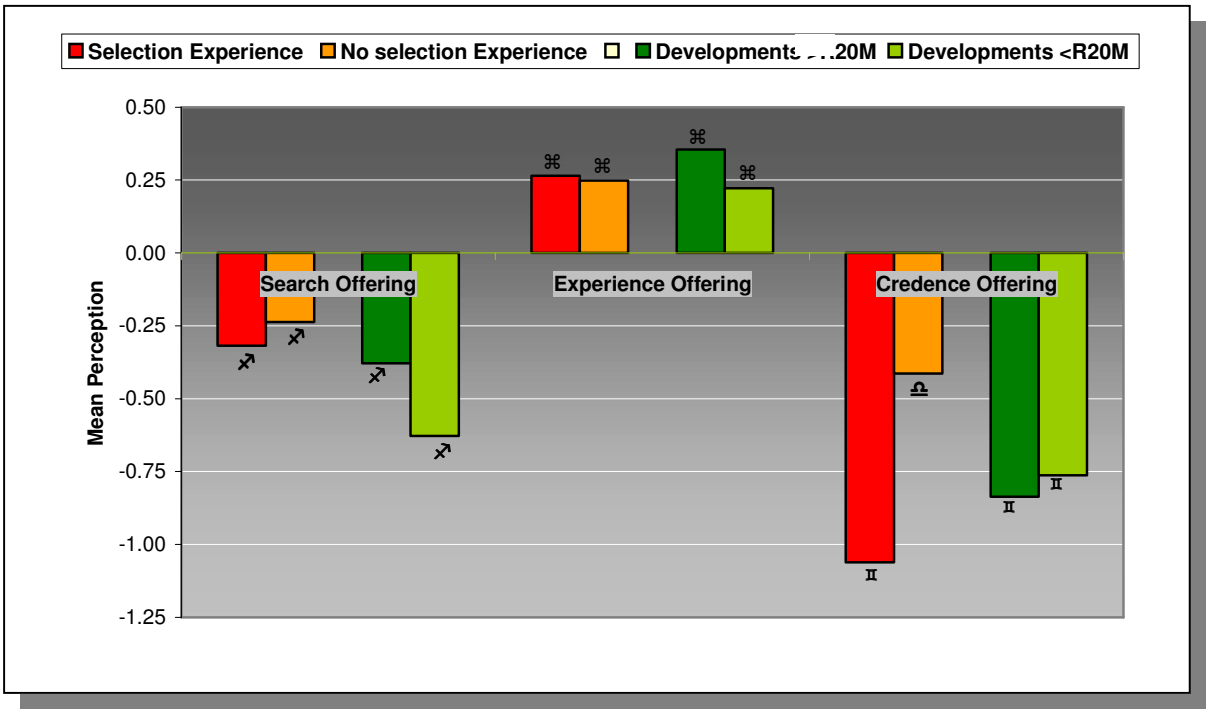
**Table 3: Statistical Results regarding the Nature of EIA Services based on experience in commissioning EIA consulting services.**

| | Experience | | | No Experience | | |
|---|---|---|---|---|---|---|
| | z-value | p-value | Significant | z-value | p-value | Significant |
| **The evaluation of EIA Consulting Services is:** | | | | | | |
| **Search Offering** | -2.17 | 0.04 | **Yes** | -4.174 | 0.00 | **Yes** |
| **Experience Offering** | 2.18 | 0.03 | **Yes** | 4.8608 | 0.00 | **Yes** |
| **Credence Offering** | -7.58 | 0.00 | **Yes** | -2.5624 | 0.02 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

It also was ascertained with significance that there was no difference in perceptions that EIA services were not search offerings and were indeed experience offerings. Once having engaged with EIA consultancy services, familiarity with the processes and outcomes does make evaluation less complicated with every re-buy (Figure 10). This is supported by the results of the t-test to determine whether there is a significant difference in the perceptions relating to EIA being a credence offering (Figure 10). There was significant difference in the strength of the perceptions regarding EIA as a credence offering, based on the experience with repeat purchases (Figure 10). When respondents were assessed based on whether the costs of their development were greater or less than R20m, there was no significant difference between the perceptions of each of the offering types (P>0.05, Figure10 and Table B1 Appendix B).

**Figure 10: Statistical results regarding the nature of EIA Services based on experience in commissioning EIA Services.**




*Influence of Business Background*

Referring to the Business sectors, the nature of EIA consulting services was further assessed (Table 4). The private industry (Developers and Intermediaries) were found to significantly agree that EIA services are not search offerings. Both the Public Sector and the Intermediaries both agreed that EIA services are indeed experience offerings. All categories analysed demonstrated significantly that EIA consulting is not a credence offering.

**Table 4: Statistical Results regarding the nature of EIA Services based on Business Background.**

| BUSINESS BACKGROUND | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Assessment before commissioning EIA services is easy (Search Offering)** | | | | | |
| Developers | -0.61 | 0.47 | -4.84 | 0.00 | **Yes** |
| Public Sector | -0.21 | 0.58 | -1.28 | 0.23 | **No** |
| Intermediaries | -0.55 | 0.88 | -4.23 | 0.00 | **Yes** |
| | | | | | |
| **Assessment of EIA services after commissioning is easy (Experience Offering)** | | | | | |
| Developers | 0.38 | 0.79 | 1.77 | 0.10 | **No** |
| Public Sector | 0.45 | 0.61 | 2.55 | 0.03 | **Yes** |
| Intermediaries | 0.33 | 0.79 | 2.84 | 0.01 | **Yes** |
| | | | | | |
| **Assessment of EIA services after commissioning is not easy (Credence Offering)** | | | | | |
| Developers | -1.16 | 0.15 | -28.97 | 0.00 | **Yes** |
| Public Sector | -0.48 | 0.68 | -2.46 | 0.03 | **Yes** |
| Intermediaries | -0.75 | 1.04 | -4.92 | 0.00 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

*Influence of Development Cost*

A two-tailed t-test was used to assess the variability within the sample once segmented into two groups based on the cost of development (≤R20m and >R20m). There was no significant difference in the responses from these categories, which concurs with the findings above that EIA services are indeed experience offerings ($\mu_{\leq R20m}$=0.22, $\mu_{>R20m}$= 0.36) as opposed to search ($\mu_{\leq R20m}$= -0.63, $\mu_{>R20m}$= -0.38) or credence ($\mu_{\leq R20m}$= -0.76, $\mu_{>R20m}$= -0.84) offerings (Table 5).

**Table5: Two-tailed t-test results assessing the difference between responses of the development cost categories regarding the nature of EIA services.**

| | t-value | p-value | Significant |
|---|---|---|---|
| **Search Offering** | -1.31 | 0.19 | **No** |
| **Experience Offering** | -0.72 | 0.47 | **No** |
| **Credence Offering** | 0.36 | 0.72 | **No** |

Key: Orange: Significant difference between the population means (P≤0.05), White: No significant difference between the population means (P>0.05).

Based on these statistical findings, Proposition 1 is rejected. Developers do not view environmental consultancy as a credence offering on the tangibility spectrum, but rather as an experience offering, which is easy to assess after it has been commissioned

**Proposition 1:** Developers view environmental consultancy as a credence offering on the tangibility spectrum. **REJECTED**

5.2.2 Risks Associated with EIA Services

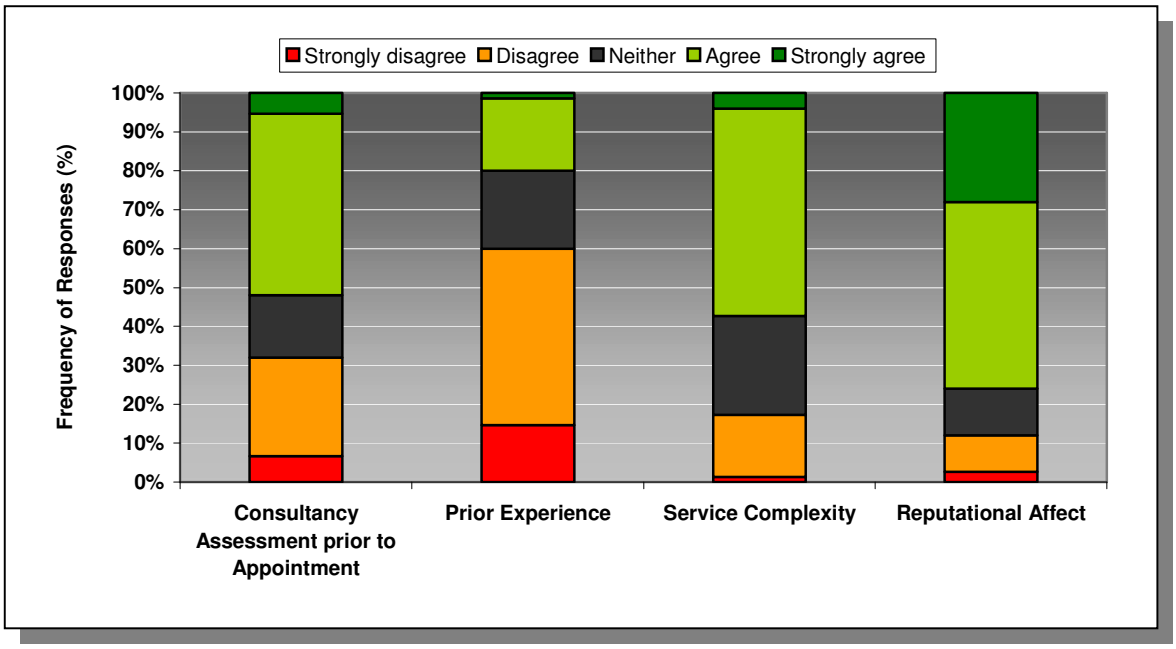
Proposition 2 is that developers perceive the selection of a consultancy to be risky because of the intangible nature of environmental consulting services.

Owing to the intangibility of professional services, there is also the inherent element of risk involved in selecting such services. The four main reasons underpinning the perception of risk were tested with respondents:

- The ability to assess a consultancy prior to commissioning;
- Experience in selecting consultants;
- The perceived complexity of the services; and lastly
- The potential affect of choice on reputation.

With regard to the ability to test a consultancy prior to appointment, 52% of respondents agreed that EIA services could not be realistically tested prior to appointment (Figure 11). The majority of respondents in the sample (60%) indicated that they had experience in selecting and appointing EIA consultants, and 57% agreed that EIA services were complex. The response regarding whether the selection of a consultant may affect the reputation of an organisation, 76% of the respondents indicated the affirmative (48% agreed and 28% strongly agreed). The responses tend to indicate that EIA consulting services are intangible in nature.

**Figure 11: Distribution of response relating to the factors influencing the intangibility of EIA services.**



Statistical analyses reveal that EIA consulting services do have elements associated therewith that are intangible (Table 6). The ability to test a consultancy prior to appointment is however, not a factor contributing to the intangibility of EIA services, as it was not found to be significantly different from the mean responses obtained. The respondents were found to be well versed in the selection and appointment of consultants and hence, this is not considered to be a source of risk for the sample. This level of experienced was echoed in the results regarding the ability to assess or test services prior to the commissioning of services, confirming the findings described in 5.1.2 indicating that environmental consulting services fall within the 'experience offering' category, particularly following a repeat purchase (Table 4).

While over 53% of respondents agreed that EIA services were complex (Figure 11), this was not found to be a perception of significance. This is most likely to be as a result of the experience the respondents have with EIA consulting, and the knowledge acquired about the process and deliverables though repeat appointments of consultants.

The outcome of an EIA will directly impact on whether or not a development will take place. The EIA process involves public participation and perceptions and expectations are created through such consultation with stakeholders. Perceptions of the development as a whole, including the entire professional team, can at times, depend on the professionalism of the EIA consultant, who is often regarded as the public liaison for a project. Hence, it is unsurprising that 78% of the sample agree that the appointment of and EIA consultant may affect an organisations reputation.

**Table 6: Statistical Results regarding perceptions of EIA Services.**

| Perceptions: | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Can not be realistically tested prior to commissioning** | | | | | |
| | -0.09 | 0.85 | -0.88 | 0.38 | **No** |
| **I do not have experience in selecting and appointing** | | | | | |
| | -0.66 | 0.77 | -7.47 | 0.00 | **Yes** |
| **EIA services are complex** | | | | | |
| | 0.07 | 0.62 | 0.96 | 0.34 | **No** |
| **The appointment of an EIA consultant may affect my organisations reputation** | | | | | |
| | 0.57 | 0.96 | 5.18 | 0.00 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

*Influence of Business Background*

For the Public Sector, the promise of service delivery, be it in the form of housing or the provision of bulk infrastructure, can severely affect how communities react and view the government and its representatives. Intermediaries manage all the professional disciplines that work together in realising any development, for a private or Public Sector client. A negative outcome of an EIA could severely affect future possible work with existing and potential clients. For private developers, any negative outcome or public perception may have several negative effects. Often EIA consultation processes spark media interest, which can have far reaching consequences for an organisation's future including success in tender processes, access to venture capital and performance on the stock exchange. The potential impact on an organisations' reputation was cited as a significant perception, and is definitely a source of risk (Table 6).

