

**AN EXAMINATION OF PERCEIVED RISK AND TRUST  
AS DETERMINANTS OF ONLINE PURCHASING  
BEHAVIOUR: A STUDY WITHIN THE U.S.A. GEMSTONE  
INDUSTRY**

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This thesis is presented for the degree of

Doctor of Philosophy

Murdoch University

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March 2007

I declare that this thesis is my own account of my research and contains as its main content work, which has not been previously submitted for a degree at any tertiary education institution.

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## **ABSTRACT**

Several studies have shown that there is a negative impact of perceived risk on trust and on the online purchasing behaviour of buyers. Other research suggests a positive impact. However, these relationships have been suggested by using evidence obtained from the purchase of inexpensive, uncomplicated, and hence low risk products such as books, compact disks (CD's, DVD's), or clothing. Exploring whether such associations could be generalised within the complex, costly high risk and credence products such as gemstones has not been examined. This gap in the literature was addressed in this study.

The results of the study suggest that perceived risk and trust are significant determinants of the online purchasing behaviour of gemstone buyers. The study also shows that the type of Internet marketing strategy used by the seller (the place strategy) and the buyer's privacy, and security concerns influence a buyer's perceived risk to purchase gemstones online. Furthermore, Internet fraud protection has been found to be the only significant factor that has an influence on the buyer's trust to purchase gemstones online. These results have implications for the literature, and all sellers and consumers.

## ACKNOWLEDGEMENTS

To my family, especially my father who passed away shortly before I submitted this thesis, and to my beloved husband, Kitti, for his unwavering encouragement.

I am deeply grateful to my supervisors, Dr. Antonia Girardi and Dr. Steven Ward for their professional advice, steadfast guidance and invaluable support. I also wish to acknowledge Dr. Timo Vuori for his assistance with this thesis.

I also wish to thank Associate Professor Dr. Beverley Thiele and Ms. Georgina Wright for their support.

My sincerest gratitude is extended to the Dhurakijpundit University scholarship committee for their staunch and unswerving support throughout my Ph.D. candidature.

I wish to thank Associate Professor Thanida Chitnomrat, Dr. Pilun P. and my academic colleagues for their assistance and good humour throughout some challenging moments of my Ph.D. journey.

And finally: A special thank you to Margaret Aylmore and Michelle Ward for their editing of this thesis.

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# CHAPTER 1: INTRODUCTION

*“...the Internet is a revolutionary technology that is transforming our world”*

*(Bill Gates, Chairman and Chief Software Architect, Microsoft Corporation, 2000)*

## **The Internet and Online Purchasing**

The utilisation of Internet-based Electronic Commerce (EC) has rapidly expanded in the last decade. It brings massive benefits to traditional business processes (E. M. Awad, 2004; Turban, King, Lee, & Viehland, 2004). For example, the easy and speedy access to information provided by the Internet saves time, reduces search-costs and enables quick comparisons for buyers and sellers (S. Kim & Montalto, 2002). Berthon, Pitt, Katsikeas, & Berthon (1999) and Corbitt (2002) argue that Internet-based EC encourages the exchange of information and transactions across regional boundaries and time zones. Moreover, using Internet-based EC can bring easier and cheaper global markets within the reach of buyers and sellers (Krishnamurthy, 2006).

For business users there are several benefits of Internet-based EC. Corbitt (2002) suggests that by using the Internet, businesses could inexpensively increase the range of new suppliers and business hours. This could be done for example, by searching for new suppliers who offer a competitive price through the Internet instead of other conventional methods such as facsimile or telephone. By employing electronic transactions, Internet-based EC reduces the transaction costs associated with trading and

thus improves profitability (J. C. Anderson, 1995; Robinson, 2001). For example, in using electronic bill-payments the paper-based costs and length of the billing-cycle are reduced.

Other advantages of Internet-based EC usage are highlighted in other studies. Karoway (1997) and Winder (2001) note that a great deal of information provided on the Internet, especially suppliers' prices, makes it easier for businesses to obtain cheaper prices which in turn can enhance competitiveness. In addition, the speedy communication of online transactions such as purchase orders can bring a reduction in operating costs involved in holding surplus inventory (Corbitt, 2002). It can be seen from the above that Internet-based EC helps businesses to improve their ability to compete through lower costs and improved efficiency (Halligan, 2002; Hornby, 2002; United Nations, 2001). As such, use of the Internet has important implications for business trading both in aspects of buying and selling activities.

It is probably these advantages that explain the significant growth in the online purchasing value in recent years (Shop.org, 2006b). According to the *2006 State of Retailing Online Report of Shop.org* study, the value of online purchases was expected to reach US\$211.4 billion in 2006, a 20 percent increase from US\$176.4 billion in 2005 (E. Burns, 2006) and a 111.4 percent increase from US\$100 billion in 2004 (Forrester Research, 2006). This report also estimates that computer hardware and software including videos and compact disks (CD's and DVD's) will be the most popular product group purchased online (US\$16.8 billion) by the end of 2006, followed by automobile and automotive parts (US\$15.9 billion) and clothing and footwear (US\$13.8 billion)

respectively. Forester Research forecasts that the value of online purchases will reach US\$316 billion by 2010 (Shop.org, 2006a). Although there has been significant growth in online purchases there is still a relatively small range of product groups and services purchased online.

Jupiter Research (Shop.org, 2006b) for example, reported in 2003 that the most popular online shopping category were books (39%) followed by compact disks (CD's and DVD's), tapes and albums (36%), and apparel and clothing (34%). While the Internet has been used to trade numerous physical product categories (see Table 1, p.26) ranging from the risky products which are high value, and complicated, such as automotive parts, most items purchased appear to be low risk products which have low value and are less complicated (L. B. Kaplan, Szybillo, & Jacoby, 1974; Laurent & Kapferer, 1985; Mitchell, 1999), such as clothing, videos, DVDs, and books. It is not surprising therefore that most academic research has focused on these more commonly purchased products and services. There seems to be little research on the online purchases of more complicated, expensive and risk products and even less when such products are purchased by organisational buyers. An example of high risk, product purchasing carried out predominately by organisational buyers is the purchasing of gemstones.

The estimated value of the purchasing of gemstones is significant. For example, since 2003 the import value to the U.S.A. which is the largest gemstone importer in the world, is over US\$600 million a year (Beard, 2005). Gemstone traders have used the Internet together with traditional selling methods since late 1999 (Beard, 2001a; Prost, 2001b, 2005; Zborowski, 2005). However, the surveys conducted by *Coloredstone Magazine*

(cited in Beard, 2001a; Prost, 2005) reported that only a minority of gemstone dealers sell gemstones online. This is consistent with the prevailing industry practise, in which gemstone dealers prefer to use personal, face-to-face contact to transact business (e.g. visiting international gemstone exhibitions, other companies) (Beard, 2001a; Elmore, 2001; Hughes, 1997; Siripant & Mansrisuk, 2001; Weinburg, 2001).

Other industry practitioners also report a low utilisation of online gemstone trading. According to Meredith (2002), Prost (2005) and Siripant & Mansrisuk (2001), online gemstone trading volume accounts for approximately 2% of the world gemstone trading value. In 2001, Merrill Lynch (cited in Krausz, 2001) forecast that over a quarter of the world's estimated US\$8 billion annual gemstone sales would be conducted online by 2005, however this has not eventuated. Given the benefits of online trading, there is a need to investigate which factors influence the online purchasing behaviour of such a high value, risky product. Important criteria for online purchase behaviour from the consumer behaviour literature may help explain the recent reluctance by commercial traders to purchase gemstones online. Two important factors may be **risk** and **trust**.

In the study of online consumer behaviour, two important psychological theories have emerged as explanations of the online purchasing behaviour of buyers (Heijden, Verhagen, & Creemers, 2003; Jarvenpaa, Tractinsky, & Vitale, 1999; Palmer, Bailey, & Faraj, 2000; Slyke, Comunale, & Belanger, 2002). The first is the buyer's level of perceived risk which influences willingness to purchase online (Gifford & Bernard, 2006; M. Kim & Lennon, 2000; Vijayasarathy & Jones, 2000; Yeung & Morris, 2006), the nature of the online purchasing decision (Dillon & Reif, 2004), and the value and

volume of online purchasing (Doolin, Dillon, Thompson, & Corner, 2005; Miyazaki & Fernandez, 2001). The buyer's level of perceived risk can be influenced by the availability and credibility of the information required to make a decision. For example, a buyer's concerns about privacy has been found to increase the buyer's perceived risk to purchase online (S. Kim & Montalto, 2002). Another important antecedent of perceived risk is the buyer's concern about information security (Heijden et al., 2003). These concerns not only increase the level of perceived risk but also reduce the likelihood of purchasing online (Chellappa & Pavlou, 2002).

The second psychological theory is about trust and how it influences buyers in purchasing online (Belanger, Hiller, & Smith, 2002; Dillon & Reif, 2004; Fung & Lee, 1999; Gefen, 2000; Shim, Slyke, Jiang, & Johnson, 2004; Vijayarathy & Jones, 2000). As buyers and sellers can not see each other when purchasing online (Turban et al., 2004), trust seems to be as important as perceived risk (Ba, 2001) and both are pertinent issues requiring examination. Buyer's trust to purchase can be influenced by the information a buyer requires in order to evaluate the purchase. For example, having appropriate Internet fraud protection practices (e.g. using seals from well-known external payment providers) could help gain a buyer's trust to purchase online (Chellappa, 2003; Wind & Mahajan, 2001). Similarly, a seller's perceived reputation (e.g. size and eminence) also affects the trust of online buyers (Jarvenpaa et al., 1999).

## **Research Problems**

On the basis of the previous discussion, the following research problems have been identified:

1. Are there factors influencing the online purchasing behaviour of gemstone buyers?  
And if so
2. How do these factors impact on the online purchasing behaviour of gemstone buyers?

## **Research Questions**

It has been suggested that, all things being equal, the level of a buyer's perceived risk in online purchases is determined by the nature of information the buyer requires to assess the purchase (Ha, 2002). Another way of stating this is that an online purchaser's requirement for information occurs because of the level of buyer's perceived risk involved with the transaction (Hugstad, Taylor, & Bruce, 1987; Tan, 1999). This is because perceived risk is an uncomfortable state for consumers, who will look for mechanisms to reduce it. Ha (2002) suggests that pre-purchase information can help reduce a buyer's perceived risk toward the purchase. In an online environment, the type of pre-purchase information which can reduce perceived risk includes product information (Poole & Muller, 2001); the type of Internet marketing strategy used by a seller such as product variety and pricing strategy (G. Gao, 2005; Gopal, Thompson, Tung, & Whinston, 2005); how privacy concerns of personal information and disclosure of financial details are addressed (S. Kim & Montalto, 2002; Ward, Bridges, & Chitty,

2005); and how associated concerns about security are addressed, especially the use of systems to prevent unauthorised access to personal information (Fung & Lee, 1999; Metzger, 2004). These factors which influence perceived risk, whilst recognised as important in the literature have never been systematically examined in one study. Therefore, the first research question to be examined is:

**Research Question 1:**

How do concerns about privacy, security, product information and Internet marketing strategy used by the seller impact on the perceived risk of online gemstone buyers?

While perceived risk is an important consideration to the success of online purchasing (Dillon & Reif, 2004; Fung & Lee, 1999; Heijden et al., 2003), the literature has also suggested that a buyer's level of trust may be determined by a number of associated factors. These are Internet fraud protection, perceived reputation and assurance of the seller (S. E. Kaplan & Nieschwietz, 2003). Other studies suggest that such pre-purchase information can also help decrease the buyer's perceived risk and thereby promote the buyer's trust in the purchase (Tan, 1999; Morgan & Hunt, 1994). This includes the use of well-known financial institutions for payment and having a guarantee of product delivery (Grazioli & Jarvenpaa, 2000; "Internet Fraud Statistics", 2005); the seller's perceived reputation and size (Jarvenpaa et al., 1999); and assurance such as product guarantees (S. E. Kaplan & Nieschwietz, 2003). Whether these factors influence risk or trust or both is examined in this research. Previous research has concentrated on products which are either frequently purchased or well-known, low risk brands with high trust in the seller such as books (Dillon & Reif, 2004; Doolin et al., 2005; Jarvenpaa et al., 1999; Miyazaki & Fernandez, 2000), compact disks (Heijden et al., 2003) and

clothing (Doolin et al., 2005; Miyazaki & Fernandez, 2000). There remains a need for a further investigation as to whether with the online purchase of risky, unbranded products such as gemstones, trust with the seller will be crucial to continued transactions. This gives rise to the second research question as:

**Research Question 2:**

How do Internet fraud protection, perceived reputation, and assurance impact on the trust of online gemstone buyers?

The literature documents the relationship between the perceived risk, trust and the online purchasing behaviour of buyers. Perceived risk is described as having a negative relationship with trust (Kimery & McCord, 2002; Swaminathan, Lepkowska-White, & Rao, 1999; Slyke et al., 2002). Jarvenpaa et al. (1999) found that higher trust in an online seller decreased the perceived risk, which in turn increased a buyer's willingness to purchase online. Heijden et al. (2003) advocated that reduced perceived risk in fact increased trust, and increased the buyer's intention to purchase online. Nonetheless, these results appear to have some limitations in their application to online gemstone purchase. Firstly, their results were derived from exploring low cost, regularly purchased, consumer products (i.e. books and CD's) (L. B. Kaplan, Szybillo, & Jacoby, 1974; Mitchell, 1999) whilst this thesis focuses on a more expensive and infrequently purchased product, gemstones. Secondly, their findings were based on a consumer's perspective while the present study focuses on organisational buyers of gemstones (Meredith, 2002). Moreover, it can be seen that the importance of perceived risk and trust to the online purchasing behaviour of buyers has been rarely examined concurrently within one study. Thus, it is worthwhile to investigate whether these

associations can apply to organisational buyers in the specific industry of gemstones.

This study therefore posits the third research question as:

**Research Question 3:**

What are the relationships between perceived risk, trust and the online purchasing behaviour of gemstone buyers?

**Focus of the Study**

On a basis of the research problems and research questions discussed previously, the major focus of this study is:

1. To determine factors influencing the perceived risk of online gemstone buyers.
2. To determine factors influencing the trust of online gemstone buyers.
3. To determine the relationship among the perceived risk, the trust and the online purchasing behaviour of gemstone buyers.

**Justifications of the study**

The results of this study have an important implication in two aspects:

1. Theoretical and methodological, and
2. Practical.

Each aspect is elaborated as follows:

## **Theoretical and Methodological Justification of the Study**

This study will contribute to the literature on online marketplace behaviour in the following ways. First, as discussed, to investigate the impact of pre-purchased information (e.g. product information and seller's privacy and security practices) on the buyer's perceived risk; and the influence of pre-purchase information (e.g. seller's practices concerning Internet fraud protection and assurance) on the buyer's trust to purchase expensive, risky, infrequently purchased, unbranded products such as gemstones. Previous studies suggested that perceived risk reduces online purchases (Doolin et al., 2005; Miyazaki & Fernandez, 2001). Other research has advocated that buyer's perceived risk is negatively related to buyer's trust to purchase online (Jarvenpaa et al., 1999; Heijden et al., 2003). However, generalisations of these relationships to other contexts, such as more risky and infrequently purchased products such as gemstones, have not been properly investigated.

Second, it is not clear whether trust has a positive effect on online purchases (Shim et al., 2004) or simply reduces the level of perceived risk. Jarvenpaa et al. (1999) suggested higher trust reduced perceived risk, which increased the buyer's willingness to purchase online. The direct effect of trust on the buyer's purchasing behaviour in this study however was not explored, and it is unclear whether trust had a direct effect on online purchases, or simply reduced the level of perceived risk. On the contrary, Heijden et al. (2003) noted that reduced perceived risk did increase trust and attitude towards online purchases, which in turn increased a buyer's intention to purchase online. Again, the direct effect of perceived risk on that buyer's purchasing behaviour was not investigated.

It is notable from these studies that the role of trust and perceived risk are not usually researched at the same time. Moreover, these studies did not explore the online purchasing behaviour in terms of the level of online purchasing. A further investigation of these disregarded issues may help confirm this relationship and contribute new empirical evidence about the purchase of online risky products such as gemstones to the literature.

Third, despite the growing body of the online purchasing research that has focused on the buyer's perceived risk, there is little research which explores the relationship between the type of Internet marketing strategy and buyer's perceived risk. For example, product strategies such as product variety appear to be examined in relation to a firm's performance (Y. Chen, 2004; G. Gao, 2005; Y. Hu, 2005); distribution strategies such as a website's functionality and efficiency (e.g. quick download time and ease of navigation) (Harpel-Burke, 2005; Norris, 2006). Moreover, earlier studies tend to examine a buyer's concerns regarding the privacy of information in relation to online purchasing behaviour (Bush, Bush, & Harris, 1998; Caudill & Murphy, 2000; Culnan, 1999; Gauzente, 2004; Hoffman, Novak, & Peralta, 1999; Korgaonkar & Wolin, 1999) and the trust to purchase online (Belanger et al., 2002; Chellappa & Pavlou, 2002; Luo, 2002; Metzger, 2004; Palmer et al., 2000; Shim et al., 2004). Relatively little research has investigated buyer's concerns about privacy as a factor that determines risk and hence online purchases (Miyazaki & Fernandez, 2001). Also, it seems that prior studies addressing buyer's concerns about privacy are provided from mostly a consumer's perspective (Teltzrow & Kobsa, 2004). In addition, research which investigated the relationship between buyer's concerns regarding security and their perceived risk to

purchase online, is limited (Miyazaki & Fernandez, 2001). Buyer's concerns about information security tend to be examined in relation to online purchasing only, rather than as an antecedent to perceived risk (Chellappa, 2003; Miyazaki & Fernandez, 2001; Otuteye, 2002). Therefore, this study will contribute new perspectives to the literature by exploring a buyer's perceived risk to conduct online purchase from an organisational buyer's viewpoint.

Finally, a theoretical framework does not appear to exist which examines the role of perceived risk and trust in determining online purchases, along with the combination of antecedents which influence both perceived risk and trust. Previous studies tend to explore the antecedents using different contexts. D. J. Kim, Cho, & Rao (2000) proposed a conceptual framework that investigated the association between online purchasing behaviour, the level of perceived risk and the perceived benefits. Miyazaki & Fernandez (2001) proposed a framework that examined the relationship between the online purchasing rate and the perceived risk to purchase online as determined by the buyer's Internet experience, and buyer's concerns about privacy and security. T. Gao, Wang, Sirgy, & Bird (2002) and Morgan & Hunt (1994) proposed a conceptual model which suggested that the nature of the relationship between buyer and seller had an influence on the buyer's level of trust, for example, the length of relationship and the seller's perceived reputation (Jarvenpaa et al., 1999). This thesis combines these theories to develop a new research paradigm which examines the role of perceived risk and trust in relation to the online purchasing behaviour of buyers. The three factors examined are:

1. A buyer's concerns about product information, and the seller's privacy and security practices;

2. A buyer's considerations about the type of Internet marketing strategies used by the seller, Internet fraud protection and the seller's assurance;
3. Relationship marketing (i.e. the seller's perceived reputation)

Thus, this study will contribute a more comprehensive explanation of the determinants of perceived risk and trust and the effect of both on online purchases.

### **Practical Justification of the Study**

From a practical perspective, exploring the buyer's perceived risk and trust in relation to online purchasing behaviour has important strategic implications for three parties: sellers, buyers and the gemstone industry. First, from a seller's managerial viewpoint, the results will provide an understanding of the behaviour of online buyers. A seller could benefit by using this knowledge to develop and implement effective strategies to reduce a buyer's perceived risk, and improve online sales. There is as yet, no framework for managers to effectively comprehend and reduce buyer's perceived risk and encourage a buyer's trust to purchase online, risky products such as gemstones. Reduction in perceived risk increases a buyer's trust and increases online purchases (Heijden et al., 2003; Jarvenpaa et al., 1999). It is also possible that greater trust between a seller and a buyer reduces the perceived risk of the transaction. This study therefore assists marketers by providing alternatives when developing strategic plans for online sales management, since it also investigates the role of a number of antecedents of trust and perceived risk (Internet fraud protection, perceived reputation, assurance; concerns about product information, privacy and security and the Internet marketing strategy used by the seller) many of which can be influenced by marketing strategy and technology.

From a buyer's viewpoint, there may be benefits from the positive effects following a seller's implementation of the results of this thesis. For example, a seller's use of a well-known financial institution for payment may increase a buyer's confidence in online purchasing. The gemstone industry could implement the suggestions from this study to develop strategies to increase the level of gemstone trading online by providing an environment where buyer's perceived risk is reduced and a buyer's trust is higher. This environment could benefit the gemstone industry as a whole, by the reduction in production costs and higher usage of gemstone trading online would result in more efficient selling and buying techniques in the industry (J. C. Anderson, 1995; Robinson, 2001), could provide a higher efficiency to the industry and hence expand trading values. Overall, this study may help determine the factors that produce a safer environment for the buyer when trading risky and expensive products such as gemstones.

## **Outline of the Study**

The thesis consists of five chapters. This introductory chapter provides the broad scope of the study, where the research problems, research questions, and justifications of the study are explained. A review of the existing literature regarding the perceived risk, trust, and the online purchasing behaviour of buyers is presented in Chapter 2. This chapter discusses the current theoretical knowledge of previous studies in relation to the relevance of perceived risk, trust, and online purchasing behaviours. This literature is then used to develop the conceptual model of the study. The influencing factors of

perceived risk and trust are also elaborated and the research hypotheses for the study are outlined.

Chapter 3 details the research design employed in this study. It outlines the sample, measurement, survey development, data collection and procedure, and the analysis method employed. Chapter 4 presents the results of the study and consists of the validation of measurements using factor analysis and confirmatory factor analysis as well as the testing of the hypotheses of this study. It also examines the answers to the research questions. Chapter 5 is a discussion of the significant findings in comparison to previous studies and provides suggestions for industry practitioners. It also considers the implications of this study and outlines directions for future research.

## **Chapter Summary**

This chapter has outlined the fundamental structure of the study. It details the relevant literature surrounding the issues that lead to the research problems, the research questions and the focus of the study. It highlights the importance of examining:

1. The influencing factors of a buyer's perceived risk to purchase online,
2. The influencing factors of a buyer's trust to purchase online, and
3. Relationships between the perceived risk, the trust and the online purchasing behaviour of buyers.

The following chapter will critically investigate and discuss the relevant literature in relation to the focus of this study.

# **CHAPTER 2: LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES**

## **Introduction**

A comprehensive understanding of consumer behaviour, how and why buyers purchase (or don't purchase) products and services is the key to business success (Neal, Quester, & Hawkins, 2000). Consumer behaviour theories suggest four major issues influencing buyer behaviour – cultural, social, personal and psychological (Arnould, Price, & Zinkhan, 2004; Kotler, 1997, 2001). In the study of online consumer behaviour in recent times, two important psychological theories have emerged as explanations of the degree of online purchases; these are perceived risk and trust (Heijden et al., 2003; Jarvenpaa et al., 1999; Palmer et al., 2000; Slyke et al., 2002). For example, perceived risk and trust have found to be antecedents of a buyer's willingness (Jarvenpaa et al., 1999) and a buyer's intention (Kimery & McCord, 2002) to purchase books and kitchen accessories, online.

Perceived risk is described as having a negative relationship with trust (Mitchell, 1999; Morgan & Hunt, 1994). Perceived risk and trust have long been pertinent factors to examine buyer's behaviour in the traditional (offline) purchasing literature (Chaudhuri, 1998a; Dion, Easterling, & Miller, 1995; Doney & Cannon, 1997; Hawes, 1994; Hoover, Green, & Saegert, 1978). While buyers tend to have some level of perceived risk in most traditional purchasing, it is suggested that in online purchases it should be a more salient factor (Doolin et al., 2005). This is because buyers are not able to inspect

the products and are required to make an advance payment, so they have to rely on trust (E. M. Awad, 2004; Liebermann & Stashevsky, 2002). Thus, for marketers, managing perceived risk and encouraging trust are considered the key factors to the success of online businesses (Dillon & Reif, 2004; Fung & Lee, 1999; Gefen, 2000; Vijayasarathy & Jones, 2000). To date, there have been a number of studies addressing the relevance of perceived risk, trust and online purchasing behaviour. Jarvenpaa et al. (1999) developed and tested a theoretical model about the relationship between the antecedent of trust (i.e. online seller's perceived reputation and size), the consequence of trust (i.e. perceived risk, attitudes toward online seller), and a buyer's willingness to purchasing online. They found that higher trust in an online seller decreased perceived risk; and that such reduced perceived risk increased a buyer's willingness to purchase online. Heijden et al. (2003) proposed and examined a conceptual model about the relationship between attitudes towards online purchasing (e.g. perceived risk and trust in the online seller as "trust antecedents") and a buyer's intention to purchase online. The results also suggested that reduced perceived risk, increased trust and attitude towards online purchasing, which in turn increased a buyer's intention to purchase online. Their models were also in line with previous online purchasing models (Jarvenpaa, Tractinsky, & Vitale, 2000; Pavlou, 2001).

Nevertheless, there seems to have been three limitations on generalising the results of these models. First, the above relationships were derived from less expensive and low risk consumer products such as books and compact disks of music (CD's). Jarvenpaa et al. (1999) studied purchasing books online and Heijden et al. (2003) explored purchasing CD's online. Whether their findings could be generalised to other product

categories has not been examined. Among several product categories, the specific product of gemstones appears to present unique qualities for investigation. It is noted that the higher value products, more complicated and involved products are more risky than the lower value, simpler and low-involvement convenience products (L. B. Kaplan et al., 1974; Laurent & Kapferer, 1985; Mitchell, 1999). Gemstones are considered more risky than general consumer products, due to their higher value and more complicated characteristics which usually require an experienced person to accurately assess their value (Hughes, 1997; ICA, 2001; Weinburg, 2001). As such, findings provided from exploring the perceived risk of consumer products such as books and CD's may not apply to complex and more expensive products such as gemstones. For example, in terms of financial risk, a gemstone, buyer may lose about US\$200 if he or she thought they had purchased a carat of high-quality blue sapphires (Jeffery, 2001). While a buyer may lose about US\$36 if purchasing a single cook book (i.e. *Jamie Oliver: Jamie's Italy*); or about US\$18 if purchasing a DVD of cooking programs (i.e. *Jamie's Great Italian Escape*). It is more likely that perceived risk and trust will be more important in the gemstone markets where financial losses can be significantly higher. In addition, gemstones are also typically difficult to brand and tend to be infrequent purchases, which suggests a greater role for trust in the purchasing processes. Given the abovementioned characteristics, gemstones have long been purchased using face-to-face contact unlike the proliferation of online trading in other industries (Beard, 2001a; Hughes, 1997; Siripant & Mansrisuk, 2001; Weinburg, 2001). For example, despite the success of using Internet as a channel of distribution in many industries (e.g. books, airlines, tourist), there remains very low usage of gemstone-trading online with approximately only 2% of trades taking place online over the last few years (Krausz,

2001; Meredith, 2002; Prost, 2005). This suggests there may be factors influencing such a low utilisation and that they should be explored. As discussed, these may have occurred because of the negative relationship between perceived risk and online purchasing behaviour (Doolin et al., 2005; Miyazaki & Fernandez, 2001) and the positive relationship between trust and online purchasing behaviour (Fung & Lee, 1999; Gefen, 2000; Zborowski, 2005). However, so far the existence of the role of perceived risk and trust for complex and costly products such as gemstones has not been explored. There is also a need for a further investigation on whether the results of Jarvenpaa et al. (1999) and Heijden et al. (2003) still hold true for more risky, expensive, unbranded and less frequently purchased products such as gemstones.

