AN INFORMATION FRAMEWORK FOR MERCHANT TRUST IN ELECTRONIC COMMERCE (BUSINESS TO CONSUMER SEGMENT)

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Ph.D. Thesis

2008

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Submitted in Partial Fulfillment of the Requirements of the Degree of Doctor of Philosophy, October 2008

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Acknowledgements

This acknowledgement is dedicated to the following people:

To my supervisor, Dr. Farid Meziane, thank you for believing in me and keep reminding me that dedication and perseverance are important attributes in becoming a credible academician. To all members of my thesis committee and all faculty members of Salford University, thank you for all your support.

To my family, thanks for all the support and endless prayers especially to my mother and my late father. To my dearest wife and sweetheart, Wan Rosnani for going through this hardship with me. Thank you for your love, strength, and understanding. To my children, Aida Syafiqah, Aida Nabilah, Akmal Syafiq, Akmal Arif, Ahmad Hakim and Ahmad Nabil. Thank you for making my life so meaningful.

To all my friends in UUM and in Manchester who constantly lend their hands for me to hold and share all the hardship with me. Thank you to all individual in UUM who show me the little steps that needs to be taken in completing this thesis. Last but not least, to UUM and Malaysian Government for the financial assistance and this golden opportunity.

Abstract

The primary purpose of this research is to investigate the information requirements that need to be available on merchants' websites. This information is important to facilitate the establishment of initial trust from potential consumers towards the owners of electronic commerce (EC) websites. This study is important due to the nature of EC itself where EC is a non face-to-face business arrangement. EC is still yet to be widely accepted and trusted by consumers.

This thesis is intended to develop an information framework for creating trust from consumers to merchants referred to as a Merchant Trust Information Framework. This framework can help both parties involved in establishing trust during EC transactions. Merchants can use this framework to decide what information needs to be present on their websites in order to help consumers establish trust while consumers can use this information framework to evaluate the trustworthiness of merchants before they decide to continue with their EC transactions. In addition, a prototype was created to test the proposed information framework in a real EC setting.

The proposed information framework consists of information regarding existence, affiliation, policy and fulfillment. The result of the study confirmed the importance and need for this information in the information framework. However, the creation of merchant trust does not only depend on the information framework being suggested but it also depends on other factors such as the technology used in the websites, the design of the websites as well as other external factors and previous online transactions between consumers and merchants.

To make this process more usable, a prototype system for information extraction and retrieval was developed to help customers find the related information for the merchant trust framework. This information is directly extracted from merchants' websites when available in textual format. Further refinement of the system should turn it into a personal shopping assistant to help consumers find important information about merchant trust creation in an online shopping environment.

Chapter 1

Introduction and Motivation

1.1 Introduction

Electronic Commerce (EC) is a secure, flexible and integrated approach to facilitate business activities through the combination of systems and processes that operate the main business activity supported by Internet technology (http://ibm.com, 2004). EC applications have created a new global market (Cohan, 2000) where businesses and consumers are no longer restricted by physical boundaries such as geographical or time differences (Guo and Sun, 2004). Today, EC influences business in a major way and the shape of the future of the business to consumer (B2C) segment (Li, Kuo and Russell, 1999; Schmitz and Latzer, 2002). In reality, EC has redefined several business processes (Hoffman, Novak, and Chatterjee, 1995) such as marketing (Hoffman, Novak, and Peralta 1997), customer services (Romano, Nicholas, and Fjermestad, 2003), payment (Ranganathan and Ganapathy, 2002) and fulfillment (Bayles, 2001).

It is expected that EC for the B2C segment will grow at a phenomenal rate. According to eMarketer, one of the leading research firm, the total business in this segment has increased from $30.0 billions in 2002 to $90.1 billions in 2003 and continued increasing to around $133 billions in 2005 (Grau, 2006). Similar figures were also predicted by Jupiter Research, which estimate an increase of the B2C segment from $85.7 billion in 2003 to $132.2 billion in 2005 (Naraine, 2003). This growth is usually attributed to the increasing number of online users over the

2000-2005 period and this is expected to continue (Naraine, 2003), although for the 2005-2009 period the growth is expected at a lower rate of 18.6 %, the expansion of EC can still be considered as strong (Grau, 2006). Though the expansion and development in EC is encouraging, this growth may not be achieved if the prevailing obstacles for a greater acceptance of EC as a transaction medium are not addressed carefully.

Most people have an understanding of commerce based on their experience as shoppers and buyers in a traditional brick and mortar environment, and they bring this experience with them when they start shopping online. In order to meet the user's needs, we must understand the typical user's experience in the traditional commerce setting (Basso et. al, 2001). Commerce is a communicative transaction between two parties playing the very familiar roles of buyer and seller. For commerce to occur, somebody must do the selling, and somebody else the buying, and they must both share the same basic understanding of how the transaction is generally supposed to flow. EC websites cannot simply make products available to be bought, they must hold up their part of role-playing in an EC transaction.

EC sites must pay attention to how they communicate with users. EC sites play their role of seller by trying to broadcast two messages to potential buyers: "buy from us" and "trust us". The impact of these explicit messages, though, is often corrupted by contradictory or distracting messages implicit in the site's implementation of the navigation flow, page layout, visual continuity and information space (Nah and Davis, 2002).

EC sites seem to convey the message that they are trustworthy and that users should have no trepidation over purchasing from them. However, trust derives not from assertions but rather from experience and judgment. When interacting, people make judgments and form expectations of others based on what they experience and what they surmise. It is a lot easier to decide to trust merchants when you can speak to them face-to-face and shake their hands. Trusting a website to deal with you fairly and deliver your merchandise is harder when you

realize that *anyone* can build a EC website. Indeed, It is generally perceived that it is relatively easy to set up a company in the digital world that appears legitimate but is actually a fraud (Ngai and Wat, 2002). Hence, EC merchants must work hard to build the impression of trustworthiness on their websites.

Evidently as iterated above, one of the main factor that has been identified as an obstacle for further acceptance of EC is related to the trust issue (Ba, 2001; Fink, 2000; Nakra, 2001; Noteberg, *et al.*, 2003; Papadopoulou *et. al*, 2001; Ratnasingham, 1998; Ratnasingham, 1998b; Ratnasingham, 2000; Jarvenpaa, Tractinsky and Vitale, 2000). This thesis is pursued to study and examine the issues of trust in the EC domain.

According to McCullagh (1998), there are four components of trust involved in EC. They are technology trust, behavior trust, product trust and legal trust. In order to keep the research scope manageable, this thesis only addresses behavior trust. The term *behavior trust* refers to the behavior of the other party in the relationship. Other researchers have defined behavior trust using a wider scope and view this trust as the trust towards merchants in EC (Pennington *et al.*, 2004). In this thesis, however, the researcher uses the term 'behavior trust' to mean merchant trust which is a requirement from the consumer towards the merchant. In the real scenario of EC, more consumers are searching for and visiting more websites as compared to the number of visits to actual stores in the real world to find information about products and services they want to buy. However, not all of these visitors make internet purchase through the EC channel. They tend to go back to traditional 'brick and mortar' setting and complete the transaction (Gupta, 95). One of the most cited reasons for this is the lack of trust in completing an internet purchase. This kind of situation has warranted more attention for research in EC. In particular, one of the areas that warrants a careful and meaningful research is in the area of *merchant trust domain*.