As with the findings above, the ability to test a consultancy prior to appointment is not a factor contributing to the intangibility of EIA services, as it was not found to be significantly different from the mean responses obtained per sector (Table 7). There was also no significant difference between the responses obtained from each sector (F-Ratio = 0.27, p=0.77).

Further analysis of the sample based on business background revealed that Intermediaries and the Public Sector had experience in appointing consultants and hence, the findings were significantly below the mean. The mean for the developer sector was also negative; these results were not statistically significant (Table 7). There was also no significant difference between each sector (F-Ratio = 1.38, p=0.26).

All respondents regardless of business background did not perceive EIA services to be complex, however, this finding was not statistically significant (Table 7), and there was no variation between each of these sectors (F-Ratio = 0.26, p=0.77).

The total sample showed with significance that the appointment of EIA consultants could potentially impact on an organisations' reputation, and responses from the private sector (Developers and Intermediaries) were found to be statistically significant (Tables 6 and 7). Although mean responses indicate that there is a tendency towards government being concerned about reputation-related damage, this was not found to be statistically significant. This may be as a result of the positions held by the various respondents in the Public Sector sample, as the level of liability and direct consequence for matters of public perception is not consistent throughout a government organisation, and is often the mandate of higher-ranking officials. The results of the ANOVA indicated no significant variation between the business sectors (F=2.08, P=0.13).

**Table 7: Statistical Results regarding the tangibility of EIA Services based on Business background.**

| | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Can not be realistically test prior to commissioning** | | | | | |
| Developers | 0.02 | 0.76 | 0.10 | 0.92 | **No** |
| Public Sector | -0.22 | 0.96 | -0.79 | 0.45 | **No** |
| Intermediaries | -0.05 | 0.86 | -0.37 | 0.72 | **No** |
| | | | | | |
| **I do not have experience in selecting and appointing** | | | | | |
| Developers | -0.36 | 0.79 | -1.71 | 0.11 | **No** |
| Public Sector | -0.83 | 0.78 | -3.70 | 0.00 | **Yes** |
| Intermediaries | -0.68 | 0.76 | -6.12 | 0.00 | **Yes** |
| | | | | | |
| **Services rendered are complex** | | | | | |
| Developers | 0.11 | 0.82 | 0.50 | 0.62 | **No** |
| Public Sector | -0.04 | 0.39 | -0.40 | 0.69 | **No** |
| Intermediaries | 0.09 | 0.58 | 1.00 | 0.32 | **No** |
| | | | | | |
| **Appointment of an EIA consultant may affect my organisations reputation** | | | | | |
| Developers | 0.63 | 1.06 | 2.21 | 0.05 | **Yes** |
| Public Sector | 0.45 | 1.10 | 1.43 | 0.18 | **No** |
| Intermediaries | 0.54 | 0.91 | 3.98 | 0.00 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

*Influence of Development Cost*

When responses were assessed based on the costs of development, there was no significant difference found regarding the ability to assess an EIA consultant prior to appointment. The same is true regarding the perception of the complexity of the

service offering. Table 8 also shows that there was also no significant variation found between the cost categories (refer to the results of the two-tailed t-test results per parameter).

**Table 8: Statistical Results regarding tangibility of EIA Services based on total development cost.**

| | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Can not be realistically test prior to commissioning** (t = 0.96, p= 0.34) | | | | | |
| Above R20M | -0.01 | 0.80 | -0.10 | 0.92 | **No** |
| Below R20M | -0.21 | 0.94 | -1.22 | 0.23 | **No** |
| **I do not have experience in selecting and appointing** (t = -0.09, p= 0.93) | | | | | |
| Above R20M | -0.64 | 0.74 | -5.76 | 0.00 | **Yes** |
| Below R20M | -0.62 | 0.89 | -3.88 | 0.00 | **Yes** |
| **Services rendered are complex** (t = 0.85, p= 0.40) | | | | | |
| Above R20M | 0.13 | 0.63 | 1.38 | 0.18 | **No** |
| Below R20M | -0.02 | 0.59 | -0.23 | 0.82 | **No** |
| **Appointment of an EIA consultant may affect my organisations reputation** (t = 0.26, p= 0.80) | | | | | |
| Above R20M | 0.60 | 1.03 | 3.84 | 0.00 | **Yes** |
| Below R20M | 0.55 | 0.81 | 3.79 | 0.00 | **Yes** |

Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05). White font=not significant.

As with the findings for the total sample, both re-buy experience and reputation-related risk were both significant factors. These also appear to be indicators of intangibility for respondents undertaking development of all scales. While the mean for developments exceeding R20m was slightly higher, there was no significant difference between the two groups (t = 0.26, p= 0.80). The same is true for the re-buy experience parameter (Table 8, refer to the results of the two-tailed t-test results per parameter).

Based on these statistical findings, Proposition 2 that developers perceive the selection of a consultancy to be risky, because of the intangible nature of EIA services, is rejected. It would appear from the research that the major factor contributing to the selection process is the multi-faceted nature of the service, which can lead to negative consequences, as described by (Lovelock & Yip, 1996 and Lundsford and Fussell, 1993).

**Proposition 2:** Developers perceive the selection of a consultancy to be risky because of the intangible nature of environmental consulting services. **REJECTED**

### 5.2.3 Dimensions of Risk Associated with EIA Services

Proposition 3 is that developers are most concerned about financial, psycho-social and temporal risk when procuring environmental consulting services.

The relative importance of the seven dimensions of risk in the selection of EIA consultants was assessed. Psycho-social (Social $\mu$= -0.51, Psychological $\mu$=-0.73) and physical risks ($\mu$= -0.25) were rated by respondents as unimportant relative to the other four risk dimensions (Figure 12). Temporal risks were rated by 93% of respondents as the largest of the risks tested, with 56% strongly agreeing that there is considerable concern about the time an EIA process takes ($\mu$= 1.23, Figure 12). Of the respondents, 79% agreed that unforeseen financial costs and the ultimate desirability of the outcome were the next most important concerns, with 32% and 21% strongly agreeing on these parameters respectively.

When considering the statistical validity of these results using a Normal Fitting Distribution Algorithm (Stacey, 2005), the findings for all seven risk dimensions were found to be significant at the 95% confidence interval (Table 9). Thus, for this sample, each of the risk dimensions is reflected in order of relative importance in Table 9, with time-related risk being the most important and psychological risk; the risk of appearing foolish, as the lowest.

**Table 9: Relative importance of the seven dimensions of risk relating to EIA services.**

| Type of Risk | | Description of risk | μ | z-value | p-value | Significant |
|---|---|---|---|---|---|---|
| 1 | Temporal | Length of time the process takes | 1.23 | 12.40 | 0.00 | **Yes** |
| 2 | Unforeseen Financial | Incurring unforeseen costs | 0.66 | 6.16 | 0.00 | **Yes** |
| 3 | Performance | EIA services may not meet objectives set out | 0.46 | 4.72 | 0.00 | **Yes** |
| 4 | Financial | Costs involved | 0.20 | 2.06 | 0.04 | **Yes** |
| 5 | Physical | Personal loss and/or damage(s) | -0.25 | -2.44 | 0.00 | **Yes** |
| 6 | Social | Reactions by business colleague to selection decision | -0.51 | -6.82 | 0.00 | **Yes** |
| 7 | Psychological | Appearing foolish based on the decision made | -0.73 | -10.93 | 0.00 | **Yes** |

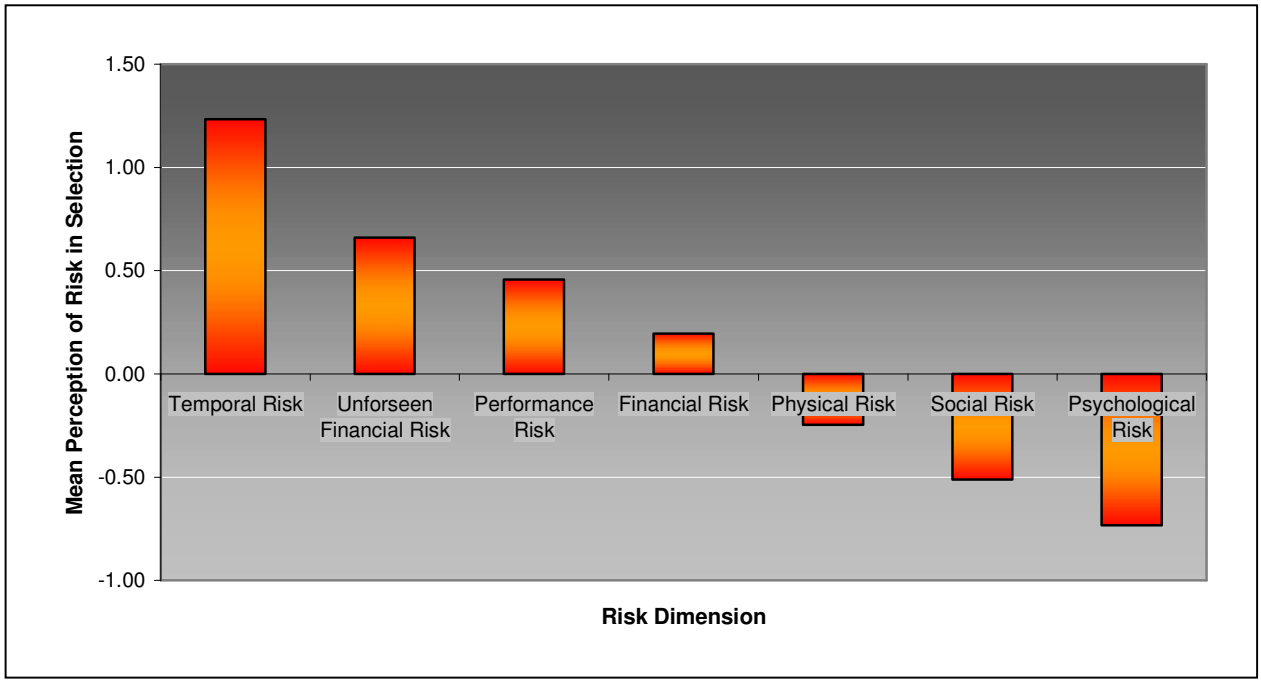
Key: Orange: Significantly more important than the average (μ>0, P≤0.05), White: Not significantly different to the average (P>0.05), Green: Significantly less important than the average (μ<0, P≤0.05).

*Influence of Business Background*

The sample was also analysed to determine whether the risk dimensions varied based on business background and/or the total cost of the developments (Figure 13

and Table B2, Appendix B). With regards to business background, the relative order of importance for each of the risk dimensions, based on the mean, was identical to that of the total sample for both the Public Sector and the Intermediaries. For all three categories of business background temporal risk was unequivocally perceived to be the highest risk (Figure 13). An EIA can take between six months to two years, depending on the characteristics of a development, for example, location, scale, nature, duration as well as the level of interest from the public.

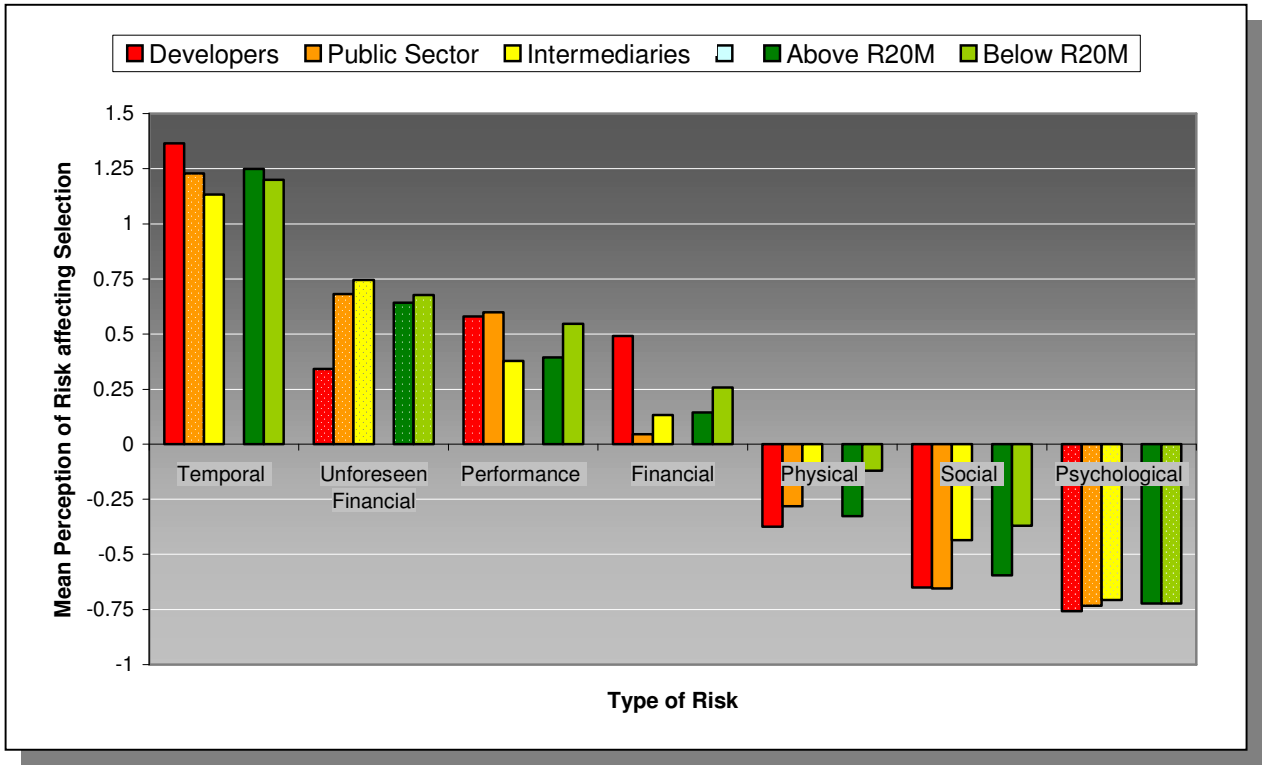
**Figure 12: Distribution of response relating to the dimensions of risk influencing the selection of EIA Services.**




For any organisation embarking on a project, the EIA is almost always the activity that determines the critical path. The length of the EIA process also often impacts indirectly on the success of a project, owing to other critical aspects that occur simultaneously (e.g. land acquisition, the terms of financial and legal agreements as well as market demand).