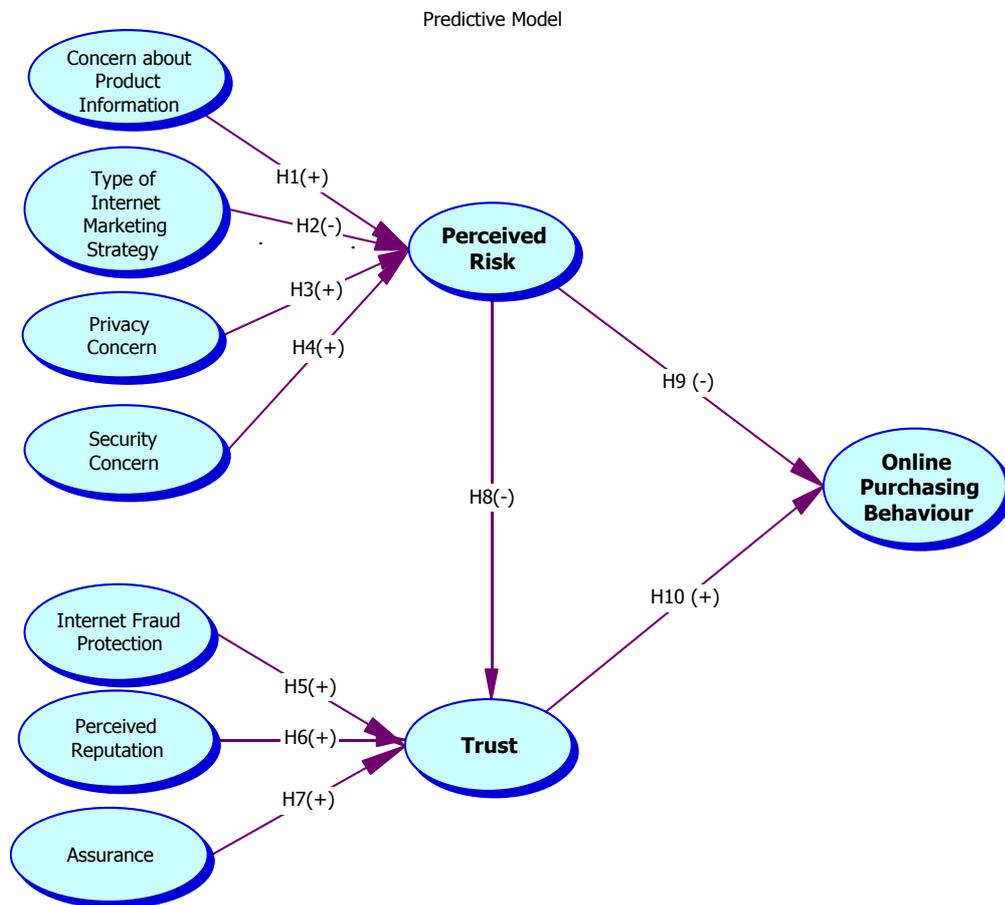
Second, Jarvenpaa et al. (1999) and Heijden et al. (2003) examined the consumer as end-user. This contrasts with the gemstone industry, where consumer's are likely to be organisational buyers (Meredith, 2002). This is because gemstones tend to be bought for further manufacturing (e.g. to be set in the jewellery) or for resale (Elmore, 2001; Porncharern, 2006; Siripant & Mansrisuk, 2001). It is therefore important to explore whether their results can be generalised to the organisational buyer.

The third limitation is that the direct effects of perceived risk and trust on online purchasing behaviour have not been fully explored in past research. Jarvenpaa et al. (1999) suggested that higher trust in an online seller decreased perceived risk which increased a buyer's willingness to purchase online. The direct effect of trust on buyer's purchasing behaviour was not examined. Heijden et al. (2003) advocated that reduced

perceived risk did increase trust and attitude towards online purchasing, which in turn increased a buyer's intention to purchase online. Again, a direct effect of perceived risk on that buyer's purchasing behaviour was not investigated. While numerous studies suggested a direct relationship between perceived risk and online purchasing behaviour (Doolin et al., 2005; Vijayasathy & Jones, 2000; Yeung & Morris, 2006) and between trust and online purchasing behaviour (Gefen, 2000; Koufaris & Hampton-Sosa, 2002), there remains a need for research in which the direct effects of perceived risk and trust on online purchasing behaviour can be further confirmed; and the study in this context can be expanded using the new evidence from the product category of gemstones.

In this study, the models of Jarvenpaa et al. (1999) and Heijden et al. (2003) were used and amended to map a conceptual framework for determining the relationship between perceived risk, trust and online purchasing behaviour of gemstone buyers. This is presented in Figure 1 which contains the three salient constructs of perceived risk, trust, and the online purchasing behaviour. According to this model, trust is examined in terms of the overall trust in the purchase (trust in online trade and trust in the online seller) rather than the trust in the online seller. The online purchasing behaviour was explored in respect of the level of online purchasing, rather than the intention and the willingness to purchase online. The model proposes that perceived risk will have a negative impact on trust and a negative impact on online purchasing behaviour; and that trust will have a positive impact on the online purchases. This model also forms the basis of discussion for this chapter.

**Figure 1: Conceptual Model of the Study**



The model suggests that perceived risk is determined by a number of factors (i.e. concern about product information, type of Internet marketing strategy used by seller, privacy and security concerns). These factors tend to be based on information the buyer requires to assess the purchase. Both consumers and organisational buyers require information about products when they make a decision to purchase (Kotler, 1997; Lamb, Hair, & McDaniel, 2006). This pre-purchase information can help reduce a buyer's perceived risk towards the purchase (Ha, 2002; Hugstad et al., 1987; Tan, 1999).

Examples of these are described in the literature, where it is suggested that providing product information such as performance data could help mitigate the buyer's perceived risk towards online purchasing (Tan, 1999). Also, providing accurate product information could further reduce the buyer's concern (Beard, 2001b; Prost, 2001a). Other information that the seller provided on the Internet such as the type of marketing strategies used (e.g. use of multi-channel distribution, or choice of distribution) could also help reduce the buyer's perceived risk to purchase (H.-J. Lee & Huddleston, 2006; Poel & Leunis, 1999). Furthermore, buyer's concerns about privacy have an influence on buyer's perceived risk to purchase online (S. Kim & Montalto, 2002). Also, as being considered as one of the trust antecedents (Heijden et al., 2003), a buyer's concern about information security may have an effect on perceived risk to conduct an online purchase (Chellappa & Pavlou, 2002). Therefore, availability of the above information is an important determinant of the level of risk that buyers perceive towards online purchasing, particularly when purchasing high-risk products such as gemstones. As such, this study-model proposes that;

1. Concern about product information will have a positive impact on the perceived risk;
2. The type of Internet marketing strategy used by the seller will reduce perceived risk;
3. The concerns about the seller's privacy practices will increase perceived risk;
4. The concerns about seller's security practices will also increase perceived risk.

Similarly, additional antecedents were also included into the proposed model in order to identify factors which influence trust. Trust, like perceived risk, can be seen as a versatile construct applicable in various disciplines (Morgan & Hunt, 1994). Trust is considered one of the central issues the buyer considers when making a decision to purchase (Howard & Sheth, 1969). It is suggested that trust in any transaction is based on credible information about the other party, usually the seller (Brody & Cunningham, 1968). This is true in traditional (Morgan & Hunt, 1994) and online purchasing (S. E. Kaplan & Nieschwietz, 2003). The literature elaborates on examples of this information. First, it is advocated that having appropriate Internet fraud protection practices (e.g. using seals from well-known external payment providers) could help gain a buyer's trust to purchase online (Chellappa & Pavlou, 2002; Chellappa, 2003; Luo, 2002; Wind & Mahajan, 2001). A seller's perceived reputation (e.g. size and reputation) also affects the trust of online buyers (Jarvenpaa et al., 1999). In addition, the assurance practices which online sellers provided (e.g. product guarantees) could assist in increasing the buyer's trust to purchase online (S. E. Kaplan & Nieschwietz, 2003). On the basis of the above discussion, this information is imperative to a buyer's trust to purchase online especially when buying risky products such as gemstones. Thus, the proposed model also aims to predict that a seller's practices, which include Internet fraud protection, will increase the buyer's level of trust and goodwill towards the perceived reputation of the seller. Effective assurance policies provided by the seller should also increase the buyer's trust to purchase online, from the organisation.

The result of this study-model is expected to contribute to the body of empirical evidence regarding the perceived risk, trust and their relationship to online purchasing behaviour, and provide a portrait of these relationships in the specific industry of gemstones. Issues in the proposed model are discussed in the following sections, which define and discuss, and propose a set of hypotheses.

## **Salient Constructs and Hypotheses Development**

### **1. Perceived Risk**

Bauer (1960, p. 24) originally introduced the construct of perceived risk into the marketing literature, stating that “consumer behaviour involves risk in the sense that any action of a consumer will produce consequences which he cannot anticipate with anything approximating certainty, and some of which at least are likely to be unpleasant”. Since then, perceived risk has become a common construct used by researchers in consumer behaviour (Chaudhuri, 1998b; Hoover et al., 1978), organisational behaviour (Doney & Cannon, 1997; Upah, 1980), and in online consumer behaviour (Archer & Yuan, 2000; Gifford & Bernard, 2006; Ha, 2002).

There is one remarkable feature of these applications of perceived risk. It is evident that perceived risk has been adopted to investigate a variety of product categories. Table 1 (p.26) presents examples of studies examining perceived risk across product categories. In considering the offline purchasing channel, it appears from these examples that perceived risk can be applied to several product categories ranging from convenience,

low involvement products such as apparel and personal hygienic products (Jacoby & Kaplan, 1972; M. Kim & Lennon, 2000) to high involvement products such as automobiles (Srinivasan & Ratchford, 1991). In line with the suggestion of Mitchell (1999), food and grocery items are also another popular category investigated by researchers (Gifford & Bernard, 2006; Roseman & Kurzynske, 2006; Wu, Holmes, & Alexander, 1984). Perceived risk has also been studied in products that are associated with poor health-outcomes such as tobacco (Pauline, Colleen, Greg, & Kathryn, 2002).

In the online consumer behaviour literature, perceived risk is recognised as very important, but the research has been limited to only a few product categories, making generalisations about its impact difficult to determine (Miyazaki & Fernandez, 2000). Research on the role of perceived risk in online purchases has been limited to four product categories; these are books (Dillon & Reif, 2004; Doolin et al., 2005; Jarvenpaa et al., 1999), music, CD's and computer software (Doolin et al., 2005; Heijden et al., 2003; Miyazaki & Fernandez, 2000). New areas of study of perceived risk (that do not exist in traditional purchasing) such as a Website's features (i.e. privacy and security practices) have also emerged (S. Kim & Montalto, 2002; Miyazaki & Fernandez, 2001). These studies suggest that the higher the risk the less likely products are to be purchased online (Doolin et al., 2005; Jarvenpaa et al., 1999; Miyazaki & Fernandez, 2001). Nevertheless, it is notable from these examples that a specific product such as gemstones was rarely used when investigating the perceived risk both in offline and online purchasing.

**Table 1: Examples of Studies on Perceived Risk across Product Categories**

<b>Products</b>	<b>Studies</b>	<b>Results</b>
<b>Offline Channel</b>		
Apparel (i.e. suit, overcoat, dress shoes); drug (i.e. toothpaste, vitamins, aspirins); hygienic (i.e. deodorants, razor blades); recreational (i.e. sports cars, colour TV, playing cards)	(Jacoby & Kaplan, 1972)	Similar types of products had similar risk types (e.g. performance, financial). Overall risk could be explained by several risk types.
Convenience products (e.g. deodorant, headache pill, coffee, car, TV)	(L. B. Kaplan, Szybillo, & J., 1974; Laurent & Kapferer, 1985; Mitchell, 1999)	Higher value, more complicated and more involving products were more risky than products less in those characteristics.
Grocery (e.g. soft drinks)	(Wu, Holmes, & Alexander, 1984)	Risk taking was positively associated with the number of generic products purchased, but risk takers would not routinely purchase generic items perceived as high risk.
Foods (i.e. Kentucky)	(Roseman & Kurzynske, 2006)	There was a relationship between food safety perceptions and behaviours. Kentucky consumers who perceived higher risks exhibited safer food handling behaviours.
Organic food (e.g. vegetable, fruit)	(Gifford & Bernard, 2006)	The potential benefits from organic growing methods and perceived risk from conventional agricultural methods increased the purchase likelihood of organic food.
Apparel television shopping	(M. Kim & Lennon, 2000)	The amount of information perceived from a television-shopping segment selling apparel was negatively related to perceived risk and positively related to purchasing intention
Automobile	(Srinivasan & Ratchford, 1991)	Perceived risk had a positive relationship with benefits of information search. Benefits of information search were positively related to amount of information search (e.g. time taking, number of dealer visit).
Health (i.e. cigarette)	(Pauline, Colleen, Greg, & Kathryn, 2002)	There was a relationship between risk in smoking and benefits to quit.
<b>Online Channel</b>		
17 consumer products (e.g. books, clothing, computer, cosmetic, foods, hygienic, music, sporting goods, toys, electronics)	(Miyazaki & Fernandez, 2000)	Prevalence of privacy and security statements was not related to perceived risk. However, percentage of privacy and security statements in a category was positively related to category-purchase intention.
Website's features (privacy and security practices)	(Miyazaki & Fernandez, 2001)	Perceived risk of conducting online purchases was negatively related to the rate of online purchasing. Concern about system security was negatively related to the rate of online purchasing.
Website's features (privacy practices)	(S. Kim & Montalto, 2002)	Perceived risk of privacy invasion significantly reduced the probability of use of online technology.
Books	(Jarvenpaa, Tractinsky, & Vitale, 1999)	Higher trust in online seller decreased perceived risk which increased a buyer's willingness to purchase online.
CDs	(Heijden, Verhagen, & Creemers, 2003)	Reduced perceived risk increased trust, and attitude towards online purchasing which increased a buyer's intention to purchase online.
Textbooks	(Dillon & Reif, 2004)	Consumer risk and shopping experience perceptions influenced experienced online purchasing decision more than customer service.
20 consumer products (e.g. books, computer software, travel and accommodation, movies and music, clothing, gifts, toys)	(Doolin, Dillon, Thompson, & Corner, 2005)	Perceived risk was negatively related to the amount and frequency of online purchasing.

Overall, it can be seen that perceived risk has been extensively used in studies looking at both offline and online purchasing behaviour and in a variety of product categories. Based on the above examples, this thesis considers perceived risk as a versatile construct that is applicable to many areas. Thus, it can be considered appropriate to apply the theory of perceived risk to examine the specific area of gemstone purchasing.

### **1.1 Interpretations of Perceived Risk**

Perceived risk has been diversely interpreted across many disciplines. There appears to have no universally accepted definition of perceived risk (Jacoby & Kaplan, 1972; Mitchell, 1999; Pires, Stanton, & Eckford, 2004). However, interpretations of perceived risk seem to emerge within two areas, which are:

1. Risk and uncertainty, and
2. Consequences.

#### **Risk and Uncertainty**

Perceived risk was initially defined as an incident that has a known probability (Knight, 1948). Knight distinguished it from uncertainty, which has an unknown probability. Bauer (1960) supported this by interpreting risk as any action in which buyers might deal with the unpleasant consequences they cannot anticipate with certainty. It seemed that Bauer defined the risk from a hypothetical and subjective perspective, rather than an objective one. Bauer (1960) also considered that risk was dissimilar to uncertainty as risk had a known probability while uncertainty did not. Similarly, in examining buyers'

attitudes toward brand acceptability, Peter and Ryan (1976) recognised that uncertainty was different from perceived risk.

However, Cunningham (1967) argued that known probability was elusive in examining a buyer's purchasing behaviour, because buyers tended to ignore it. He suggested risk and uncertainty should be perceived similarly. Correspondingly, Mitchell (1999) suggested that because buyers were unable to realise the exact probability of consequences, risk and uncertainty could be considered to be similar and should be acknowledged as risk rather than uncertainty.

Addressing risk and uncertainty to be alike seems to be appropriate when considering risks that buyers perceived towards the purchase. Thus, this thesis considers that uncertainty is similar to perceived risk and uncertainty can be acknowledged as a component of perceived risk (Cunningham, 1967; Mitchell, 1999).

### Consequences

In addition, some researchers defined perceived risk in terms of positive consequences. For example, Arrow (1965) investigated the relevance of perceived risk and buyer satisfaction. He found the buyer to be more satisfied with a smaller risk rather than a larger one. Stone & Gronhaug (1993) suggested that when examining purchasing behaviour, the perceived risk should be defined in terms of a positive outcome (e.g. satisfaction that is a desired outcome of a purchase decision) from purchasing, rather than a negative outcome.

Other studies argued that perceived risk should be interpreted as an aspect of negative consequences. In that interpretation, perceived risk was described as being comprised of two different facets; chance and peril, which in turn were exacerbated by negative outcomes (Kogen & Wallack, 1964). Cox (1967) provided support for this view by interpreting risk as the perception of loss from an unsatisfactory purchase. Correspondingly, perceived risk was conceptualised as the negative consequences (e.g. danger) that could arise with the use of products (Bettman, 1973). Peter & Ryan (1976) also corroborated this view by defining perceived risk as the probability of negative consequences that occurred with brand choices.

Interpretation of perceived risk in terms of negative consequences was also used to explore business buyer behaviour. Upah (1980) defined perceived risk as the loss from a bad purchasing decision, perceived by individuals in a buying unit. Stone & Winter (1987) further supported this by interpreting perceived risk as the determined expectation of loss; the larger this loss could be, the larger the risk perceived by these individuals.

By combining these diverse perceptions, others interpreted perceived risk as a combination of positive and negative perceptions. For example, using the case study of the possibility of a win or loss in a lottery draw, the perceived risk was interpreted as an alternative solution involving both positive (winning) and negative consequences (not winning) (Weber & Bottom, 1989).

It seems that whether perceived risk should be interpreted in terms of positive or negative consequences depends on the focus of the examination. For example, when the aim was to examine the loss that individuals in an organisational buying-unit (e.g. purchasing agents) perceived from a bad purchasing decision, Upah (1980) defined perceived risk on the negative side. With the aim of exploring the satisfaction of the buyer, Arrow (1965) interpreted perceived risk to be on the positive side.

Interpretation of perceived risk in negative consequences appears to correspond with a buyer's perceptions towards the risk in general, and the attention on the factors concerning buyers. Thus, perceived risk can be considered as a negative consequence resulting from the purchase (Stone & Winter, 1987; Upah, 1980).

## **1.2 Interpretations of Perceived Risk in Online Purchasing**

While buyers tend to perceive some risk in offline purchasing, they are likely to associate more risk with online purchasing (Doolin et al., 2005). It is suggested that this risk in an online transaction may result from a buyer's inability to inspect and compare a product's quality for themselves (Tan, 1999), and from providing and compromising personal information (Doolin et al., 2005; Liebermann & Stashevsky, 2002). Perceived risk associated with online purchasing received less attention in early online purchasing literature (Jarvenpaa & Todd, 1997). Some scholars (Pires et al., 2004) noted that perceived risk towards online purchasing has been disregarded in buyer behaviour research. This is perhaps because the importance of perceived risk to online purchasing

was not obvious at that time. To date it is evident that a buyer's perceived risk is one of the major impediments to the growth of online commerce (E. M. Awad, 2004; Culnan, 1999; FTC, 2000; United Nations, 2001, 2005); there have been a number of studies addressing this issue. Similar to the interpretations of perceived risk in offline purchasing literature (as discussed in section 1.1, p.27), perceived risk in the online purchasing has been conceptualised diversely across studies. Examples of these studies are summarised in Table 2 (p.32).

There appears to be two common issues arising from these examples. First, it can be seen that perceived risk has been defined differently according to the focus of the study. For instance, with the focus on Internet experience, concerns regarding the privacy and security issues, and online purchasing, Miyazaki & Fernandez (2001) interpreted perceived risk as risk associated with a buyer's Internet experience and a buyer's concerns regarding the privacy and security issues related to online purchases. With the focus on the information that buyers required to purchase an online-brand product, Ha (2002) described perceived risk as being associated with online pre-purchase information (i.e. brand, word-of-mouth communication, customised information) and an online brand purchase by the consumer. These examples corroborate that a universally accepted definition of perceived risk remains illusive in the online purchasing literature (Mitchell, 1999).

**Table 2: Examples of Interpretations of Online Perceived Risk across Studies**

<b>Studies</b>	<b>Interpretations of Perceived Risk</b>	<b>Consequences</b>
(Jarvenpaa, Tractinsky, & Vitale, 1999)	Perceived risk associated with a buyer's willingness to purchase online seller.	Negative outcomes based on risk, potential for loss and negative situation from the decision to purchase a product from the online seller.
(Tan, 1999)	Perceived risk associated with Internet shopping behaviour.	Negative outcomes based on product performance risk (i.e. inability to inspect product), economic risk (i.e. inability to compare price or quality of similar products, making a poor purchase decision),
(Miyazaki & Fernandez, 2000)	Perceived risk associated with privacy and security disclosures and purchase intentions	Negative outcomes based on general risk towards the online purchasing (i.e. how risky to purchase products online).
(D. J. Kim, Cho, & Rao, 2000)	Perceived risk associated with the amount and frequency of online purchasing.	Negative outcomes based on price-oriented style (e.g. financial costs/charges, attractive of special rewards and discounts), net-oriented style (e.g. frequency and amount of time of using a WWW browsers and Internet skill), and time-oriented style (e.g. duration of Internet experience).
(Miyazaki & Fernandez, 2001)	Perceived risk associated with Internet experience, and concerns regarding the privacy and security of online purchases, and rate of online purchasing	Negative outcomes based on general risk towards the online purchasing (e.g. purchasing products online is safe or risky).
(S. Kim & Montalto, 2002)	Perceived risk towards the use of online technology by consumers.	Negative outcomes based on privacy invasion.
(Ha, 2002)	Perceived risk associated with online pre-purchase information (i.e. brand, word-of-mouth communication, customised information) and a brand purchase online by the consumer.	Negative outcomes based on the expectation of possible loss from performance risk (i.e. products do not meet expectations), psychological risk (i.e. negative effect on consumer image and privacy), financial risk (e.g. costs from bad purchase), and time-loss risk (e.g. search costs).
(Heijden, Verhagen, & Creemers, 2003)	Perceived risk associated with attitude towards online purchasing and buyer's intention to purchase online.	Negative outcomes based on risk, potential for loss and negative situation from the decision to purchase online.
(Dillon & Reif, 2004)	Perceived risk associated with the online purchasing decision.	Negative outcomes based on personal risk (e.g. credit card security), privacy loss, and product performance risk (e.g. a product fails to meet expectations).
(Pires, Stanton, & Eckford, 2004)	Perceived risk associated with the frequency of online purchasing.	Negative outcomes from a potential loss from the purchase of a brand based on the overall risk (i.e. the likelihood that purchase of the item will result in general risk of the consumer).
(Doolin, Dillon, Thompson, & Corner, 2005)	Perceived risk associated with the amount and frequency of online purchase made.	Negative outcomes based on product performance risk (i.e. inability to inspect product), economic risk (i.e. inability to compare price or quality of similar products, making a poor purchase decision), security risk (i.e. credit card abuse security), and privacy risk (i.e. compromising personal information).

The second similarity among these examples is that they seem to share a common ground in conceptualising the perceived risk with this examination. That is, this thesis considers perceived risk as similar to uncertainty. Similarly, these examples did not distinguish perceived risk from uncertainty. Furthermore, this thesis considers perceived risk as a negative consequence resulting from the general risk toward online purchase (Miyazaki & Fernandez, 2000, 2001). This corresponds somewhat to examples in the literature which defined perceived risk on a variety of aspects of negative outcomes (e.g. potential loss from general risk, performance risk, financial risk; risk from making a poor decision).

### **1.3 Factors Influencing Perceived Risk**

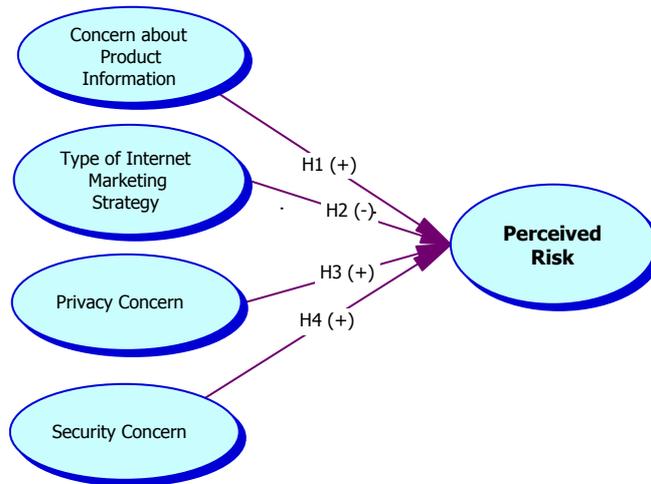
The consumer behaviour literature also elaborates on several factors influencing the level of a buyer's perceived risk. The focus appears to be on the information a buyer requires regarding the purchase. Theories in relation to buyer behaviour delineate that in the purchasing process, both consumers and business buyers require information about products when they make a decision to purchase (Kotler, 1997; Lamb et al., 2006). Various examinations concluded that this information was associated with reducing perceived risk involved in the purchases (Hugstad et al., 1987; Tan, 1999). Ha (2002) supported this notion by highlighting the fact that this pre-purchase information could help to reduce a buyer's perceived risk towards a purchase. Similarly, several researchers suggested that the higher the perceived risk, the more information and the search efforts the business buyer seemed to require in order to reduce the risk (Copley &

Callom, 1971; Jackson, Keith, & Burdick, 1984; Jacoby, Chestnut, & Fisher, 1978; M. Kim & Lennon, 2000).

Not surprisingly, the relationship between perceived risk and the information the buyer requires is relevant in online purchasing. Credible information posted on the Internet (e.g. product information) may help ease a buyer's perceived risk towards the purchase (Poel & Leunis, 1999). In a similar way, Poole & Muller (2001) described that potential buyers search for further information about products to mitigate the risk they perceived. R. Chen & He (2003) corroborated this view by suggesting that the greater the risk online buyers perceive, the more information about products (perhaps from other sources), was required. This increased the buyer's information search effort. These notions suggested that searching for information about the purchase was used as a strategy to reduce the risk that a buyer perceived toward online purchasing (Ha, 2002).

As discussed in the study-model, a buyer requires a different type of information to assess the perceived risk towards the purchase (see Figure 2). This information can be considered as a possible factor influencing perceived risk. Such factors are discussed in the following sections.