However, before further discussions on this problem can be carried out, a general overview on several related topics such as Internet and EC forms the preamble to

this thesis. Then the discussion will be followed by problem definition and the development of this thesis.

1.2. The Internet and Electronic Commerce

Many world leaders are of the view that the Information era is another phase of human innovation that is progressing slowly but steadily in influencing our daily lives (Blair, 2000; Clinton, 1996; Mahathir, 1996). The advancement in information and communication technologies has hugely bridged the digital divide and people seem to be living in a global village. Developed nations are allocating their resources in terms of manpower and materials (IMF, 2001) in order to bring their nations to the forefront of the information era. Meanwhile, some developing nations like Malaysia are taking risks to leap frog into the information era (Said, Sarifuddin and Li, 1997).

EC or eBusiness, as some people may call it, is one of the evidences of this revolution (Werthner, 2001). The development of EC is not only becoming a major concern for governments but also for private organizations especially those directly involved in the business world. EC, ideally, will change the ways and methods of carrying out business activities. However, this change is not devoid of the "ups and downs" cycle. Before the year 2000, dot.com companies were the companies that people invested in. However, between 2000 and 2001, dot.com companies resulted in losses for many investors. According to Webmergers.com's data (http://webmergers.com), from January 2000 to January 2002, at least 862 dot.com companies of which 368 (43%) were EC related companies and 217 (25%) were content related companies, have failed (Chait, 2002). This period of time is referred to as the dot.com doom days (Pallatto, 2001). With a lot of lessons learnt from such failure and supported with better strategies for the future, EC is slowly but steadily bouncing back to be a significant economic force in many advanced countries. Internet has enabled business transactions to be no longer bound to the physical existence of the business entity (Guo and Sun, 2004).

Theoretically, business transactions will no longer be limited by geographical boundaries, time differences or distance barriers. Today, the Internet, through the implementation of the WWW technology, has created a single global business world which exists within the network of computers around the world (IWS, 1997). This type of business setting is better known as ***Electronic Commerce (EC).*** The term EC was first coined by IBM in 1977 to describe this new environment of business setting and was defined as:

> *"a secure, flexible and integrated approach to delivering differentiated business value by combining the system and the process that run core business operation with the simplicity and reach made possible by Internet technology" (http://ibm.com).*

Generally this definition is accepted to describe the overall business activities that are carried out over the Internet (O'Connor and Galvin, 1998; www.texas.one.org, 1999). A good understanding of how real EC applications differ from the traditional business setting is summarised in Figure 1.1 (Choi et al, 1997).

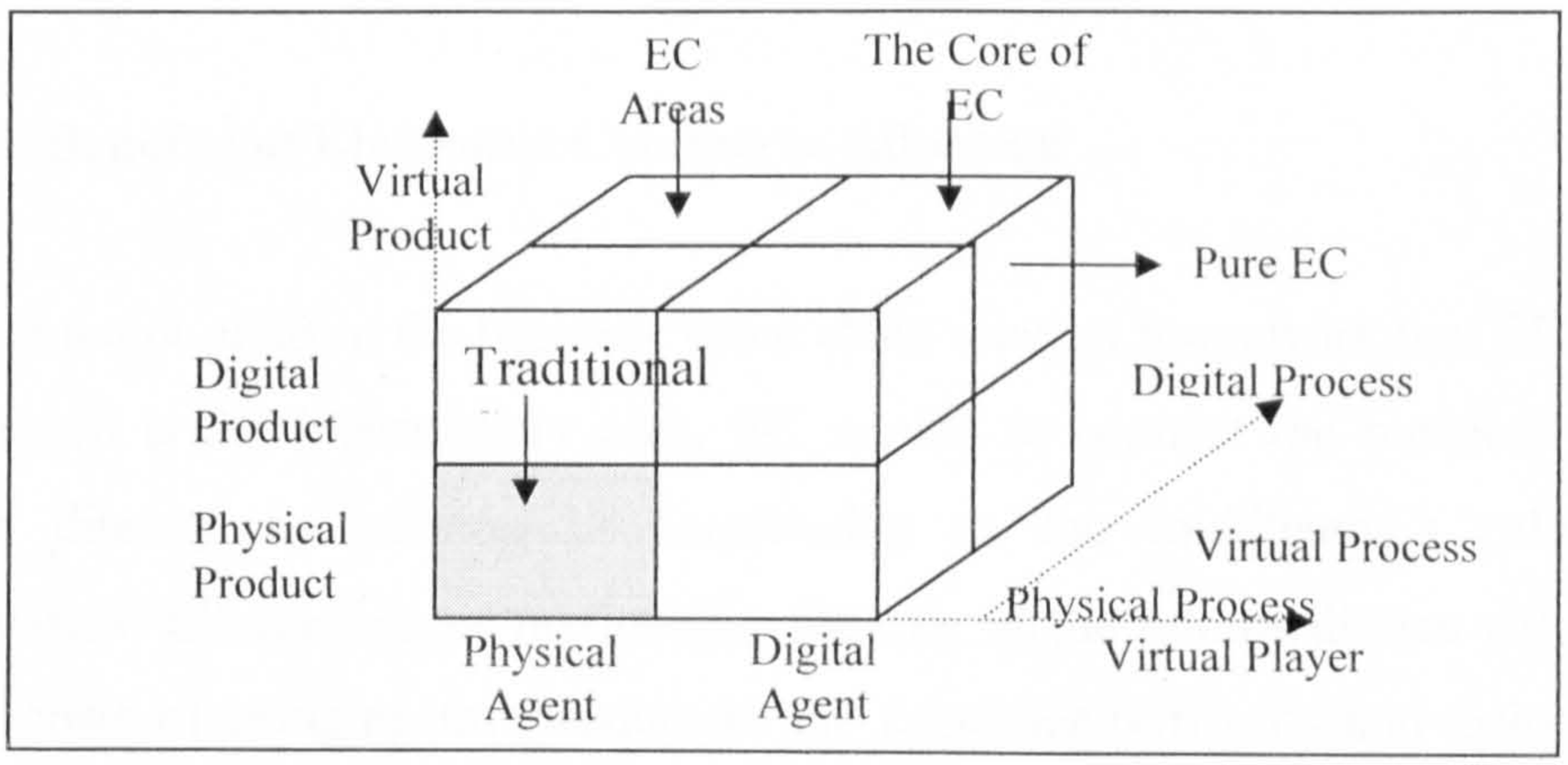

Figure 1.1: The Dimension of EC (Choi *et al.* 1997).

This Figure is based on three elements, namely *product, player* and *process*, which will create a three-dimensional cubical graph. The highest dimension (pure EC) is described by the upper right cube when the product being sold is in a

digital form and the agent completes the transaction in a digital form while the process of exchanging goods is also in the electronic medium. A good example of an EC transaction is when music is bought through the Internet. After the payment is made by the user using a credit card, the buyer then will be given permission from the company to download the song that has been bought onto the computer via the Internet. If the company sends a CD for example to the buyer using a courier service like Federal Express, the transaction is a partial EC transaction. The traditional transaction, on the other hand, does not involve any electronic element. For example, a CD is bought from a shop and paid for by cash. Research, especially in the areas of economics, marketing, customer behavior, technology and any other areas related to EC have been carried out by many researchers. EC will continue to grow especially now that customers are embracing EC more than ever. Businesses are starting to realize and achieve real benefits from the implementation of the Internet in their businesses. As Internet development is continuously being expanded and improved, so is the support system for Internet facilities. This has further propelled and improved the infrastructure for EC for it to be fully explored by EC applications (O'Connor and Galvin, 1998).