Developers were found to perceive performance risk as the second highest risk ($\mu$=0.58, p=0.01), whereas Public Sector and the Intermediaries viewed unforeseen financial risk ($p \leq 0.01$) as the next most important risk (Figure 13). Performance risk was found to be a third factor of importance to the intermediary sector ($\mu$=0.38, p=0.00) (Figure 13).

**Figure 13: Distribution of response by relating to the dimensions of risk influencing the selection of EIA Services based on Business Background and Development Cost.**




Key: Solid cells represent statistically significant dimensions, shaded cells represent dimensions which were not found to be statically significant at P=0.05.

Performance of the Public Sector and Intermediaries, which act as project managers, is assessed based on the ability to meet time and financial budgets. It therefore makes sense that unforeseen costs, which may be incurred during the course of a project, are the second most important risk factor for these sectors (Figure 13).

The intermediary sector faces the additional risk of reputation-based damage should the EIA process not meet desired expectations, as future contracts are often based on the successful delivery on previous appointments, particularly with large clients. These implications were also discussed in section 5.2.2.

Variability between the perceptions of each of these sectors was tested using a one-way ANOVA (Table 10). There was no significant difference found between the perceptions regarding the seven risk dimensions (Table 10). The importance of each of the risk dimensions relating to EIA consultancy selection is thus not influenced significantly by business background.

**Table 10: One-way ANOVA results assessing the difference between responses of the Business Sectors regarding the risk dimensions of EIA Services.**

| Risk Dimensions | F-Ratio | p-value | Significant |
|---|---|---|---|
| Temporal Risk | 0.68 | 0.51 | **No** |
| Unforeseen Financial Risk | 2.00 | 0.14 | **No** |
| Performance Risk | 0.83 | 0.44 | **No** |
| Financial Risk | 1.89 | 0.16 | **No** |
| Physical Risk | 0.56 | 0.58 | **No** |
| Social Risk | 0.89 | 0.42 | **No** |
| Psychological Risk | 0.03 | 0.97 | **No** |

Key: Orange: Significant difference between the population means (P≤0.05), White: No significant difference between the population means (P>0.05).

*Influence of Total Development Cost*

The mean order of importance of the risk dimensions, based on the segmentation of the sample using development costs, matched that of the total sample (Table 10).

Statistically, the three most important areas of risk were identical in order of importance to that of the total sample; temporal, unforeseen financial risk and performance (P=0.00). Moreover, psycho-social risks are found to be significantly unimportant (P≤0.01), as with the total sample.

Variability between these two categories was tested using a two-tailed t-test and revealed no significant difference at the 95% confidence interval (Table B3, Appendix B). Thus, the cost of development, does not significantly affect the perception of the risk dimensions relating to EIA consultancy selection.

When considering the procurement of environmental consulting services, developers, from all business backgrounds, are unequivocally concerned about temporal risk and financial risk, particularly unforeseen financial risks. Psycho-social risks were found to be significantly unimportant. Hence, Proposition 3 is partially accepted.

**Proposition 3:** Developers are most concerned about financial, psycho-social and temporal risk when considering the procurement of environmental consulting services. **PARTIALLY ACCEPTED**

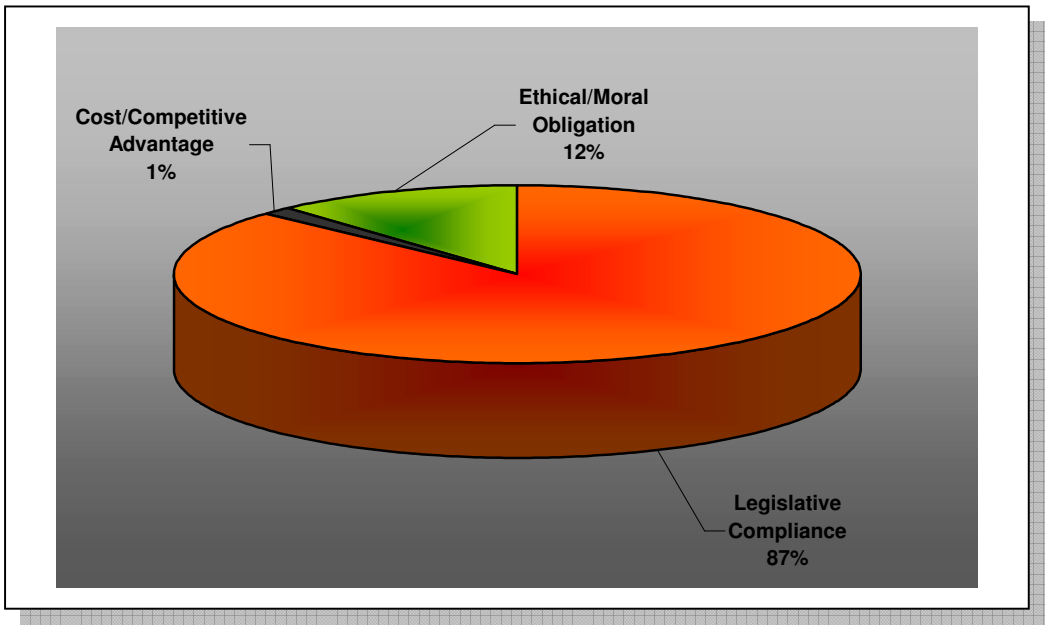
### 5.2.4 Motivation for appointing EIA Consultants

Proposition 4 was stated as the primary reasons for procuring environmental consulting services is regulatory compliance

Although there is a global shift towards becoming more environmentally conscious and responsible, results showed that 87% of the respondents procure EIA services as a direct response to the legislative requirements in South Africa (Figure 14). This was also the mode.

It is encouraging to see that a small portion of the sample, 12%, responded that procurement is based on a feeling of ethical/moral obligation (Figure 14). Interestingly, when considering this small group of respondents, 43% were from the intermediary business background. This may be as a result of the potential impact of EIA services on the reputation of an organisation. Those respondents' mainly undertaking commercial developments featured as the largest segment undertaking EIA's on ethical and/or moral grounds (43%). When considering the total cost of development categories, the percentage spilt of the responses corresponded to the exact proportions as found within the total sample.

**Figure 14: Primary reasons for procuring EIA Services.**




It is clear from the survey that the primary reason for procuring environmental consulting services in South Africa is regulatory compliance. Hence, Proposition 4 is accepted.

Proposition 4: The primary reason for procuring environmental consulting services is regulatory compliance. **ACCEPTED**

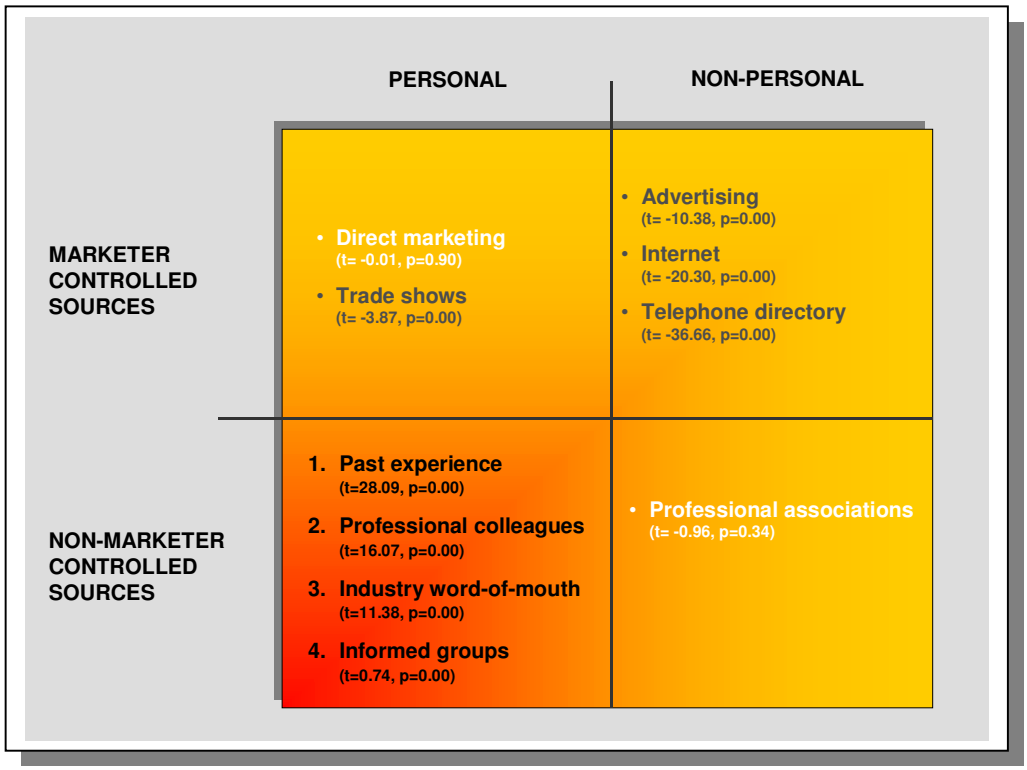
### 5.2.5 Information Sources used in the Selection Process

Proposition 5 is developers rely on personal non-marketer controlled information sources when investigating environmental consultancies.

The means by which respondents reduce uncertainty and perceived risk was assessed using the model developed by Assail (1995). T-test results following the application of a Stochastic Shogun Parameter Estimation Algorithm (Stacey, 2006) revealed that personal non-marketer controlled information sources were the most significantly utilised (see the numbered list in Figure 15 and Table B4, Appendix B). Of these information sources, past experience rated the highest followed by advice from professional colleagues. Less dominant, although also important were advice from similar organisations in the same industry and advice from well-informed bodies, such as authorities and universities (Figure 15).

Statistically unimportant sources were all the non-personal marketer controlled sources including specialised advertising, the internet and the telephone directory (Figure 15). These are realistic outcomes considering that EIA's are professional services and the environmental consultant forms part of a professional team appointed to ensure a development project becomes a reality. Non-personal sources where validity and integrity can not be assessed are unlikely to be used considering that there are financial and temporal, as well as reputation-based risks involved in procuring EIA services.

**Figure 15: Information sources used in the selection of EIA Service Providers.**




Key: The most significantly important sources have been labelled 1-4, in order of importance. White indicates those sources that were not statistically important, while grey indicates statistically unimportant.

Direct marketing and membership lists of professional associations did not feature as statistically significant information sources (Figure 15). The environmental industry, as it is known today, was borne from the environmental regulations promulgated in 1998. Thus, it is a relatively immature industry and while still very price competitive, it has not yet moved into being a mature industry where formal marketing strategies are developed and applied. Hence, it is not surprising that direct marketing is not a well-recognised information source at this time. Currently, there is no single regulating body which governs the professional practice of environmental assessment practitioners. However, there is progress being made within the industry and a formalised structure and certification process for practitioners will be finalised early in 2009.

*Influence of Business Background*

Using the same statistical methods for the total sample, the information sources consulted by each business sector was assessed (Table B5, appendix B). A one-way ANOVA was used to determine whether there were differences in the sources used by each sector.

It was evident that there were differences in the relative importance in three of the four kinds of information sources (Table 11). Of the ten sources listed, there was significant variation found to occur between the sectors in seven of the sources (Table 11).