**Figure 2: Conceptual Schema of Factors Influencing Perceived Risk**



### **Concern about Product Information**

Products can be defined as physical goods and intangibles which have different characteristics (Kotler, 1997). For example, the typical characteristics for physical products such as cars and gemstones could be performance, colour, style, and size. In relation to intangible products such as information or services, the seller's image and the manufacturer's reputation is relevant. To most people, it appears that product means physical goods (Lamb et al., 2006).

Physical goods, when being bought for use in business, can be distinguished as three major types - materials and parts, capital items, and supplies (Kotler, 2001). However, Kotler further described that the material and parts tend to be the most "reflective" when addressing manufacturing products. These can be the materials that require further processing in the manufacturing process. Thus, products such as gemstones which tend

to be purchased for setting in jewellery or for resale can be considered as a manufacturing product (Elmore, 2001; Porncharern, 2006; Siripant & Mansrisuk, 2001).

A buyer could use several product characteristics, such as performance and price to assess the risk before purchasing the physical products (Ueltschy, Krampf, & Yannopoulos, 2004; Zikmund & Scott, 1977). For example, expensive products were likely to be perceived as high risk; Mitchell (1999) supported this view. For instance, gemstones could be perceived as more risky than general consumer products such as clothing or CD's. It seems that the information on more expensive products is more important to buyers than less expensive items, due to the higher level of risk associated with them. By adding evidence from online trading, Ha (2002) further corroborated this thesis by showing product characteristics such as performance could help reduce the buyer's perceived risk toward online purchasing. However, these studies did not investigate the perceived risk towards specific product categories. As such, there is value in examining whether their suggestions can be generalised to particular product categories such as gemstones.

It is logical for buyers to acquire accurate information about product characteristics regardless of product category. For example, buyers seek information concerning ingredients, place of manufacturing and expiration date, when purchasing food. Likewise, gemstone buyers expect genuine information namely colour, clarity, cutting, carat weight and origin when considering purchase ("Gems", 2002; GIA, 2001; Hughes, 1997; Weinburg, 2001). Therefore, providing misleading information regarding product characteristics may increase a buyer's concern (Beard, 2001b; Prost, 2001a).

Investigating how buyers' concerns would affect their perceived risk to purchase should be examined. The above discussion gives rise to the following hypothesis:

**H1: Concern about product information will have a positive impact on the perceived risk of online gemstone buyers**

### **Type of Internet Marketing Strategy Used by Seller**

When considering the use of physical products, they can be classified as either consumer or business products, depending on the buyer's intention (Lamb et al., 2006). A consumer product is purchased according to an individual's personal needs and a business product is used for manufacture or reselling to other customers. For instance, buying finished gemstones to be set in jewellery or for reselling to other gemstone dealers is considered a business product. These two product types require different marketing strategies (Engelfriet, 2005; Kotler, 1997, 2001). For example, consumer products such as personal care items that are purchased regularly and without much planning may require a marketing strategy that highlights the distribution, to sell an adequate quantity to make a profit. Conversely, business products such as gemstones, that are of greater value, and require more planning to purchase require a marketing strategy which focuses on assurance and personal selling qualities.

The dissimilar characteristics between product types also require different marketing strategies when selling (Kotler, 1997, 2001; Lamb et al., 2006). For example, Internet marketing strategies for intangible products such as free downloading, and online

delivery of information and software, could not be applied with physical products such as gemstones.

The literature concludes that a buyer may require information about marketing strategies (used by the seller) when purchasing physical products. Buyers can use both offline and online channels to search for this information (Ha, 2002; Smith & Chaffey, 2005). Given this, sellers should use combined offline and online strategies to provide marketing information to buyers (Gan, Lee, Lingtay, & Wai, 2005; Krishnamurthy, 2006). It seems that a typical starting point is to develop marketing strategies based on the traditional well-known marketing mix; the four P's - product, price, place, and promotion (Kalyanam & McIntyre, 2002; McCarthy, 1996; Samiee, 1998). As the online environment could affect most areas of business, incorporating the four P's into online methods seems to be applicable to several business industries (Smith & Chaffey, 2005). Examples of these marketing strategies are shown in Table 3. As the most effective strategy to be employed when addressing specific industries is as yet unknown, studies exploring this area should consult several four P's strategies.

**Table 3: Examples of Offline and Online Marketing Strategies Based on Four Ps**

<b>Features</b>	<b>Marketing Strategies</b>
Product	<ul style="list-style-type: none"><li>- Increasing product types (e.g. Dolbow, 2002; "Oral-B Unveiled Age-Pegged Toothbrushes for Kids", 2001)</li><li>- Extending products items in the same product categories to enhance product variety; Launching differentiate/innovative products (Beirne, 2001; Brooker, 2001; G. Gao, 2005; Quelch &amp; Klein, 1996)</li></ul>
Price	<ul style="list-style-type: none"><li>- Setting online price; using several pricing strategies such as price discount (Samiee, 1998; Shor &amp; Oliver, 2006; Sun, 2004)</li></ul>
Place (Distribution)	<ul style="list-style-type: none"><li>- Offering convenience by using multi-channel distributions (H.-J. Lee &amp; Huddleston, 2006) such as online channels with offline channels (Chu &amp; Kim, 2006; Corbitt, 2002; Palumbo &amp; Herbig, 1998)</li></ul>
Promotion	<p>Promotional mix strategies (Eid &amp; Trueman, 2002; Gopal, Pathak, Tripathi, &amp; Yin, 2006; Krishnamurthy, 2006; Quelch &amp; Klein, 1996; Vark, 2004; Yubo, 2004) such as</p> <ul style="list-style-type: none"><li>- Using the mixture of offline and online advertising</li><li>- Using public relations strategies such as charity campaigns</li><li>- Using sales promotion strategies</li><li>- All marketing activities other than the three previous mentioned such as free samples, free testimonials</li></ul>

Furthermore, the availability of information that a seller provides on the online channel such as information about marketing strategies, could assist in decreasing the buyer's perceived risk to purchase (Poel & Leunis, 1999). Similarly, Ha (2002) advocated the relationship between information about Internet marketing strategies (e.g. brand, promotion) the seller provided, and the buyer's perceived risk to purchase online. Also, information about the type of Internet marketing strategies used by the seller may associate with certain risk types, such as, offering a buyer greater value via a change in the seller's price strategies (e.g. offering price discounts and special rewards) which is likely to reduce a buyer's financial perceived risk regarding online purchases (D.J. Kim et al., 2000). Credible product information may help alleviate a buyer's perceived risk towards product performance (the chances that products will meet the intended

performance) (Pires et al., 2004). As the type of information that a seller provides in an online channel influences the buyer's perceived risk to purchase (Poel & Leunis, 1999), a buyer's perception of the type of Internet marketing strategy (e.g. a discount to purchase online) used by the seller may also impact on his or her level of perceived risk. As shown in Table 3, there are four major types of Internet marketing strategies available for online sellers. These are discussed as follows:

First, there exist various kinds of product strategies that a seller could implement. However, product strategies such as offering a variety of products are often explored in marketing research. For example, G. Gao (2005) suggested that offering a variety of choices of products is associated with increased sales. It is also reported that for the specific products such as gemstones, consumers are likely to purchase from a seller with product variety (Professionaljeweler, 2001). However, product variety appears to be investigated in relation to firm performance (Y. Chen, 2004; G. Gao, 2005; Y. Hu, 2005). Exploring whether this type of Internet marketing strategy (i.e. product) has an impact on a buyer's perceived risk, especially when purchasing the specific product of gemstones is not examined.

Second, given that the Internet increases a consumer's power to simply acquire and compare the best price for goods from wherever they are in the world (Lazer & Shaw, 2000), a buyer will pay a lot more attention to price than before (BrandStrategy, 2006, p.25). As such, online marketing research is awash with studies examining pricing strategies, such as a price discount (N. F. Awad, 2004; Quek, 2002; Sun, 2004). Pricing strategies are described as having an influence on risk associated with the online

purchase (Gopal et al., 2005; Y. Hu, 2005). For example, a buyer may perceive lower priced products as less risky, nevertheless, this notion is derived from exploring the less complex, less expensive products such as books (Hu, 2005) and other manufacturing products, which did not include gemstones (Gopal et al., 2005). Whether this relationship can be generalised to complex, costly products such as gemstones, is not explored.

Third, it is further suggested that a seller's use of place or distribution strategies such as offering convenience through multi-channel distribution (e.g. offline and online) is negatively related to a buyer's perceived risk (H.-J. Lee & Huddleston, 2006), is because the offline distribution of products and services increases the creditability of online purchasing. In online distribution, convenience also seems to be addressed in respect of a website's usability (e.g. quick download time and ease of use) (Lohse & Spiller, 1998), which is often examined in relation to websites' evaluations such as accessibility (Norris, 2006), and efficacy (Harpel-Burke, 2005), and in relation to technology development (J. Y. Kim, 2005). Whether this type of Internet marketing strategy based on website design has an influence on a buyer's perceived risk to purchase online is not yet proven.

Finally, promotion strategies such as advertising in offline sources (e.g. printed media), and in online sources such as websites (e.g. industry e-marketplaces, commercial websites) has also been suggested as reducing the buyer's perceived risk to purchase online (Ko & Park, 2002). That is, when more of this marketing information is made available offline and online, a buyer is given choices to reduce risks that they perceive in

the purchase, such as financial risk (D. J. Kim et al, 2000). However, this evidence is drawn from exploring branded clothing that tends to be regularly purchased while products such as gemstones seem to be an infrequently purchased product with less brand involvement. As such, there requires a further examination as to whether such the relationship between this type of Internet marketing strategy (i.e. promotion) and a buyer's perceived risk can be generalised, to gemstones purchasing. The aforementioned discussion gives rise to the following hypothesis:

**H2: Types of Internet marketing strategies (i.e. product, price, place, promotion) will have a negative impact on the perceived risk of online gemstone buyers**

### **Privacy Concern**

In western countries, privacy has been considered a basic human right and fundamental to democracy. It is often described as the right to be left alone (Luo, 2002). Erbschloe & Vacca (2001) added that cultural, political, legal and national aspects influence privacy interpretations; they further elaborated that this resulted in no universal definition of privacy. Nevertheless, these multiple definitions seem to have one common theme; the ownership of personal information.

The literature describes this right to privacy is affected by the utilisation of online commerce. The massive benefits of the Internet could also bring potential risks to buyers (S. Kim & Montalto, 2002). Online buyers are typically asked to provide personal information such as their name, address or credit card details to complete the online

transaction (Hatlestad, 2001). Simultaneously, interactive online technology such as “cookies” allows sellers or other Internet users to collect and record other buyer’s information (e.g. registration, shopping cart selection) and even monitor the buyer’s behaviour on Web sites, without their knowledge or consent (Turban et al., 2004). Thus, a buyer’s personal information is vulnerable to violation via unauthorised collection, improper dissemination to third parties, or misuse through privacy breaches (Erbschloe & Vacca, 2001; Wang, Lee, & Wang, 1998).

Online buyers are highly concerned about threats to privacy (Culnan, 1999; Hoffman et al., 1999; S. Kim & Montalto, 2002; Teltzrow & Kobsa, 2004). Ward et al. (2005) noted that buyers who were concerned about, and unwilling to, provide their information (i.e. financial data) to websites even when incentives such as discounts and additional service were provided. They further suggested that instead, buyers became more sceptical about providing this information when these incentives were offered. When a buyer’s concerns about privacy were high, that buyer would be highly reluctant to provide personal information (Gauzente, 2004) and this may decrease the probability of online purchases via a common payment method such as credit cards. The survey of Harris Interactive (2001) showed that a great level of privacy concerns exists amongst online users, for example, 83% of 2,087 US online users in 2000 and 73% of 2,180 US online users in 2001, refused to give personal financial information that they considered unnecessary. Moreover, approximately 50% of participants in this survey considered that consumers did not have an appropriate level of control over their personal information collected by online sellers. In response to this, it is suggested that online sellers should have the appropriate privacy practices in place to deal with buyer’s concerns (Erbschloe & Vacca,

2001). For example, the Federal Trade Commission (FTC) and the Department of Commerce (DOC) of the U.S.A. have created a set of guidelines for business privacy practices for business trading in/with the U.S.A. The FTC in particular, identified that privacy information practices are comprised of four principles: notice, choice, access and security (FTC, 2000, 2001). That is, online sellers must provide notice of what they collect and how they use it; give buyers access to that information and opportunities to rectify inaccuracies of data; and have procedures and systems in place to protect the security of information.

Similarly, the European Union (EU) has outlined the appropriate privacy practices for business trading in/with the EU. It shared the U.S.A. philosophy of enhancing privacy practices. In addition, the EU developed a safe-harbour framework to facilitate business trading between the U.S.A. and the EU (M. W. Thompson & Magee, 2003). That is, being a member of this safe-harbour helped to certify that online sellers have provided adequate privacy protections, as required between the two countries. It appeared that most online sellers across countries adhered and adopted these privacy practices (Erbschloe & Vacca, 2001).

Proper privacy practices to deal with a buyer's concerns regarding the privacy of information could also arise with a seller securing privacy services from a third party (Krishnamurthy, 2003; Palmer et al., 2000). There are many online seal- programs created to gain an online buyer's confidence regarding privacy (Luo, 2002). For example, BBBOnline and payment providers are self-regulated third parties who allow

online sellers who comply with their privacy principles, to display a special seal of approval on Web sites.

It can be argued that the above seller's privacy practices may be insufficient in the buyer's view (Krishnamurthy, 2003). Sparta (2000) suggested that Internet privacy was one of the foremost concerns of online buyers. The number of privacy breaches involving buyers' personal information have increased (Gold, 2002; Meyer, 2003). To date, several privacy-invasion lawsuits are being pursued in many industries (FTC, 2005a; Spagat, 2001; Williams, 2002).

The literature tends to examine a buyer's concerns regarding the privacy of information in relation to two contexts: the online purchasing behaviour and the trust to purchase online. First, many studies investigated the relationship between a buyers' privacy concerns and their online purchasing behaviour. For example, Korgaonkar & Wolin (1999) found that a buyer's concerns regarding personal information (e.g. transactions, financial) were negatively related to online purchasing. Various studies described that a buyer's concern about online privacy was one of the major barriers to the utilisation (acceptance) of online trading (Bush et al., 1998; Caudill & Murphy, 2000; Culnan, 1999; Gauzente, 2004; Hoffman et al., 1999). Second, a number of studies explored a buyer's concerns about the privacy of information in relation to the trust in conducting online purchasing (Belanger et al., 2002; Chellappa & Pavlou, 2002; Luo, 2002; Metzger, 2004; Palmer et al., 2000; Shim et al., 2004). Conversely, there has been little published research examining concerns about privacy as determining risk, and hence online purchases (Miyazaki & Fernandez, 2001). Notable exceptions are Foxman &

Kilcoyne (1993) who elaborated that the level of perceived risk varied according to the buyer's awareness of the collection and control over personal information, and Miyazaki & Fernandez (2000) who found that the privacy policy was not related to a buyer's perceived risk. However, these results were derived from a consumer's perspective rather than an organisational buyer's view, which is the focus of the present study (Teltzrow & Kobsa, 2004). As such, research exploring the relationship between a buyer's concerns about a seller's privacy practices and their perceived risks to purchase from an organisational buyer's standpoint, is limited, and a further examination in these areas is required. The above discussion warrants a further investigation of the following hypothesis:

**H3: Concerns about a seller's privacy practices will have a positive impact on the perceived risk of online gemstone buyers**

### **Security Concern**

In business trading, information has become a valuable asset for both buyer and seller, and hence, security of information is one of the important issues that should be examined when addressing online purchasing (Otuteye, 2002). Information security is frequently considered to be a significant issue vis a vis privacy (FTC, 1998; Rohm & Milne, 1998). However, it can be argued that they are different concepts and should be investigated separately, as a more strict and extensive security technology is required when addressing information security (Belanger et al., 2002; Chellappa, 2003; Erbschloe & Vacca, 2001).

Information security in an online business should be based on a twofold consideration; **authentication** and **authorisation** (E. M. Awad, 2004; Napier, Judd, Rivers, & Wagner, 2001; M. Singh, 2004). Authentication refers to the ability of an individual or organisation to prove the identity of a user, and the authorisation refers to the control of access to particular information, after the identity is verified. Likewise, other researchers supported this principle by advising that the seller's security systems should prevent unauthorised access, unauthorised disclosure and unauthorised action such as data alteration, of the buyer's personal information (Bhimani, 1996; Chellappa & Pavlou, 2002; US Congress, 1997). It follows that, buyers should consider information security as the subjective probability that their personal information (their private, financial and transactional data) will not be accessed, stored and manipulated during transit, or stored by unauthorised parties (Chellappa, 2003; FTC, 2005b). Further, that these principles of information security should be used by online sellers to develop a proper information security practice.

Nevertheless, the open non-secure nature of Internet, together with its unregulated global reach and numerous existing security **attack-tools**, has resulted in a buyer's concerns about information and transaction security (Fung & Lee, 1999; Otuteye, 2002). Examples of these security attack-tools are hackers - those who access other computer systems illegally (E. M. Awad, 2004, p. 55); virus - a piece of software code that inserts and propagates itself into a host, including the operating systems (Turban et al., 2004, p.693); and worms - software programs that run independently, consuming the resources of its host in order to maintain itself and propagating a complete version of itself into another computer (Turban et al., 2004, p.693). The survey of InformationWeek

Research's Global Information Security reported that concerns about information security were considered to be the top priority across business sectors (e.g. telecommunication, banking, finance) (InformationWeek, 2000). This survey found that in the U.S.A., the value lost by these attack-tools was as high as approximately 2.5% (US\$266 billion) of the nation's gross domestic product in 2000. This indicates that buyers and businesses are right to be very concerned about information security (Briones, 1998; Culnan, 1999; Fung & Lee, 1999; Metzger, 2004; Teltzrow & Kobsa, 2004).

A seller having a proper security policy could mitigate a buyer's concern regarding information security (BBBOnLine, 2005; Coupey, 2005; Otuteye, 2002; Timmers, 2000), by having a security policy compliant with the FTC when conducting business trading with the U.S.A. (Erbschloe & Vacca, 2001). Similarly, having appropriate physical security systems to prevent information security attacks (Turban et al., 2004, p.691). One way is to use encryption - a process of scrambling (encrypting) a message in such a way that it is difficult, expensive, or time consuming for an unauthorised person to unscramble it (Turban et al., 2004, p.686); Another is to use digital signatures - a special signature for signing electronic correspondence, produced by encrypting the message-digest with the sender's private key (E. M. Awad, 2004, p.447); And yet another is to use and firewall-software - a security device that places a protective wall around a computer or network of computers, keeping it from being accessible to the public (Erbschloe & Vacca, 2001, p.303). Other examples are by having security practices and policies complying with, and adopting security-seals from well-known

security providers such as TRUSTe or PayPal (Ashworth, 1999; Wind & Mahajan, 2001).

Unfortunately, studies of the relationship between a buyer's concerns regarding information security and their perceived risk are limited (Miyazaki & Fernandez, 2001). That is, a buyer's concerns about information security tend to be investigated in relation to online purchasing. For example, Miyazaki & Fernandez (2001) found that concerns about system-security were negatively related to the rate of online purchasing. Otuteye (2002) suggested that lack of information security (e.g. transactions) was one of the major reasons why consumers were reluctant to purchase online. Chellappa (2003) gave support to this view by reporting that a buyer's concerns about information security mediated the effects of a buyer's concerns about privacy and trust to purchase online. Additionally, studies examining the association between a buyer's concerns regarding information security and their perceived risk towards online purchasing in specific industries, are scarce. In order to contribute new knowledge to these areas, this thesis therefore explores the relationship between a buyer's concerns about information security and their level of perceived risk to purchase from a business buyer's view. The following proposition was also examined:

**H4: Concerns about a seller's security practices will have a positive impact on the perceived risk of online gemstone buyers**

## **2. Trust**

Trust is frequently acknowledged as “confidence” in another party (Sheth, 1973; Sheth & Venkatesan, 1968; Shimp & Bearden, 1980). According to Howard & Sheth (1969), trust is considered one of the key issues the buyer considers when making a decision to purchase. Trust, like perceived risk, can be seen as a versatile construct applicable in various disciplines (Morgan & Hunt, 1994).

The literature describes trust as having a negative relationship with perceived risk. In some studies, for example, trust has been considered as a negative antecedent of the buyer’s level of uncertainty and perceived risk (Bord & O’Connor, 1990). The reverse has also been suggested by Morgan & Hunt (1994) and T. Gao et al. (2002) have stated that when a trust-based relationship between a buyer and a seller was developed, the buyer’s trust was likely to be higher and therefore the buyer’s uncertainty or perceived risk reduced, possibly suggesting that trust may moderate perceived risk. It is therefore appropriate to investigate trust in relation to perceived risk.

### **2.1 Interpretations of Trust**

Trust is defined as the basic expectation an individual has on the reliability of the co-exchanger’s promises (Rotter, 1967). In a similar way, trust can be interpreted as the outcome of the reliability and integrity of the seller, such as quality evaluation criteria like honesty and responsibility (Dwyer & Lagace, 1986). Morgan & Hunt (1994) corroborate this perspective by conceptualising trust as the framework of belief in the reliability and integrity of the seller. In doing so, Doney and Cannon (1997) considered

trust as the domain of a solid credibility between the buyer and the seller, and the reliability of the seller's promises. This view was also supported by T. Gao et al. (2002) who interpreted trust as the reliability and integrity perceived by the co-exchangers.

It is evident that the above interpretation of trust focuses on the reliability and integrity of the exchanges between buyers and sellers, and the importance of the seller keeping promises to buyers. Given that trust could be considered (in the expectations of buyers) to be about the reliability and integrity of the seller's promises, it seems that this view is an objective perspective and applicable to various contexts (Morgan & Hunt, 1994).

Trust is considered as the essential basic element in online trading (T. Gao et al., 2002). Brannigan & De Jager (2003) defined trust in online transactions as the combination of trust in online trade and trust in the online seller. It can be argued that by focusing on the purchasing aspect, these two types of trust represent one common theme; the trust to purchase online (Ba, 2001). Moreover, trust in online purchasing is often interpreted as the promise and assurance of online sellers to deliver high quality products or services to online buyers (Cowcher, 2001). It can be considered from these examples that the assurances of online sellers tend to be a necessary element to a buyer's trust to purchase online.

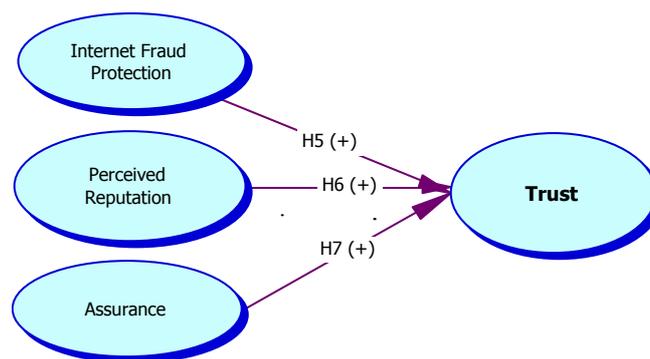
Additionally, the interpretation of trust also emerges in specific industries such as the gemstone industry. Here the buyer's trust is described as one of the essential keys to successful trading (Zborowski, 2005). It appears that trust in this industry is based on the buyer's satisfactory evaluation of a gemstone's qualities (Hughes, 1997; Weinburg,

2001). However, interpretation of trust from a theoretical perspective in this industry is limited. Definition of trust in the gemstone industry appears to draw from a practitioner's viewpoint. As such, the contribution of further studies in this area is required.

## 2.2 Factors Influencing Trust

The literature describes the relevance of information that a buyer requires and buyer's trust to purchase. The information the buyer requires is considered a vital element in enhancing the trust of the buyer (Day, 1976; Hakansson, 1982). Moreover, this pre-purchase information can help decrease the buyer's perceived risk and thereby promote the buyer's trust in the purchase (Tan, 1999; Morgan & Hunt, 1994). As discussed in the study-model (Figure 1, p.21), a buyer's trust to purchase is determined by several types of information. Figure 3 presents this information that will be discussed below.

**Figure 3: Conceptual Schema of Factors Influencing Trust**



## **Internet Fraud Protection**

Although Internet-based electronic commerce can bring a multitude of benefits to business trading, some disadvantages could also occur. One of those often cited is Internet fraud. Turban et al. (2004) elaborated that in the environment of online commerce, the buyer and seller cannot see each other. This could lead to dishonest people committing several forms of fraud over the Internet. In legal terms, fraud is defined as, “a misrepresentation or concealment, with reference to a transaction that is made with knowledge of its falsity, or in reckless disregard of its truth or falsity, with the intent to deceive, and that it is reasonably relied on by the other who is injured thereby...” ("Find Law Legal Dictionary", 1996).

This definition can be applied to Internet fraud in online trading. For example, E. M. Awad (2004, p.376) described Internet fraud as “the intent to deceive as a material fact about a product that was known in advance but was covered-up in an online sale”. Similarly, Internet fraud can also be characterised as a deception made for personal gain by email, Websites, chat-rooms or messages to conduct fraudulent transactions or to transmit the proceeds of fraud to financial institutions. It therefore, can be considered that Internet fraud is any activity aiming to deliberately deceive the co-exchanger using online channels.

Baker (1999) and Cowcher (2001) suggested that the lack of global, standard online-trading regulations agreed by all online co-exchangers to control this deliberation to deceive, results in a buyer’s concerns about Internet fraud. It appears that this buyer’s

fear has increased in recent years (Metzger, 2004). The Internet Fraud Watch reports that online fraud cases have significantly expanded over the last few years. In 2000, consumers lost approximately US\$3.4 million to Internet fraud ("Internet Fraud Statistics", 2000). The loss values have steadily increased to US\$13,863 million in 2005 ("Internet Fraud Statistics", 2005). Many studies described that a buyer's concerns about Internet fraud increased the buyer's perceived risk, and hence reduced trust to purchase online (Grazioli & Jarvenpaa, 2000; Krishnamurthy, 2003; Swaminathan et al., 1999).

These online fraud cases tend to be involved in payment-fraud and fraud in relation to product delivery. Payment-fraud is described as one of the major fraud types hindering online transactions (Spagat, 2001). Buyers are likely to consider payment fraud in terms of the security systems that the seller uses to protect their personal information (Ashworth, 1999; Krishnamurthy, 2003). This can be seen from a number of innovative electronic payment systems created to prevent Internet payment-fraud (E. M. Awad, 2004; Bajaj & Nag, 1999; Duncan, 2001). For example, online bill payment; special purpose payment cards issued to employees to be used solely for purchasing materials and services up to a preset amount limit (Turban et al., 2004); and electronic funds transfer (EFT) - a computer-based system that facilitates the transfer of money or the processing of financial transactions between two financial institutions (E. M. Awad, 2004, p.494). Use of these electronic payment systems is related to the buyer's trust in conducting online purchasing (Heeger, 1999; Robinson, 2001).