1.2.1. Benefits of Electronic Commerce Adoption

One of the major areas in the business value chain relation framework that EC has an impact on is the intermediary area. EC is able to connect the business and customer directly by playing or functioning as the middleman's role or intermediaries. Eliminating or minimising the role of the intermediaries will cut the total costs of bringing the product to the customer (Gritzalis and Gritzalis, 2001). However, not all industries can afford to eliminate the role of intermediaries, the automobile industry being an example. It is almost impossible for the automobile manufacturer to deal directly with customers in the whole value chain process, especially in the after sales service support value chain. However, intermediaries in the service industry or book industry can anticipate that EC could be a threat to their continued existence in the value chain

framework. Their major justification for their existence is based on collection and disbursement of information to their clients which can be easily taken over by any dot.com company. Dot.com companies such as Amazon can create some impact on the role of bookstores in the book value chain framework. However, further studies in this area suggest that the process of intermediation, disintermediation and reintermediation will make a traditional mediator to be a stronger player in a long run by adding more value in the value chain framework (Chircu and Kauffman, 2000).

There are many reasons why business organizations are interested to exploit the advancement of the Internet and WWW technology. WWW is capable of creating a single market that can be participated by those who have access to the technology. It is not an understatement to claim that web-based commercial efforts are more efficient and effective than traditional channels (Hoffman *et al.*, 1995). Based on Potter (1994), web-based marketing effort produces ten times the sales of products with only a tenth of the advertising budget and can save up to one fourth of the direct marketing costs compared to the traditional channel (Verity and Hof, 1994). Marketing is not the only area that organizations can benefit from the usage of the Internet. Productivity saving such as online orders which lead to the reduction of processing cost and better inventory management are other benefits that could be enjoyed by business organizations through the use of the Internet (Hoffman *et al.*, 1995).

Quite often, convenience and time saving are frequently cited by customers as their motivation for carrying online transactions (Ranganathan and Ganapathy, 2002). In addition to the different 'pull-factors' to Internet usage, consumers are getting greater access to dynamic information and helpful tools to window-shop for better decision-making for each stage of the transaction cycle. The WWW is capable of interconnecting vast information in different sites, analyze and control specialized data that can help customers to make a fair product and price comparison, and this will help to expedite decision to purchase or to reject a

particular project (Wallace, 1995). Such opportunity gives more satisfactory results to consumers' shopping experience. According to Gupta (1995), gathering information for making better purchase as described in consumer buying behavior is the most preferred activity on the web. Personal direct marketing is easier to do on the web compared to traditional channels through the availability of hyperlinked environments. The feature such as "consumer who bought this book also bought" or "related product" available at Amazon creates more effective personal direct marketing. The WWW is also capable of providing a higher chance of finding 'hard to find' products due to the width and depth of interconnection from one site to another (Wallace, 1995).

In addition, the consumer can use several tools to help them do their shopping in the EC world. For example, a recommendation system as described in the previous paragraph can alert the consumer about other related products that he might need to buy with his current shopping list. Meanwhile, a search engine allows the consumer to expand and explore his choices of product while shopping online. In EC world, evaluation of alternative products can also be done by shopping tools. Single attribute evaluations such as price can be very easy to do and is being offered by many EC agents such as AllBookStore.com (http://www.allbookstores.com/).

1.2.2. Barriers to Electronic Commerce Adoption

Although some research shows that EC has managed to find a place for itself among its multi users in the society, there are many obstacles that hinder EC from achieving its full potential. Han and Noh (2000) found that several critical failure factors of EC need to be addressed seriously by the EC industry to ensure its usage will continue to grow. Among the primary findings are the dissatisfaction of customers on the unstable EC system; low level of personal data security; inconvenient system and disappointing purchase or final (or done) transactions.

Basically, EC still encounters fundamental problems to prove that it can be a profitable business venture (Hoffman *et al.*, 1995). In general, the root of the problem is the market environment whereby it is difficult to identify potential market size (Donaton, 1995). When the number of potential consumers cannot be identified accurately, the business has difficulties to strategize its business investment. This is due to the fact that the returns from the investment cannot be calculated correctly (Markus, 1987). There seems to be a mismatch between theory and practice. The theory of one global market that is created and claimed by the Internet is not well supported in reality. The current segmented market based on country borders or economic agreements areas is still influencing or hampering the implementation of EC activities. The issues of protecting local market, legality or incompatible local laws as well as taxation issues create many problems for EC implementation. There are many other things that need to be done in the areas of law and regulations pertaining to EC. The law of the land which is based on country or economic cooperation areas is currently still being applied. Some of these laws and regulations vary and are incompatible with each other within this new global market.

In addition, the problem can also be attributed to several factors caused by both sides, the business organization and the consumers. The business organization still lacks a business model to emulate, lacks stability on the technology applications adopted, no assurance on the guaranteed return and lacks protective laws as a guideline for implementing EC applications. According to the Institute of Information Technology Application (IITA, 1994) security matters in the area of transmitting financial as well as personal information affects the tendency to participate in EC.

In some countries, consumers are having problems with Internet accessibility (Gupta, 95) due to the technology availability or cost factors. In addition, lack of experience as well as other psychological barriers such as ease of use and perceived risk also contribute to the problem of successful EC implementation. As

a result, the main usage of EC is still at an early stage of consumer buying behavior model which is the level of information search or browsing and price comparison or selection activities (Booker, 1995; Wintrob, 1995). EC will have a chance to be very successful when the main activities turn into purchases.

1.2.3. Current Status of Electronic Commerce

Since EC has its own strengths and weaknesses, the question of what constitutes the real performance of EC is very difficult to answer. Two different pictures based on two different views merge to describe the performance of EC in the past. As suggested by Werthner (2001), the performance of EC companies based on their stock market value and the value of real sales through EC medium as summarised in Figure 1.2.