**Table 11: One-way ANOVA results assessing the difference between responses of the business sectors regarding the sources of information used in procuring EIA services.**

| Categorisation | Information Source | F-Ratio | p-value | Significant |
|---|---|---|---|---|
| Personal Non-Marketer Controlled | Consultants with which you have had past experience | 61.01 | 0.00 | Yes |
| | Professional/ business colleagues | 9.76 | 0.00 | Yes |
| | Particular groups who are well informed (e.g. authorities, universities, etc.) | 2.05 | 0.14 | No |
| | Similar organisations in your industry that have previously utilised the services of consultants | 0.91 | 0.41 | No |
| Personal Marketer Controlled | Consultants that have made direct approaches (marketing) | 10.89 | 0.00 | Yes |
| | Specialised conferences, seminars or meetings | 7.33 | 0.00 | Yes |
| Non-Personal Non-Marketer Controlled | Membership lists of various professional associations | 1.20 | 0.31 | No |
| Non-Personal Marketer Controlled | Advertisements in specialised journals and magazines | 7.01 | 0.00 | Yes |
| | The internet | 26.17 | 0.00 | Yes |
| | The telephone directory/yellow pages | 25.30 | 0.00 | Yes |

Key: Orange: Significant difference between the population means (P≤0.05), White: No significant difference between the population means (P>0.05).

- *Personal Non-Marketer Controlled Sources*

There was significant variation in the use of the previous experience information source. Two-tailed t-tests showed that difference to be between the public and private sectors (Figure 16, P=0.00). Government projects and appointments are regulated through tender processes and the Public Finance Management Act, 1999 (The Republic of South Africa, Act No. 1 of 1999) [PFMA]. Such policies require that tenders are adjudicated based on aspects such as cost, relevant experience, understanding of the brief, Broad-based Black Economic Empowerment as well as previous working experience with the organ of state. This approach does not favour one criterion over another, albeit that each criteria/information source may have a different rating.

The same rationale is also applicable to consultation with professional colleges, however, in tendering, this practice is not deemed appropriate and thus, this information source was not found to be significant for the Public sector (Figure 16, P=0.08).

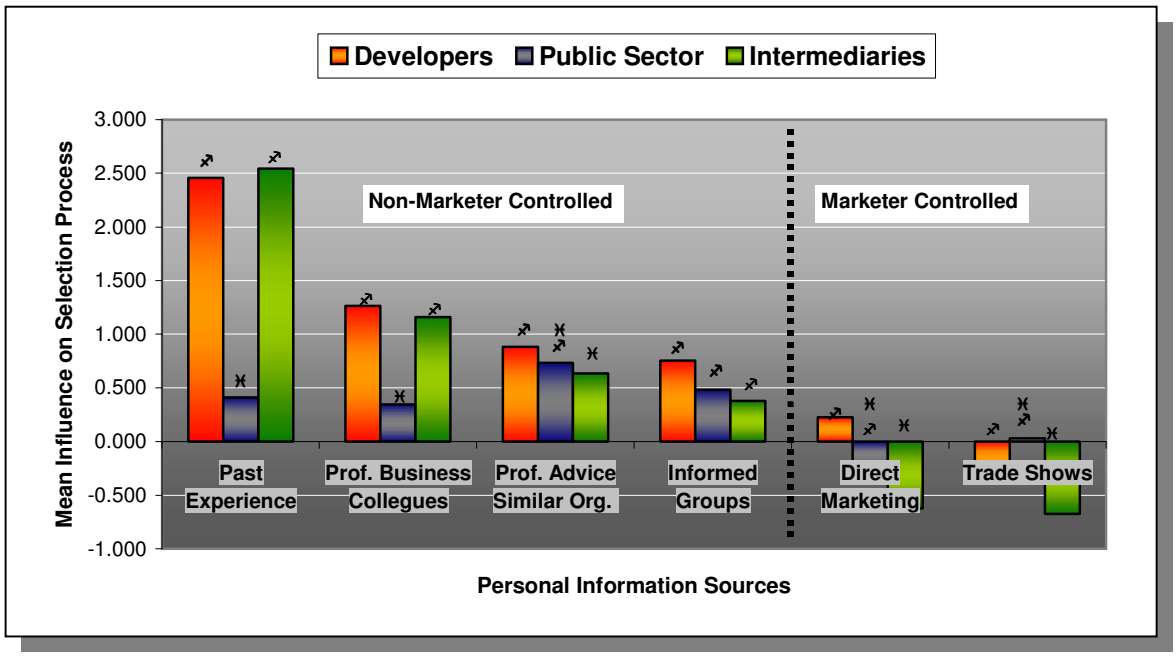
Approaching recognised bodies or well-informed groups such as Chambers of Commerce, universities or previous clients, is used consistently by all the sectors as a source of information (Figure 16, $P_{dev}$=0.00, $P_{pub}$=0.02, $P_{int}$=0.00,). This practice would not conflict with the PFMA, as it would be seen as objective opinion seeking. The same is true for organisations in the same industry that have previously utilised the services of consultants (Figure 16, P=0.00).

- *Personal Marketer Controlled Sources*

Intermediaries were the only sector that was found to significantly disfavour direct marketing approaches (P=0.00), whilst direct marketing was not identified as a significant source of information by either the Public sector or Developers (Figure 17, P>0.05). Intermediaries, acting as project managers, may well favour working with a

dedicated set team, which has a collective deep understanding of the expected work ethic and desired outputs.

**Figure 16: Personal information sources used by the three business sectors in the selection of EIA service providers.**

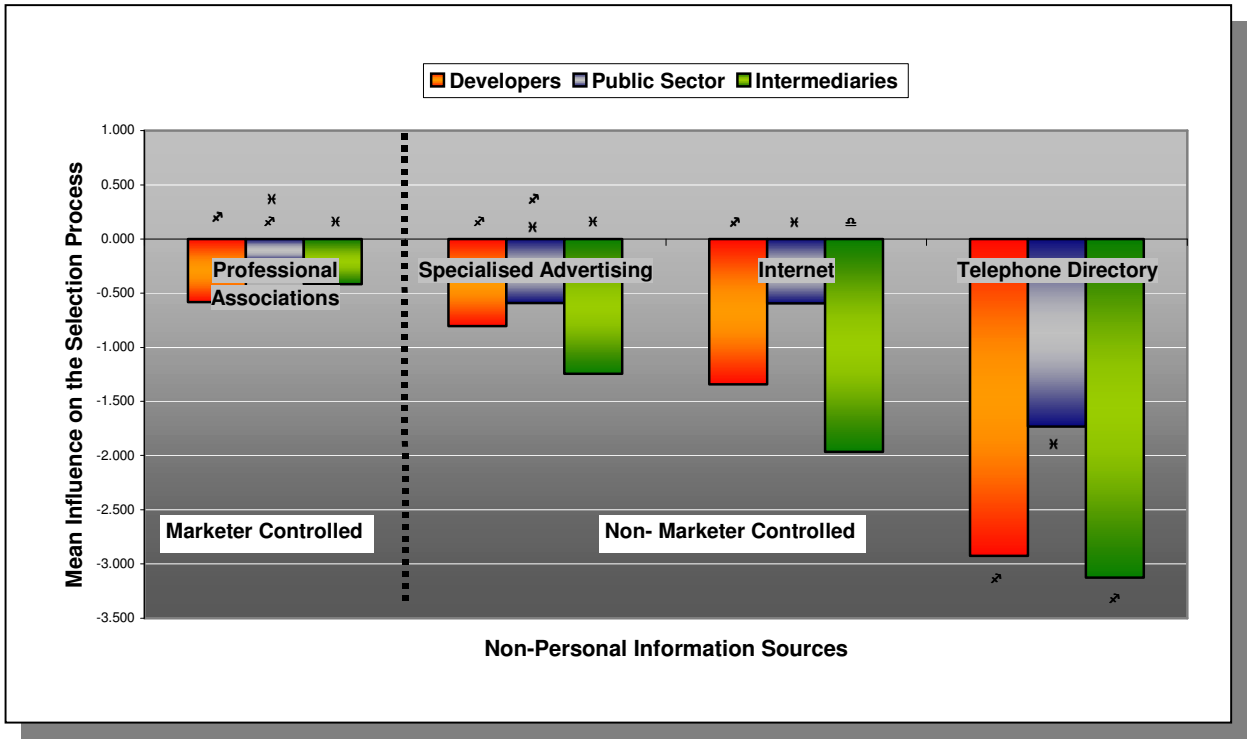



Key: symbols represent significant difference or similarity per information source, where P<0.05.

- *Non-Personal Non-Marketer Controlled Sources*

With no professional bodies formally regulating the environmental industry at this time, this source cannot currently be utilised. The variability between the sectors is likely to be a result of the extent to which the sectors expressed the disuse of this source, and does not have bearing on the outcome of this study (Figure 17).

**Figure 17: Non-personal information sources used by the three business sectors in the selection of EIA service providers.**




Key: symbols represent significant difference or similarity per information source, where P<0.05.

- *Non-Personal Marketer Controlled Sources*

As with the total sample, none of these information sources are utilised in the selection process by any of the sectors (Figure 17). Differences encountered are a reflection of the extent of antagonism expressed by the various sectors relative to one another and do not have direct bearing on the results of this study.

*Influence of Total Development Cost*

The influence of cost in the use of information sources was evaluated using one and two-tailed t-tests (Table 12 and Tables B6 and B7, Appendix B).

No significant difference was observed between the two cost categories for any of the ten sources investigated (Table 12, P>0.05 and Table B7, Appendix B).

As with the total sample (Figure 15), the significant sources influencing the selection process were in order of importance (P=0.00):

- Consultants with which you have had past experience;
- Professional/ business colleagues;
- Similar organisations in your industry that have previously utilised the services of consultants; and
- Particular groups who are well informed (e.g. authorities, universities, etc.).

Information sources, which were significantly disfavoured (P>0.05), included:

- Membership lists of various professional associations;
- Advertisements in specialised journals and magazines;
- The internet; and
- The telephone directory/yellow pages.

**Table 12: Two-tailed t-test results assessing the difference between responses of the Development Cost categories regarding information sources used in the selection process.**

| | Development Cost Below vs Above R20M | | |
|---|---|---|---|
| **Information Source** | **t-value** | **p-value** | **Significant** |
| Professional/ business colleagues | 1.98 | 0.05 | No |
| The telephone directory/yellow pages | 1.57 | 0.12 | No |
| Specialised conferences, seminars or meetings | 1.56 | 0.12 | No |
| Similar organisations in your industry that have previously utilised the services of consultants | 1.41 | 0.16 | No |
| Consultants that have made direct approaches (marketing) | 1.38 | 0.17 | No |
| Membership lists of various professional associations | 1.24 | 0.22 | No |
| Advertisements in specialised journals and magazines | 0.46 | 0.64 | No |
| Consultants with which you have had past experience | 0.41 | 0.68 | No |
| Particular groups who are well informed (e.g. authorities, universities, etc.) | -0.59 | 0.56 | No |
| The internet | -0.59 | 0.56 | No |

Key: Orange: Significantly more important than the average (low p-value), White: Not significantly different to the average (higher p-value), Green: Significantly less important than the average (low p-value).

Results for the total sample as well as the segmentation thereof clearly indicate that when procuring EIA services, the information sources that are used are personal and non-marketer controlled. Thus, Proposition 5 is accepted.

**Proposition 5:** Developers rely on personal non-marketer controlled information sources when investigating environmental consultancies. **ACCEPTED**

### 5.2.6 Criteria used in the selection of an EIA Consultant

Proposition 6 was stated as reputation and previous experience are the most dominant criteria used by developers when selecting environmental consultancies.

The relationships amongst a list of globally recommended selection criteria were assessed using Factor Analysis. The analysis reflected the importance of each selection criterion in the initial stages of the buying process. Using a scree plot, cumulative percentage and by considering the Eigen values, both before and after using varimax rotation, it was established that there were two interpretable factors (Table 13).

**Table 13: Eigen values after varimax rotation including cumulative percentage from Factor Analysis.**

| No. | Eigenvalue | Individual Percent | Cumulative Percent | Scree Plot |
|---|---|---|---|---|
| **1** | **2.28** | **54.62** | **54.62** | **\|\|\|\|\|\|\|\|\|\|** |
| **2** | **1.39** | **33.26** | **87.87** | **\|\|\|\|\|\|\|** |
| 3 | 0.78 | 18.67 | 106.54 | \|\|\|\| |
| 4 | 0.65 | 15.50 | 122.04 | \|\|\|\| |
| 5 | 0.36 | 8.65 | 130.69 | \|\| |
| 6 | 0.29 | 6.94 | 137.63 | \|\| |
| 7 | 0.16 | 3.81 | 141.45 | \| |
| 8 | -0.02 | -0.45 | 141.00 | \| |
| 9 | -0.05 | -1.19 | 139.81 | \| |
| 10 | -0.12 | -2.98 | 136.83 | \| |
| 11 | -0.18 | -4.40 | 132.43 | \| |
| 12 | -0.27 | -6.43 | 126.00 | \|\| |
| 13 | -0.38 | -9.12 | 116.88 | \|\| |
| 14 | -0.71 | -16.88 | 100.00 | \|\|\|\| |

Key: Shaded cells show factors extracted based on Eigen values, cumulative percentage contribution and the scree plot.