Also, fraud in relation to product-delivery is another aspect concerning online buyers ("Internet Fraud Statistics", 2003; "Internet Fraud Statistics", 2005). These surveys

reported that online buyers were concerned about non-delivery fraud that comprised of goods which were never delivered or of goods which were received but were not the same as advertised (i.e. misrepresented). The surveys further indicated that the percentages of complaints about product-delivery compared to all Internet fraud complaints, have significantly increased from 5% to 20% and to 30% in 2003, 2004 and 2005 respectively. This is also consistent with others who suggested that online buyers worried about the delivery of faulty goods (E. M. Awad, 2004; Spagat, 2001). Similarly, in the specific industry of gemstones, Elmore (2001) noted that the non-delivery of purchased gemstones was another issue concerning gemstone buyers.

Having the proper Internet fraud-protection policy is likely to help gain a buyer's trust to purchase online (Chellappa, 2003; Jarvenpaa, 1999; Kimery & McCord, 2002; Wind & Mahajan, 2001). For example, having a policy comply with government guidelines such as the FTC; using seals from well-known external payment providers such as PayPal and Escrow system; and adopting the certifications of well-recognised courier providers such as FedEx and DHL. As these studies did not investigate specific industries it would be useful to know if these associations could apply to specific industries, and exploring their relevance in the gemstone industry would expand and benefit the research in this area. On a basis of the previous discussion, the following hypothesis will be tested:

**H5: Buyer perceptions of a seller's practices about Internet fraud protection will have a positive impact on the trust of online gemstone buyers**

## **Perceived Reputation**

The literature suggests that the business buyer could consider characteristics of the seller organisation in order to explore the matter of trust in purchasing. This is done using organisational buying behaviour theories (Sheth, 1996). He further suggested that recent research conducted in this area tends to shift attention to the relationship between the buyer and seller. T. Gao et al. (2002) and Morgan & Hunt (1994) supported his view by describing that this relationship could help build a higher level of trust to purchase. These studies signify that a relationship between the buyer and seller is an issue which warrants examination.

There are multiple definitions of the relationship between the buyer and seller. For example, relationships in marketing are described in an entire range of marketing activities: creating, developing, and maintaining successful relational exchanges between buyers and sellers (Hunt, 1997; Mattsson, 1997). Correspondingly, J. R. Evans & Laskin (1996) explained relationships in marketing as the process where an enterprise builds long-term associations with current customers in order to work toward a particular common mission. Relationships in marketing are also considered as the long-term connection between the seller and customer for mutual long-term profitability (Gummenson, 1994). However, these varied interpretations appear to reflect one commonality, that is, to build, maintain and develop a relationship between sellers and buyers.

T. Gao et al. (2002) and Morgan & Hunt (1994) suggested that the relationship between sellers and buyers was related to the buyer's trust. That is, this relationship could help to increase the buyer's trust to purchase. The literature elaborates a concept of the *perceived reputation* towards characteristics of seller-organisations when investigating the relationship between buyers and sellers. For instance, the past experience between buyer and seller was described as having an influence on the buyer's trust to purchase (E. Anderson, Lodish, & Weitz, 1989). The longer the length of the relationship between the buyer and seller, the more likelihood this would increase the buyer's trust to purchase (Dwyer, Schurr, & Oh, 1987; Young & Wilkinson, 1989).

The literature also describes other characteristics of seller-organisations which are important when addressing the relationship between buyer and seller. Shimp & Bearden (1980) and E. Anderson et al. (1989) suggested that a seller's good (favourable) reputation was likely to help increase a buyer's trust to purchase. This perspective advocates that a buyer's trust could be developed from beliefs in the reputation of the seller such as their company name and brand (Chaudhuri & Holbrook, 2001; McAllister, 1995).

The literature also examines the characteristics of salespersons in relation to buyer's trust. For example, the friendliness of a salesperson was suggested as being related to the buyer's trust to purchase (Hawes, Mast, & Swan, 1989). Doney & Cannon (1997) further described that the salesperson's expertise, and the similarity of the salesperson to the other members of the buyer-organisation (e.g. common interest, values) could help increase the buyer's trust to purchase.

The relationships between the characteristics of seller-organisations outlined in this section and a buyer's trust to purchase, tend to be based on the purchasing occurring in conventional offline channels. Moreover, many online transactions seem to occur between buyers and sellers who have had no previous relationship (Ba, 2001). Therefore, whether the relationship between characteristics of the seller-organisations and a buyer's trust also exists when purchasing specific products online, should be examined.

The relevance of other characteristics of seller-organisations and a buyer's trust to purchase online also emerges in the literature. For instance, Jarvenpaa et al. (1999) and Jarvenpaa et al. (2000) suggested that the reputation and size of an organisation affected a buyer's trust to purchase online. That was, a buyer was likely to have more trust in larger organisations. It requires further investigation to examine whether this suggestion can be generalised to specific products such as gemstone industry.

Thus, the following hypothesis will be tested:

**H6: A seller's perceived reputation will have a positive impact on the trust of online gemstone buyers**

### **Assurance**

Buyers can use the seller's assurance about products to assess their trust to purchase. The literature elaborates on the assurance issue from two contexts - the

conceptualisation of assurance and the practical aspect. In terms of conceptualisation, Cowcher (2001) defined assurance as methods that the sellers use to keep promises about products and services to the online buyers. Others suggested that because there was risk associated with the separation of payment and delivery when conducting online purchasing (Ha, 2002; Standifird, 2001), the assurance should be interpreted as the compensation that the online buyers must receive for this risk (Kollock, 1999). It can be considered from these examples that assurance in the online domain is the approach that the sellers use to keep promises about products, and to compensate for that inherent risk in relation to online purchasing.

From a practical perspective, the literature explores the assurance issue in terms of methods used to assure the buyer's trust. For example, a product warranty or guarantee. This represents the robust assurance that the buyer will be compensated if the products fail to meet the seller's promises (Etzel, Walker, & Stanton, 1997). Product warranty functions by conveying the assurance regarding the quality performance and value of products (Feldman, 1976; Shimp & Bearden, 1980). Using a product warranty is likely to help reduce the buyer's (financial) perceived risk (Vann, 1987) and build the buyer's trust to purchase (Kendall & Russ, 1975; Mitchell, 1999; Morgan & Hunt, 1994). Similarly, in the context of online purchasing, S. E. Kaplan & Nieschwietz (2003) suggested that assurance practices that online sellers provide on the Website (e.g. product guarantees) could assist in increasing the online buyer's trust and online purchasing level.

There are other methods applicable to deal with the buyer's trust to purchase. Innis & Unnava (1991) described that using a full money return-policy was positively related to the buyer's decision to purchase. That is, the use of this approach can help increase the likelihood of purchasing. Heeger (1999) and Weinburg (2001) further noted that the seller's assurance (by offering a solid return-policy such as return within the trial period with full money refund, and offering authentic testimonials) also had an influence on the buyer's trust to purchase gemstones online.

Unfortunately, the relationships between these assurance methods and the buyer's trust to purchase tend to derive from a consumer's perspective rather than an organisational buyer's viewpoint. The organisational buyer's perspective is therefore examined in the present study. It can also be seen from these examples that suggestions about this relationship in specific industries, such as the purchasing of gemstones, tends to be provided by industry practitioners (i.e. Heeger, 1999; Weinburg, 2001) rather than academic studies. Based on this information, further exploration is required to verify whether these relationships are applicable to business buyers in specific industries, namely the gemstone industry. Therefore, the following hypothesis will be explored:

**H7: The seller's assurance will have a positive impact on the trust of online gemstone buyers**

### 3. Online Purchasing Behaviour

The online purchasing behaviour of buyers is widely examined in terms of the level of online purchasing. For example, online purchasing behaviour has been conceptualised in terms of the buying status, classifying consumers as either a frequent, occasional, or a none-online buyer (Li, Kuo, & Russel, 1999). Similarly, Deeter-Schmelz, Bizzari, Graham, & Howdysshell (2001) interpreted online buying behaviour as the level of professional (or organisational) buying. Koufaris (2002) defined online buying behaviour as the level of repeat purchases and unplanned purchases. George (2004) supported this by interpreting online purchasing behaviour as the level of the planned purchases of the buyer. It is therefore appropriate to investigate online purchasing behaviour of buyers using the level of online purchasing (see Figure 4).

**Figure 4: Conceptual Schema of Online Purchasing Behaviour**



The level of online purchasing is often explored based on types of materials purchased. According to Konicki (2002), organisational buyers purchase two types of materials: manufacturing and non-manufacturing material. Manufacturing materials refer to essential materials for production, and non-manufacturing materials refer to the

materials for activities other than production, such as maintenance, repairs and operations.

Proportions of manufacturing and non-manufacturing materials purchased by organisation seem to vary across industries. For example, Turban et al. (2004) and Varmazis (2005) described approximately 80% of the organisational purchase volume in major industries (e.g. automobile, airline, financial institution, construction) spent in manufacturing-type materials and the remainder in non-manufacturing materials. Similarly, some companies in electrical and electronic industries such as Texas Instruments Inc. spent around 70% in the purchase of manufacturing-type materials (Turban, King, Lee, Warkentin, & Chung, 2002). Although other industries are not mentioned in these studies, it can be seen that the majority of organisational purchases appear to be in manufacturing-type materials.

When considering online versus offline buying channels, the Institute for Supply Management and Forrester Research Inc. (cited in Baljko, 2003) reported low utilisation of the Internet in the purchase of manufacturing-type materials across the manufacturing sector. A survey by Purchasing Magazine (cited in Varmazis, 2005, p.43) expanded that companies use online methods to buy only 13% of manufacturing items in 2003, 18% in 2004 and 19% in 2005. Correspondingly, several studies also reported the low usage of the Internet in gemstone purchasing (Krausz, 2001; Meredith, 2002; Siripant & Mansrisuk, 2001). They indicated the use of the Internet to purchase manufacturing-type materials in the gemstone industry (i.e. finished gemstones) was approximately 2% of the world gemstone-trading values, over the last few years. Because gemstones tended to

be bought for business purposes such as further manufacturing (e.g. to be set in the jewellery) and for resale (Elmore, 2001; Porncharern, 2006; Siripant & Mansrisuk, 2001), it can be considered that this 2% figure was purchased as manufacturing-type material. These examples suggest that the utilisation of the Internet in gemstone purchasing is low compared to the use of online methods, to buy other manufacturing-type materials. Thus, an examination in relation to factors influencing such low utilisation of online purchasing in the gemstone industry is required.

### **Perceived Risk, Trust and Online Purchasing Behaviour**

The literature documents the relationship between perceived risk, trust and online purchasing behaviour of buyers. In the context of the online purchasing, perceived risk is also described as having a negative relationship with trust (Kimery & McCord, 2002; Swaminathan et al., 1999). Jarvenpaa et al. (1999) suggested that higher trust in the online seller decreased perceived risk; and as such reduced perceived risk (an indirect effect of trust) by increasing a buyer's willingness to purchase online. Heijden et al. (2003) described that reduced perceived risk did increase trust and attitude towards online purchasing, which in turn increased a buyer's intention to purchase online. As previously discussed in the Introduction section (p.17), the two latter studies appear to have three limitations when considering the focus of this study. First, they examine consumer products while this thesis focuses on the specific product of gemstones. Second, their results are provided based on a consumer's perspective, whilst the current study focuses on gemstone buyers who tend to be organisational buyers (Meredith,

2002). There is thus room to explore whether the relationships suggested in these studies could be generalised to organisational buyers in the specific industry of gemstones.

The third limitation found that some studies had not examined the direct effects of perceived risk and trust on online purchasing behaviour. Heijden et al. (2003) did not investigate a direct effect of perceived risk on a buyer's purchasing behaviour (i.e. intention to purchase). Jarvenpaa et al. (1999) did not explore a direct effect of trust on a buyer's purchasing behaviour (i.e. willingness to purchase). While such direct relationships have been well documented in other studies, perceived risk has been found to have a negative influence on the likelihood/intention to purchase online (Vijayarathy & Jones, 2000; Yeung & Morris, 2006), affect the online purchasing decision (Dillon & Reif, 2004), and the amount of online purchases (Doolin et al., 2005; Miyazaki & Fernandez, 2001). Trust has been found to have a positive effect on the intention to purchase online (Gefen, 2000; Koufaris & Hampton-Sosa, 2002; Shim et al., 2004). Again, a further examination on these issues could help confirm the direct effects of perceived risk and trust on online purchasing behaviour by using empirical evidence from the specific industry of gemstones.

The above discussion gives rise to the following hypothesis:

**H8: Perceived risk will have a negative impact on the trust of online gemstone buyers**

**H9: Perceived risk will have a negative impact on the online purchasing behaviour of gemstone buyers**

**H10: Trust will have a positive impact on the online purchasing behaviour of gemstone buyers**

## **Chapter Summary**

In conclusion, this chapter introduces and proposes a set of hypotheses and a theoretical framework to outline the relationship among perceived risk, trust and online purchasing behaviour, and influencing factors of perceived risk and trust. Overall, it is hypothesised that the perceived risk will have a negative impact on the trust; the perceived risk will have a negative impact on the online purchasing behaviour; and that trust will have a positive impact on the online purchasing behaviour. Moreover, the perceived risk is proposed as being influenced by four factors: concern about product information, Internet marketing strategy used by the seller, privacy and security concerns. Finally, trust is predicted as being influenced by three factors: Internet fraud-protection, perceived reputation, and assurance. Previous studies are yet to explore the generalisation of these proposed relationships to the specific industry of gemstones. Table 4 (see p.66) summarises a set of hypotheses that presented in this chapter and the expected relationship between the constructs in the framework.

These hypotheses will guide the research methodology to be used in the current study. This in conjunction with the sample, measurement and survey development, data collection and procedure, and method of analysis are discussed in chapter 3.

**Table 4: Summary of Study Hypotheses (H) Under Research Questions (Q)**

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<b>Q1</b>	How do the concern about product information, Internet marketing strategy used by a seller, privacy and security concern impact on the perceived risk of online gemstone buyers?
H1	Concern about product information will have a positive impact on the perceived risk of online gemstone buyers
H2	Types of Internet marketing strategies (i.e. product, price, place, promotion) will have a negative impact on the perceived risk of online gemstone buyers
H3	Concerns about a seller's privacy practices will have a positive impact on the perceived risk of online gemstone buyers
H4	Concerns about a seller's security practices will have a positive impact on the perceived risk of online gemstone buyers

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<b>Q2</b>	How do Internet fraud protection, perceived reputation, and assurance impact on the trust of online gemstone buyers?
H5	Buyer perceptions of a seller's practices about Internet fraud-protection will have a positive impact on the trust of online gemstone buyers
H6	A seller's perceived reputation will have a positive impact on the trust of online gemstone buyers
H7	The seller's assurance will have a positive impact on the trust of online gemstone buyers

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<b>Q3</b>	What are the relationships between perceived risk, trust and the online purchasing behaviour of gemstone buyers?
H8	Perceived risk will have a negative impact on the trust of online gemstone buyers
H9	Perceived risk will have a negative impact on the online purchasing behaviour of online gemstone buyers
H10	Trust will have a positive impact on the online purchasing behaviour of online gemstone buyers

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# CHAPTER 3: RESEARCH METHODOLOGY

## Introduction

The previous chapter presented the developed conceptual model and theoretical framework, and hypotheses of the study. This chapter presents the research methodology and design used to test these hypotheses. The outline of the methodological approach was based on the research objectives and literature review. To obtain data for testing the proposed hypotheses, a survey was conducted to determine:

1. Factors influencing perceived risk,
2. Buyer's perceived risk towards online purchasing,
3. Factors influencing trust,
4. Buyer's trust towards online purchasing, and
5. Buyer's online purchasing behaviour.

This chapter consists of four major sections. First, the research design that describes how the data was collected, is discussed. This is followed by the sample design used and development of measures and instruments for the key constructs. The data collection, the procedure which was used and the statistical techniques employed are then discussed. The chapter concludes with an overview of the methodology and analysis used to examine the key hypotheses of the study.

## **Research Design**

The first step in conducting the research was to determine which type of research design would be the most appropriate to use. This depended on the research objectives and types of information required in each study (Hair, Bush, & Ortinau, 2000). It can be seen from the discussion in Chapter 2 that the proposed hypotheses of this study (Table 4, p.66) aimed to make a prediction about the relationships between perceived risk and its influencing factors; trust and its influencing factors; and the relationships among perceived risk, trust and online purchasing behaviour of gemstone buyers. A cross-sectional survey design was considered to be the most effective means by which to collect data and answer the research questions posed by this study.

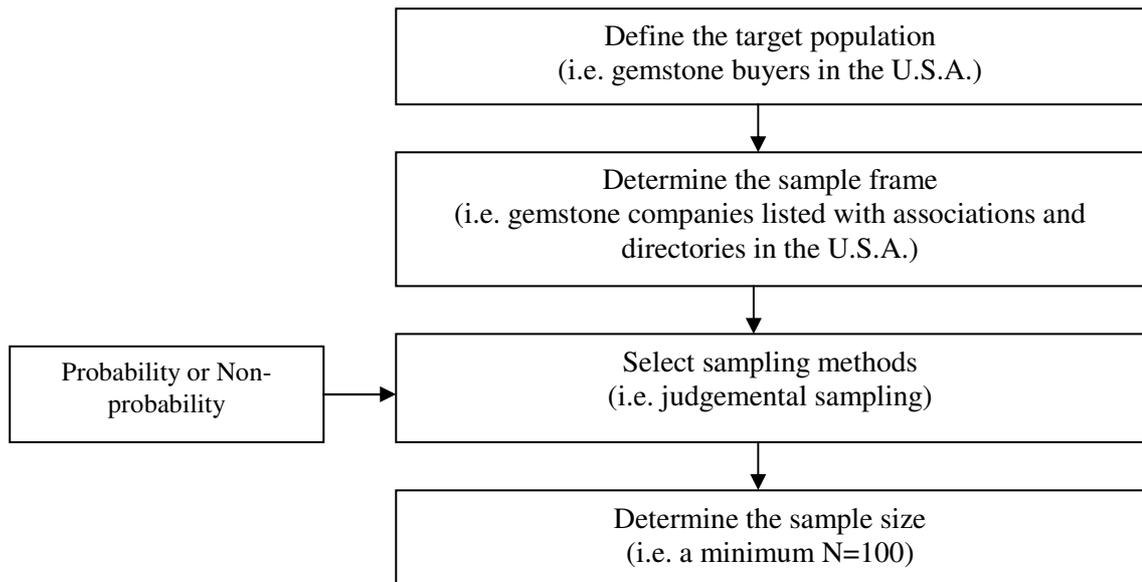
## **Sampling Design**

The sample used in this study represents the population of interest (Aaker, Kumar, & Day, 2001; Saunders, Lewis, & Thornhill, 2003) which is buyers within the gemstone industry (see p.3). Together with the focus on a buyer's perspective, the current study collected data from gemstone buyers in the U.S.A.

The principal idea of sampling is to demonstrate that by selecting some of the elements in a defined target population, we are able to draw a conclusion about the entire population (Hair et al., 2000). Figure 5 shows the four stages of the sampling procedure I used as adapted from Cooper & Schindler (2006). First, the process required identifying a defined target-population for investigation. Second, determining the sampling frame which lists all eligible population-elements from which the sample will

be drawn. Third, the sampling methods determining whether to utilise a probability or non-probability sampling method. Last, the process required in determining the appropriate sample size.

**Figure 5: Sampling Design Process**



Source: Adapted from Cooper & Schindler (2006)

While gemstone trading has emerged in every corner of the world, the U.S.A is considered as the fairest representation of gemstone buyers (Buncharoen, 2006; Khaoplum, 2002; Porncharern, 2006). First, the U.S.A. is the biggest market for gemstone trading as its gemstones import value accounts for approximately 30% of the world market (Beard, 2001c, 2005). The United Nations (2005) has reported that the U.S.A. is currently the world leader in online trading.

The literature suggests that online gemstone buyers tend to be organisational buyers. It has been industry practice for gemstone trading to be dominated by buyers who purchase for business purposes such as resale and setting in jewellery (Elmore, 2001; Porncharern, 2006; TGJTA, 2001; Weinburg, 2001). Similarly, Meredith (2002) reported that the majority of online gemstone buyers are likely to be organisational buyers.

Based on these factors, the target population of this study is defined as gemstone companies in the U.S.A. that buy gemstones using online channels. Gemstone companies that are listed with gemstone and jewellery associations and directories in the U.S.A. were employed as the sample frame. It is expected that using these participants as a sample-frame could help to capture a broad range of online purchasing behaviour in the specific industry of gemstones.

The next step of the sampling process was to select the sampling methods for the study. The non-probability sampling with judgemental sampling was determined to be the most suitable for this study. Past studies exploring online buyer behaviour have shown that using judgemental sampling is an efficient and acceptable approach within survey research (Carlson, 2006; Gummerus, Liljander, Pura, & Riel, 2004). Additionally, in order to obtain the member directory, a personal connection (a membership) was required. Since the researcher had such family connections, the member directory of the gemstone and jewellery association was used as the sampling unit. Data was collected from companies' purchasing agents.

The last step of the sampling process was to determine the sample size. It seems to be acceptable that the sample size to be used should be at least ten cases per studied variable (Kline, 2005; Tabachnick & Fidell, 2001). For instance, as the conceptual model of this study (Figure 1, p.21) explored ten major measures (perceived risk and its four influencing factors, trust and its three influencing factors, and online purchasing behaviour), a minimum sample size of 100 cases was sought. In a more relaxed rule for testing relationships between independent variables and a dependent variable with regression analysis, a sample size of at least five times more cases than the number of independent variables is considered acceptable (Coakes & Steed, 2003, p.163). A minimum of 100 cases was the sample size sought in this study.

### **Data Collection Strategy**

A survey approach has been widely used in marketing research to obtain raw data from large groups of people (Cooper & Schindler, 2006). The major advantages of employing a survey include: the ability to collect data from large sample sizes at relatively low costs; the capability to identify factors related to the context of issue and to measure perception and behaviour by using relevant instruments (e.g. Likert scale) (Hair et al., 2000). A survey also allows collection of standardised common data as respondents give answers to the same fixed-response questions that allow direct comparisons between responses (Saunders et al., 2003). This fixed-pattern of responses can facilitate the use of statistical analyses. Thus, a survey is considered the most appropriate data collection method for this study.

Hair et al. (2000) suggests that choice of survey methods tends to vary according to several factors, which are usually based on the type of data required (e.g. quantitative, qualitative), the budget of available resources, the completion time frame, and the requirement of quality data (e.g. generalisation). As this study aims to make predictions about relationships, and given the context of this study, quantitative data collected via an online survey appeared to be the most appropriate technique to use.

An online survey provides the advantage of lower costs and faster response rates than the conventional mail-out survey (Llieva, Baron, & Healey, 2002). Wygant & Lindorf (1999) support a claim that the response rate for the online (or electronic) survey is much higher (50%) than conventional mail survey (32%). Moreover, the online survey can provide instant access to a large group of respondents regardless of their geographical locations. This advantage makes the online survey also appropriate for international research (Llieva et al., 2002), such as this study, where data is to be collected from gemstone buyers in the U.S.A. Based on these advantages, a survey method by means of an online administration was used in this study. More specifically, an online self-administered questionnaire has the following advantages.

First, conducting the self-administered questionnaire on the Internet (i.e. Web-based survey) provides quick access to the respondents and increases speed of data collection (Llieva et al., 2002; Tse, 1998). Second, it incurs lower administration costs (e.g. papering, stamp duty) compared to other types of surveys, such as mailing and interviews (Boyer, 2001; Cooper & Schindler, 2006; Ranchhod, 2001).

Third, completion of online survey can be made anonymously (Forrest, 1999; Grossnickle & Raskin, 2001; Stanton, 1998). For example, the Website can be designed to record only the incoming time of responses. Having an anonymous survey is suggested to help ease respondents' concerns about their identifications being disclosed (Watt, 1997).

Fourth, use of a Web-based survey assists in reducing transcription errors that may occur during the data collection process (Malhotra, Hall, Shaw, & Oppenheim, 2002). For example, the non-response items that may appear as missing values in the data entry can be reduced, by requiring respondents to answer all questions prior to advancing to the next question (J. Evans & Mathur, 2005; Zikmund, 2003). This technique has been widely used in several Web-based surveys (Brace, 2004, p.161; Llieva et al., 2002), including the survey: JCOC Consumers Predictions for 2002 conducted by the MVI Marketing Research (<http://jcoc.mvimarketing.com>).

Fifth, the responses submitted through the Web-based survey can be directly stored and organised in a desired structure that can facilitate and speed-up data analysis (Llieva et al., 2002). For instance, storing the submitted responses as an MsExcel file that can be easily converted to an SPSS file that supports the data analysis techniques.

Moreover, using this online survey (e.g. Web-based) can assist in increasing response rates because it can better reach the targeted respondents (Boyer, 2001; Malhotra et al., 2002). In addition, much of marketing research is also conducted through online surveys (Llieva et al., 2002). For example, exploring the online purchasing behaviour of

consumers across product categories (Doolin et al., 2005; Ha, 2002; Miyazaki & Fernandez, 2000, 2001), and organisational buyers in the specific industry of gemstones (Tiangsoongnern & Vuori, 2004).

## **Survey Administration**

Based on the above advantages, a Web-based self-administered survey was used to collect data from U.S.A. gemstone buyers in this study. Instructions on how to complete the survey were provided. A familiar layout of the Web-based survey was used (Brace, 2004). Respondents were asked to respond using the simple 'radio button' provided with each item. Where necessary, a write-in box was also presented. The previous and next buttons were provided along the end of survey pages to provide respondents with the choice of editing responses before submission. In the hope of improving reliability and validity of the survey instruments (Krosnick, 1999; Krosnick & Berent, 1993), all points of the scale used were presented in a word format (e.g. "1" was elaborated as "strongly disagree"; "5" was replaced with "strongly agree").

Respondents were required to answer all questions prior to advancing to the next question; and responses submitted through the Web-based survey were stored as a MsExcel file that could be easily converted to the SPSS file that supported the data analyses.

The uses of incentives such as cash, gifts or something valued could sometimes help obtain more truthful responses and discourage non-responses (A. C. Burns & Bush,

2000). Therefore, respondents were promised an incentive to signify appreciation for their co-operation. With the inability to offer valuable items, this study adopted a non-material incentive in the form of a report about the study outcomes. Other studies have shown that such access to information is viewed as valuable (Forrest, 1999).<sup>1</sup>

### Ethical Considerations

Murdoch University requires research involving human participants to comply with the National Statement on the Ethical Conduct of Research Involving Humans. This study acknowledged and adhered to this statement and received an approval (No. 2003/156) from Murdoch Human Research Ethic Committee.

Additionally, following Bowers (1997) that adopted the privacy principle set by the US Information Infrastructure Task Force to conduct an online survey, the survey for this study provides an introduction/cover letter that discloses: the

- Objective of collecting information (i.e. to determine influencing factors of perceived risk and trust to purchase gemstones online and the relationships among perceived risk, trust and online purchasing behaviour of gemstone buyers);
- Use of the information collected (i.e. for research purpose only);

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<sup>1</sup> Results from an earlier exploratory survey “Critical Attributes in Gemstone Purchasing via Internet” (Appendix 1) was also used as an incentive in this study. It is hoped that findings of this report would motivate respondents to participate in the main survey. The report was provided in two alternative versions, a pdf file and MsWord file. The links to these reports would appear after respondents submitted their responses.

- Procedure used to protect the confidentiality of the collected information (i.e. the survey is completely anonymous); and
- Rights available to respondents (i.e. to withdraw their consent at any time) (Forrest, 1999).