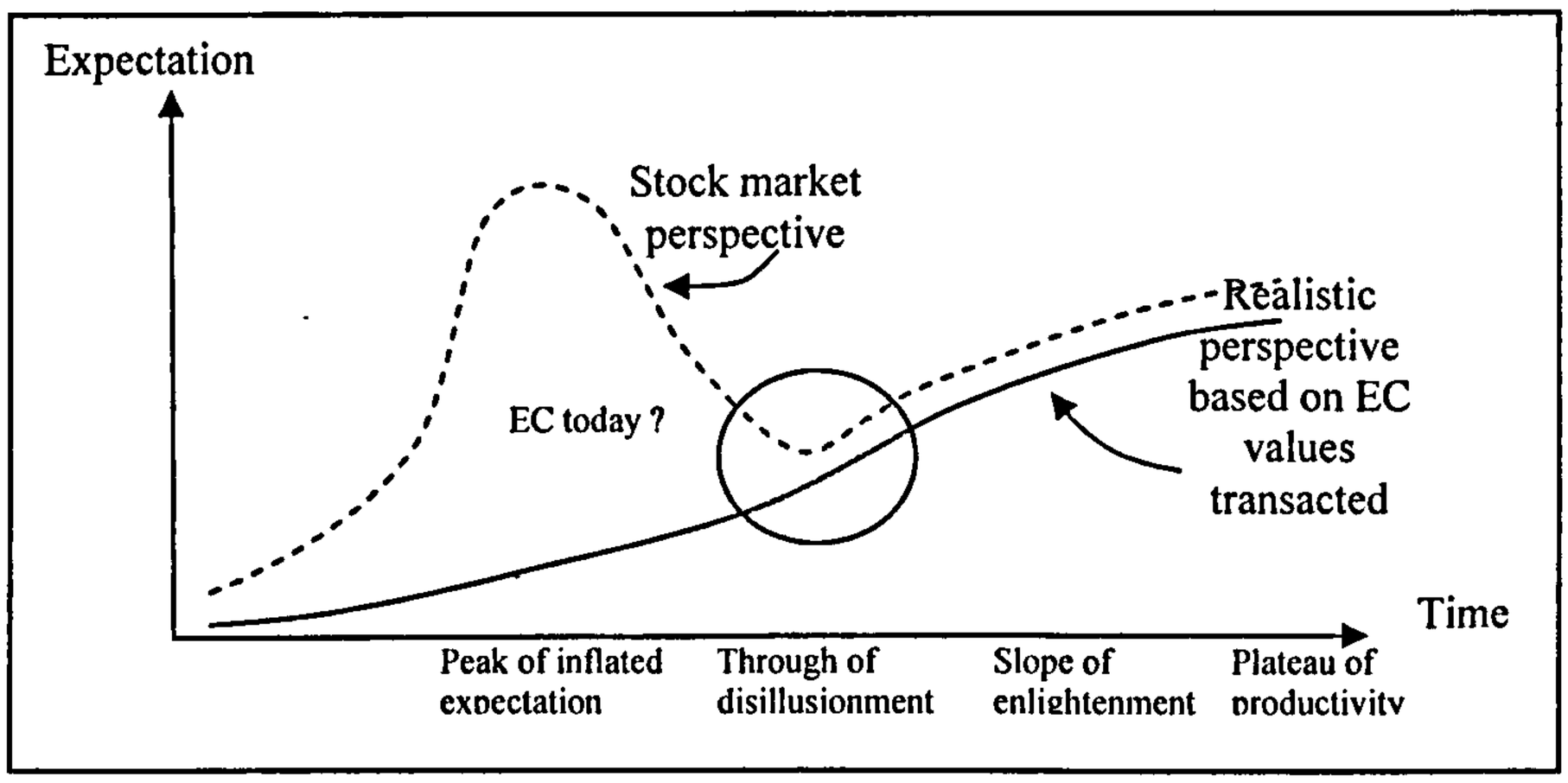

Figure 1.2: Stock market vs. real world? (Werthner, 2001)

Based on the stock market value, EC has reached its peak in the year 2002 when the price of dot.com companies' stock dropped drastically followed by the crash of many of them (described as the peak of inflated expectation). However, as Figure 1.2 shows, if the evaluation is based on the real value of EC transactions, then EC is still in the early stages of success. The statistics show that the increasing rate of actual EC value transacted is in single digit but continues to grow from one year to another. The evaluation based on stock market has been

inflated based on technological anticipation and expectation if not hype in the past. The expectation that the society will change its paradigm and consumer behavior in conducting business activity through EC is at its peak. The hype where people will start using computers and do all of their shopping through the Internet is unlikely to be the reality in the near future. Even though the hype is not as expected, the acceptance of EC is progressing slowly but persistently. When the investors are able to value the dot.com companies based on more realistic expectations and actual data based on actual sales made through EC channels, then both scenarios will become more realistic. EC has gone through a lot more development in terms of conceptual, technological and procedural aspects in order to continue its steady growth.

1.2.4. Brief Profile of Potential Electronic Commerce Customers

Understanding the profile of Internet users is the first step to understand the overall potential of EC consumers. In general, EC patrons have the following characteristics (O&M Direct 1994; GVUC, 1999); (i) they are early adopters of new technologies and tend to be a bit more adventurous; (ii) they are also willing to take risks and are more computer literate. In addition, they have the accessibility and skills related to the technology. The tenth WWW user survey done by Graphics Visualization and Usability Center shows several important findings (Kehoen *et. al.*, 1999). The average age of WWW users is 37.6 with 87.8 % of the total respondents having at least college education. They earn on average between USD 50,000 to USD 60,000. From this survey which was mainly answered by Americans, Europeans and Canadians, the most cited reasons for online shopping are convenience, time, availability of information and no sales pressure. Among other information that are important to them are information related to price comparison process and product availability. However, problems related to failure to find the product that they are looking for, problems related to websites and speeds of accessibility are cited most frequently as 'dissatisfactory experience' that they encounter when using Internet and EC. Evidently, factors

related to users' skill influence such experience. Undoubtedly, frequent and expert users are able to find what they search for, and only half of the unskilled or novice users were successful in finding their products or interest online.

Among the different barriers to successful EC acceptance, ***trust*** has been identified as one of the major hindrances that need to be addressed carefully. Without trust, EC development will have less impact and may not be sustainable in the future (Araujo and Araujo, 2003).

1.3. Internet, Electronic Commerce and Trust

Internet technology has opened the world into a single market. The networks and technologies available on the market have offered connections to almost all parts of the world. When this technology is exploited by the society, it will create an enormous amount of opportunities to everybody. The business community is among the first to take advantage of these opportunities through the implementation of EC. Businesses are no longer constrained by physical factors since they can reach their consumers around the world with a their presence on the Internet world through their digital store. With a relatively low cost for entrance and maintenance, rapid and easy existence, the 'digital store' has attracted different kinds of business organizations and individuals into the virtual world of EC. However, this mass participation in non-physical existence has created challenging trust problems. As stated by Ratnasingham (1998, p 316),

> *"The question of trust may be more important in virtual world than it is in the real world. This is because the parties to the transaction are not in the same place, and therefore cannot depend on things like physical proximity, hand shakes and body signal."*

This view is supported by Klang (2001) who states "the size and the anonymity of the Internet make it more difficult for the parties entering into the transaction to judge the trustworthiness of his or her counterpart". Therefore, it is very important for consumers to put their trust on merchants and vice versa. When both parties

can trust each other, then, any business transaction between them is possible. Without the establishment of trust between EC participants, this newly created business setting is bound to fail in the future since the success of EC is partly dependent on "whether consumers trust sellers and products they cannot see or touch and electronic systems with which they have no previous experience" (Matthew and Turban, 2001).

1.4. Background of Trust in Electronic Commerce and Problem Definition

Business-to-consumer (B2C) EC on the Internet has revolutionised the purchase of products and services by giving consumers round the clock access to worldwide providers. However, B2C EC has also shown to be associated with a myriad of factors hindering its adoption and usage by private customers. Such factors include concerns regarding security and privacy (Adams and Sasse, 2001; Malhotra, Kim and Agarwal, 2004), the unfamiliarity of some online services (Riegelsberger and Sasse, 2001), lack of direct interaction with products (Matthew and Turban, 2001; Salam *et al.* 2005), salespeople (Ratnasingham, 1998) and fellow shoppers and the generally low credibility of online information (Araujo and Araujo, 2003). These factors were collectively defined as "trust issues", as they refer to a purchase decision customers have to make in a situation of uncertainty and risk.