Both factors contained five criteria with Factor 1 accounting for 54.62% of the variance, whereas the second factor accounted for 33.26% (Tables 13 and 14).

**Table 14: Factor Loadings from factor analysis on selection criteria, including Factor Structure Summary.**

| Variables | Factor1 | Factor2 |
|---|---|---|
| | Reliability | Reputation |
| Professional and ethical reputation | 0.275 | 0.404 |
| Extent of working experience (# years, # clients) | 0.190 | 0.174 |
| Direct experience with projects similar in scope and nature (sector specific experience) | 0.208 | -0.010 |
| Organisational structure and size (sufficient resources) | 0.049 | 0.375 |
| Extent of subcontracting and related commissions | -0.332 | 0.194 |
| Project management ability (e.g. regular updates, managing of subcontractors) | -0.169 | 0.463 |
| Location of offices | 0.497 | -0.409 |
| Experience and good relationships with relevant authorities | 0.206 | -0.598 |
| Knowledge and understanding of applicable legislation | -0.630 | 0.040 |
| Professional qualifications | -0.590 | -0.202 |
| Registration with Professional Bodies | -0.709 | 0.030 |
| Professional Indemnity Insurance | -0.180 | -0.419 |
| Quality Management System (ISO 9001) and/or Environmental Management System (ISO 14001) | -0.546 | -0.093 |
| Potential conflicts of interest | -0.348 | -0.227 |

Key: Shaded cells show variables contained in each of the factors extracted.

- *Factor 1: Reliabiity*

It is evident from the results in Tables 13 and 14 that Factor 1 captures those attributes, which relate to an organisations business strategy and its systems and can be used as tangible indicators of reliability or professionalism. A quality and/or environmental management system, professional indemnity as well as registration with professional bodies all reflect an organisations desire to minimise risk both to themselves and to their clients. Moreover, it demonstrates a desire to deliver consistent services and products.

When seeking environmental authorisation for a proposed development, having sound relationships with the decision makers is a critical success factor for any project. This allows for rapid understanding of the authorities expectations and development planning goals. These attributes all directly address risks relating to temporal and quality/performance.

Lastly, the extent of subcontracting and related commissions will provide an immediate indication of the potential for unforeseen financial risk. In EIA applications, the largest financial risk items are additional specialist studies, which stem either from requests from the authorities or from the public participation process. This again reaffirms the need to have a good relationship with the authorities to proactively establish what their requirements will be for a development. Should a consultancy have most of the expected specialists within their organisation, the need for external sub-contracting and additional commissions and handling fees is negated, reducing the financial risk. This may also reduce time-related risk as no extended search or contracting lead-time is necessary, if the specialists are readily accessible and available.

Based on the tangible aspects contained in Factor 1, this factor is described as Reliability.

- *Factor 2: Reputation*

Factor 2, by comparison consists largely of intangible aspects, which can be used as indicators of reputation as well as experience and competence (Table 14). Reputation is reflected as a single criterion, but is also underpinned by an organisations experience. An attribute such as project management ability is enhanced through years of practice as are knowledge and understanding of applicable legislation and experience and good relationships with relevant authorities. In order to grow and maintain a good reputation, the foundations of any professional service provider are firmly routed in appropriately skilled and qualified employees, which accounts for that criteria.

Based on the intangible aspects of this factor and those which relate to experience and competence, Factor 2 is defined as Reputation.

Based on the results of the factor analysis, it is clear that developers indeed do use bundles of attributes, tangible and intangible, to determine the value an EIA consultancy can provide. The factors extracted indicate that tangible indicators of reliability as well as less tangible indicators of reputation (and experience/competence) are used in the search process for EIA consulting services. Thus, Proposition 6 is partially accepted.

**Proposition 6:** Reputation and previous experience are the most dominant criteria used by developers when selecting environmental consultants. **PARTIALLY ACCEPTED**

# 6 CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Responses to Research Propositions

The purpose of the study was to examine factors influencing the selection of environmental impact assessment consultants in South Africa, with specific emphasis on the pre-purchase phase. Consumer behaviour was explored and this information can be used to answer the five sub-problems, stated as propositions. The results are summarised in Table 15.

The literature review indicated that although EIA services would appear to be credence offerings on Shostack's (1977) spectrum. Respondents however, indicated that EIA services are in fact, easy to assess after commissioning and thus, are perceived as experience offerings. Proposition 1 was therefore rejected.

With regards to risk, it was found that concerns regarding the procurement of EIA services do not relate to the intangibility of the services, but rather to the multi-faceted nature of the services, which can ultimately lead to negative consequences. This resulted in Proposition 2 being rejected. This was further substantiated when the perceptions regarding the dimensions of risk were assessed. It was found that the most significant risk dimension was that of time, or temporal risk. Time delays can result in substantial financial and reputation-based risk. Financial risk, specifically unforeseen costs were also found to be a significant risk by respondents. Also of importance was the concern that the service rendered may not achieve the desired objectives, which can be defined as performance risk. Proposition 3 stated that developers are most concerned about financial, psycho-social and temporal risk when considering the procurement of environmental consulting services. Thus, this proposition regarding perceived risk was partially accepted.

There was an unequivocal indication that environmental consulting services in South Africa are procured only as a direct response to legislative requirements. Therefore, Proposition 4 regarding need recognition was accepted.

Once in the selection process, it was found that developers use four main information sources in their quest for information. These were, in order of importance, the constancy's previous experience, advice from professional colleagues, advice from similar organisations within the industry as well as advice from well-informed groups such as authorities. As the environmental impact assessment process lies on the critical path of most development projects, customers seek personal non-marketer controlled information when selecting a consultancy. Proposition 5 was thus accepted.

The criteria used in the final stages of the pre-purchase decision were analysed using factor analysis. Results indicated that there are two factors underlying the evaluation of service providers; reliability and reputation. The Reliability Factor was most dominant and comprises tangible indicators of professionalism such as Quality management Systems (ISO 9001), while Factor 2: Reputation consisted of less tangible aspects such as understanding of legislation. Factor 2 also contained aspects that relate directly to the extent of experience of a consultancy as well as their level of competence. Proposition 6 regarding criteria for decision-making was partially accepted based on these findings.

**Table 15: Summary of Responses to Research Propositions.**

| Sub-Problem | Proposition | Response |
|---|---|---|
| What kind of offering is an environmental consulting service, using the tangibility spectrum? | Developers view environmental consultancy as a credence offering on the tangibility spectrum. | **Rejected** |
| What are the dominant risks associated with environmental consulting? | Developers perceive the selection of a consultancy to be risky because of the intangible nature of environmental consulting services. | **Rejected** |
| | Developers are most concerned about financial, psycho-social and temporal risk when considering the procurement of environmental consulting services. | **Partially Accepted** |
| What are the main reasons for appointing environmental consultants? | The primary reason for procuring environmental consulting services is regulatory compliance. | **Accepted** |
| What information sources are used in the selection process? | Developers rely on personal non-marketer controlled information sources when investigating environmental consultancies. | **Accepted** |
| What criteria are used in the selection process | Reputation and previous experience are the most dominant criteria used by developers when selecting environmental consultants. | **Partially Accepted** |

## 6.2 Recommendations to Organisations

In developing a business strategy, environmental consultancies are urged to focus on the following areas, based on the findings of this research:

- Relationship building so as to understand the perceptions regarding the risks associated with environmental services, in particular, which risks are the most

dominant based on the business sectors of clients, and their related developments;

- Identification and development of tangible indicators of reliability and reputation that address the variety of concerns/risk areas identified as important through this study (temporal, financial and performance risk);
- Direct marketing strategies aimed at communicating differentiation as well as indicating these tangible indicators of reliability and reputation such that the pertinent risks can be relayed as early as possible;
- Integration and implementation of processes and systems into service offerings to consistently manage for those risks areas, which can create instability in the client-service provider relationship. This would include relationship building with the relevant authorities and a commitment to growing a knowledge base; and
- Continuous improvement of processes and systems such that a healthy reputation, based on sound experience, can be developed and maintained well into the future.

## 6.3 Limitations of Research

This research focussed on EIA services in South Africa over the period 2006-2008. Thus, the findings are not wholly applicable to all environmental service offerings. This also impacts on the applicability of the findings for sectors such as mining, which do not respond directly to the NEMA EIA legislation. The study did not investigate the tender processes, which may be employed by some organisations and sectors, and applicability may be limited in such circumstances. As this industry is closely linked to economic trends, many external factors may change future buying behaviour. Such changes may be *inter alia* global and local perceptions about environmental matters, the structure and regulation of the local environmental industry as well as the national enabling legislation. As with all research, discernment should be exercised when applying the findings to developing business strategy.

## 6.4 Recommendations for Future Research

Into the future, research into the environmental industry with reference to consumer behaviour could focus on:

- Factors influencing the selection processes of the mining sector;
- Consideration of how the formation of a professional certification body for the industry affects the selection process;
- How marketer controlled information sources can be used to increase market share;
- The composition and structure of the buying centres for both the public and private industries; and
- Strategies that can be executed by environmental consultancies to stimulate proactive behaviour regarding environmental management and sustainable development.

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# APPENDIX A: SURVEY

**QUESTIONNAIRE REGARDING CRITERIA FOR SELECTING ENVIRONMENTAL SERVICES IN SOUTH AFRICA**

## 1 RESPONDENT INFORMATION

| **Date** | |
|---|---|

| | |
|---|---|
| **Name** | |
| **Telephone Number** | |
| **Fax Number** | |
| **Mobile Number** | |
| **Email** | |

### 1.1 Business Background (Please tick one)

| | |
|---|---|
| Developer: Individual | |
| Developer: Organisation | |
| Public Sector | |
| Parastatal | |
| Intermediary/Project Manager | |

### 1.2 Predominant type of development (Please tick one)

| | |
|---|---|
| Residential | |
| Commercial | |
| Bulk Infrastructure | |
| Industrial/Waste | |
| Other (please specify) | |

### 1.3 Total cost of development on average (Please tick one)

| | |
|---|---|
| ≤ 2.5 Million Rand | |
| >2.5 ≤ 5 Million Rand | |
| >5 ≤ 7.5 Million Rand | |
| >7.5 ≤ 10 Million Rand | |
| > 10 Million Rand | |

## 2 EVALUATING ENVIRONMENTAL CONSULTING SERVICES

| | | Strongly Agree | Agree | Neither Agree nor Disagree | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 2.1 | It is easy for me to evaluate the quality of environmental consulting services before commissioning the services of an environmental consultant | | | | | |
| 2.2 | It is easy for me to evaluate the quality of environmental consulting services after commissioning the services of an environmental consultant | | | | | |
| 2.3 | It is not easy for me to evaluate the quality of environmental consulting services after receiving the services of an environmental consultant | | | | | |

## 3 PERCEPTIONS OF ENVIRONMENTAL CONSULTING SERVICES

| | | Strongly Agree | Agree | Neither Agree nor Disagree | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 3.1 | An environmental consultancy can not be realistically tested prior to appointment | | | | | |
| 3.2 | I do not have extensive experience in selecting and appointing environmental consultants | | | | | |
| 3.3 | The service rendered by an environmental consultant is complex | | | | | |
| 3.4 | The appointment of an environmental consultant may affect my organisations reputation | | | | | |

## 4. CONSIDERATION OF RISK

| | When selecting and appointing an environmental consultant: | Strongly Agree | Agree | Agree nor | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 4.1 | I have concerns about whether the service rendered will achieve the objectives set out | | | | | |
| 4.2 | I have concerns about the cost of the service | | | | | |
| 4.3 | I have concerns about incurring unforeseen costs | | | | | |
| 4.4 | I have concerns about the time the EIA process takes | | | | | |
| 4.5 | I have concerns about how business colleagues will react to my decision | | | | | |
| 4.6 | I have concerns about whether I will look foolish, based on my selection | | | | | |
| 4.7 | I have concerns about whether the process will result in personal injury or damage to possessions | | | | | |

## 5. MOTIVATION

5.1 **The motivation behind appointing an environmental consultant is:**

(Tick the single most important factor for you/your organisation)

| | |
|---|---|
| Legislative compliance | |
| Cost/competitive advantage | |
| Ethical/moral obligation | |