This type of approach protects respondents' privacy, which in turn should increase the response rate.

### **Survey Format**

The survey was made up of two main sections. The first section sought biographical data including information about the company (including online purchasing behaviour) and the individual respondent (e.g. years of experience etc). The second section of the survey focused on the nine critical instruments which seek to measure the factors which influence on-line purchasing behaviour. These measures include: determinants of perceived risk (concern about product information, type of internet marketing strategy, privacy concern, and security concerns); perceived risk; determinants of trust (Internet fraud protection, perceived reputation and assurance); and trust.

In order to capture a wide range of these constructs, multi-items were utilised to tap each construct. The items were adapted in terms of wording to increase the applicability of the items to the current study context (Heijden et al., 2003). A full questionnaire is shown Appendix 2.

A set of instruments to tap measures of interests, the corresponding response scale, and the sources of items which were used are discussed below. These measures and items used are also summarised in Appendix 3.

## **Instruments**

### *Perceived Risk*

Perceived risk is considered to be similar to uncertainty and as a negative consequence resulting from the general risk towards online purchasing. In this study, perceived risk was measured in terms of the general risk towards online purchasing. A three-item scale ( $\alpha = 0.91$ ) suggested by Miyazaki & Fernandez (2001) was used. These items consisted of “I feel that buying gemstone(s) using the Internet is risky”; “I feel that it is less risky to buy gemstone(s) using the Internet today”; and “Buying gemstone(s) using the Internet is safe (reverse coded)”. Responses were scored along a five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement.

### *Concern about product information*

This study defines concern about product information as “buyers’ concern about sellers’ misleading about gemstone characteristics and information”. Concern about product information was measured by a 7-item measure based on the standard criteria used for evaluating gemstones’ quality in practice (AGL, 2002). These items (I tend to be concerned about “treatment disclosure”; “naturalness shown through gemstone images”;

“origin of gemstone”; “color-shade shown through gemstone images”; “disclosure of color enhancement”; “clarity shown through gemstone images”; and “cutting style of gemstone”) were adapted from the Coloredstone Annual Survey 2004 (Prost, 2005) and the content of the gemstone quality-grading report of the American Gemological Laboratories (AGL, 2002), as there exist only limited previous studies in this area. This measure also showed a high reliability alpha coefficient of 0.84 in the earlier exploratory survey (see Appendix 1). Similarly, responses were scored using the same five point scale.

#### *Type of Internet Marketing Strategy Used by Seller*

This thesis interprets an Internet marketing strategy as the combination of online and offline strategies based on a traditional well-known marketing mix, the four Ps - product, price, place, and promotion (see chapter 2, p.37). In addition, it is assumed that gemstone sellers already have a physical store before adopting online selling.

The type of Internet marketing strategy used by sellers was tapped by a 13-item measure. One item related to a price strategy (“I tend to buy from sellers offering a price discount”); two items related to place strategy (“I never buy online from sellers in general e-marketplaces” and “I buy online from sellers in gemstone & jewelry e-marketplaces”) and five items related to promotion strategy (“Gemstone & jewelry search engines help me to find sellers”; “I rarely search for sellers from Web sites of gemstone & jewelry online media”; “I look for sellers from Websites of gemstone & jewelry associations”; “I usually look for sellers from gemstone & jewelry magazines” and “I think printed publications of gemstone & jewelry associations are the first source

to find sellers”) were adapted from the industry survey of the *JCOC Consumers Predictions for 2002* which were used to explore online purchasing behaviour of gemstone and jewellery buyers.

Three-items related to place (distribution) strategy (“Ease of Web site navigation is not important to my decision”; “I am concerned about download time of Website” and “I am not concerned about easy use of shopping cart”), were adapted from the original scales used by Belanger et al. (2002) which reported a coefficient alpha of 0.72.

An additional two items related to product strategy (“I prefer to buy from sellers offering gemstone(s) in variety of lot-sizes” and “variety of lot-types influences my decision”) were adapted from G. Gao (2005) who suggested that offering variety choices of products is related to increased sales. Similarly, these items were scored along a five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement.

#### *Privacy Concern*

This study describes privacy issues as buyers’ concerns about privacy practices of online sellers toward their personal information - collecting, using, sharing and securing that information. Items used to measure this privacy concern were developed on a basis of privacy practices operated by the sellers themselves (Erbschloe & Vacca, 2001), and those employed from privacy third parties (Palmer et al., 2000).

Privacy concerns were tapped by an 11-item measure. Four-items (“Availability of written privacy policy on seller’s Web site”; “Collection of my personal information on Web sites”; “Type of my personal information that will be collected” and “Not knowing how my personal information will be used”) were adapted from Miyazaki & Fernandez (2000). A further two items (“Disclosure of my personal information collected to third-parties” and “Not knowing if my behaviour is tracked and by what methods”, were adopted from Miyazaki & Fernandez (2001). Each item was scored along a five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement. These scales sources were used to explore concerns about privacy information when purchasing products online. Use of these items is also in line with previous studies investigating this issue (Culnan, 1999; Gauzente, 2004; Harris Interactive, 2001; Miyazaki & Krishnamurthy, 2000).

Given that there had been few prior studies exploring gemstone products, five new items (“Seller not having a choice on what personal information is collected”; “Not knowing how to correct inaccuracies of my personal information”; “Sellers’ compliance of privacy practices by Federal Trade Commission (FTC)”; “Sellers’ compliance of privacy practices by global well-known privacy program” and “Seller not having a seal of privacy practices from global well-known privacy programs”), were also developed for the purpose of this study based on the privacy principles of the Federal Trade Commission (FTC, 2000) and Erbschloe & Vacca, 2001. These new items were also measured using the same five-point Likert scale, where 1 indicated strongly disagreed, and 5 indicated strongly agreed with the statement. The results of pre-testing the validity

of these items (see Appendix 1) showed a high reliability alpha of 0.98. These measures were also scored using the similar five point Likert scale.

### *Security Concern*

Buyers are likely to consider security issues in the light of personal security information (Erbschloe & Vacca 2001). This study interprets security issues as buyers' concerns about sellers' security practices regarding buyers' personal information. Thus, items used to measure buyers' concerns about information security were based on preventing unauthorised access, unauthorised disclosure and unauthorised action (e.g. data alteration), of the buyers' personal information.

Security concern was tapped by a 10-item measure. Four items ("Availability of written security policy on seller's Web site"; "Seller not using global well-known credit card companies for payment"; "Seller not using global well-known online payment systems" and "Seller not using encryption on financial transaction e.g. credit card details") were adopted from Miyazaki & Fernandez (2000). Three items ("Seller not using systems that prevent unauthorised access to my personal information"; "Seller not using systems that prevent unauthorised access to my transaction information" and "Seller not using systems that prevent unauthorised access to my financial information") were adopted from Miyazaki & Fernandez (2001). Following Erbschloe & Vacca (2001), the "Sellers' compliance of security practices by Federal Trade Commission (FTC)" was also developed to investigate a buyer's security concern. Another two items ("Sellers' compliance of security practices by global well-known security program" and "Seller not having a seal of security practices from global well-known security programs") were

also used to measure a buyer's concern about security information because past studies have implied some possible evidence of this relationship (Miyazaki & Fernandez, 2001; Palmer et al., 2000). These items also showed a high reliability alpha of 0.98 in the pre-testing survey (see Appendix 1).

Similar to all the measures, these items tapping security concerns were scored along a five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement.

### *Trust*

This study interprets trust as a buyer's trust to purchase online, the expectations of buyers about the reliability and integrity of the seller's promises based on the assurances of online sellers. That is, trust is considered as general trust to purchase online, rather than trust in the seller (Brannigan & De Jager, 2003) or trust in the online trade (T. Gao et al., 2002).

Trust was tapped by a four-item scale adapted from the items used to measure general risk towards online purchasing as suggested by Miyazaki & Fernandez (2001) which reported coefficient alpha of 0.91. Following past studies (Chellappa, 2003; Kimery & McCord, 2002; Ohanian, 1990), the word "reliable" was used to tapping trust and hence was employed to replace the word "risky". The word "comfortable" was substituted with the word "confident". The word replacement was expected to help ensure consistency in the analysis of this construct (Azjen & Fishbein, 1977). The four items consisted of the "I feel confident to buy gemstone(s) using the Internet"; "I feel wary to buy gemstone(s)

using the Internet (reverse coded)”; “I feel more confident to buy gemstone(s) using the Internet today” and “To date, buying gemstones online tends to be reliable”. These items were measured using the same five point Likert scale where 1 indicated strongly disagreed, and 5 indicated strongly agreed with the statement.

### *Internet Fraud Protection*

This study interpreted Internet fraud as possible fraudulent behaviour regarding payment and the delivery of the gemstones (E. M. Awad, 2004; , "Internet Fraud Statistics", 2005; Spagat, 2001).

Internet fraud protection was tapped by an eight-item measure. Two items (“Availability of written payment fraud protection policy on seller’s Web site” and “Availability of written non-delivery fraud protection policy on seller’s Web site”) were adapted from the scale used by Miyazaki & Fernandez (2000). One item, “Seller not having guarantee of product delivery” was used to explore Internet fraud in relation to delivery following Miyazaki & Fernandez (2001). Two items (“Sellers’ adherence of payment fraud protection practices to global well-known program” and “Seller not using global well-known financial institutions for payment”) were employed to tapping the payment fraud protection from third parties as suggested by Kimery & McCord (2002). Again, following Erbschloe & Vacca (2001) the “sellers’ adherence of non-delivery fraud protection practices to FTC” was also used to examine Internet fraud protection in this study.

Two items relating to the impact of Internet fraud on the company (“Impact of non-delivery fraud on my company” and “Impact of payment fraud on my company”) were also used to tap into the Internet fraud protection construct as it seemed that the more online buyers consider these items, the higher they regard the importance of Internet fraud protection (Baker, 1999; Cowcher, 2001).

A five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement, were also used to score the above items.

#### *Perceived Reputation*

Perceived reputation is considered as the relationship between sellers and buyers in relation to the seller’s perceived reputation about characteristics of seller organisations (e.g. reputation and size of seller organisation, length of relationship).

Perceived reputation was tapped by a four-item measure (“I prefer to buy from sellers that have good reputation”; “Size of online seller organization influences my buying decision”; “I usually don’t buy online from new contacts” and “Knowledge/expertise of salesperson has nothing to do with my decisions to buy gemstone(s) online”) adopted from the scales used by Doney & Cannon (1997) and Jarvenpaa et al. (1999). These items were scored using the same five point scale.

### *Assurance*

This study interprets assurance issues as seller's practices regarding methods used to keep promises about products and to assure buyers' trust to purchase. Assurance was tapped by a 3-item measure ("I tend to buy from sellers offering warranty/guarantee for gemstone(s)"; "Offering return of gemstone(s) within inspection period influences my decision to buy gemstone(s) online" and "I am concerned about not having authentic testimonials with gemstone(s)") adapted from the industry survey of the JCOC Consumers Predictions for 2002. Items used to tap this construct were consistent with the items explored by Innis & Unnava (1991) and S. E. Kaplan & Nieschwietz (2003). Responses were scored along a five-point Likert scale, where 1 indicated that respondents strongly disagreed with the statement, and 5 indicated that respondents strongly agreed with the statement.

### *Online Purchasing Behaviour*

This study investigates online purchasing behaviour of buyers using the level of online purchasing. The online purchasing literature elaborates on several criteria applicable to quantify the level of online purchasing. Some researchers adopt frequency to measure the level of online purchasing. For instance, Gattiker, Perlusz, & Bohmann (2000) employed the frequency of purchase to quantify the online buying level of purchasing agents (organisational buyers). Miyazaki & Fernandez (2001) supported this by using the frequency of purchases to identify the rate of consumer purchasing online.

This is not the only criterion that can be applied however. Others use volume to quantify the level of online purchasing. For example, Min & Galle (1999) adopted the annual

purchasing volume to measure the level of organisational purchasing. Tiangsoongnern & Vuori (2004) corroborated this by applying the percentage of organisational purchasing online compared to offline methods to assess the level of gemstone purchasing online. In compromising this diverse usage some researchers (Doolin et al., 2005; D. J. Kim et al., 2000) adopted both the amount and frequency to measure buyer's online purchasing behaviour. Based on these studies, it seems that the measurement criterion applicable across industries is not yet known. That is, choice of online purchasing behaviour measures tends to vary according to the objective of the study.

Information relating to money matters such as purchasing-volume is suggested as one of the most sensitive topics which could make respondents be less willing to answer questions (Cooper & Schindler, 2006; Sjoberg, 1980). In order to avoid such issues, this study examined online purchasing behaviour in terms of the frequency of purchases. The one item-measure "In a typical month, how many times would you say your company buys gemstone online?" was adapted from the item employed to measure level of online purchasing by Miyazaki & Fernandez (2001).

As previously stated, all of the measures in this study adopted a Likert scale of measurement. Using a Likert scale, respondents were asked to agree or disagree with statements that express either a favourable or an unfavourable attitude toward the item explored (Cooper & Schindler, 2006). These scales were anchored with "Strongly Agree = 5", "Agree = 4", "Neither Agree or Disagree = 3", "Disagree = 2", and "Strongly Disagree = 1". Use of this five-point scale descriptors is consistent with previous studies examining online purchasing behaviour of consumers (Ha, 2002; Pires et al., 2004).

### *Biographical Data*

The questionnaire also included a section relating to company and personal data. This section included questions relating to company type, number of employees (staff number), years of experience, education level, and buying characteristics (buying methods, gemstone types, gemstone lot-types, gemstone lot-sizes, and gemstone quality). For the purpose of this study, a buying method was used to ensure that respondents had bought gemstones online (indicated by selecting any of online buying methods given). These items were adapted from scales used by the industry survey of the JCOC Consumers Predictions for 2002 and the Coloredstone Annual Survey 2004 (cited in Prost, 2005).

Previous studies (Doolin et al., 2005; Teo, 2001) have found no significant association between age and online purchases. Bhatnagar, Misra, & Rao (2000) have suggested that the effect of gender on online purchases was mixed and tended to vary with the product category, which implied there may not exist (or exist) the influence of this demographic data on online purchasing behaviour of gemstone buyers. Therefore, demographic data such as age and gender of respondents were not explored in this study. This is also in line with the practice used by PURCHASING magazine's surveys 2000-2004 which have focused on online purchasing strategies used by purchasing organisations (cited in Hannon, 2004; cited in Varmazis, 2005).

## **Method of Analysis**

Analysis of the data proceeded in various stages and is discussed as follows.

### *Data Screening*

Outliers were screened using results of descriptive statistics to assure that any extreme values did not affect the data analysis. The assumptions of normality, linearity and homoskedasticity were tested by viewing scatter-plot diagrams and ensuring skewness and kurtosis values were within specified ranges (i.e.  $-1 < \text{skewness values} < +1$ ,  $-2 < \text{kurtosis values} < +2$ ) (Tabachnick & Fidell, 2001).

In order to deal with both continuous and categorical data, all data was first analysed through the PRELIS program where a polychoric correlation matrix and an asymptotic covariance matrix were produced (Browne & Cudeck, 1993). These matrices were then used in the LISREL run to estimate and test the one-factor congeneric models.

### *Measurement Validation*

The relationships between measurement items used and the constructs explored (see Figure 1, p.21) were tested using a mix of factor analysis, one-factor congeneric model testing and confirmatory factor analysis (CFA) (E.-J. Lee, 2002; Ruth, 2000; Yoh, 1999). Because the factor which is a composite of several items can represent a single measurement variable (Tabachnick & Fidell, 2001), factor analysis helps provide a more reasonable means for capturing the sample size rule of ten cases per a measurement variable used in the current study.

The psychometric properties of the factors derived from factor analysis were then confirmed using one-factor congeneric models with Structural Equation Modelling (SEM). SEM is a statistical methodology that takes a confirmatory approach to the multivariate analysis of a structural theory bearing on some phenomenon (Byrne, 1998, p.3). SEM therefore provides a more rigorous method for evaluating and modifying theoretical models than an exploratory approach (J. C. Anderson & Gerbing, 1988). For example, confirmatory factor analysis with SEM can provide modification indices to improve the fit of the factor structures. This helps to ensure that the measurement items truly represent the measures before using those measures to test the hypotheses (Byrne, 1998).

One-factor congeneric models were assessed using the LISREL 8.3 statistical program to examine whether the items were measuring the same single latent variable or factor (Joreskog & Sorbom, 1993). A one-factor congeneric model is “the simplest form of a measurement model and represents the regression of a set of observed indicator variables on a single latent variable” (Holmes-Smith & Rowe, 1994, p.6). Such models consider the different degrees to which each individual item contributes to the composite variable to ensure that they are measuring the same composite variable (Girardi, 1999). Once baseline models were identified, and measures validated, reliability was evaluated using a reliability coefficient of Cronbach’s alpha (1970).

In terms of confirmatory factor analysis, the approach taken by Byrne (1989) was used. To assess the model-fit, a number of competing models were compared, starting with the null model, which assumed that each item was loaded onto a separate latent variable.

The next model assumed that all items were loaded onto a single factor. The last model assumed that items were loaded onto their relating latent variables. Evaluation of the extent to which the models fit the observed data, is suggested to be based on several goodness-of-fit indices (Girardi, 1999; Holmes-Smith & Rowe, 1994). The improvement in model-fit was indicated by consulting the change in the chi-square, relative to the change in the number of degrees of freedom and the change in other goodness-of-fit indices (Byrne, 1989; Kline, 2005).

Several goodness-of-fit indices were used to assess the model-fit. Following Girardi (1999) and Heijden et al. (2003), this study adopted eight goodness-of-fit indices (see Table 5). The likelihood ratio chi-square ( $\chi^2$ ) is the traditional index used to test the fit between the restricted hypothesised model and the unrestricted sample data (Byrne, 1989; Kline, 2005). The chi-square difference ( $\Delta\chi^2$ ) is used to test the statistical significance of the reduction in the overall fit as paths are eliminated, or the improvement in fit, as paths are added (Kline, 2005, p.146).

The Root Mean square Residual (RMR) indicates the average discrepancy between the element in the sample and the hypothesised covariance matrices (Byrne, 1989, p.55). The Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit Index (AGFI) assess how well the model accounts for the observed variance (Gerbing & Anderson, 1993).

The Root Mean Square Error of Approximation (RMSEA) indicates a close fit of the model relative to the degree of freedom (Byrne, 1989; Browne & Cudeck, 1993). The Comparative Fit Index (CFI) accounts for sample size and the extent that item covariances can be reproduced in relation to the model of zero common factors and the Non-Normed Fit Index (NNFI) measures relative fit by comparing noncentrality per degree of freedom (J. C. Anderson & Gerbing, 1988).

The acceptable values of these goodness-of-fit indices were presented in Table 5 (see p.93). Based on these criteria, a confirmatory factor analysis using one-factor congeneric baseline models can help assess construct validity<sup>2</sup> (P. Bentler, 1990; Browne & Cudeck, 1993; Girardi, 1999), and discriminant validity<sup>3</sup> (A. C. Burns & Bush, 2000; Prooijen & Kloot, 2001) of constructs, examined in this study.

#### *Development of Composite Variables and Reliability Tests*

Once baseline models were identified, items were summed to compute a composite variable. Factor score regression weights were multiplied by each corresponding indicator item for each variable and then summed. This ensured that each item represented within the scale was appropriately weighted for its contribution to the overall scale, thus providing a more realistic interpretation of the data. These composite variables were then used to test the study hypotheses.

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<sup>2</sup> The ability of a measure to provide empirical evidence consistent with a theory based on the concepts (Zikmund, 2003, p. 718).

<sup>3</sup> The ability to predict the probability that an object will belong in one of two or more mutually exclusive categories (Zikmund, 2003).

**Table 5: Goodness-of-Fit Indices Used in the Study**

<b>Indices</b>	<b>Acceptable Values</b>
Likelihood Ratio Chi-square ( $\chi^2$ )	Low values, non significant at minimum level of .05 (Hair, Anderson, Tatham, & Black, 1998)
Chi-square Difference ( $\Delta\chi^2$ )	Statistical difference in chi-square values (Kline, 2005)
Goodness-of-Fit Index (GFI)	Values of .90 or greater (Gerbing & Anderson, 1993; Kline, 2005)
Adjusted Goodness-of-Fit (AGFI)	Values of .90 or greater (J. C. Anderson & Gerbing, 1988; Kline, 2005)
Root Mean square Residual (RMR)	Values of less than .08 (J. C. Anderson & Gerbing, 1988) while value of .05 or less suggested a good fit (Byrne, 1989; Kline, 2005)
Root Mean Square Error of Approximation (RMSEA)	Values of less than .08 while value of .05 or less suggested a good fit (Browne & Cudeck, 1993; Hair et al., 1998)
Comparative Fit Index (CFI)	Values of .90 or greater (Byrne, 1989)
Non-Normed Fit Index (NNFI)	Values of .90 or greater (Browne & Cudeck, 1993; L. Hu & Bentler, 1999)

### *Hypothesis Testing*

With the insufficient sample size to test the study hypothesis with SEM (N=134, p.97) (Joreskog & Sorbom, 1993), multiple regression analysis was used to test the hypotheses of the study. This analysis is useful for investigating the relationship between a dependent variable from several independent variables; determining how strong the

relationship is between a dependent variable and independent variables; assessing the importance of each of the independent variables to the relationship; and examining the relationship between a dependent variable and some independent variables with the effect of other independent variables statistically deleted (mediating effect) (Kline, 2005; Tabachnick & Fidell, 2001; Weisberg, 2005). These goals of multiple regression analysis are then appropriate for the nature of the hypotheses in this study which explores the relationships between the perceived risk and its influencing factors; the relationships between trust and its influencing factors, and the relationships among perceived risk, trust and online purchasing behaviour.

The use of multiple regression analysis has been shown in previous studies. For example, Doolin et al. (2005) predicted the amount and frequency of consumer product purchasing online (e.g. books, movies and music, clothing) using perceived risk (e.g. inability to inspect product), perceived benefit (e.g. convenience due to time saved), and loss of social action (e.g. personal contact). Inma (2002) employed multiple regression analysis to determine the influence of franchise-management (e.g. franchise control, influence strategy) on the franchise-success (e.g. financial performance). Inma also used regression analysis to test the mediating role of influence strategy on the effect of franchise-control on franchise-performance. As well, Miyazaki & Fernandez (2001) examined the relationship between a consumer's perception (e.g. perceived risk of conducting online purchases, Internet experience) and the rate of online purchasing. They all utilised multiple regression analysis to assess the mediating role of perceived risk on the effect of Internet experience, on the rate of online purchasing.

A step-wise multiple regression procedure was used to determine the contributions of independent variables and control variables (demographic) to the dependent variable. Step-wise regression is a procedure in which the order of entry of variables to the equation is based on the statistics computed from the sample data itself (e.g. significance and size of correlations with a dependent variable) (Tabachnick & Fidell, 2001; Hair et al., 1998). A number of regression equations were tested according to the stated hypotheses.

### **Pre-testing the survey instrument**

It is suggested that in situations where little previous knowledge is available or where the researcher aims to identify the factors and indicators related to the research topic (A. C. Burns & Bush, 2000), using an exploratory study can help clarify ambiguities prior to conducting the main study (Cooper & Schindler, 2006; Inma, 2002). An exploratory survey was conducted to identify whether the factors suggested as having an influence on perceived risk (Figure 2, p.35) and on trust (Figure 3, p.52) from the literature review, can be generalised to the context of online-gemstone-buyer- behaviour.

The exploratory study was conducted using the survey, “Critical Attributes in Gemstone Purchasing via Internet” (see Appendix 1). This survey obtained 45 responses from the U.S.A. gemstone buyers. Using a set of data screening procedures suggested by Tabachnick & Fidell (2001), the data was assessed for normality, skewness, kurtosis and the presence of univariate and multivariate outliers before the main analyses. Investigation of normal probability and scatter plot diagram reported no serious

violation. The majority of data fell in  $-1 < \text{skewness values} < +1$  and  $-2 < \text{kurtosis values} < +2$ . The data therefore could be assumed normally distributed.

Factor analysis was used to reduce the number of measures. Results indicated that buyers considered several items when purchasing gemstones online (e.g. characteristics of gemstones, a seller's privacy practices, a seller's Internet fraud protection practices, and a seller's assurance practices). Gemstone buyers considered product information, Internet marketing strategies used by a seller, privacy concerns, and security concerns when assessing perceived risk to purchase the gemstones online. They also considered Internet fraud protection, perceived reputation and assurance when evaluating trust to purchase the gemstones online. As expected, factor loading was within the normal range of around 0.70 or greater (B. Thompson, 2004). Most factors had a high internal consistency (coefficient alpha between 0.83 to 0.98) which also indicated that items used to explore the constructs were appropriate (Aaker et al., 2001; Doolin et al., 2005; Tabachnick & Fidell, 2001; Teo, 2001). Such results provided support for the use of these items to examine perceived risk and trust of online gemstone buyers in the main survey.

## **Chapter Summary**

This chapter has presented the fundamental structure of the research method used in this study. A cross-section survey design was presented as the approach to collect quantitative data from U.S. gemstone buyers via an on-line survey. Both exploratory and confirmatory factor analysis via the use of Structural Equation Modelling techniques was used to validate measures. Stepwise multiple regression analysis was chosen as the most appropriate technique (given the sample size) to test the hypotheses of the study.

Results of measurement validation and hypothesis testing are presented and discussed in Chapter 4.

# **CHAPTER 4: RESULTS**

## **Introduction**

The previous chapter discussed the research methodology and method of analysis used to test the hypotheses. This chapter presents the results from the data analyses which were conducted in two stages:

1. Measurement validation using exploratory factor analysis and Confirmatory Factor Analysis (CFA) with Structural Equation Modelling (SEM),
2. Hypothesis testing using multiple regression analysis.

This chapter consists of seven sections. First, the sample and response rate is discussed. This is followed by data screening, biographical data, results of the measurement validation, and results of reliabilities and a correlation matrix is also presented. The results of the hypothesis testing are then provided. The chapter concludes with a summary of the significant findings of this study.

## **The Sample and Response Rate**

As discussed in the methodology chapter (see p.68), gemstone companies that have been listed with gemstone and jewellery associations and directories in the U.S.A. were employed as the sample frame. The sample was collected from:

1. The entire 877 members (i.e. wholesale natural gemstone suppliers/firm members and affiliate members) of the American Gems Trade Association (AGTA) 2004;
2. The 81 exhibitors of the Gem & Lapidary Wholesalers 2004 in Tucson city, Arizona State during January 29 – February 11 2004; and
3. The 197 gemstone and jewellery dealers obtained from the Yellowpages directory of New York State (Teo, 2001) and the Colored Stone TUCSON Show Guide (Coloredstone, 2005; Doolin et al., 2005).

Data collection was completed in 12 weeks (i.e. April to June 2005). One hundred and sixty email addresses were inactive. This resulted in a total of 895 email addresses being available. 134 responses were received from these 895 addresses, representing a 14.97% response rate. This response rate was in line with the range of response rates of virtual surveys (15% to 29%) as noted by Comley (2000), and was higher than that reported by Ranchhod (2001) and Tse (1998) of 6% and 7% percent respectively. The response rate of this study, therefore, can be considered satisfactory.