Trust is a fundamental element in a business relationship regardless of its method of interaction (Cheung and Lee, 2000; Papadopoulou *et al.*, 2001). In the current business setting, trust is mainly created through the exchange of accepted legal financial instruments such as money that is guaranteed by the government or credit cards and other debt instruments, which are backed by financial institutions (Macfarlane *et al.*, 2004). Since EC exists in a virtual marketplace, it requires different kinds of environment that inculcate and furnishe trust building compared to the traditional physical environment. The difficulty to prove someone's physical presence and establish a direct relationship between the two parties involved in the transaction causes this difference to exist (Matthew and Turban,

2001). The inability of the participants to use physical gestures such as body language, eye contact and personal proximity to evaluate trustworthiness of each other makes the problem of establishing trust between them in the cyber world even more difficult compared to the brick and mortar world (Ratnasingham, 1998&1998b; Papadopoulou et.al. 2001).

The concept of trust has become a major consideration behind the design, evaluation and use of EC websites (Corbitt et al, 2003; Cazier et al, 2006; Koo, 2006). Consumers are facing trust issues as early as the browsing stage. Araujo and Arujo (2003) classified these trust issues in term of technology (security, privacy and integrity) and business transaction (misuse of personal information and incorrect fulfillment of transaction). Meanwhile, Riegelsberger and Sasse (2001) looked at the risk issues from two sources. The first source is originated from the Internet itself such as (a) whether card data get intercepted; (b) whether the data are transmitted correctly; and (c) their own interaction with the system. The second source is from the absence of physical existence of online merchants which includes (a) whether the personal details supplied by consumer will be passed to other parties; (b) whether the online merchants will actually deliver the product or service as promised. Other researchers such as Caeparu et al (2002) conclude those elements of risk perceived by consumer are associated with (a) business practice: to what extent will the online merchants follow on their promises in term of product, services and guarantees; (b) information protection: will private information will be protected and used as intended only; (c) transaction integrity: will the transaction be processed accurately and securely?

Egger (2000) believes that the factors that can influence the creation of trust can be grouped into four categories. (a) Pre interaction: based on the company's reputation, the strength of the company's brand and previous consumer experience interacting with the company; (b) Interface properties: based on the usability and the structure of the merchants' websites; (c) Information content: based on the information provided on the websites about products and services, company

history, values and commitment, and privacy statement; and (d) Relationship management: based on the communication and interaction facilities with the organisation.

In addition, the low barrier level for both parties to enter and leave the digital market space has prompted the two parties to assess the level of risk involved before trusting each other in an EC transaction (Gary and Debreceny, 1998; Klang, 2001). Since consumers are the ones who usually initiate EC transactions, trust creation from consumer to merchant or merchant trust is very important (Kasiran and Meziane, 2002). A closer look at an EC transaction cycle shows that consumers are in a disadvantaged position, especially if the product is a non-digital and non-service product. Consumers are expected to fulfill their obligation first by committing their financial and information resources before merchants are able to proceed with their obligation. As shown by recent survey, nearly half of the consumers express fears about Internet security which relate to the financial risk while doing online transaction (Centre of Digital future, 2004).

Therefore, the requirement for establishing merchant trust is a very important factor in an EC market place setting (AICPA 1997; Daignault *et al.*, 2002; Hoffman *et al.*, 1999; Urban *et al.*, 2000). Ranganathan and Ganapathy (2002) reported in their study that providing alternative payment methods for online transactions can increase trust. In addition to security, misuse of personal information is another serious concern of online consumers (Anderson, 2000; Ranganathan and Ganapathy, 2002). In the survey conducted by the Web Trends on the reasons why shoppers abandon their carts, 35% gave 'the site requested too much information' as a reason (Thomson, 2004). This is well justified as 72% of the sites surveyed by Anderson collected personal information but only 51% had their privacy policy published on their websites. From this 51%, only 28% of them have notified users about the information they collected.

Reputation systems have also been identified as an important method for fostering trust among strangers in EC environments. A reputation system gathers, distributes, and aggregate feedback about online merchants' behaviour. Resnick et al (2000) believe that these mechanisms can help people make decisions about who to trust and provide incentives for honest behaviour. In addition, interface web design and usability have been found to be very influencial on user behaviour and trust towards EC websites (Basso et al, 2001; Riegelsberger and Sasse, 2001; Hu et al, 2004). Web retailers use eye-catching graphics not only to grab user's attention but also to convey competence or professionalism. Meanwhile, ease of navigation is also important if not crucial for initial trust development. Hu et al (2004) have also stressed the importance of cultural aspects in designing the websites. They should be very sensitive to the cultural aspects especially towards the main targeted market of the websites. Different cultures may respond differently towards any picture or sign available on merchants' websites.

When shopping online, consumers search for information on risk and benefit and weight them against each other to reach a decision. Although there are several research studies on EC, only limited research has been carried out on the subject of information requirement for merchant trust in B2C segment. For example Cheskin Research and Studio Archtype (1999); Cheskin Research (2000); Mahadevan and Venkatesh (2000); Noteberg (1999) and Noteberg, *et al.* (2000) have looked at the issue of *affiliation.* Meanwhile other researchers such as Adams and Sasse (2001); Cheskin Research and Studio Archetype (1999); Hoffman *et al* (1999); Kim and Agarwal (2004); Nakra (2001); OECD (2000) have looked at the issue of *payment method* and *privacy* and Lohse and Spiller (1999) on the issue of *the website itself.*

For this thesis, the study is adopted from several models of trust relationship available in the literature such as Cheskin Research and Studio Archetype/Sapient (1999); Lewicki and Bunker (1996); Matthew and Turban (2001); Mayer *et al.* (1995); Shapiro *et al.* (1992) and Tan and Thoen (2000). Shapiro *et al.*, (1992)

suggested three types of trust that need to be considered: *calculated based trust, stable knowledge-based trust* and *stable identification based-trust.* Lewicki and Bunker (1996) expand the previous work by looking at the development of trust from one type to another. Meanwhile other models such as Cheskin Research and Studio Archetype/Sapient (1999) have approached trust from the consumer buying behavior point of view. Tan and Thoen (2000) proposed a generic model of trust requirement in Internet transactions, and they identified two trust determinants: trust in *other party* and *trust in electronic mechanism.* Finally, Mayer *et al.*, (1995) and Matthew and Turban (2001) gave more specific requirements for trust creation especially in B2B segment. Both of them agreed that *benevolence*, *ability* and *integrity* are key requirements for creating trust towards the other party involved in EC trust relationship.

Eventhough, the closest research domain that is available on the subject matter is about inter-organisation trust between cooperating organisations in Business-to-Business (B2B) segment, this trust relationship is different in terms of level of cooperation, time frame of trust relationship that needs to exist and level of involvement when compared to merchant trust in B2C segment. Merchant trust in B2C segment needs to be created as quickly as possible, at least whilst consumers are window-shopping on the merchants' websites (Basso *et. al*, 2001). In general, consumers are still facing problems in creating sufficient trust in their minds towards the merchants to facilitate EC transactions due to the nature of space in which an EC transaction is done, i.e. in the cyber world (Ranganathan and Ganapathy, 2002). Since websites are the main meeting point, the information that can lead to the establishment of trust from consumers to merchants (merchant trust) needs to be generated while consumers are still online (Salam *et. al*, 2005). Therefore, a merchant trust information framework can help parties involved in EC website development to deliver information which can help to instill merchant trust among customers. If not, consumers will move to other sites, which can establish this element of trust or revert to traditional transactional channels if this problem is not addressed correctly. In addition, EC setting is an information-based

environment. Therefore, it is important to understand the information requirement (Lee *et al.*, 2000; Ranganathan and Ganapathy, 2002) for solving the merchant trust problem in the B2C segment.