## 6. INFORMATION SOURCES

| | **Please rank from 1 (most important) – 10 (least important) the relative importance of each of the information sources listed below when selecting an environmental consultant.** | **1 -10** |
|---|---|---|
| 6.1 | Consultants that have made direct approaches (marketing) | |
| 6.2 | Specialised conferences, seminars or meetings | |
| 6.3 | Professional colleagues | |
| 6.4 | Similar organisations in your industry that have previously utilised the services of consultants | |
| 6.5 | Particular groups who are well informed (e.g. authorities, universities, etc.) | |
| 6.6 | Consultants with which you have had past experience | |
| 6.7 | The telephone directory/yellow pages | |
| 6.8 | The internet | |
| 6.9 | Advertisements in specialised journals and magazines | |
| 6.10 | Membership lists of various professional associations | |

## 7. SELECTION CRITERIA

**Please divide 100 points between the following selection criteria in terms of their importance when selecting an environmental consultant** (e.g 5 points for each of the least important factors, 10 or even 50 for each of the most important factors, collectively these points should total 100).

| | | |
|---|---|---|
| 7.1 | Professional and ethical reputation | |
| 7.2 | Extent of working experience (# years, # clients) | |
| 7.3 | Direct experience with projects similar in scope and nature (sector specific experience) | |
| 7.4 | Organisational structure and size (sufficient resources) | |
| 7.5 | Extent of subcontracting and related commissions | |
| 7.6 | Project management ability (e.g. regular updates, managing of subcontractors) | |
| 7.7 | Experience and good relationships with relevant authorities | |
| 7.8 | Knowledge and understanding of applicable legislation | |
| 7.9 | Professional qualifications | |
| 7.10 | Necessary expertise/skill | |
| 7.11 | Registration with Professional Bodies | |
| 7.12 | Professional indemnity insurance | |
| 7.13 | Quality Management System (ISO 9001) and/or Environmental Management System (ISO 14001) | |
| 7.14 | Potential conflicts of interest | |
| | | **100** |

## APPENDIX B:

## SUMMARY OF STATISTICAL RESULTS NOT PRESENTED IN DETAIL ELSEWHERE IN THE RESEARCH REPORT

## TABLE B1: ONE-TAILED T-TEST RESULTS REGARDING THE NATURE OF EIA SERVICES BASED ON COST CATEGORIES (AFTER TRANSFORMATION USING THE NORMAL DISTRIBUTION FITTING ALGORITHM).

| | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Assessment before commissioning EIA services is easy** | | | | | |
| Above R20M | -0.38 | 0.77 | -3.26 | 0.00 | Yes |
| Below R20M | -0.63 | 0.84 | -4.16 | 0.00 | Yes |
| | | | | | |
| **Assessment of EIA services after commissioning is easy** | | | | | |
| Above R20M | 0.36 | 0.80 | 2.93 | 0.01 | Yes |
| Below R20M | 0.22 | 0.86 | 1.44 | 0.16 | No |
| **Assessment of EIA services after commissioning is not easy** | | | | | |
| Above R20M | -0.84 | 0.94 | -5.92 | 0.00 | Yes |
| Below R20M | -0.76 | 0.86 | -4.95 | 0.00 | Yes |

## TABLE B2: ONE-TAILED T-TEST RESULTS REGARDING RISK DIMENSIONS BASED ON BUSINESS BACKGROUND (AFTER TRANSFORMATION USING THE NORMAL DISTRIBUTION FITTING ALGORITHM).

| | μ | σ | z-value | p-value | Significant |
|---|---|---|---|---|---|
| **Performance Risk** | | | | | |
| Developers | 0.58 | 0.76 | 2.86 | 0.01 | Yes |
| Public Sector | 0.60 | 1.28 | 1.61 | 0.13 | No |
| Intermediaries | 0.38 | 0.81 | 3.18 | 0.00 | Yes |
| | | | | | |
| Above R20M | 0.39 | 0.83 | 3.16 | 0.00 | Yes |
| Below R20M | 0.55 | 0.83 | 3.66 | 0.00 | Yes |
| | | | | | |
| **Financial Risk** | | | | | |
| Developers | 0.49 | 1.02 | 1.81 | 0.09 | No |
| Public Sector | 0.05 | 0.69 | 0.23 | 0.82 | No |
| Intermediaries | 0.13 | 0.78 | 1.14 | 0.26 | No |
| | | | | | |
| Above R20M | 0.15 | 0.82 | 1.17 | 0.25 | No |
| Below R20M | 0.26 | 0.79 | 1.82 | 0.08 | No |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Unforeseen Financial Risk** | | | | | |
| Developers | 0.34 | 1.02 | 1.25 | 0.23 | No |
| Public Sector | 0.68 | 0.81 | 2.91 | 0.01 | Yes |
| Intermediaries | 0.75 | 0.95 | 5.30 | 0.00 | Yes |
| | | | | | |
| Above R20M | 0.64 | 0.95 | 4.48 | 0.00 | Yes |
| Below R20M | 0.68 | 0.89 | 4.26 | 0.00 | Yes |
| | | | | | |
| **Temporal Risk** | | | | | |
| Developers | 1.37 | 0.32 | 15.90 | 0.00 | Yes |
| Public Sector | 1.23 | 1.13 | 3.77 | 0.00 | Yes |
| Intermediaries | 1.13 | 0.83 | 9.30 | 0.00 | Yes |
| | | | | | |
| Above R20M | 1.25 | 0.85 | 9.79 | 0.00 | Yes |
| Below R20M | 1.20 | 0.88 | 7.58 | 0.00 | Yes |
| | | | | | |
| **Social Risk** | | | | | |
| Developers | -0.65 | 0.45 | -5.42 | 0.00 | Yes |
| Public Sector | -0.65 | 0.54 | -4.17 | 0.00 | Yes |
| Intermediaries | -0.43 | 0.71 | -4.14 | 0.00 | Yes |
| | | | | | |
| Above R20M | -0.60 | 0.55 | -7.23 | 0.00 | Yes |
| Below R20M | -0.37 | 0.73 | -2.81 | 0.01 | Yes |
| | | | | | |
| **Psychological Risk** | | | | | |
| Developers | -0.76 | 0.54 | -5.22 | 0.00 | Yes |
| Public Sector | -0.73 | 0.43 | -5.84 | 0.00 | Yes |
| Intermediaries | -0.71 | 0.61 | -7.92 | 0.00 | Yes |
| | | | | | |
| Above R20M | -0.72 | 0.60 | -8.04 | 0.00 | Yes |
| Below R20M | -0.72 | 0.52 | -7.69 | 0.00 | Yes |
| | | | | | |
| **Physical Risk** | | | | | |
| Developers | -0.37 | 0.89 | -1.58 | 0.14 | No |
| Public Sector | -0.28 | 0.77 | -1.26 | 0.23 | No |
| Intermediaries | -0.17 | 0.92 | -1.25 | 0.22 | No |
| | | | | | |
| Above R20M | -0.33 | 0.85 | -2.53 | 0.02 | Yes |
| Below R20M | -0.12 | 0.86 | -0.77 | 0.45 | No |

**TABLE B3: TWO-TAILED T-TEST RESULTS REGARDING RISK DIMENSIONS BASED ON TOTAL COST OF DEVELOPMENT CATEGORIES (AFTER TRANSFORMATION USING THE NORMAL DISTRIBUTION FITTING ALGORITHM).**

| | t-value | p value | Significant |
|---|---|---|---|
| **Performance** | -0.78 | 0.44 | No |
| **Financial** | -0.59 | 0.56 | No |
| **Unforeseen Financial** | -0.18 | 0.85 | No |
| **Temporal** | 0.24 | 0.81 | No |
| **Social** | -1.17 | 0.25 | No |
| **Psychological** | 0.00 | 1.00 | No |
| **Physical** | -1.28 | 0.20 | No |

## TABLE B4: ONE-TAILED T-TEST RESULTS REGARDING INFORMATION SOURCES FOR THE TOTAL SAMPLE (FOLLOWING TRANSFORMATION USING THE STOCHASTIC SHOGUN PARAMETER ESTIMATION ALGORITHM).

| | FOR ALL RESPONDENTS | | | | |
|---|---|---|---|---|---|
| **Information Source** | **μ** | **σ** | **t-value** | **p-value** | **Significant** |
| Consultants with which you have had past experience | 2.01 | 1.27 | 28.09 | 0.00 | Yes |
| Professional/ business colleagues | 1.15 | 0.74 | 16.07 | 0.00 | Yes |
| Particular groups who are well informed (e.g. authorities, universities, etc.) | 0.74 | 0.49 | 10.34 | 0.00 | Yes |
| Similar organisations in your industry that have previously utilised the services of consultants | 0.81 | 0.53 | 11.38 | 0.00 | Yes |
| Consultants that have made direct approaches (marketing) | -0.01 | 0.02 | -0.12 | 0.90 | No |
| Membership lists of various professional associations | -0.07 | -0.01 | -0.96 | 0.34 | No |
| Specialised conferences, seminars or meetings | -0.28 | -0.14 | -3.87 | 0.00 | Yes |
| Advertisements in specialised journals and magazines | -0.74 | -0.43 | -10.38 | 0.00 | Yes |
| The internet | -1.45 | -0.87 | -20.30 | 0.00 | Yes |
| The telephone directory/yellow pages | -2.62 | -1.60 | -36.66 | 0.00 | Yes |

## TABLE B5: ONE-TAILED T-TEST RESULTS REGARDING INFORMATION SOURCES BASED ON BUSINESS BACKGROUND (FOLLOWING TRANSFORMATION USING THE STOCHASTIC SHOGUN PARAMETER ESTIMATION ALGORITHM).

| | Developers | | | | Public Sector | | | | Intermediaries | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Information Source** | **μ** | **t-value** | **p-value** | **Significant** | **μ** | **t-value** | **p-value** | **Significant** | **μ** | **t-value** | **p-value** | **Significant** |
| Consultants with which you have had past experience | 2.46 | 14.85 | 0.00 | Yes | 0.41 | 2.29 | 0.04 | Yes | 2.54 | 27.86 | 0.00 | Yes |
| Professional/ business colleagues | 1.26 | 7.64 | 0.00 | Yes | 0.35 | 1.93 | 0.08 | No | 1.16 | 16.22 | 0.00 | Yes |
| Particular groups who are well informed (e.g. authorities, universities, etc.) | 0.75 | 4.55 | 0.00 | Yes | 0.48 | 2.70 | 0.02 | Yes | 0.38 | 5.29 | 0.00 | Yes |
| Similar organisations in your industry that have previously utilised the services of consultants | 0.88 | 5.32 | 0.00 | Yes | 0.73 | 4.09 | 0.00 | Yes | 0.63 | 8.87 | 0.00 | Yes |
| Consultants that have made direct approaches (marketing) | 0.23 | 1.36 | 0.20 | No | -0.26 | -1.43 | 0.18 | No | -0.62 | -8.69 | 0.00 | Yes |
| Membership lists of various professional associations | -0.58 | -3.52 | 0.00 | Yes | -0.21 | -1.19 | 0.26 | No | -0.42 | -5.83 | 0.00 | Yes |
| Specialised conferences, seminars or meetings | -0.29 | -1.78 | 0.10 | No | 0.03 | 0.18 | 0.86 | No | -0.68 | -9.44 | 0.00 | Yes |
| Advertisements in specialised journals and magazines | -0.80 | -4.84 | 0.00 | Yes | -0.59 | -3.30 | 0.01 | Yes | -1.24 | -17.41 | 0.00 | Yes |
| The internet | -1.34 | -8.10 | 0.00 | Yes | -0.59 | -3.33 | 0.01 | Yes | -1.97 | -27.48 | 0.00 | Yes |
| The telephone directory/yellow pages | -2.92 | -17.66 | 0.00 | Yes | -1.73 | -9.69 | 0.00 | Yes | -3.13 | -43.71 | 0.00 | Yes |

## TABLE B6: ONE-TAILED T-TEST RESULTS REGARDING INFORMATION SOURCES BASED ON DEVELOPMENT COST (FOLLOWING TRANSFORMATION USING THE STOCHASTIC SHOGUN PARAMETER ESTIMATION ALGORITHM).

| | Cost <R20M | | | | Cost >R20M | | | |
|---|---|---|---|---|---|---|---|---|
| **Information Source** | **μ** | **t-value** | **p-value** | **Significant** | **μ** | **t-value** | **p-value** | **Significant** |
| Consultants with which you have had past experience | 1.40 | 12.60 | 0.00 | Yes | 1.50 | 21.04 | 0.00 | Yes |
| Professional/ business colleagues | 0.94 | 8.46 | 0.00 | Yes | 0.67 | 9.33 | 0.00 | Yes |
| Particular groups who are well informed (e.g. authorities, universities, etc.) | 0.80 | 7.22 | 0.00 | Yes | 0.45 | 6.35 | 0.00 | Yes |
| Similar organisations in your industry that have previously utilised the services of consultants | 0.83 | 7.48 | 0.00 | Yes | 0.58 | 8.17 | 0.00 | Yes |
| Consultants that have made direct approaches (marketing) | 0.08 | 0.74 | 0.46 | No | -0.14 | -1.89 | 0.06 | No |
| Membership lists of various professional associations | 0.06 | 0.57 | 0.57 | No | -0.18 | -2.50 | 0.01 | Yes |
| Specialised conferences, seminars or meetings | 0.23 | 2.07 | 0.05 | No | -0.05 | -0.65 | 0.52 | No |
| Advertisements in specialised journals and magazines | -0.47 | -4.25 | 0.00 | Yes | -0.37 | -5.16 | 0.00 | Yes |
| The internet | -0.95 | -8.50 | 0.00 | Yes | -1.02 | -14.23 | 0.00 | Yes |
| The telephone directory/yellow pages | -1.69 | -15.20 | 0.00 | Yes | -1.77 | -24.78 | 0.00 | Yes |