### **Data Screening**

Using a set of data screening procedures suggested by Tabachnick & Fidell, 2001, the data was assessed for normality, skewness, kurtosis and the presence of univariate and multivariate outliers before the analysis. Investigation of normal probability and scatter-plot diagram reported no serious violations. The data fell in specified ranges: of  $-1 <$  and

$<+1$  for skewness and  $-2 <$  and  $<+2$  for kurtosis. The data therefore could be assumed to be normally distributed.

### **The Nature of the Sample**

The majority of respondents were found to be gemstone dealers (44.96%), followed by gemstone and jewellery dealers (37.98%) as expected. Most respondents were self-employed and operated within a micro company that has 1-10 employees (75.96%) (Ranchhod, 2001). These gemstone buyers had a tendency towards a high level of experience ranging from 8-15 years in the industry (68.99%). Furthermore, gemstone buyers in this study were educated people with 41.86% having attended college and 36.43% having graduated from college.

Results also revealed that gemstone buyers in this study had been using both offline (60.5%) and online-buying methods (39.5%). In terms of offline-buying methods, visiting gemstone exhibitions (37.31%) and visiting other companies (25.07%) were found to be the two most popular buying methods used. Buying from sellers' Websites (48.62%) and buying from gemstone and jewellery e-marketplaces (35.32%) were found to be the two most frequent online-buying methods.

Semiprecious gemstones (i.e. amethyst, topaz, quartz, moonstone, beads and other semiprecious gemstones) were more likely to be purchased (69.10%) than precious gemstones (i.e. ruby, sapphire and emerald) (30.89%), when purchasing through online channels. It was also found that most buyers (36%) tended to buy these gemstones in

loose lots (i.e. buying a number of gemstones of varying sizes and shapes in one lot) rather than as a single piece (28.8%) (Tse, 1998). Moreover, online buyers purchased gemstones in a variety of qualities, which were generally classified by colour, clarity, cutting style and weight, with higher grading in these features indicating a higher quality (Bridge, O'Neill, & Cromie, 2003; ICA, 2001; Weinburg, 2001) The medium-high quality was found to be the most purchased (41%), followed by medium-low quality (31.1%), high quality (14.8%) and low quality (13.1%).

### **Results of Measurement Validation**

An exploratory factor analysis was conducted in order to identify relevant and irrelevant measurement items (see p.88). Factor loadings of less than 0.30 were considered to be unsatisfactory and these items were removed from further analyses (Metzger, 2004; J. Singh & Rhoads, 1991). Preliminary tabulation of alpha coefficients revealed reliable scales with alpha scores of greater than 0.70 for most factors (Doolin et al., 2005; Teo, 2001). A notable exception was the measure of perceived reputation, and assurance. A full result of exploratory factor analysis is available in Appendix 4.

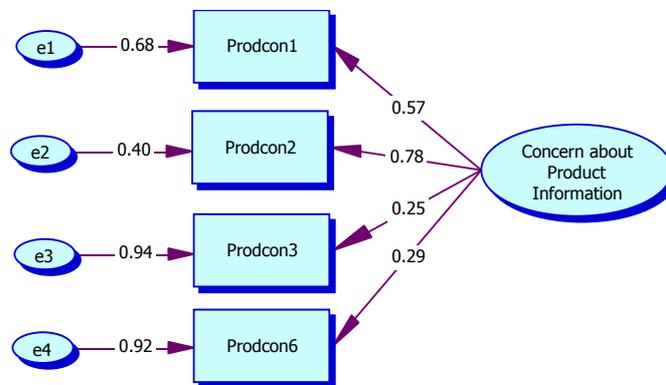
Next, one-factor congeneric models were run for each of the study variables.

## Results of One Factor Congeneric Model Testing

### *Concern about Product Information*

A LISREL-run of the remaining four items (that is, those with loadings greater than 0.30), contained within the “concern about product information” measure, revealed that the measurement model fits the data well. The chi-square was non-significant ( $\chi^2 = 0.43$ , d.f =2,  $p>0.81$ ). GFI, AGFI, and CFI were high at 1.00. RMR and RMSEA were less than the acceptable value of 0.05. No competing model which could represent the data was found and the results suggested that it was unlikely that a superior measurement model could be found. As a result, this factor structure was considered to be the best fit for the data. Figure 6 presents this outcome.

**Figure 6: Fitted One-Factor Congeneric Model for Concern about Product Information (N=134)**



#### **Goodness-of-fit Indices:**

$\chi^2(2) = 0.43$ ,  $p>0.81$ , GFI=1.00, RMR=0.02,  
RMSEA=0.00, AGFI=1.00, CFI=1.00

Note: Prodcon1: concern about treatment disclosure

Prodcon2: concern about naturalness

Prodcon3: concern about origin

Prodcon6: concern about clarity

### *Type of Internet Marketing Strategy Used by the Seller*

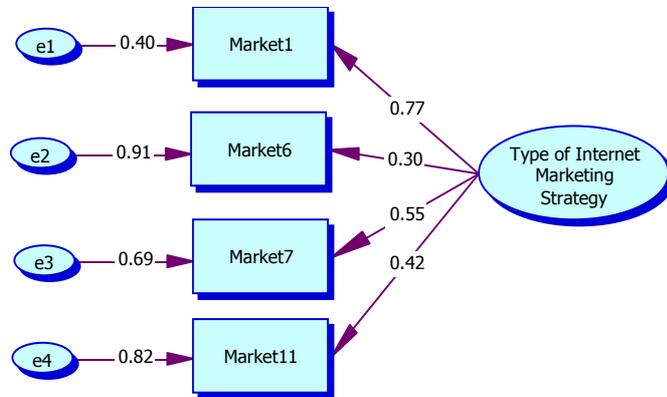
A one-factor congeneric test of the remaining eight items (that is, those with loadings greater than 0.30), contained within the Internet marketing strategy measure, revealed that the measurement model improved significantly. However, modification indices suggested that four of the items did not contribute to the measurement model and were thus removed from further analyses.

Two items relating to the variety of lot sizes (Market9) and lot types (Market10) were loaded negatively onto the factor, suggesting that these two measures were tapping another construct. Similarly, two items relating to advertising on Websites (Market2 &3) seemed to be tapping a different factor.

The Internet marketing strategy measure therefore consisted of four items relating primarily, to place (or distribution) strategy as outlined in Figure 7, The chi-square was non-significant ( $\chi^2 = 0.54$ , d.f =2,  $p>0.76$ ). GFI, AGFI, and CFI were high at 1.00. RMR and RMSEA were also less than 0.05.

**Figure 7: Solution for One-Factor Congeneric Model for Internet Marketing**

**Strategy Used by Seller (N=134)**



**Goodness-of-fit Indices:**

$\chi^2(2) = 0.54, p > 0.76, GFI = 1.00, RMR = 0.02,$   
 $RMSEA = 0.00, AGFI = 1.00, CFI = 1.00$

Note:

Market1: advertise company in Web sites of industry search engines

Market6: buy from general e-marketplaces

Market7: buy from industry e-marketplaces

Market11: ease of Web site navigation

*Privacy Concern*

Of the original 11-item measure, only one item was removed based on the result of exploratory factor analysis (that is, those with loadings less than 0.30). A LISREL run based on the remaining 10-item measure suggested that further modifications were needed to this privacy concern measure. Although GFI, AGFI, CFI, and NNFI were high and close to 1.00, RMR and RMSEA were poor. The chi-square was also large ( $\chi^2 = 200.69, d.f = 35, p < 0.00$ ).

An examination of the factor loadings suggested that two items relating to the choice of personal information collected and inability to correct personal information (that is, Privacy 6 and 8 respectively) had very weak loadings and contributed little to the measure. These items were removed from further analyses, and produced the results presented in Table 6. Removal of the Privacy6 and Privacy8 resulted in an improvement in model fit each time, as denoted by the significant change in chi-square. GFI, AGFI, CFI, and NNFI remained high at 0.99 indicating a good model fit. RMR and RMSEA remained constant after modifications to the model were made, but were less than ideal. Overall however, the Goodness-of-Fit Indices point to an acceptable result for the privacy concern factor.

**Table 6: Solutions of One-Factor Congeneric Models for Privacy Concern (N=134)**

Competing Model	Goodness of Fit Measures							
	$\chi^2$ (df)	Sig $\Delta\chi^2$	GFI	RMR	RMSEA	AGFI	CFI	NNFI
Null Model	14331.58(45)	0.00	NA	NA	NA	NA	NA	NA
One Factor Model	200.69(35)	0.05	0.99	0.32	0.19	0.98	0.99	0.99
Remove privacy8	121.75(27)	0.05	0.99	0.32	0.16	0.99	0.99	0.99
Remove privacy6	99.15(20)	0.05	0.99	0.33	0.17	0.99	0.99	0.99

Competing Models

Note:

**Null Model:** all items represent different latent variables.

**One factor model:** all items represent a single latent variable.

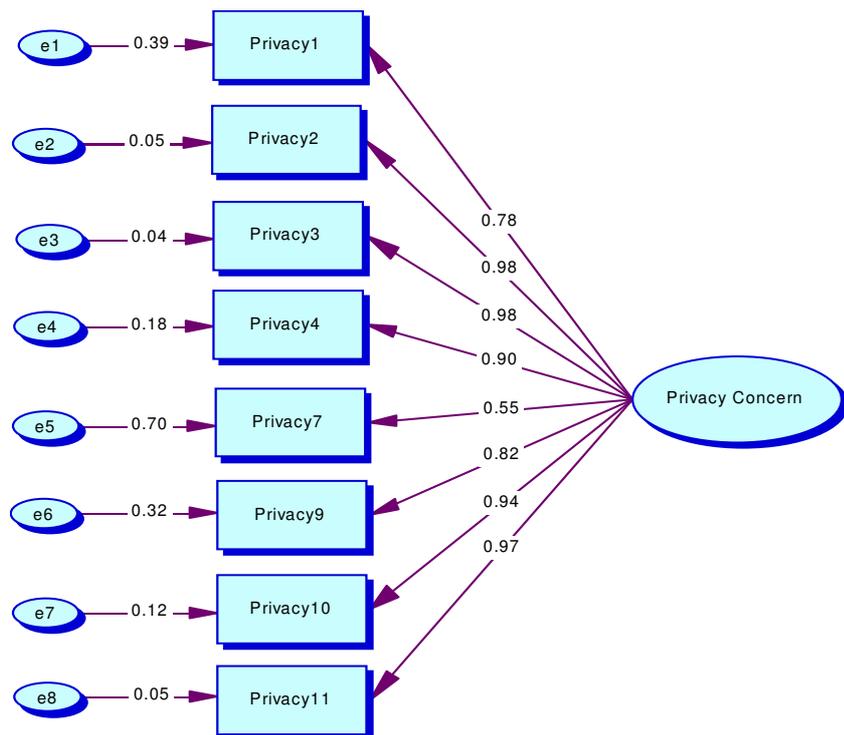
Privacy8: not knowing how to correct personal information.

Privacy6: not having a choice on what personal information is collected.



Based on the above discussion, the final version of the privacy concern measure comprised eight (8) items relating to: the “availability of written privacy policy” (Privacy1), the “collection of personal information” (Privacy2), the “type of personal information collected” (Privacy3), “not knowing how personal information will be used” (Privacy4), “not knowing if buyer’s activity is tracked” (Privacy7), the “compliance of privacy practices by [the] FTC” (Privacy9), the “compliance of privacy practices to well-known privacy programs” (Privacy10), and “not having [a] seal of privacy practices from well-known privacy programs” (Privacy11). The factor weightings and Goodness-of-Fit Indices for the privacy concern measure are presented in Figure 8.

**Figure 8: Solution of One-Factor Congeneric Model for Privacy Concern (N=134)**



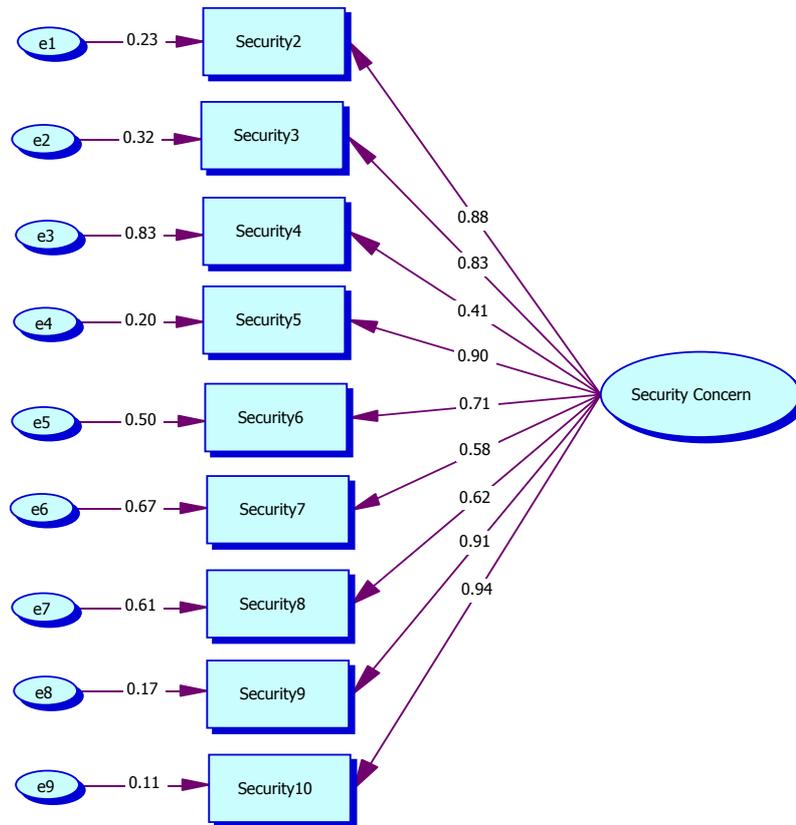
**Goodness-of-fit Indices:**  
 $\chi^2(20) = 99.15, p < 0.00, GFI = 0.99, RMR = 0.33,$   
 $RMSEA = 0.17, AGFI = 0.99, CFI = 0.99, NNFI = 0.99$

### *Security Concern*

The exploratory analysis revealed that of the original 10-item scale, one item relating to the availability of a written security policy on the Website (that is, Security1), contributed little to the scale and was dropped from further analyses. A one-factor congeneric model of the remaining nine-items fit the data well. Although the chi-square was significant ( $\chi^2 = 152.28$ , d.f =27,  $p < 0.00$ ), GFI, AGFI and CFI were well above 0.90. NNFI was also at 0.90. It appeared that no competing model could explain these results. Hence, this measurement model was accepted as the best fit for the observed data at this stage.

Figure 9 shows a factorial structure and Goodness-of-Fit Indices of the one-factor congeneric model for the security concerns measure which consisted of nine (9) items. These items related to: “not using systems’ access to personal information” (Security2); “not using systems access to transactional information” (Security3); “not using systems’ access to financial information” (Security4); “not using well-known credit card for payment” (Security5); “not using well-known online payment systems” (Security6); “not using encryption on financial transaction” (Security7); “compliance of security practices by FTC” (Security8); “compliance of security practices to well-known security programs” (Security9); and “not having seal of security practices from well-known security programs” (Security10).

**Figure 9: Fitted One-Factor Congeneric Model for Security Concern (N=134)**



**Goodness-of-fit Indices:**

$\chi^2(27) = 152.28, p < 0.00, GFI = 0.95, RMR = 0.31,$   
 $RMSEA = 0.19, AGFI = 0.91, CFI = 0.92, NNFI = 0.90$

*Perceived Risk, Perceived Reputation and Assurance*

Perceived risk was measured via a three-item scale. As it is an unidentified model, goodness-of-fit statistics could not be computed in the LISREL program (Joreskog & Sorbom, 1993; J. Singh & Rhoads, 1991). Similarly, measures of Perceived Reputation and Assurance were both tapped by three-item scales and suffered under the same constraints of the perceived risk measure. The measurement model for the perceived reputation construct consisted of “having good reputation” (Reput1), the “size of

organisation” (Reput2), and the “knowledge/expertise of salesperson” (Reput3). The measurement model for the assurance construct comprised “offering warranty/guarantee” (Assur1), “offering return within inspection period” (Assur2), and the “having authentic testimonials” (Assur3).

Despite this limitation, reliability coefficients for all three scales provided some insight into the measures’ suitability. Perceived risk had a high reliability coefficient of 0.87 suggesting that these three measurement items were good indicators of perceived risk (Doolin et al., 2005; Teo, 2001).

However, the reliability coefficient of the measurement items tapping perceived reputation and assurance were of low at 0.43 and 0.41 respectively. This outcome needs to be considered when reporting further results.

#### *Internet Fraud Protection*

A one-factor congeneric model based upon the eight-item internet fraud protection measure suggested the model needed improvement. The chi-square was significant ( $\chi^2 = 92.93$ , d.f =20,  $p < 0.00$ ). Although, GFI and AGFI were around 0.90, and CFI and NNFI were below 0.90, RMR and RMSEA were poor.

Modification indices identified several changes that could be made to improve model-fit. First, an inspection of factor loadings suggested that the “impact of payment fraud on my company” (Fraud4) and the “availability of written non-delivery fraud protection

policy” (Fraud 5) did not contribute to the measure because of poor factor loadings (that is, the loading was less than 0.30). This may be a result of the way in which the items were worded. Second, the correlated error variances between items relating to the “availability of written payment fraud protection policy” (Fraud1) and to the “impact of non-delivery fraud on my company” (Fraud8) suggested that these items had low levels of stability and were then removed. The outcome of removing these items is presented in Table 7.

**Table 7: Solutions of One-Factor Congeneric Models for Internet Fraud Protection (N=134)**

Competing Model	Goodness of Fit Measures							
	$\chi^2$ (df)	Sig $\Delta\chi^2$	GFI	RMR	RMSEA	AGFI	CFI	NNFI
Null Model	41.81(28)	0.00	NA	NA	NA	NA	NA	NA
One Factor Model	92.93(20)	0.05	0.94	0.21	0.17	0.89	0.81	0.73
Remove fraud4	58.73(14)	0.05	0.95	0.18	0.15	0.91	0.85	0.78
Remove fraud5	47.62(9)	0.05	0.96	0.16	0.18	0.90	0.86	0.76
Remove fraud1	10.22(5)	0.05	0.99	0.05	0.09	0.96	0.97	0.94
Remove fraud8	0.05(2)	0.05	1.00	0.05	0.05	1.00	1.00	1.00

Competing Models

Note:

**Null Model:** all items represent different latent variables.

**One factor model:** all items represent a single latent variable.

Fraud4: impact of payment fraud on my company.

Fraud5: availability of written non-delivery fraud protection policy.

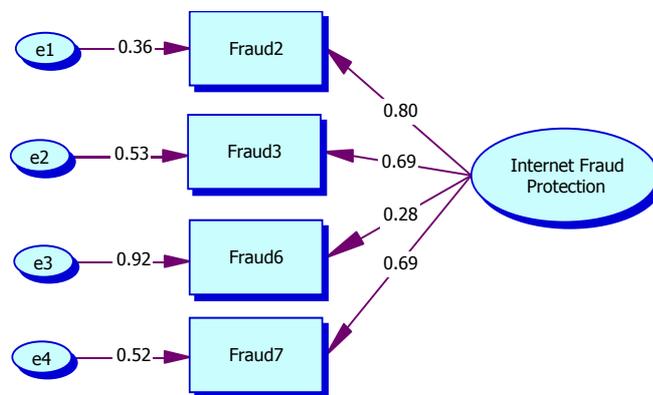
Fraud1: availability of payment fraud protection policy.

Fraud8: impact of non-delivery fraud on my company.

The final four-item measure fits the data well. These items related to: the “adherence of payment fraud protection practices to well-known program” (Fraud2), “not using well-known financial institutions” (Fraud3), “not having guarantee of product delivery” (Fraud6), and “adherence of non-delivery fraud protection practices to FTC” (Fraud7). Changes in chi-square were significant after each item removal which confirmed the efficacy of such an approach. GFI, AGFI, CFI, and NNFI were at 1.00. RMR and RMSEA were also within acceptable limits. Figure 10 shows the factor weightings and results for the internet fraud protection measure.

**Figure 10: Solution of One-Factor Congeneric Model for Internet Fraud**

**Protection (N=134)**



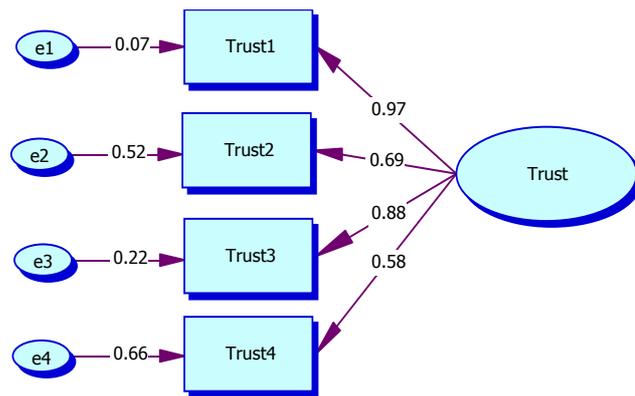
**Goodness-of-fit Indices:**

$\chi^2(2) = 0.05, p > 0.98, GFI = 1.00, RMR = 0.05,$   
 $RMSEA = 0.05, AGFI = 1.00, CFI = 1.00, NNFI = 1.00$

## Trust

A LISREL run on the four-item trust measure showed that the measurement model did fit the data well. The chi-square was non-significant ( $\chi^2 = 3.06$ , d.f =2,  $p>0.22$ ). GFI, AGFI, and CFI were high at around 1.00. RMR and RMSEA were within the acceptable suggested limits. No competing model which could represent the data was suggested. This basic model therefore was considered to best fit the data. Figure 11 shows the factorial structure of the trust measure and provides a summary of Goodness-of-Fit Indices.

**Figure 11: Fitted One-Factor Congeneric Model for Trust (N=134)**



**Goodness-of-fit Indices:**

$\chi^2(2) = 3.06$ ,  $p>0.22$ , GFI=1.00, RMR=0.02,  
RMSEA=0.06, AGFI=0.99, CFI=1.00, NNFI=1.00

Note:

Trust1: I feel confident to buy gemstones using the Internet.

Trust2: I feel wary to buy gemstones using the Internet.

Trust3: I feel more confident to buy gemstones using the Internet.

Trust4: to date, buying gemstones online tends to be reliable.

## **Results of Confirmatory Factor Analysis**

In order to establish measurement-independence, confirmatory factor analysis was conducted. Because of the limitations imposed by the sample size, the analyses were conducted in two phases. The first phase examined information about the independence of the factors which influenced perceived risk. The second phase scrutinised the factorial independence of the determinants of trust.

### *Phase 1: CFA Results for Factors Influencing the Perceived Risk Construct*

To determine the independence of perceived risk and its determinants of: concern about product information; type of Internet marketing strategy; privacy concerns; and security concerns, a two-stage confirmatory factor analysis was used. This approach was necessary in order to deal with the relatively small sample size (n=134).

Stage one of the confirmatory factor analysis examined the independence of the measures relating to “concern about product information” and “Internet marketing strategy used by the seller”, via the LISREL program. Stage two required that a confirmatory factor analysis with the “privacy concern” and “security concern” measures be made using the SPSS program, given that the LISREL program could not cope with the demands of such a large number of measures (that is, 22 items for the security and privacy concern measures), at one time.

### CFA Results Using SEM for the Concern about Product Information and Internet Marketing Strategy Used by the Seller Measures

Table 8 shows the results of a confirmatory factor analysis with concern about product information and Internet marketing strategy measures. The one factor model did not fit the data well, as was expected. The chi-square was significant ( $\chi^2 = 72.37$ , d.f = 20,  $p < 0.00$ ). Although GFI, AGFI was above 0.90, CFI, NNFI, RMR and RMSEA were poor. A two-factor model saw a great improvement in the fit statistics.

An inspection of Goodness-of-Fit Indices reported that the two-factor model fits the data well. Although the chi-square remained significant ( $\chi^2 = 50.72$ ,  $\Delta$ d.f = 19,  $p < 0.05$ ), there was a significant drop in the chi-square statistic ( $\Delta\chi^2 = 21.65$ ,  $\Delta$ d.f = 1,  $p < 0.05$ ). GFI and AGFI were closer to 1.0. CFI and NNFI statistics were also much improved. RMR dropped to an acceptable level of 0.08 (Hair et al, 1998). Moreover, co-variance between the two latent variables was not large (0.23). These Goodness-of-Fit Indices indicated that the two-factor model is a superior measurement model to the one factor model. It therefore can be assumed that concern about product information and Internet marketing strategy used by the seller were significantly distinct constructs (A. C. Burns & Bush, 2000; Doolin et al., 2005; Prooijen & Kloot, 2001).

A reliability test showed that the concern about product information measure had a fair reliability alpha coefficient of 0.43. Such a result needs to be taken into account in further analyses. A reliability alpha coefficient of 0.60 was computed for the Internet

marketing strategy measure. This reliability was of an acceptable level (Joreskog & Sorbom, 1993). A full set of measures and items used is available in Appendix 3.

**Table 8: Modification Indices for Confirmatory Factor Analysis with Concern about Product Information and Internet Marketing Strategy Used by Seller (N=134)**

Competing Model	Goodness of Fit Measures							
	$\chi^2$ (df)	Sig $\Delta\chi^2$	GFI	RMR	RMSEA	AGFI	CFI	NNFI
Null Model	186.74 (28)	0.00	NA	NA	NA	NA	NA	NA
One Factor Model	72.72(20)	0.05	0.94	0.16	0.14	0.90	0.67	0.54
Two Factor Model	50.72(19)	0.05	0.96	0.10	0.11	0.92	0.80	0.71

Competing Models

Note:

**Null Model:** all items represent different latent variables.

**One factor model:** all items represent a single latent variable.

**Two factor model:** Items relating to concern about product information (Prodcon1, Prodcon2, Prodcon3, and Prodcon6) represent one latent variable. Items relating to Internet marketing strategy used by seller (Market1, Market6, Market7, and Market11) represent one latent variable.

CFA Results for Privacy Concern and Security Concern Measures

In order to demonstrate that privacy concern and security concern are independent measures, a confirmatory factor analysis using SPSS was performed (Prooijen & Kloot, 2001). Table 9 reveals that privacy concern and security concern are two separate factors. Of particular note, is that two items from the security concern measure (not using systems to prevent un-authorized access to personal information (Security2) and

transactional information (Security3), loaded onto the privacy concern measure. Additionally, three items from the privacy concern measure (compliance of privacy practices by FTC, (Privacy9), compliance of privacy practices to well-known privacy programs (Privacy10), and not having a seal of privacy practices from well-known privacy programs (Privacy11), loaded onto the security concern measure.

It appears from these results that those items relating to privacy concerns, focus more on personal privacy and security issues, whilst those items relating to security concerns are more about security provided by or through external sources. This would be an interesting area for further examination.

Computed alpha coefficients support the reliability of each of these measures, with a reasonably high reliability of 0.90 for privacy concern and 0.88 for security concern (Doolin et al., 2005; Teo, 2001). A full set of measures and items used can be seen in Appendix 3.