For this thesis, the literature review will be used to identify the main variables that are shown and proved to increase trust towards online merchant especially those which can reduce the element of risk. A prototype system for information extraction and retrieval is then developed and tested in a real EC environment. A model is then suggested to evaluate the trust of the websites based on these variables and the users' view on the relevance and importance of these variables. The objectives of the current research are described in the next section.

1.5. Research Objectives

The overall objectives of this research are:

- to develop and evaluate a merchant trust framework that can be used as a guideline by EC web developers to understand the information required to create merchant trust needed by consumers while they are shopping online. From this objective, the thesis will address the formation of merchant trust information framework based on factors such as ability, benevolence and integrity taken from organisational trust theory. In addition existence factor will also be included in the framework. The proposed merchant trust information model will be evaluated at perception level as well as in a real shopping environment.
- to show the required factors for merchant trust framework, which consumers can also use as a guidelines to evaluate cyber merchants. When the proposed merchant trust framework is developed and tested, then it can be used by consumers to evaluate the level of trustworthiness of online merchant based on the information provided on the merchants' websites.

- to create a prototype system which can assists consumers in finding the information related to the merchant trust framework on the website. Based on the proposed framework, consumers are expected to find certain information in order to create a trust relationship with online merchants. In order to ease this process a prototype is also developed to assist consumers in finding the information.

1.6. Research Question

Based on the problem definition and research objectives described above, the research question developed for this study is as follows:

> ***"What is the information that needs to be included in the merchant website in order to create merchant trust while consumers are online doing their window-shopping on a particular merchant website?"***

1.7. Research Hypotheses

After the above research question has been identified, four constructs have been established to be very important in creating merchant trust framework and being used as a basis for hypotheses in this thesis. The hypotheses are as listed below:

i. **Hypotheses 1 (P1):** Information about existence is important in creating a sense of merchant trust in business to consumer segment.

ii. **Hypotheses 2 (P2):** Information about affiliation is important in creating a sense of merchant trust in business to consumer segment.

iii. **Hypotheses 3 (P3):** Information about policy is important in creating a sense of merchant trust in business to consumer segment.

iv. **Hypotheses 4 (P4):** Information about fulfillment is important in creating a sense of merchant trust in business to consumer segment.

1.8. Research Scope

Trust in EC constitutes a bigger picture than the main topic of this research which is merchant trust. Therefore, it is important to note that this thesis does not intend to solve the entire trust problem in the EC setting. To clarify the scope of this research in greater detail, several terms used in this research title will be elaborated upon in order to remain within the confines of the research scope. Terms used in this thesis such as *information requirement, merchant trust, EC* and *B2C* segment will be further elaborated for a better understanding of the scope of this research.

1.8.1. Information Requirement

EC websites can be described as a collection of files and links stored at one or more locations or servers. These files contain information that will form a storefront of the business in a virtual environment (Hoffman and Novak, 1997). They are usually linked together in such a way that it can be accessed in a logical manner for easy and efficient navigation. The information can be about the business itself, the product/service that is being offered and other related information to the business. The main emphasis in this thesis is to shed some light on the information that needs to be available on merchants' websites in order to create trust from the consumer point of view. In this thesis, this information will be referred to as information requirements for creating merchant trust from consumers towards online merchants. Therefore, information that is relevant to this research is the information about the merchants that can lead to the establishment of trust from consumer to online merchants. This information must be available on the website and in a form that can be easily understood by consumers. In addition, it must also be available in the public domain from the merchant website and be easily accessible and in text form.

1.8.2. Merchant Trust

EC transactions are usually initiated by consumers. Consumers are connected to a business website through a direct link typed by the consumer or as a result of search activities or through an active link from other websites. A closer look at the EC transaction cycle shows that consumers are at a disadvantage especially if the product involved is non-digital in nature or a non-service product. Consumers are expected to fulfill their obligations first by committing their financial and information resources in the transaction before the merchants are able to proceed with their obligation. Therefore, consumers need to trust the merchants first before they can release their personal and financial resources to the merchants. This form of trust from consumers to merchants is referred to as **merchant trust** in this thesis. Another term that has similar meaning to merchant trust is *merchant trustworthiness*. The trust intended in this research is a one-way trust, which is from consumer to merchant and not the other way around. This scenario needs to be acknowledged since trust requirement from business to consumer involves different factors that may not be included in this thesis. In addition, a basic property of trust indicates that trust is generally a one-way relationship (McCullagh, 1998). When consumers are able to trust the merchant, it does not mean that the merchant can trust the consumer automatically. But rather, the fundamental trust that this thesis is concerned about is the consumers' ability to trust the EC 'system' as a medium to help them make the decision on whether to buy or not to buy the merchandise offered or being sold by the merchant through their websites.

1.8.3. Electronic Commerce

A simple but descriptive illustration about EC is any business activity or transaction that is done electronically (www.texas.one.org). Although, EC is a relatively new terminology, the activity related to the term based on the above definition has been around for a long time. Business organisations have been

using electronic networks such as facsimiles to transfer business documents from one location to another location across the world in a few seconds. In addition, the banking industry has been utilising electronic networks as the backbone of their Automatic Teller Machine from the time when the machine was a strategic business asset until it has become an essential technological tool available to consumers. However, people did not pay close attention to the use of this electronic network until the introduction of the WWW technology. However, in this research, the definition will only include business transactions through electronic network using Internet via personal computers. Other electronic networks such as mobile telephone, is not included since it has limited processing and browsing activity due to the speed, cost and display capability. Transactions that are relevant in this research are only those, which involve non-service and non-digital products since such transactions cannot be completed instantaneously. Consumers have to commit their resources first before the merchants can start to process their orders.

1.8.4. Business to Customer Electronic Commerce

Based on the available literature (Chaffey, 2004; Jackson, Harris and Eckersley, 2003; Turban, *et al.*, 2004), EC can usually be divided into three segments; *business to business (B2B), business to consumer (B2C) and consumer to consumer (C2C) segments*. In the B2B segment, the transaction is mainly between two business organizations that have special business relationship like *supplier relationship*, *vendor relationship* or *partner relationship*. They are usually connected to each other through dedicated systems such as *Electronic Data Interchange* (EDI). In the C2C segment, the transaction is mainly between ad hoc sellers to the consumer through an open network via a unique system such as an auction system. In this segment, the expectation of sellers and buyers is only on that particular transaction. The last segment, which is directly related to this research, is the B2C segment, where the transaction is mainly between business organizations and consumers through open networks via a digital storefront

operated by the business organizations. Since trust requirements for these three segments are different, this research only addresses trust requirements from consumers to web merchants in the B2C segment where the product or service is offered by business organizations directly to consumers.

1.9. Thesis Organisation

In order to answer the research question with the above objectives and hyothesis, this thesis has been organised in the following chapters:

1.9.1. Chapter 1: Introduction and Motivation

This thesis starts with the identification of the main research question with some discussion on the background of EC and the motivation for addressing this research question. This discussion then led to the identification of the research problem and finally the main research question is presented. To ensure the scope of the research is achievable and can be understood, a brief discussion of several concepts such as information requirement, merchant trust, B2C segment and EC concluded this chapter.