## TABLE B7: TWO-TAILED T-TEST RESULTS REGARDING INFORMATION SOURCES BASED ON BUSINESS BACKGROUND (FOLLOWING TRANSFORMATION USING THE STOCHASTIC SHOGUN PARAMETER ESTIMATION ALGORITHM).

| | | Developers Vs Public Sector | | | Public Sector vs Intermediaries | | | Developers vs Intermediaries | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Information Source** | **t-value** | **p-value** | **Significant** | **t-value** | **p-value** | **Significant** | **t-value** | **p-value** | **Significant** |
| 6.1 | Consultants with which you have had past experience | 7.21 | 0.00 | Yes | -8.46 | 0.00 | Yes | -0.50 | 0.62 | No |
| 6.2 | Professional/ business colleagues | 3.24 | 0.00 | Yes | -3.23 | 0.00 | Yes | 0.60 | 0.55 | No |
| 6.3 | Particular groups who are well informed (e.g. authorities, universities, etc.) | 0.95 | 0.35 | No | 0.41 | 0.68 | No | 2.16 | 0.04 | Yes |
| 6.4 | Similar organisations in your industry that have previously utilised the services of consultants | 0.52 | 0.60 | No | 0.39 | 0.70 | No | 1.42 | 0.16 | No |
| 6.5 | Consultants that have made direct approaches (marketing) | 1.69 | 0.10 | No | 1.45 | 0.15 | No | 4.89 | 0.00 | Yes |
| 6.6 | Membership lists of various professional associations | -1.30 | 0.21 | No | 0.81 | 0.42 | No | -0.96 | 0.34 | No |
| 6.7 | Specialised conferences, seminars or meetings | -1.15 | 0.26 | No | 2.80 | 0.01 | Yes | 2.20 | 0.03 | Yes |
| 6.8 | Advertisements in specialised journals and magazines | -0.74 | 0.46 | No | 2.59 | 0.01 | Yes | 2.56 | 0.01 | Yes |
| 6.9 | The internet | -2.63 | 0.01 | Yes | 5.43 | 0.00 | Yes | 3.60 | 0.00 | Yes |
| 6.10 | The telephone directory/yellow pages | -4.19 | 0.00 | Yes | 5.52 | 0.00 | Yes | 1.17 | 0.25 | No |

# DETAILED RESULTS OF THE FACTOR ANALYSIS ON SELECTION CRITERIA

## FACTOR ANALYSIS REPORT

### Descriptive Statistics Section

| Variables | Count | Mean | Standard Deviation | Communality |
|---|---|---|---|---|
| C1 | 77 | 11.98701 | 8.006155 | 0.238376 |
| C2 | 77 | 9.084415 | 6.733363 | 0.066143 |
| C3 | 77 | 11.93507 | 8.685041 | 0.043478 |
| C4 | 77 | 5.168831 | 4.037334 | 0.142948 |
| C5 | 77 | 3.162338 | 2.570636 | 0.147805 |
| C6 | 77 | 5.714286 | 3.653071 | 0.243406 |
| C8 | 77 | 8.935065 | 5.594494 | 0.414092 |
| C9 | 77 | 8.818182 | 4.37991 | 0.400110 |
| C10 | 77 | 3.597403 | 2.598125 | 0.398022 |
| C11 | 77 | 3.032468 | 2.492538 | 0.388683 |
| C12 | 77 | 3.558442 | 2.75654 | 0.503503 |
| C13 | 77 | 6.88961 | 4.804482 | 0.207789 |
| C14 | 77 | 3.98052 | 3.041859 | 0.307001 |
| C15 | 77 | 4.012987 | 3.928618 | 0.172413 |

### Correlation Section

| | Variables | | | | |
|---|---|---|---|---|---|
| **Variables** | **C1** | **C2** | **C3** | **C4** | **C5** |
| C1 | 1.000000 | 0.025832 | -0.212896 | -0.006648 | -0.213591 |
| C2 | 0.025832 | 1.000000 | -0.239080 | -0.143558 | 0.035876 |
| C3 | -0.212896 | -0.239080 | 1.000000 | 0.127526 | -0.073780 |
| C4 | -0.006648 | -0.143558 | 0.127526 | 1.000000 | 0.038528 |
| C5 | -0.213591 | 0.035876 | -0.073780 | 0.038528 | 1.000000 |
| C6 | 0.057682 | -0.017328 | -0.274723 | 0.197354 | 0.254060 |
| C8 | -0.262205 | 0.048700 | -0.019044 | -0.265150 | -0.201456 |
| C9 | -0.265168 | -0.107332 | -0.114807 | -0.224073 | -0.160661 |
| C10 | -0.240944 | -0.087724 | -0.233254 | -0.016641 | 0.281294 |
| C11 | -0.275755 | -0.221056 | -0.140915 | -0.056122 | 0.143428 |
| C12 | -0.190156 | -0.147722 | -0.222154 | -0.039914 | 0.215897 |
| C13 | -0.150121 | -0.306689 | -0.130721 | -0.114683 | -0.083493 |
| C14 | -0.319184 | -0.108005 | -0.048858 | -0.249901 | 0.166576 |
| C15 | -0.078850 | -0.167172 | -0.233283 | -0.253158 | -0.052327 |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

**Correlation Section**

| | Variables | | | | |
|---|---|---|---|---|---|
| **Variables** | **C6** | **C8** | **C9** | **C10** | **C11** |
| C1 | 0.057682 | -0.262205 | -0.265168 | -0.240944 | -0.275755 |
| C2 | -0.017328 | 0.048700 | -0.107332 | -0.087724 | -0.221056 |
| C3 | -0.274723 | -0.019044 | -0.114807 | -0.233254 | -0.140915 |
| C4 | 0.197354 | -0.265150 | -0.224073 | -0.016641 | -0.056122 |
| C5 | 0.254060 | -0.201456 | -0.160661 | 0.281294 | 0.143428 |
| C6 | 1.000000 | -0.128719 | -0.267679 | 0.178342 | -0.052796 |
| C8 | -0.128719 | 1.000000 | 0.362244 | -0.357130 | -0.325386 |
| C9 | -0.267679 | 0.362244 | 1.000000 | -0.075316 | -0.059414 |
| C10 | 0.178342 | -0.357130 | -0.075316 | 1.000000 | 0.298182 |
| C11 | -0.052796 | -0.325386 | -0.059414 | 0.298182 | 1.000000 |
| C12 | 0.088573 | -0.359810 | -0.190373 | 0.416704 | 0.350174 |
| C13 | -0.312755 | -0.133422 | 0.243987 | 0.084146 | 0.203846 |
| C14 | 0.094517 | -0.143116 | -0.143719 | 0.362358 | 0.202695 |
| C15 | -0.070792 | -0.108919 | -0.006361 | 0.159723 | 0.443380 |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

| | Variables | | | |
|---|---|---|---|---|
| **Variables** | **C12** | **C13** | **C14** | **C15** |
| C1 | -0.190156 | -0.150121 | -0.319184 | -0.078850 |
| C2 | -0.147722 | -0.306689 | -0.108005 | -0.167172 |
| C3 | -0.222154 | -0.130721 | -0.048858 | -0.233283 |
| C4 | -0.039914 | -0.114683 | -0.249901 | -0.253158 |
| C5 | 0.215897 | -0.083493 | 0.166576 | -0.052327 |
| C6 | 0.088573 | -0.312755 | 0.094517 | -0.070792 |
| C8 | -0.359810 | -0.133422 | -0.143116 | -0.108919 |
| C9 | -0.190373 | 0.243987 | -0.143719 | -0.006361 |
| C10 | 0.416704 | 0.084146 | 0.362358 | 0.159723 |
| C11 | 0.350174 | 0.203846 | 0.202695 | 0.443380 |
| C12 | 1.000000 | 0.075007 | 0.518764 | 0.205267 |
| C13 | 0.075007 | 1.000000 | 0.063549 | 0.059331 |
| C14 | 0.518764 | 0.063549 | 1.000000 | 0.107924 |
| C15 | 0.205267 | 0.059331 | 0.107924 | 1.000000 |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

**Bar Chart of Absolute Correlation Section**

| | Variables | | | | |
|---|---|---|---|---|---|
| **Variables** | **C1** | **C2** | **C3** | **C4** | **C5** |
| C1 | | \| | \|\|\|\|\| | \| | \|\|\|\|\| |
| C2 | \| | | \|\|\|\|\| | \|\|\| | \| |
| C3 | \|\|\|\|\| | \|\|\|\|\| | | \|\|\| | \|\| |
| C4 | \| | \|\|\| | \|\|\| | | \| |
| C5 | \|\|\|\|\| | \| | \|\| | \| | |
| C6 | \|\| | \| | \|\|\|\|\| | \|\|\|\| | \|\|\|\|\| |
| C8 | \|\|\|\|\| | \| | \| | \|\|\|\|\| | \|\|\|\|\| |
| C9 | \|\|\|\|\| | \|\|\| | \|\|\| | \|\|\|\|\| | \|\|\|\| |
| C10 | \|\|\|\|\| | \|\| | \|\|\|\|\| | \| | \|\|\|\|\| |
| C11 | \|\|\|\|\| | \|\|\|\|\| | \|\|\| | \|\| | \|\|\| |
| C12 | \|\|\|\| | \|\|\| | \|\|\|\|\| | \| | \|\|\|\|\| |
| C13 | \|\|\|\| | \|\|\|\|\|\| | \|\|\| | \|\|\| | \|\| |
| C14 | \|\|\|\|\|\| | \|\|\| | \| | \|\|\|\|\| | \|\|\|\| |
| C15 | \|\| | \|\|\|\| | \|\|\|\|\| | \|\|\|\|\| | \|\| |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

| | Variables | | | | |
|---|---|---|---|---|---|
| **Variables** | **C6** | **C8** | **C9** | **C10** | **C11** |
| C1 | \|\| | \|\|\|\|\|\| | \|\|\|\|\|\| | \|\|\|\|\| | \|\|\|\|\|\| |
| C2 | \| | \| | \|\|\| | \|\| | \|\|\|\|\| |
| C3 | \|\|\|\|\|\| | \| | \|\|\| | \|\|\|\|\| | \|\|\| |
| C4 | \|\|\|\| | \|\|\|\|\|\| | \|\|\|\|\| | \| | \|\| |
| C5 | \|\|\|\|\|\| | \|\|\|\|\| | \|\|\|\| | \|\|\|\|\|\| | \|\|\| |
| C6 | | \|\|\| | \|\|\|\|\|\| | \|\|\|\| | \|\| |
| C8 | \|\|\| | | \|\|\|\|\|\|\|\| | \|\|\|\|\|\|\|\| | \|\|\|\|\|\|\| |
| C9 | \|\|\|\|\|\| | \|\|\|\|\|\|\|\| | | \|\| | \|\| |
| C10 | \|\|\|\| | \|\|\|\|\|\|\|\| | \|\| | | \|\|\|\|\|\| |
| C11 | \|\| | \|\|\|\|\|\| | \|\| | \|\|\|\|\|\| | |
| C12 | \|\| | \|\|\|\|\|\|\| | \|\|\|\| | \|\|\|\|\|\|\|\| | \|\|\|\|\|\|\| |
| C13 | \|\|\|\|\|\| | \|\|\| | \|\|\|\|\| | \|\| | \|\|\|\|\| |
| C14 | \|\| | \|\|\| | \|\|\| | \|\|\|\|\|\|\| | \|\|\|\|\| |
| C15 | \|\| | \|\|\| | \| | \|\|\|\| | \|\|\|\|\|\|\|\| |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