**Table 9: Confirmatory Factor Analysis with Privacy Concern and Security**

**Concern (N=134)**

Items	Factor/Factor Loading	
	Privacy Concern	Security Concern
Privacy2	.909	
Privacy3	.892	
Privacy4	.889	
Privacy1	.770	
Security2	.710	
Security3	.602	
Security9		.893
Privacy10		.856
Security10		.816
Privacy11		.800
Security8		.685
Security5		.555
Security6		.543
Privacy9		.535
Mean	4.45	4.43
Std. Deviation	0.48	0.47
Reliability Coefficient	0.90	0.88

Note:

Privacy1: privacy information consists of availability of written privacy policy

Privacy2: collection of personal information

Privacy3: type of personal information collected

Privacy4: not knowing how personal information will be used

Privacy9: compliance of privacy practices by FTC

Privacy10: compliance of privacy practices to well-known privacy programs

Privacy11: not having seal of privacy practices from well-known privacy programs

Security2: not using systems access to personal information

Security3: not using systems access to transactional information

Security5: not using well-known credit card for payment

Security6: not using well-known online payment systems

Security8: compliance of security practices by FTC

Security9: compliance of security practices to well-known security programs

Security10: not having seal of security practices from well-known security programs

It should be noted that three items; the tracking of a buyer's activity on Websites, having systems to prevent un-authorised access to personal information, and using encryption on financial transactions were removed from the analysis as they had factor loadings below 0.50 (Klein, 1982; Teo, 2001).

*Phase 2: CFA Results for Factors Influencing the Trust Construct*

A confirmatory factor analysis with the LISREL program was also used to determine the independence of trust and the following measures; Internet fraud protection, perceived reputation and assurance.

Unexpectedly, perceived reputation and assurance constructs produced negative factor loadings on the trust dimension which suggested that they were possibly tapping other constructs. These measures also had poor levels of reliability. This may have contributed to this outcome. As a result, perceived reputation and assurance constructs were removed from further analysis because the validity and reliability of the constructs appear to be compromised. As such, the measure of Internet fraud protection remains the sole determinant of trust. Table 10 shows the fit statistics for the Internet fraud protection measure.

A coefficient alpha of 0.65 suggests that the Internet fraud protection measure had reasonable reliability (Hair et al., 2000). See Appendix 3 for a full set of measures and items used.

**Table 10: Modification Indices for Confirmatory Factor Analysis with Factor Influencing Trust Construct (N=134)**

Competing Model	Goodness of Fit Measures						
	$\chi^2$ (df)	GFI	RMR	RMSEA	AGFI	CFI	NNFI
Null Model	212.94	NA	NA	NA	NA	NA	NA
One Factor Model	32.98(14)	0.97	0.10	0.10	0.94	0.90	0.85

Competing Models

Note: **Null Model**: all items represent different latent variables.

**One factor model**: all items represent a single latent variable.

This section has illustrated that the measures used in this study are factorially independent from one another and have reasonable reliabilities. Furthermore, a summary of the measurement properties (e.g. AVE, alpha reliability) of these measures is shown in Appendix 5. With these results, hypothesis testing can now begin.

**Results of Correlation Matrix**

A correlation matrix was constructed in order to examine the relationships between the relevant biographical data and measurement items. In most cases, the correlation results were as expected.

**Table 11: Correlation Matrix showing Means, Standard Deviation, Reliability and Correlation Coefficients**

Variable	Mean	Std Deviation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.Precious Gemstone	NA	NA																	
2.Semiprecious Gemstone	NA	NA	.59**																
3. Buy Method	NA	NA	.04	.18*															
4. Lot Type	NA	NA	.13	.03	.23**														
5. Quality	NA	NA	-.09	.09	.21*	.16													
6. Company Type	NA	NA	-.01	.04	.02	.11	.36**												
7. No. of Staff	NA	NA	.02	.08	.29**	.11	.03	.08											
8. Years of Experience	13.93	5.27	.17	-.36**	-.15	-.03	-.00	.04	.12										
9. Education	NA	NA	.03	.19*	-.04	.01	.11	.02	.13	-.03									
10.Concern about product Information	2.95	2.35	.04	-.14	-.05	-.04	-.16	.08	.08	.10	.07	<b>.43</b>							
11.Internet Marketing Strategy	3.18	0.85	.21*	.05	.59**	.08	-.06	-.11	.26**	-.10	-.20*	-.05	<b>.60</b>						
12. Privacy Concern	4.45	0.48	-.32**	.36**	.08	.04	.03	.06	.19*	-.05	.21*	.00	-.09	<b>.90</b>					
13. Security Concern	4.43	0.47	.09	-.19*	-.19*	-.00	-.02	.17	.05	.22**	-.12	.15	-.05	-.36**	<b>.88</b>				
14. Internet Fraud Protection	4.49	0.38	.05	-.05	.18*	.03	-.01	-.07	.07	-.03	-.04	-.10	.14	.21*	-.75**	<b>.65</b>			
15. Perceived Risk	-2.57	0.92	-.16	-.01	-.27**	-.07	.01	.19*	-.01	.27**	.15	.13	-.36**	.19*	.27**	-.24**	<b>.87</b>		
16. Trust	2.70	0.97	.12	.12	.46**	.14	.07	-.22*	.08	-.16	-.12	-.11	.59**	-.07	-.24**	.22*	-.74**	<b>.85</b>	
17. Online Purchasing Behaviour	0.88	0.93	.01	.28**	.34**	.06	.02	-.10	.42**	-.14	-.09	.04	.39**	.13	-.06	.02	-.31**	.37**	NA

Note:

\*p<0.05, \*\*p<0.01

Online purchasing behaviour is a one item measured  
Reliability coefficient represented on the diagonal

In terms of the buyer's perceived risk, the correlation matrix reveals the following results; a negative relationship with the type of Internet marketing strategy used by the seller and the buyer's perceived risk ( $r = -0.36$   $p < 0.05$ ); a positive relationship with privacy concerns and a positive relationship with security concerns ( $r = 0.27$   $p < 0.05$ ). However, there was no evidence of a significant relationship between concern about product information and the buyer's perceived risk ( $p > 0.05$ ). Concern about product information was found to have no impact on a buyer's perceived risk to purchase online.

In terms of the relationship between privacy and security concerns, the correlation matrix presents evidence of a significant and negative relationship ( $r = -0.36$ ,  $p < 0.01$ ). This suggests that the less concern about security issues, the more the concern about personal privacy information. Studies from research published by Harris Interactive (2001); Hoffman et al. (1999) and Teltzrow & Kobsa (2004) support that privacy information is paramount to those online buyers irrespective of security measures taken by the company. Hence, although security concerns and privacy concerns may be considered to go hand in hand, this outcome suggests that sellers need to focus on ensuring personal privacy for their potential customers.

Table 11 also shows that Internet fraud protection had a positive relationship with a buyer's trust ( $r = 0.22$   $p < 0.05$ ), suggesting that the higher the seller's use of appropriate Internet fraud protection methods, the higher the buyer's trust.

A buyer's perceived risk had a negative relationship with online purchasing behaviour ( $r = -0.31$   $p < 0.05$ ), suggesting that the higher the level of risk perceived by the buyer, the

lower the level of online purchasing behaviour. A buyer's perceived risk also had a strong negative relationship with the buyer's trust ( $r = -0.74$   $p < 0.05$ ), which suggested that the higher the buyer's perceived risk the lower the buyer's trust to purchase online. Moreover, the buyer's trust was found to have a positive relationship with online purchasing behaviour ( $r = 0.37$   $p < 0.05$ ), suggesting that a greater the level of trust coincided with a higher level of online purchasing.

It should be noted that the aforementioned significant relationships support the following hypotheses H1, H2, H3, H4, H5, H8, H9, and H10 as shown in Table 17 (p.134).

The pattern of correlations in this study partially supports the discriminant validity of the constructs examined. There was no significant relationship between company data (such as precious gemstone, gemstone lot-type, gemstone quality, and education) and perceived risk, trust, and online purchasing behaviour ( $p > 0.05$ ).

Of interest however is that there was a significant correlation between the following variables; buying methods used, semiprecious gemstones, number of staff, years of experience, and company type and, the buyer's perceived risk, the buyer's trust and online purchasing behaviour.

Table 11 reveals that the buying method used was found to have a negative relationship with the buyer's perceived risk ( $r = -0.27$   $p < 0.05$ ); a positive relationship with the buyer's trust ( $r = 0.46$   $p < 0.05$ ); and a positive relationship with online purchasing behaviour ( $r = 0.34$   $p < 0.05$ ). These results suggest that a buyer's perceived risk to

purchase gemstones online could be ameliorated by using a variety of buying methods which could in turn, increase a buyer's trust.

There also emerged a positive relationship between semiprecious gemstones (e.g. amethyst, topaz) and the online purchasing behaviour of buyers ( $r = 0.28$   $p < 0.01$ ) which signified that this type of gemstone tends to be purchased more than precious gemstones (e.g. ruby, sapphire) through online channels. A positive relationship between the number of staff and online purchasing behaviour ( $r = 0.42$   $p < 0.01$ ) suggested that the larger the company size the higher the level of online purchasing.

A positive relationship between the years of the buyer's experience and their perceived risk of the transaction ( $r = 0.27$   $p < 0.01$ ) was also reported. The type of company was also positively associated with the buyer's perceived risk and the buyer's trust to purchase online ( $p < 0.05$ ).

Given these outcomes, it is important to control for these variables in further hypotheses testing. These variables were then used as control variables in the regression analyses (Hair et al., 2000).

## Results of Hypothesis Testing

Multiple stepwise regression analysis was used to test the ten study hypotheses. This involved the analysis of six regression equations, as outlined below:

1. Perceived risk = Control variables + concern about product information + type of Internet marketing strategy used by seller + privacy concern + security concern
2. Trust = Control variables + Internet fraud protection
3. Trust = Control variables + perceived risk
4. Online Purchasing Behaviour = Control variables + concern about product information + type of Internet marketing strategy used by seller + privacy concern + security concern + perceived risk
5. Online Purchasing Behaviour = Control variables + Internet fraud protection + trust
6. Online Purchasing Behaviour = Control variables + perceived risk + trust

Where:

**Control variables** = Semiprecious gemstones, buying methods, company type, number of staff, and years of experience. Note these variables were included in the equations based on the correlation matrix outcomes.

A stepwise procedure was used to determine the contributions of control variables and independent variables to the dependent variable in each equation (see p.94). As shown in Table 4 (see p.66), hypothesis 1, 2, 3 and 4 were tested in regression equation 1. Hypothesis 5, 6, and 7 were assessed in regression equation 2. Hypothesis 8, 9, and 10 were examined in regression equation 3, 4, and 5 respectively.

Support for H1 was not found in this study. There was no evidence of a statistical relationship between concerns about product information and perceived risk of online gemstone buyers. This was not expected as previous studies have shown some evidence of a relationship between providing information about product-characteristics (e.g. quality) and the buyer's perceived risk towards online purchasing. Why this has occurred will be discussed in the next chapter.

Table 12 shows support for H2 to H4 of the study, with the type of Internet marketing strategy reducing the perceived risk of online gemstone buyers (H2). This type of marketing strategy is related to place (distribution) strategy. That is, the more information about other distribution channels a seller provides, reduces the perceived risk of online gemstone buyers. This result seems to be in line with buying regularly purchased and branded products such as music CD's and clothing (H.-J. Lee & Huddleston, 2006).

**Table 12: Regression Results (Standardised Coefficients)****Impact of Factors Influencing Perceived Risk (H1-H4)**

<b>Perceived risk = Control variables + concern about product information + type of Internet marketing strategy used by seller + privacy concern + security concern</b>		
	<b>Perceived risk</b>	
<b>Control Variables</b>	<b>Step 1</b>	<b>Step2</b>
Buying method	-0.24**	-0.07
Company type	0.18*	0.09
Years of experience	0.23**	0.18*
<b>Influencing factors of perceived risk</b>		
Concern about product information		0.04
Type of Internet marketing strategy		-0.24*
Privacy Concern		0.28**
Security Concern		0.27**
R <sup>2</sup>	0.16	0.30
Adjusted R <sup>2</sup>	0.14	0.27
F	8.33***	7.75***
Δ R <sup>2</sup>		0.14
F for Δ R <sup>2</sup>		6.28***

Note:

\*p&lt;0.05, \*\*p&lt;0.01, \*\*\*p&lt;0.001

Concerns about a seller's privacy practices were also found to have a positive impact on the perceived risk of online gemstone buyers (H3). Concern about a seller's privacy practices had a positive impact on the perceived risk of online gemstone buyers (H4). Given that there has been little published research examining concerns about privacy, and concerns about information security as determining risk and hence online purchases

using the perceptions of organisational buyers, the results of H3 and H4 make significant contributions to the research in these areas.

Evidence of support for H5 was also found in this study. A buyer's perceptions of a seller's practices concerning Internet fraud protection had a positive impact on the trust of online gemstone buyers, as reported in the correlation matrix, Pearson's  $r = 0.22$ ,  $p < 0.05$  (see Table 11, p.119). It did appear, as predicted, that the Internet fraud protection practices of sellers both in terms of payment fraud and non-delivery fraud were considered important to a buyer's trust to purchase online. Unfortunately, H6 and H7 were not tested in this study because perceived reputation (H6) and assurance (H7) were poor measures (see p.117) and therefore were removed from further analyses. These findings will be discussed in Chapter 5.

The findings (see Table 13) support the notion that perceived risk has a negative impact on the trust of online gemstone buyers (H8). This relationship was strong, as demonstrated by a regression coefficient (Beta) of  $-0.66$  ( $p < 0.001$ ) (B. Thompson, 2004). This result is consistent with past studies (Heijden et al., 2003; Jarvenpaa et al., 1999; Kimery & McCord, 2002) which have provided evidence of negative correlations between perceived risk and trust when purchasing low risk and regularly purchased products, such as compact disks (CD's), books and kitchen accessories.

Table 13 also shows that the buying methods used were a significant predictor of a buyer's trust to purchase gemstones online. A greater variety of buying methods (e.g. several online buying methods), appeared to indicate higher trust of online gemstone buyers. This result was not expected, and hence provides additional knowledge to this body of literature, as well as a focus for future research in this area.

**Table 13: Regression Results (Standardised Coefficients)**

**Impact of Perceived risk on Trust (H8)**

<b>Trust = Control variables + Perceived risk</b>		
	<b>Trust</b>	
<b>Control Variables</b>	<b>Step 1</b>	<b>Step2</b>
Buying method	0.45***	0.29***
Company type	-0.23**	-0.10
Years of experience	-0.08	0.07
<b>Perceived risk</b>		-0.66***
R <sup>2</sup>	0.27	0.64
Adjusted R <sup>2</sup>	0.25	0.63
F	15.79***	55.927***
Δ R <sup>2</sup>		0.37
F for Δ R <sup>2</sup>		128.98***

Note:

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

There also emerged support for H9 in this study. As displayed in Table 14 (see p.129), perceived risk was found to have a negative impact on the online purchasing behaviour of gemstone buyers (Beta = -0.25,  $p < 0.01$ ). This result extends the empirical evidence in relation to the direct effects of perceived risk and trust on the online purchasing behaviour of buyers.

Results in step 3 of the regression support the hypotheses that semiprecious gemstones ( $p < 0.01$ ), number of staff (which may imply organisation size) ( $p < 0.001$ ), and type of Internet marketing strategy (promotion) ( $p < 0.05$ ) were significant contributors to the level of online purchasing behaviour. These outcomes suggest that; semiprecious gemstones tend to be purchased more through online channels; the larger the organisation the higher the level of purchasing gemstones online; and the more information provided by the seller about the promotion, the higher the level of purchasing gemstones online. With this new evidence, this thesis provides a study-model that could be used to further explore factors influencing perceived risk to the purchase of products online.

**Table 14 : Testing the Impact of Perceived risk on Online Purchasing Behaviour**

(H9)

<b>Online Purchasing Behaviour = Control variables + Influencing factors of perceived risk+ Perceived risk</b>			
	<b>Online Purchasing Behaviour</b>		
<b>Control Variables</b>	<b>Step 1</b>	<b>Step2</b>	<b>Step3</b>
Buying method	0.20*	0.06	0.04
Type of gemstone (semiprecious)	0.21**	0.24**	0.23**
Staff Number	0.35***	0.32***	0.31***
Company type	-0.14	-0.12	-0.10
<b>Influencing factors of perceived risk</b>			
Concern about product information		0.08	0.09
Type of Internet marketing strategy		0.26**	0.19*
Privacy Concern		0.01	0.08
Security Concern		0.00	0.08
<b>Perceived Risk</b>			-0.25**
R <sup>2</sup>	0.30	0.34	0.38
Adjusted R <sup>2</sup>	0.27	0.29	0.33
F	10.71***	7.05***	7.53***
Δ R <sup>2</sup>		0.04	0.04
F for Δ R <sup>2</sup>		2.03 <sup>a</sup>	8.17**

Note:

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001, <sup>a</sup> = p<0.10

Support for H10 was also found in this study. Table 15 reveals that trust has a positive impact on the online purchasing behaviour of gemstone buyers (Beta = 0.28, p<0.01). This result also contributes to the literature. It demonstrates the direct effects of trust on the level of online purchasing behaviour using empirical evidence from the specific product of gemstones. Similar to the results reported in H9, semiprecious gemstones

( $p < 0.05$ ) and number of staff (which may imply organization size) ( $p < 0.001$ ) were positively related to the level of gemstone purchasing online. These again emphasise the importance of exploring semiprecious gemstones and numbers of staff as determinants of the level of online purchasing in future research.

**Table 15 : Testing the Impact of Trust on Online Purchasing Behaviour (H10)**

<b>Online Purchasing Behaviour = Control variables + Influencing factors of trust+ Trust</b>			
	<b>Online Purchasing Behaviour</b>		
<b>Control Variables</b>	<b>Step 1</b>	<b>Step2</b>	<b>Step3</b>
Type of gemstone (semiprecious)	0.21**	0.21**	0.19*
Staff Number	0.35***	0.36***	0.37***
Buying method	0.20*	0.21*	0.09
Company type	-0.14	-0.15	-0.09
<b>Influencing factors of trust</b>			
Internet fraud protection		-0.05	-0.08
<b>Trust</b>			0.28**
$R^2$	0.29	0.29	0.35
Adjusted $R^2$	0.27	0.27	0.32
F	13.11***	10.52***	11.14***
$\Delta R^2$		0.00	0.05
F for $\Delta R^2$		0.41	10.36**

Note:

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

### Supplementary Analysis

A supplementary analysis examined the relationship between the perceived risk, the trust and the online purchasing behaviour of gemstone buyers. A mediating effect was investigated through regression equation 6, as past studies have examined the mediating effect of the buyer's perceived risk in relation to the online purchasing behaviour of buyers (Miyazaki & Fernandez, 2001). Studies exploring the mediating effect of a buyer's trust on the online purchasing behaviour of buyers are limited.

Table 16 shows that perceived risk is negatively related to online purchasing behaviour (Beta = -0.24,  $p < 0.01$ ) in Step 2 of the regression. However, perceived risk becomes non-significant to online purchasing behaviour when trust is introduced (Beta = -0.14,  $p > 0.05$ ) in step 3 of the equation. Although the F statistic change in step 3 was not significant ( $F \Delta R^2 = 1.46$ ,  $p > 0.05$ ), it does suggest that a mediating effect of trust on the relationship between perceived risk and online purchasing behaviour of gemstone buyers, should be explored in future research.

**Table 16: Supplementary Test for Meditating Effects**

<b>Online Purchasing Behaviour = Control variables + Perceived risk+ Trust</b>			
	<b>Online Purchasing Behaviour</b>		
<b>Control Variables</b>	<b>Step 1</b>	<b>Step2</b>	<b>Step3</b>
Buying method	0.19*	0.13	0.08
Type of gemstone (semiprecious)	0.18*	0.22**	0.20*
Company type	-0.14	-0.10	-0.08
Staff Number	0.37***	0.37***	0.38***
Years of experience	-0.09	-0.02	-0.04
<b>Perceived risk</b>		-0.24**	-0.14
<b>Trust</b>			0.15
R <sup>2</sup>	0.30	0.35	0.35
Adjusted R <sup>2</sup>	0.27	0.32	0.32
F	10.71***	11.03***	9.69***
$\Delta R^2$		0.05	0.01
F for $\Delta R^2$		9.14**	1.46

Note:

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

## Chapter Summary

This chapter presented the statistical results of the measurement-validation and hypotheses testing. Three study research questions have been answered. As shown in Table 17 (p.134), significant results have been found to support the study hypotheses.

It is clear that the perceived risk of online gemstone buyers is determined by the type of Internet marketing strategy (i.e. place strategy), privacy concerns, and security concerns, as predicted. It is also evident that Internet fraud protection is a significant factor

influencing the level of trust of gemstone buyers. Additionally, it has been found that a relationship between the perceived risk, the trust, and the online purchasing behaviour of buyers also exists, when purchasing the risky product of gemstones. This thesis has also provided some support for the mediating effect of trust on perceived risk for the online purchasing behaviour of buyers, which would benefit from further study.

Chapter 5 will present a discussion of the findings of this study, with an outline of the theoretical and practical implications, limitations, and suggestions for future research.

**Table 17: Summary of Hypothesis Results**

<b>Q1</b>	How do concerns about product information, Internet marketing strategy used by the seller, privacy concerns, and security concerns impact on the perceived risk of online gemstone buyers?
H1	Concern about product information will have a positive impact on the perceived risk of online gemstone buyers (Not significant, $p > 0.05$ )
H2*	Type of Internet marketing strategies (i.e. promotion) will have a negative impact on the perceived risk of online gemstone buyers (Beta = -0.24, $p < 0.05$ )
H3*	Concerns about a seller's privacy practices will have a positive impact on the perceived risk of online gemstone buyers (Beta = 0.28, $p < 0.01$ )
H4*	Concerns about a seller's security practices will have a positive impact on the perceived risk of online gemstone buyers (Beta = 0.27, $p < 0.01$ )
<b>Q2</b>	How does Internet fraud protection, perceived reputation, and assurance impact on the trust of online gemstone buyers?
H5*	Buyer's perceptions of a seller's practices about Internet fraud protection will have a positive impact on the trust of online gemstone buyers ( $r = 0.22$ , $p < 0.05$ )
H6	A seller's perceived reputation will have a positive impact on the trust of online gemstone buyers (Not tested)
H7	A seller's assurance will have a positive impact on the trust of online gemstone buyers (Not tested)
<b>Q3</b>	What are the relationships between perceived risk, the trust and the online purchasing behaviour of gemstone buyers
H8*	Perceived risk will have a negative impact on the trust of online gemstone buyers (Beta = -0.66, $p < 0.001$ )
H9*	Perceived risk will have a negative impact on the online purchasing behaviour of online gemstone buyers (Beta = -0.25, $p < 0.01$ )
H10*	Trust will have a positive impact on the online purchasing behaviour of online gemstone buyers (Beta = 0.28, $p < 0.01$ )

Note:

\* significant hypotheses

H6 and H7 were not tested because confirmatory factor analysis suggested they are poor measures with negative factor loadings and low reliability coefficients

## **CHAPTER 5: DISCUSSION AND CONCLUSIONS**

### **Introduction**

The objective of this study was to examine the following issues:

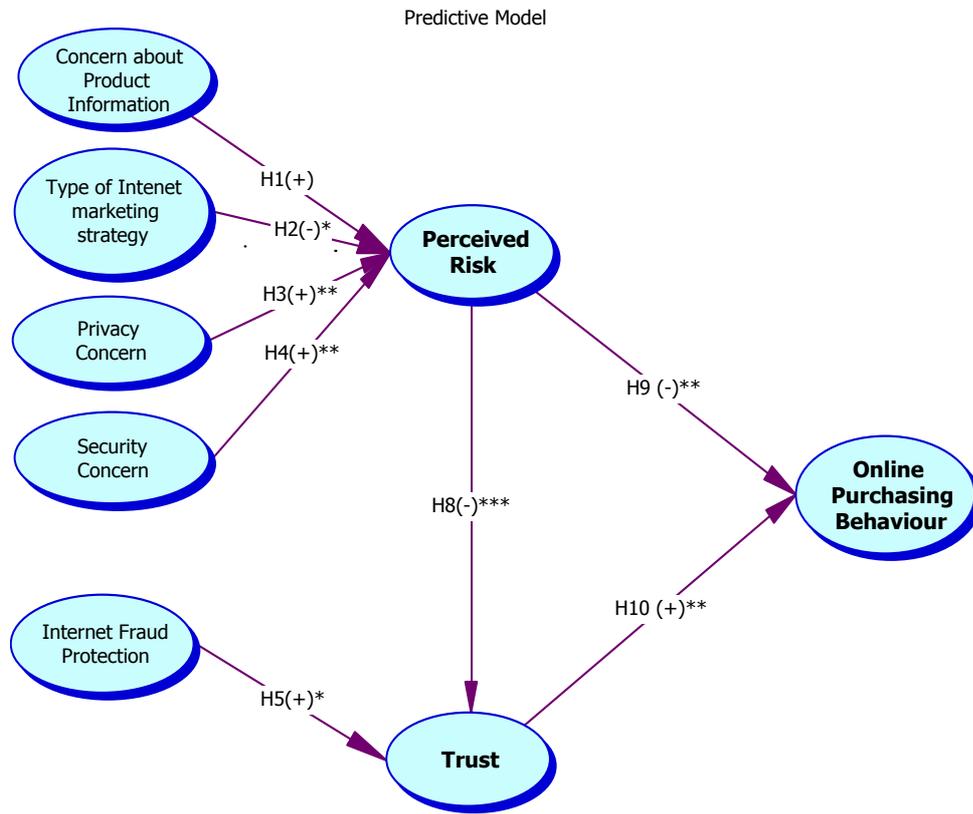
1. To determine factors influencing the perceived risk of online gemstone buyers.
2. To determine factors influencing the trust of online gemstone buyers.
3. To determine the relationship amongst perceived risk, trust and online purchasing behaviour of gemstone buyers.

The critical review of previous literature provided the foundation for the development of ten hypotheses which aimed to verify each of the above objectives. These three objectives framed the format of the research design in which the factors influencing perceived risk, the factors influencing trust, and the relationship between perceived risk, trust and online purchasing behaviour of gemstone buyers could be explored.

### **Summary of Results**

Figure 12 shows the summary of results for each of the study hypotheses in the study-model (the revised study-model). This is discussed as follows.

**Figure 12: The Revised Conceptual Model of the Study**



\*\*\*p<0.001, \*\*p<0.01, \*p<0.05

Perceived Reputation (H6) and Assurance (H7) were not tested because confirmatory factor analysis suggested they are poor measures with negative factor loading and low reliability coefficient.