1.9.2. Chapter 2: Literature Review

Once the research question has been identified, the researcher studied and analyzed all previous research related to the main topic of this thesis. The initial search domain was not only on trust in EC but also included several other areas such as computer science, marketing, management, sociology, psychology, organizational behavior and human resource management. This multi-cross domain search was important since trust is by its nature multi-faceted. The establishment of trust in EC, for example will be influenced physiologically, technologically, environmentally as well as socially.

There were several strategies that were used by the researcher in making a search on literature that has been published. A key word search using the term "trust" was carried out to establish the trail and the WWW was the main source of information that lead then to the identification of the main literature from books, journals and academic conferences. The databases of well known publishers such as Elsevier and Springer, IEEE Explore, ACM and other databases were also used to search for journals and conferences specialized in EC. Then, by using a web search pattern whereby one article will lead to another article, the researcher was confident that the literature review has reached a satisfactory level.

1.9.3. Chapter 3: Conceptual Model Development

After completing the literature review, a process of carrying out the whole research was developed. However before, this process can be formulated, a conceptual model, which this thesis will be based on, will be discussed first based on several theoretical perspectives. The foundation of the proposed model is based on an economic perspective i.e. the rationality of choice between trust and risk. Then the model started to take shape after the model was combined with consumer buying behavior process. In order to complete the model, trust development in EC transaction perspective was included in the model. Several other perspectives were also included in the model development process such as technological and social factors. When the conceptual model started to materialize, the researcher needed to develop the overall research design by considering the conceptual model and the overall objectives of the research. The overall research design was divided into three stages. The first stage concerns the development of the initial conceptual model as described in chapter 3. This was followed by the development of tools for retrieving relevant parts of websites that contained information required in the conceptual model. The third stage was to test the tools on real EC websites while consumers shopped online.

As indicated in the limitations section, the trust problem in the EC domain constitutes a larger part of the problem than the researcher has addressed in this research. Therefore, the researcher believes that developing the information framework, followed by tools which can retrieve the required information specified in the model and tested the system on the real EC environment can help reduce the effects of other factors in addressing trust problems in EC. Since the overall research strategy is divided into three different phases, there were three different methodologies adopted to collect the data required to achieve the goals of each phase.

In the first phase, an initial information framework was proposed. The data required in the first phase was collected through the use of questionnaires. At the same time, a prototype was developed to facilitate the process of information extraction and retrieval and the data required for this phase was collected through a manual walkthrough approach. Finally, the proposed framework was validated with the prototype developed through a lab experiment approach. In this stage, the respondents were asked to visit selected websites, and use the prototype developed in order to find the information required by the proposed framework and evaluate the importance of the information for creating initial trust towards online merchants.

1.9.4. Chapter 4: Result

After all steps have been taken to carry out the whole research process, this chapter will present the raw result from the three phases of research. First, demography information will be presented for each phase. Then, it will be followed by the result of regression and correlation analysis for the first phase and report on establishing rules for second phase and end with an analysis of the results for the third phase.

1.9.5. Chapter 5: Discussions and Conclusions

In this chapter, the overall findings of the thesis are being presented. The discussion on the findings is the continuation of the previous chapter where all results are being presented. The discussion started with compatibility analysis of two different respondents in phase one and phase three. Then the discussion is being continued using the data collected in phase one and phase three. These groups of data contributed greatly in answering the main research question of this thesis. The data from the first phase was analyzed using statistical methods. Regression and correlation was used to interpret the meaning of the data. This was followed by the descriptive analysis of data from the third phase. The chapter continues with the evaluation of the prototype. The evaluation was based on the precision level of the tools in performing its extraction and retrieval tasks based on fifty selected EC websites.

In addition, there are also some discussion on the contribution of this thesis on the theoretical and practical aspects and ended with some recommendations as well as possible future research.

1.10. Chapter Summary

This chapter puts forward the overall foundation and purpose as well as the organization of this thesis. First, a brief introduction on problems related to this research is put forward by the researcher, followed by the background of trust and problem definition. Then, the chapter continues with the research objectives, research question and research scope. The overall structure of the thesis is given at the end of this chapter. The next chapter explores the background and literature review and details of problem definition of the thesis.

Chapter 2

Literature review

The previous chapter has laid out the overall foundation and the purpose of this thesis. In this chapter, the discussions related to areas such as Internet and EC and their relationship to the thesis will be carried out particularly the discussion on trust in general and trust in EC in particular.

2.1. Introduction to Trust

The main concept examined in this thesis is consumer trust, as it encapsulates the notions of uncertainty, vulnerability and risk and the characteristics of transactional relationships. Trust is defined as a type of belief superior to faith and inferior to confidence (Arion *et al.*, 1984). The Faith-Trust-Confidence continuum, as defined by Arion *et al* (1984), refers to the amount of available knowledge and cues on which to base one's belief. Thus, trust acts as a mental mechanism, based on incomplete information that helps reduce complexity to allow for decision making under uncertainty (Luhmann, 1988; Kahneman *et al*, 1982).

Trust is seen as a highly valuable element of business relationships, as it fosters risk taking in economic transactions (Luhmann, 1988). There are two types of trust, the initial trust and trust based on experience. Initial trust, refers to a new situation where a prospective customer assesses the trustworthiness of a merchant based on third-party information and surface cues. Trust based on direct experience, presupposes an initial transaction, followed by an evaluation of the

outcome. As such, it affects the long-term orientation of the relationship. In this thesis, the stress will be on designing for initial trust.

Trust is a very complex subject and has many different facets. It is very important to understand trust as seen from different domains such as *organization development, team development, marketing, human relationship* and many other areas. Much effort has been taken to understand the role of trust and how it can be developed to strengthen relationships between two entities. With the growing knowledge of trust in EC, trust has been identified as one of the important aspects that influence the proliferation of this new business channel (Papadopoulou *et al.* 2001; Quelch and Klein, 1996). Most of the work that has been carried out emphasizes the conceptual model of trust formation without going to actual information requirement that forms this conceptual model. With the objective of identifying what the information framework requires in creating the merchant trust in EC, this chapter identifies the literature that can provide important background to help complete this thesis.

2.1.1. Definition of Trust

Trust is a very complicated concept to define since almost every discipline has its own definition and concept (Castelfranchi and Pedone, 2003). In order to understand the term better, the discussion starts from the basic definitions offered by oxford dictionaries. According to these dictionaries, trust can be in the form of a noun, which means:

1. *firm belief in the reliability, truth, ability or strength of someone or something (The New Oxford Dictionary of English, 1998),*
2. *the belief or willingness to believe that one can rely on the goodness, strength, ability etc of somebody or something (Oxford Advanced Learner's Dictionary of Current English, 1995),*

Based on these two definitions, several basic properties of trust can be extracted. First, trust is a relationship between two parties, the trustee and trustor. Trust relationship can exist not only towards another human being but also towards other objects or even concepts like the organization. The basic essence of trust is the strong belief that may already exists in the trustee towards the element that needs to be trusted. However, trust can also be based on some calculated risk element where the trustee must be willing to believe the other parties in the relationship. This conclusion is supported by Konrad *et al.* (1999). They defined trust as part of taking risks or acceptance of uncertainties to believe that something will happen as he expected. Trust is presented when an individual believes that something will happen and as it should happen without complete knowledge and complete understanding of the situation. In other words, he realizes and accepts ignorance on the matter. In contrary, trust is not present when the individual is very certain or sure that something is going to happen based on his knowledge and rational consideration. In addition, trust is also not present when the person is unaware of his ignorance. With this kind of understanding, trust and risk can be said to be closely linked to each other.