**Bar Chart of Absolute Correlation Section**

| | Variables | | | |
|---|---|---|---|---|
| **Variables** | **C12** | **C13** | **C14** | **C15** |
| C1 | \|\|\|\| | \|\|\|\| | \|\|\|\|\|\|\| | \|\| |
| C2 | \|\|\| | \|\|\|\|\|\| | \|\|\| | \|\|\|\| |
| C3 | \|\|\|\|\| | \|\|\| | \| | \|\|\|\|\| |
| C4 | \| | \|\|\| | \|\|\|\|\| | \|\|\|\|\| |
| C5 | \|\|\|\|\| | \|\| | \|\|\|\| | \|\| |
| C6 | \|\| | \|\|\|\|\|\| | \|\| | \|\| |
| C8 | \|\|\|\|\|\|\| | \|\|\| | \|\|\| | \|\|\| |
| C9 | \|\|\|\| | \|\|\|\|\| | \|\|\| | \| |
| C10 | \|\|\|\|\|\|\|\| | \|\| | \|\|\|\|\|\|\| | \|\|\|\| |
| C11 | \|\|\|\|\|\|\| | \|\|\|\|\| | \|\|\|\|\| | \|\|\|\|\|\|\|\| |
| C12 | | \|\| | \|\|\|\|\|\|\|\|\| | \|\|\|\|\| |
| C13 | \|\| | | \|\| | \|\| |
| C14 | \|\|\|\|\|\|\|\|\|\| | \|\| | | \|\|\| |
| C15 | \|\|\|\|\| | \|\| | \|\|\| | |

Phi=0.205570 Log(Det|R|)=-4.904858 Bartlett Test=345.79 DF=91 Prob=0.000000

**Eigenvalues after Varimax Rotation**

| | | Individual | Cumulative | |
|---|---|---|---|---|
| **No.** | **Eigenvalue** | **Percent** | **Percent** | **Scree Plot** |
| 1 | 2.283336 | 54.62 | 54.62 | \|\|\|\|\|\|\|\|\|\| |
| 2 | 1.390434 | 33.26 | 87.87 | \|\|\|\|\|\| |
| 3 | 0.780346 | 18.67 | 106.54 | \|\|\|\| |
| 4 | 0.648143 | 15.50 | 122.04 | \|\|\|\| |
| 5 | 0.361623 | 8.65 | 130.69 | \|\| |
| 6 | 0.290296 | 6.94 | 137.63 | \|\| |
| 7 | 0.159392 | 3.81 | 141.45 | \| |
| 8 | -0.018652 | -0.45 | 141.00 | \| |
| 9 | -0.049951 | -1.19 | 139.81 | \| |
| 10 | -0.124553 | -2.98 | 136.83 | \| |
| 11 | -0.183842 | -4.40 | 132.43 | \| |
| 12 | -0.268631 | -6.43 | 126.00 | \|\| |
| 13 | -0.381436 | -9.12 | 116.88 | \|\| |
| 14 | -0.705751 | -16.88 | 100.00 | \|\|\|\| |

**Eigenvectors after Varimax Rotation**

| | Factors | |
|---|---|---|
| **Variables** | **Factor1** | **Factor2** |
| C1 | 0.172242 | 0.350419 |
| C2 | 0.121514 | 0.152737 |
| C3 | 0.137943 | -0.002612 |
| C4 | 0.023587 | 0.319333 |
| C5 | -0.223810 | 0.154993 |
| C6 | -0.122604 | 0.387915 |
| C8 | 0.337769 | -0.332354 |
| C9 | 0.149657 | -0.501155 |
| C10 | -0.417244 | 0.015232 |
| C11 | -0.385412 | -0.188469 |
| C12 | -0.469465 | 0.004269 |
| C13 | -0.109498 | -0.360339 |
| C14 | -0.359016 | -0.095068 |
| C15 | -0.224633 | -0.202799 |

**Bar Chart of Absolute Eigenvectors after Varimax Rotation**

| | Factors | |
|---|---|---|
| **Variables** | **Factor1** | **Factor2** |
| C1 | \|\|\|\| | \|\|\|\|\|\|\| |
| C2 | \|\|\| | \|\|\|\| |
| C3 | \|\|\| | \| |
| C4 | \| | \|\|\|\|\|\| |
| C5 | \|\|\|\|\| | \|\|\|\| |
| C6 | \|\|\| | \|\|\|\|\|\|\| |
| C8 | \|\|\|\|\|\| | \|\|\|\|\|\| |
| C9 | \|\|\| | \|\|\|\|\|\|\|\|\| |
| C10 | \|\|\|\|\|\|\|\| | \| |
| C11 | \|\|\|\|\|\|\| | \|\|\|\| |
| C12 | \|\|\|\|\|\|\|\|\| | \| |
| C13 | \|\|\| | \|\|\|\|\|\|\| |
| C14 | \|\|\|\|\|\|\| | \|\| |
| C15 | \|\|\|\|\| | \|\|\|\|\| |

**Factor Loadings after Varimax Rotation**

| | Factors | |
|---|---|---|
| **Variables** | **Factor1** | **Factor2** |
| C1 | 0.274514 | 0.403755 |
| C2 | 0.189799 | 0.173548 |
| C3 | 0.208259 | -0.010316 |
| C4 | 0.048697 | 0.374936 |
| C5 | -0.331727 | 0.194326 |
| C6 | -0.169321 | 0.463397 |
| C8 | 0.496605 | -0.409237 |
| C9 | 0.205551 | -0.598213 |
| C10 | -0.629631 | 0.039837 |
| C11 | -0.589884 | -0.201792 |
| C12 | -0.708959 | 0.029664 |
| C13 | -0.180144 | -0.418733 |
| C14 | -0.546190 | -0.093152 |
| C15 | -0.347611 | -0.227110 |

**Bar Chart of Absolute Factor Loadings after Varimax Rotation**

| | Factors | |
|---|---|---|
| **Variables** | **Factor1** | **Factor2** |
| C1 | \|\|\|\|\|\| | \|\|\|\|\|\|\|\| |
| C2 | \|\|\|\| | \|\|\|\| |
| C3 | \|\|\|\|\| | \| |
| C4 | \| | \|\|\|\|\|\|\| |
| C5 | \|\|\|\|\|\| | \|\|\|\| |
| C6 | \|\|\|\| | \|\|\|\|\|\|\|\| |
| C8 | \|\|\|\|\|\|\|\| | \|\|\|\|\|\|\| |
| C9 | \|\|\|\|\| | \|\|\|\|\|\|\|\|\| |
| C10 | \|\|\|\|\|\|\|\|\|\|\| | \| |
| C11 | \|\|\|\|\|\|\|\|\|\| | \|\|\|\|\| |
| C12 | \|\|\|\|\|\|\|\|\|\|\|\|\| | \| |
| C13 | \|\|\|\| | \|\|\|\|\|\|\| |
| C14 | \|\|\|\|\|\|\|\|\| | \|\| |
| C15 | \|\|\|\|\|\| | \|\|\|\|\| |

**Communalities after Varimax Rotation**

| | Factors | | |
|---|---|---|---|
| **Variables** | **Factor1** | **Factor2** | **Communality** |
| C1 | 0.075358 | 0.163018 | 0.238376 |
| C2 | 0.036024 | 0.030119 | 0.066143 |
| C3 | 0.043372 | 0.000106 | 0.043478 |
| C4 | 0.002371 | 0.140577 | 0.142948 |
| C5 | 0.110043 | 0.037762 | 0.147805 |
| C6 | 0.028670 | 0.214736 | 0.243406 |
| C8 | 0.246617 | 0.167475 | 0.414092 |
| C9 | 0.042251 | 0.357859 | 0.400110 |
| C10 | 0.396435 | 0.001587 | 0.398022 |
| C11 | 0.347963 | 0.040720 | 0.388683 |
| C12 | 0.502624 | 0.000880 | 0.503503 |
| C13 | 0.032452 | 0.175337 | 0.207789 |
| C14 | 0.298324 | 0.008677 | 0.307001 |
| C15 | 0.120834 | 0.051579 | 0.172413 |

**Bar Chart of Communalities after Varimax Rotation**

| | Factors | | |
|---|---|---|---|
| **Variables** | **Factor1** | **Factor2** | **Communality** |
| C1 | \|\| | \|\|\|\| | \|\|\|\|\| |
| C2 | \| | \| | \|\| |
| C3 | \| | \| | \| |
| C4 | \| | \|\|\| | \|\|\| |
| C5 | \|\|\| | \| | \|\|\| |
| C6 | \| | \|\|\|\|\| | \|\|\|\|\| |
| C8 | \|\|\|\|\| | \|\|\|\| | \|\|\|\|\|\|\|\| |
| C9 | \| | \|\|\|\|\|\|\| | \|\|\|\|\|\|\|\| |
| C10 | \|\|\|\|\|\|\| | \| | \|\|\|\|\|\|\| |
| C11 | \|\|\|\|\|\| | \| | \|\|\|\|\|\|\| |
| C12 | \|\|\|\|\|\|\|\|\|\| | \| | \|\|\|\|\|\|\|\|\|\| |
| C13 | \| | \|\|\|\| | \|\|\|\|\| |
| C14 | \|\|\|\|\| | \| | \|\|\|\|\|\| |
| C15 | \|\|\| | \|\| | \|\|\|\| |

**Factor Structure Summary after Varimax Rotation**

| | Factors |
|---|---|
| **Factor1** | **Factor2** |
| C12 | C9 |
| C10 | C6 |
| C11 | C13 |
| C14 | C8 |
| C8 | C1 |

**Factor Score after Varimax Rotation**

| | Factors | |
|---|---|---|
| **Row** | **Factor1** | **Factor2** |
| 2 | -0.3740 | 0.5429 |
| 3 | 1.9519 | 1.2214 |
| 4 | 1.5062 | -2.1470 |
| 5 | -1.1736 | -0.8991 |
| 6 | -0.9045 | -0.6227 |
| 7 | 0.6722 | -0.7991 |
| 8 | 1.9515 | 2.4127 |
| 9 | 0.0139 | -3.8319 |
| 10 | 1.8144 | -1.2066 |
| 11 | 2.4701 | -0.9287 |
| 12 | 2.9271 | -1.3718 |
| 13 | 0.9550 | 0.4200 |
| 14 | -0.2352 | -0.6072 |
| 15 | -0.2282 | -0.3062 |
| 16 | 0.9862 | -0.4054 |
| 17 | -0.3526 | 0.0145 |
| 18 | -0.5033 | 1.2512 |
| 19 | -1.1922 | 0.9617 |
| 20 | -2.2415 | 0.2581 |
| 21 | 0.1456 | 0.0442 |
| 22 | -1.2606 | -1.8172 |
| 23 | -0.1419 | 0.2395 |
| 24 | 1.0760 | 0.4087 |
| 25 | -0.7469 | -0.4331 |
| 26 | -1.0627 | 0.4413 |
| 27 | -0.2156 | 0.2377 |
| 28 | -0.1648 | 0.6597 |
| 29 | -0.4247 | -0.3612 |
| 30 | -0.6613 | 0.0069 |
| 31 | 1.5238 | 4.8337 |
| 32 | 0.5009 | 1.0149 |
| 33 | 1.1762 | 1.5239 |
| 34 | -1.5750 | -1.2010 |
| 35 | 2.6103 | -2.2095 |
| 36 | 1.7803 | -1.1057 |
| 37 | 0.2916 | 1.5395 |
| 38 | 0.8352 | -1.4835 |
| 39 | -0.6604 | 0.4237 |
| 40 | 1.0500 | 0.4578 |
| 41 | 0.5214 | -1.0891 |
| 42 | -0.2836 | -0.8398 |
| 43 | 0.2629 | -0.7495 |
| 44 | -0.7655 | 0.2390 |
| 45 | -0.9118 | -0.5093 |

## Factor Score after Varimax Rotation

| | Factors | |
|---|---|---|
| **Row** | **Factor1** | **Factor2** |
| 46 | -0.8158 | 0.7749 |
| 47 | 0.2028 | 0.4112 |
| 48 | -1.2023 | -0.1610 |
| 49 | -0.7575 | -0.5303 |
| 50 | 1.0412 | 0.1330 |
| 51 | -1.6832 | 0.0255 |
| 52 | 1.6857 | -0.7025 |
| 53 | -1.0399 | 1.2862 |
| 54 | 0.4126 | -1.2704 |
| 55 | -1.0339 | 0.3147 |
| 56 | 0.4510 | 1.5675 |
| 57 | -1.8514 | -0.4983 |
| 58 | -0.0308 | -0.1218 |
| 59 | -0.0389 | 1.3140 |
| 60 | -0.1261 | 0.0206 |
| 61 | -0.5487 | 0.4564 |
| 62 | -1.0427 | 0.1824 |
| 63 | -0.8838 | -0.1974 |
| 64 | -0.4904 | 0.4046 |
| 65 | 0.2915 | 1.7519 |
| 66 | 0.4685 | 0.1802 |
| 67 | 1.0785 | 0.1289 |
| 68 | 0.4580 | -0.1176 |
| 69 | -0.7589 | 0.6751 |
| 70 | -1.4535 | -0.2285 |
| 71 | -1.9334 | -0.1750 |
| 72 | -1.4715 | -0.6055 |
| 73 | -1.0445 | 0.5046 |
| 74 | 0.2033 | -2.7834 |
| 75 | -0.4767 | 0.4602 |
| 76 | 0.4206 | 0.8437 |
| 77 | -0.2298 | -0.7778 |
| 78 | 1.2573 | 2.5052 |

## Plots Section