This study aimed to answer two research problems, “Are there factors influencing the online purchasing behaviour of gemstone buyers?” and if so “What are these underlying

factors and how do these factors impact on the online purchasing behaviour of gemstone buyers?” In the study of online consumer behaviour (Heijden et al., 2003; Jarvenpaa et al., 1999; Kimery & McCord, 2002; Slyke et al., 2002), perceived risk and trust have emerged as explanations of the online purchasing behaviour of buyers and hence are used to answer these research problems. Past studies have determined a buyer’s perceived risk via a number of factors associated with information that a buyer requires to evaluate the purchase. For example, the concern about product information (Poole & Muller, 2001); the type of Internet marketing strategy used by the seller such as place (distribution) strategy (H.-J. Lee & Huddleston, 2006; Poel & Leunis, 1999); the privacy concerns about providing personal information and disclosure of financial details (S. Kim & Montalto, 2002; Ward et al., 2005); and associated concerns about information-security such as use of systems to prevent unauthorised access to personal information (Fung & Lee, 1999; Metzger, 2004). These factors influencing perceived risk, despite being recognised as important, have never been systematically examined in one study. Furthermore, perceived risk associated with purchasing the specific product of gemstones has never been explored. These gaps in the literature gave rise to the first research question, by asking how the aforementioned factors impact upon the perceived risk of online gemstone buyers. Four specific hypotheses were tested to answer the first research question.

This study found no evidence of a statistically significant relationship between a concern about product information and the perceived risk of online gemstone buyers. The regression coefficient was very weak (Beta = 0.04,  $p > 0.05$ ); so thus, no support had been found for H1. In other words, concern about a seller’s provision of accurate information

about gemstone characteristics (that is, treatment disclosure, naturalness, origin, and clarity) was shown to have no statistically significant impact on the perceived risk of online gemstone buyers. This result is not consistent with the fact that providing credible information such as product-information (on the Internet) can reduce a buyer's perceived risk towards the purchase (Ward et al., 2005). It is also not in line with the study of Ha (2002) which suggested that providing product-characteristics such as quality, could decrease the buyer's perceived risk toward online purchasing.

Three explanations may account for this lack of support for H1. The first relates to the level of risk associated with product categories. The results of Ha (2002) were derived from the purchase of posters online which tended to be lower in value, less complicated, and hence a lower risk than the specific product of gemstones (Fung & Lee, 1999; Metzger, 2004; Poel & Leunis, 1999). It therefore seems sensible that studies exploring different product-categories, which associate with different levels of risk, may have differing results. Second, it seems that the credibility of information regarding gemstones online is hard to gauge and hence trust may be considered as exerting a greater influence on a buyer's behaviour than perceived risk. Lastly, as several gemstone sellers' Websites (e.g. [Thaigem.com](http://Thaigem.com), [multicolour.com](http://multicolour.com), [polygon.net](http://polygon.net)) offer a return policy within an inspection time (and a full money refund), gemstone buyers may feel more comfortable about the perceived risk. As such, it is appropriate to note that the level of inherent risk associated with a product category, the seller's assurance practices, and the buyer's trust may account for the lack of support for H1.

Support was found for H2. That is, the type of Internet marketing strategy used by the seller reduced the perceived risk of the online transaction. In this case, this was related to place (or distribution) strategy. In simple terms, a buyer associated lower perceived risk when gemstones were available by other online channels, (e.g. other formalised trading sites or e-marketplaces). This does not mean that other elements of the marketing strategy are unimportant, as this study did not find a measurement model which encapsulated the other three parts of the marketing mix (that is, price, product and promotion). It may well be that these elements of marketing strategy were also addressed by other parts of the predictive model. Product and price may be partially explained by the concern for product information. Promotion may have been assessed by the role of providing or advertising the seller's policies which address the buyer's concerns of privacy, security of information and protection against fraud occurring in a highly risky transaction.

This support for H2 is also in line with past studies. It is suggested that a seller's use of place strategy, such as offering proof of the *bona fides* of the transaction by its acceptance through other channels of distribution, reduces a buyer's perceived risk (Lee & Huddleston, 2006). In particular, this study found that "selling through general e-marketplaces" had a negative impact on the perceived risk of online gemstone buyers.

Past literature, when discussing the role of distribution strategy online, has tended to focus on the mechanics and design of Websites. For example, a buyer's perceived risk has been examined in relation to evaluations of a website's efficacy (Harpel-Burke, 2005; Lohse & Spiller, 1998; Norris, 2006). The results of this thesis go further than the

limited literature in this area, and suggest the importance of multiple market access as a vital component of a firm's online marketing and distribution strategy.

This study found support for H3 (that is, Concerns about a seller's privacy practices increased the perceived risk of online gemstone buyers). This finding conflicts with Miyazaki & Fernandez (2000) who have found that providing a privacy policy on Websites was not related to a buyer's perceived risk to purchase online. It may be that the measures used in previous studies only covered a portion of the measures employed to tap the privacy concern construct in this study, and this may account for the discrepancy.

Another reason for this outcome may be related to the clearer distinction in this study between personal privacy concerns and security concerns. In this study, two items adopted from the scale used by Miyazaki & Fernandez (2001); "not using systems that prevent unauthorised access to personal information" and "not using systems that prevent unauthorised transaction information" were found to be a measure of privacy rather than security concern. Given this outcome, the issue around measurement of privacy concern and security concern needs to be scrutinised in further research.

This study found support for H4 (Concerns about a seller's security practices increased the perceived risk of online gemstone buyers). Although there exists limited studies exploring the relationship between a buyers' concerns regarding information security and their perceived risk to purchase online (Miyazaki & Fernandez, 2001), it is interesting to address why this result has occurred.

Three items relating to the privacy concern dimension (that is, “compliance of privacy practices to FTC”, “use of global well-known privacy program” and “not having a seal of privacy from a well-known privacy program”) which were the scales developed for this study based on past studies (Erbschloe & Vacca, 2001; Harris Interactive, 2001; Belanger et al., 2002), have been found to be a measure of security concern. The use of similarly worded items (that is, Privacy 9-11 and Security 9-11) may account for this result. For example, the third party words, such as FTC, global well-known programs, and seals from well-known program may mirror the security assurance provided from third parties (Erbschloe & Vacca, 2001; Kimery & McCord, 2002), rather, the privacy concern. It is again suggested to avoid the use of similarly worded items in future studies in order to distinguish the privacy and security constructs.

Additionally, the support for H4 was in line with Kimery & McCord (2002) who had suggested that adopting the privacy assurance seal from a well-known third party (e.g. BBBOnline) had a positive impact on the online buyer’s trust. Given that, perceived risk is described as having a negative relationship with trust in the online purchasing arena (Heijden et al., 2003; Jarvenpaa et al., 1999; Kimery & McCord, 2002), the use of privacy assurance seals may also have an influence on the buyer’s perceived risk.

On the basis of the discussion of H1 to H4, it can be concluded that the first research question of the study has been answered. The type of Internet marketing strategy (that is in the form of place strategy) has been found to have a negative impact on the perceived

risk of online gemstone buyers. Privacy concerns and security concerns have been found to have a positive impact on the perceived risk of online gemstone buyers.

Past studies have determined a buyer's trust through a number of factors relating to that they required to assess the purchase. For example, through Internet fraud protection in terms of payment and product delivery (Grazioli & Jarvenpaa, 2000; Harris Interactive, 2001); a seller's perceived reputation (Jarvenpaa et al., 1999; Kimery & McCord, 2002) and assurance (S. E. Kaplan & Nieschwietz, 2003). While past studies ("Internet Fraud Statistics", 2005; Jarvenpaa et al., 1999; Tan, 1999) suggested that pre-purchase information can help reduce a buyer's perceived risk and in turn, increase the buyer's trust in the purchase, studies exploring whether this suggestion could apply to risky products such as gemstones, where trust in the seller is crucial to continued transactions, are lacking. The second research question was formulated to determine how the above factors impact on the trust of online gemstone buyers. Three hypotheses were tested to answer this research question.

This study found support for H5 (Buyer's perceptions of a seller's practices about Internet fraud protection having a positive impact on the trust of online gemstone buyers). The result is consistent with past studies (Chellappa, 2003; Jarvenpaa, 1999; Kimery & McCord, 2002; Wind & Mahajan, 2001) which have suggested that having an effective Internet fraud protection policy was likely to increase a buyer's trust to purchase online. A confirmatory factor analysis (p.117) suggested that both payment fraud (that is, "adherence of payment fraud protection practices to well-known program" and "not using well-known financial institutions") and fraud in relation product delivery

(that is, “not having a guarantee of product delivery” and the “adherence of non-delivery fraud protection practices to FTC”), are dimensions of the Internet fraud protection construct. This result supports the use of the new scale developed from the studies of Kimery & McCord (2002) (payment fraud) and Erbschloe & Vacca (2001) (delivery fraud) to tap Internet fraud protection in this study. It can be seen that these four-measurement items mirror the concept of a third-party assurance. This emphasises the importance of studying the use of Internet fraud protection practices from a third-party (in terms of payment fraud and delivery fraud) in relation to a buyer’s trust in future research.

The hypothesised positive impact of a seller’s perceived reputation on the trust of online gemstone buyers (H6) and the hypothesised positive impact of a seller’s assurance on the trust of online gemstone buyers (H7) were not tested in this study. This was based on the outcomes of a confirmatory factor analysis which found the measures of perceived reputation and assurance were weak. In particular, extremely low levels of reliability, coupled with unexpected correlated errors and negative factor loadings demonstrated that the measures had poor levels of validity. The measurement items used to tap “perceived reputation” were adapted from the scale used by Doney & Cannon (1997). The “size of organisation” and the “knowledge/expertise of salesperson” items were reported as having a high reliability coefficient of 0.80 (Teo, 2001). The item relating to a preference to buy from sellers with a “good reputation” was adapted from the scale used by Jarvenpaa et al. (1999). While the reliability coefficient was not reported in that study, the scale was validated in the present study using confirmatory factor analysis

with the AMOS program. In spite of these reported reliability results, this study did not replicate Jarvenpaa et al's results. This outcome provides an avenue for future research.

On the basis of the discussion of H5 to H7, it can be concluded that the second research question of the study has been answered. Internet fraud protection has been found to have a positive impact on the trust of online gemstone buyers.

The literature describes the relationship between the perceived risk, trust and the online purchasing behaviour of buyers. Perceived risk is described as having a negative relationship with trust. Jarvenpaa et al. (1999) suggested that higher trust in the online seller reduced the perceived risk, which in turn, increased a buyer's willingness to purchase online. Heijden et al. (2003) argued that reduced perceived risk increased both trust and positive attitudes towards online purchasing, which, in turn increased a buyer's intention to purchase online. These results were derived from exploring less expensive and regularly purchased, consumer products (i.e. books and CD's) (L. B. Kaplan et al., 1974; Mitchell, 1999) whilst this thesis focused on the more expensive and infrequently purchased, specific product of gemstones. Moreover, their findings were provided based on a consumer's perspective while the present study focused on gemstone buyers who tend to be organisational buyers (Meredith, 2002). In addition, the importance of trust and perceived risk to the online purchasing behaviour of buyers has never been examined concurrently in past studies. This study therefore posits a third research question: what is the relationship between the perceived risk, trust and online purchasing behaviour of gemstone buyers.

This study found support for H8 (Perceived risk has been found to have a negative impact on the trust of online gemstone buyers). This relationship was strong and significant (Beta= -0.66,  $p < 0.01$ ). This result is in line with past studies which have suggested that perceived risk is negatively related to trust when purchasing online (Heijden et al., 2003; Jarvenpaa et al., 1999; Kimery & McCord, 2002). Support for H8 has suggested that the relationship between a buyer's perceived risk and a buyer's trust to purchase online as noted by previous studies (Heijden et al., 2003; Jarvenpaa et al., 1999; Kimery & McCord, 2002) can be generalised to gemstone purchasing online.

This study found support for H9 and H10. Perceived risk has been found to have a negative impact (Beta= -0.25,  $p < 0.01$ ) on the online purchasing behaviour of online gemstone buyers (H9). Trust (H10) has been found to have a positive impact on the online purchasing behaviour of online gemstone buyers (Beta=0.28,  $p < 0.01$ ). The result of H9 is consistent with past research which has suggested a negative relationship between perceived risk and; the likelihood/intention to purchase online (Vijayasathy & Jones, 2000; Yeung & Morris, 2006); the online purchasing decision (Dillon & Reif, 2004), and the level of online purchasing (Doolin et al., 2005; Miyazaki & Fernandez, 2001). Similarly, support for H10 is in line with prior studies (Gefen, 2000; Koufaris & Hampton-Sosa, 2002) which have noted the positive effect of trust on the intention to purchase online. The support for H9 and H10 found in this study has suggested that a buyer's perceived risk ( $R^2 = 0.38$ ,  $p < 0.01$ ) and a buyer's trust ( $R^2 = 0.35$ ,  $p < 0.01$ ) are significant determinants of the level of gemstone purchasing online. So the relationships between a buyer's perceived risk, a buyer's trust and online purchasing behaviour as established in previous studies can be generalised to gemstone purchasing online.

On a basis of the previous discussion in relation to H8 to H10, it can be concluded that the third research question of the study has been clarified. Perceived risk has been found to have a negative impact on the trust of online gemstone buyers and the level of online purchasing. Trust has been found to have a positive impact on the level of online purchasing. Statistical results also support that such relationships amongst the perceived risk, the trust and the online purchasing behaviour found are strong and highly significant ( $p < 0.01$ ). Moreover, a supplementary analysis for research question 3 has suggested a possible mediating effect ( $R^2 = 0.35$ ) of the buyer's trust on the relationship between the buyer's perceived risk and the online purchasing behaviour of buyers, which has guided a direction for future study.

## **Implications of the Main Findings**

The findings of this study have theoretical and managerial implications.

### **Theoretical Implications**

Results of this study have contributed to the gaps in the relevant literature in the following ways. First, exploring the impact of pre-purchased information on buyer's perceived risk and buyer's trust to purchase the risky, infrequently purchased and less brand involvement products such as gemstones which have been largely ignored in the online purchasing literature, has been addressed. This study has found that type of Internet marketing strategy (place strategy) (negative); privacy concern (positive); and security concern (positive) are the significant factors influencing buyer's perceived risk

to purchase online. Internet fraud protection has been found to be the sole factor which has a significant influence on buyer's trust to purchase online. Buyer's perceived risk has been found to have a negative impact on the buyer's trust and on the online purchasing behaviour of buyers (level of online purchasing). Buyer's trust has been suggested as having a positive impact on the online purchasing behaviour of buyers. The findings of this study have asserted that these relationships which have been suggested using evidence from other product categories (e.g. books, compact CDs) could be generalised to the context of the specific product of gemstones.

Second, given the support of H9 and H10 found in this study, it is now apparent that perceived risk has a direct (negative) effect on the level of online purchasing, not just simply decreasing the level of trust, and attitude towards online purchasing as has been noted by Heijden et al. (2003). It is also clear that trust has a direct (positive) effect on the level of online purchasing, not just simply reducing the level of perceived risk as has been suggested by Jarvenpaa et al. (1999). Moreover, the support for H9 and H10 has contributed to a number of issues which have been neglected in those past studies. First, this thesis has researched the role of perceived risk, and trust to online purchasing behaviour in the one study. Second, this thesis has explored the online purchasing behaviour of buyers in terms of level of online purchasing. This research therefore has helped to confirm the direct relationships between perceived risk, trust, and online purchasing behaviour, and has contributed new empirical evidence from the purchasing of risky products such as gemstones to the literature.

Third, the findings of this study have provided a new paradigm to explore a buyer's perceived risk to conduct online purchasing which incorporates actions and policies of the seller. Whilst the growing body of the online purchasing research is has focused on a buyer's perceived risk, there is little research which explores the relationship between the type of Internet marketing strategy used by a seller and a buyer's perceived risk. In particular, this study has found that the type of Internet marketing strategy used by the seller (the place strategy) has reduced the perceived risk of online gemstone buyers.

Moreover, past studies tend to examine a buyer's concerns regarding the privacy of information in relation to online purchasing behaviour (Bush et al., 1998; Caudill & Murphy, 2000; Gauzente, 2004; Hoffman et al., 1999) and the trust to purchase online (Belanger et al., 2002; Chellappa & Pavlou, 2002; Luo, 2002; Metzger, 2004; Palmer et al., 2000; Shim et al., 2004). As such, relatively little research has investigated a buyer's concerns about privacy as a factor that determines risk and hence online purchases (Miyazaki & Fernandez, 2001). Also, it appears that prior studies addressing a buyers' concerns about privacy information are provided from a consumer's perspective (Teltzrow & Kobsa, 2004). This study has demonstrated that concerns about a seller's privacy practices increase the perceived risk of online gemstone buyers who are experienced, knowledgeable and organisational buyers (Belanger et al., 2002; Meredith, 2002). Additionally, results from prior studies which investigated the relationship between a buyers' concerns regarding information security and their perceived risk to purchase online are limited (Miyazaki & Fernandez, 2001). Buyers' concerns about information security tend to be examined solely in relation to online purchasing (Chellappa & Pavlou, 2002; Chellappa, 2003; Miyazaki & Fernandez, 2001; Otuteye,

2002). This study has contributed to the research in that it has established that concerns about seller's security practices increase the perceived risk of online gemstone buyers, rather than directly discouraging online purchases.

Finally, as discussed in the introduction chapter (p.12) this study has developed a theoretical framework that has examined the direct relationship amongst the perceived risk and the trust to purchase online, and the online purchasing behaviour of buyers using the combination of the, buyer's concerns context (Miyazaki & Fernandez, 2001), buyer's consideration context (D. J. Kim et al., 2000), and relationship marketing context (Chellappa, 2003; Morgan & Hunt, 1994; T. Gao et al., 2002). Although perceived reputation and assurance which represents the relationship marketing context were not tested in this study, this study has contributed to a more comprehensive explanation of the determinants of perceived risk and trust and the effect of both on online purchases.

### **Practical Implications**

From a practical perspective, results from exploring the buyer's perceived risk and the buyer's trust in relation to the buyer's online purchasing behaviour in this study has important strategic implications for three parties: sellers, buyers and the gemstone industry. First, from a managerial viewpoint, the results have provided a rigorous framework to effectively comprehend and manage a buyer's a perceived risk and trust to purchase risky products, such as gemstones, online. Sellers can use the knowledge provided to develop and implement effective strategies to reduce buyer's perceived risk

and improve online sales. These findings therefore assist marketers by providing alternatives to develop strategic plans to deal with online sales management. If marketers choose to reduce a buyer's perceived risk in order to increase sales, the results of this study will have provided several alternatives strategies:

- Using place strategies such as selling through general e-marketplaces, selling through industry e-marketplaces and providing ease of Web site navigation;
- Having appropriate privacy practices such as providing a written privacy policy, providing notification that the Web site is collecting personal information, and providing information on how personal information collected will be used; and
- Having appropriate security practices such as “compliance of security practices by FTC”, “compliance of security practices to well-known security programs” and “having a seal of security practices from well-known security programs”.

Alternatively, if marketers opt to increase a buyer's trust in order to increase sales, this study has found that by having the appropriate Internet fraud protection practices, such as adherence to the payment of fraud protection practices in a well-known program, using well-known financial institutions for payment, having guarantee of product delivery and adherence of non-delivery fraud protection practices to FTC, marketers are likely to increase a buyer's trust to purchase online.

From a buyer's viewpoint, buyers could benefit from the seller's implementation of the results (strategies) suggested in this thesis. Implementation of policies and practices

previously discussed which benefit online sellers, only do so because they reduce the perceived risk of buyers and encourage trust in online purchasing.

Lastly, the results from this study should provide in industry strategies for increasing the level of online gemstone trading. For example, the environment in which a buyer's perceived risk has been reduced and a buyer's trust has been increased could signify gemstone trading online is safe. As such, this environment is likely to help increase the utilisation of gemstone trading online that benefits the gemstone industry as a whole. That is, the possible reduction in business production costs with higher usage of gemstone trading online (Anderson, 1995; Robinson, 2001) may provide a higher efficiency in the industry and hence expand trading values. In summary, the results of this study have provided a more comfortable environment for trading the risky products such as gemstones.

### **Limitations of the Study**

There exist some limitations inherent in the findings of this study which pertain to the methodology used. Although the thesis demonstrates significant findings, these have been derived from a sole study. The first limitation is the sample size used in this study. The results obtained from a sample size of 134 online gemstone buyers in the U.S.A. may lack generalisability, although it was taken from a relevant population of interest. The overall smaller size of the population of online gemstone buyers in the U.S.A compared to other studies of online consumers (e.g. purchasers of CDs and books)

which are sampled from much larger populations means that sampling error in this study may still be lower than would be expected.

In order to test the robustness of these findings researchers should repeat this study with a larger sample such as adding gemstone buyers from other gemstone and jewellery associations or directories in the U.S.A. to the sample frame. Or this study could be replicated in the broader context of cross-national research or in another product category. For example, extending the scope of the study to cover gemstone traders in other major gemstone trading countries such as India, Japan and Sri Lanka (Beard, 2005).

The second limitation in this study relates to the measurement of some items. The measurement instrument used to measure the concern about product information had a low reliability coefficient alpha of 0.43 (Hair et al., 2000). Although this measure was put through some rigorous measurement validation, the reliability of the measure was still poor. Hence, it will be important that future studies should focus on developing reliable measures, perhaps in consultation with both buyers and sellers to avoid these issues.

Another possible limitation of this study emerged in the use of new scales developed to tap privacy and security concerns. Although these scales have been constructed from suggestions of past studies, their validity has never been verified (except in the exploratory survey of this study). As discussed, there is some overlap of measurement of both constructs and this needs to be carefully considered by future researchers.

The possible influence of other variables on the study result was not considered, and can be considered to be a limitation of the study. For instance, demographic data such as age and gender of respondents was not considered in this study as having an influence over purchasing behaviour, or indeed trust or perceived risk. This study followed previous studies from Doolin et al. (2005) and Teo (2001) who have suggested no impact of age on the online purchasing behaviour; Bhatnagar et al. (2000) who have found a mixed effect of gender on online purchases; and the PURCHASING magazine survey 2001-2004 (Varmazis, 2005) which did not examine such personal factors. However, it must be noted that personal characteristics do have an influence on the determinants of online purchasing behaviour, namely risk and trust within other academic disciplines (T.-Y. Chen & Chang, 2005; Dillon & Reif, 2004; Flavian et al., 2006) and therefore should be considered in future studies.

### **Directions for Future Study**

This study lends support to the research aiming to explore the factors influencing perceived risk, the factors influencing trust and the associations amongst the perceived risk, the trust and the online purchasing behaviour of buyers. The aforementioned limitations do provide some interesting alternatives for a future study. Additionally, there does exist other possible issues that could be further explored.

First, future studies should consider studying the mediating effect of the buyer's trust on the relationship between the buyer's perceived risk and the online purchasing behaviour

of buyers. As discussed in a supplementary test of research question 3 (Table 16, p.132), perceived risk on its own had a negative impact on the level of online purchasing. However, perceived risk had a non-significant effect of online purchasing behaviour when trust was introduced into the regression analysis. Although, the F statistic change was not significant, it has suggested a possible evidence of mediating effect of trust on the relationship between perceived risk and online purchasing behaviour of gemstone buyers ( $R^2 = 0.35$ ). Future research should explore this outcome, in order to better understand the nature of the relationship between these constructs, as past studies in this area have focused on only part of this relationship. For example, Bearden & Shimp (1982) have found that a buyer's perceived risk mediated the negative effect of a seller reputation on the new product affect (i.e. willingness to try new products). Miyazaki & Fernandez (2001) have suggested that a buyer's perceived risk mediated the positive effect of Internet experience on the rate of online purchasing. Fukuyama (1995) has shown the mediating effect of the buyer's trust on the relationship between the buyer's perceived risk and the intention to purchase products from new-contacts (or new sellers). Therefore, further examination could help confirm whether a mediating effect of the buyer's trust on the relationship between the buyer's perceived risk and the level of online purchasing exists and is warranted.

Second, future research should be conducted with the use of a refined measure of perceived reputation and assurance constructs, so that the conceptual model in this study can be completely examined. Note that the predicted positive relationships between these factors and buyer's trust were not tested in this study due to the lack of validity of the measurement constructs. It may well be that these constructs are best measured by a

single item For example, future research may use the one-item measure of warranty/guarantee to tap the assurance construct as in the case in previous studies (S. E. Kaplan & Nieschwietz, 2003).

Another potential avenue for future research is to further examine the impact of the type of Internet marketing strategy used by the seller in an attempt to reduce a buyer's perceived risk. Results found that only distribution strategies appear to reduce the perceived risk of purchasing online. Further research needs to be conducted which examines the impact of the elements of the marketing mix in reducing perceived risk. For this to occur, a new measurement of an online marketing strategy needs to be developed. This could be done by refining and adapting the measurement items used in this study. Once this measurement has been validated, research could pursue a number of interesting hypotheses about the conventional wisdom of particular online marketing strategies. For example, it could be assumed more popular Websites which may involve the effect of better promotion strategies could be less risky and therefore encourage more online purchases. It may also be that by reducing prices and using accepted brand names online marketers can reduce the perceived risk of online purchasing.

Lastly, future research may consider using other more sophisticated statistical programs to replicate the results of this study (Table 17, p.134). Such additional studies could help to confirm the reliability of the measures used in the current thesis (Hair et. al, 2000, p.665), but more importantly examine concurrently the validity of the entire predictive model. For example, future studies may utilise path analysis to further explore hypothesised direct and indirect relationships between multiple variables (Kline, 2005).

Results of path analysis can indicate how well the specific paths (e.g. hypotheses 1 to 10) and the model as a whole account for the relationships revealed in the data (Kimery & McCord, 2002). The use of specific programs which take into account small sample sizes would be a particularly useful tool, for example, path analysis via the PLS program could be appropriate for predicting the relationships among variables (Hair et al., 1998).

### **Concluding Remarks**

Perceived risk and its influencing factors, trust and its influencing factors, and relationships amongst perceived risk, trust, and online purchasing behaviour of buyers have been examined by a number of scholars. Although there has been extensive research on these issues, exploring whether these relationships could be generalised to the specific area of gemstones purchasing have not been investigated. Past studies tend to explore perceived risk, trust and online purchasing behaviour using evidence from less expensive, less complicated, and hence low risk products such as books, compact disks (CD's, DVD's), or clothing. Moreover, past research has examined these issues based on a consumer's perspective rather than an organisational buyer's standpoint.

The main objective of this study was to determine the factors influencing the perceived risk of online gemstone buyers; to determine factors influencing the trust of online gemstone buyers; and relationships amongst the perceived risk, the trust, and the online purchasing behaviour of online gemstone buyers. This research study demonstrated that place (distribution) strategy, a buyer's privacy concerns, and a buyer's security concerns have emerged as the significant factors influencing a buyer's perceived risk to purchase

online. Also, Internet fraud protection has been found to significantly influence the buyer's trust to purchase online. This study showed that perceived risk and trust are the determinants of the online purchasing behaviour of buyers; and that the relationship amongst the perceived risk, the trust and the online purchasing behaviour of buyers which has been suggested in prior studies, could be generalised to the specific industry of gemstones.

The importance of trust in gemstone trading over the centuries is just as important today even when the purchases occur online. The findings of this study can be considered as valid and reliable, based on the statistical methods used. Results had both theoretical and practical implications and provided several possible avenues for future study. However, in generalising the results of this study some limitations as discussed earlier should be considered (p.151). Despite these limits this study has advanced a theoretical model which has good predictive power, using validated measurements. Precious gems will continue to be sought after as has been the case for thousands of years, and in doing so online merely confirms the age old importance of risk and trust in this venerable industry.

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