Based on the above definitions, researchers and practitioners have been looking into the concept closely and define it according to the context being studied. In the general business domain, trust is "the confidence that participants in commerce have on the business activities involved (transactions and other exchanges of information, goods, and services) which will be protected and conducted as intended" (Steinauer *et al.*, 2000) and can be measured based on reliability and predictability (Keen, *et al.* 2000).

Meanwhile one of the most cited definitions of trust in the area of EC is:

> "*the willingness of a party to be vulnerable to the action of the other party based on the expectation that the other party will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*" (Mayer *et al.*, 1995).

In this thesis, the definition of trust is more similar to the above definition with the exception of acknowledging the importance of control factors which will have a direct impact on trust level required in the relationship. Based on the definition above, in EC, the trust relationship is based on the "willingness" which will place the consumer in total control of committing to any trust relationship in the EC setting. However, once the consumer is willing to commit himself in a trust relationship, then he is willing "to be vulnerable to the action of other party" and take the risks involved in the trust relationship. For example, trust in EC is not only important when there is a transaction involved, but it is also important when consumers are merely browsing on the merchants' web sites. The consumer is willing to be vulnerable by allowing any form of cookies to monitor his shopping behavior. The willingness of the consumer to take considerable risk and be vulnerable is usually based on the assumption that the merchant will "perform a particular action important to the trustor". In the case of the above example, the consumer believes that the merchant will use any information collected as described in the privacy policy and protect the information from internal and external misuse.

Most of the definitions cited above acknowledge some level of risk involved in the placement of trust. However, the main components that are being put forward within the meaning of trust such as willingness, expectation, uncertainty, confidence, reliability and predictability are very subjective and difficult to measure, which makes studying the subject of trust a very challenging task.

2.1.2. Properties of Trust

Understanding basic properties of trust and their effect on certain environments is important in order to understand how trust is formulated. The first property of trust is that it is not "associative" (McCullagh, 1998). If A can place his trust in B, it does not mean that B is automatically able to trust A. Based on this property, trust is a one-way relationship and each party involved needs to establish its own trust factors in order to create a trusting-environment towards it. In this research,

the identification of merchant trust framework may serve the purpose of establishing trust from the consumer's point of view towards merchants only. A different framework may be required for establishing trust from merchants to consumers. This is because within such a relationship, it does not necessitate equal trust of both parties. In particular if consumers are able to trust merchants, it does not guarantee that merchants will automatically trust consumers.

Second, as suggested in the beginning of this chapter, the placement of trust is closely related with the element of risk (Konrad *et al.*, 2000; Mayer *et al.*, 1995). The relationship between these two elements can be summarized as a positive correlation (Tan and Thoen, 2000), the higher the risk, the higher the level of trust is needed in order to make the trust relationship works. Therefore, trust creation can be enhanced by giving more control to the trustor (Tan and Thoen, 2000) as he can reduce the element of risk. In return, this will reduce the level of trust required within the relationship and give more chance to the trust relationship to work.

In another study by Cheskin/Studio Archetype (1999), the development of trust is said to be a function of time and is built based on experience. Within a business context, an initial trust is created based on external factors such as the strength of a particular brand of product or recommendation from colleagues, friends or family members. Naturally, if the initial trust warrants a purchase of the product, this will allow the customer to personally experience the tangible or intangible product purchased. Consequently, the foundation of trust starts to change from the external factors to inside information such as own experience with the product or merchandise. Logically, if the customer is happy with what he has purchased, he will be convinced and this will further enhance his trust relationship with the merchant.

In summation, this property of trust is also elicited by McCullagh, (1998) who suggests that the development of trust usually starts by recommended trust to

direct trust. Recommended trust is a relationship between two parties who rely on the other parties' recommendation to develop the relationship. Meanwhile, direct trust is a trust relationship between two parties and the relationship is based on their experiences in dealing with each other in the past. McCullagh, (1998) also suggests that trust is not generally transitive but can be conditionally transitive particularly during the early stage of trust relations development.

2.1.3. The Importance of Trust in Business.

Trust is a fundamental element in business transactions (Kini and Choobineh, 1998; Jarvenpaa *et al.*, 2000). Regardless of its method of interaction which can range from person to person, via mail, telephone or an electronic device, trust is an important ingredient to ascertain business success. In current business settings, the basic level of trust can be created through the exchange of accepted legal financial instruments such as money that is guaranteed by the government or credit cards and other debt instruments backed by financial institutions. Business can also take place through the establishment of strong trust created by a long term relationship established between two parties. Their engagement in the business transaction is based on the knowledge and trust developed over time. The nature of business resulting from this type of trust can be very unique and special such as providing loan without interest (further illustration on trust development is discussed at a later stage).

EC is a faceless business arrangement. Most of the time, consumers are not dealing directly with a salesperson but always depend on flat presentation of digital storefront to act on the merchant's behalf (Culnan and Armstrong, 1997). In order for a faceless business arrangement to work, both parties involved should have good relationship between them. In order for a relationship to work for a long time, it must be accompanied by trust (Cheskin Research, 2000). Without the element of trust within the EC context of business, such business activity is bound to fail. The need for trust from online consumers in the virtual business world has

been stressed by Better Business Bureau's testimony in the House of Representatives which stated:

> *"because the online environment exposes consumer[s] to the threat of possible inappropriate opportunistic behavior, online vendors such as masqueraders, misuse and unauthorized distribution of personal information and even card credit fraud" (Cole 1998).*

Trust becomes more important when risk is involved (Kee and Knox, 1970). Establishing trust then is establishing the acceptances of risk. Since EC is made possible by Internet technology development, then creating trust in EC is a process of taking risks in believing that the Internet technology is able to function as expected for the purpose of EC transactions. In addition, creating trust in EC is also accepting the risk that everybody involved in this faceless business environment will perform his duties as expected.

In essence, the importance of trust was well summarized by Gefen (2000) as:

> *"The downstream of trust, in general, are a willingness to engage with a trusted party in situation where the trusting party may be vulnerable (Blau, 1964; Luhman, 1979). This is also true in the case of business interaction where trust determines the nature of the business interaction and whether a business interaction will even occour (Fukuyama, 1995). It is also a significant factor leading to actual and to anticipate purchases (Donney & Connan, 1997), and creates the kind of atmosphera where people are more willing to provide sensitive information (Ramaswani et al., 1997). And trust increases the commitment of the involved companies to the business relationship between them, resulting in increase interaction between the companies and increase profits (Kumar, 1996)."*

In general, all products have four stages of usage levels in the society; *dependence, reliance, confidence* and *trust* (McCullagh, 1998). The highest level of usage is when the society is dependant on that product. For example, in modern society, electricity and automation are considered to be at a level where the society has high *dependence* on those products in their everyday life. The *reliance*

level comes third after confidence level. The examples of products on reliance and confidence levels are television and Coca-Cola respectively. However, before a product can reach the second level, it must be trusted first by the society. The product must be able to meet its expectations in terms of role and function in the society. Therefore, it is clear that EC must gain its place in the trust stage before it can progress to other stages of usage in the future. Therefore, having an overview of what trust relationship models already exist will help one to understand trust in greater detail.

2.1.4. Trust relationship model

Whatever the definition is, trust will always be very important and become the foundation of EC acceptance in the future (Kini and Choobineh, 1998). Based on Cavalli (1995), business trust relationship can be modeled basically as shown in Figure 2.1 and Figure 2.2.

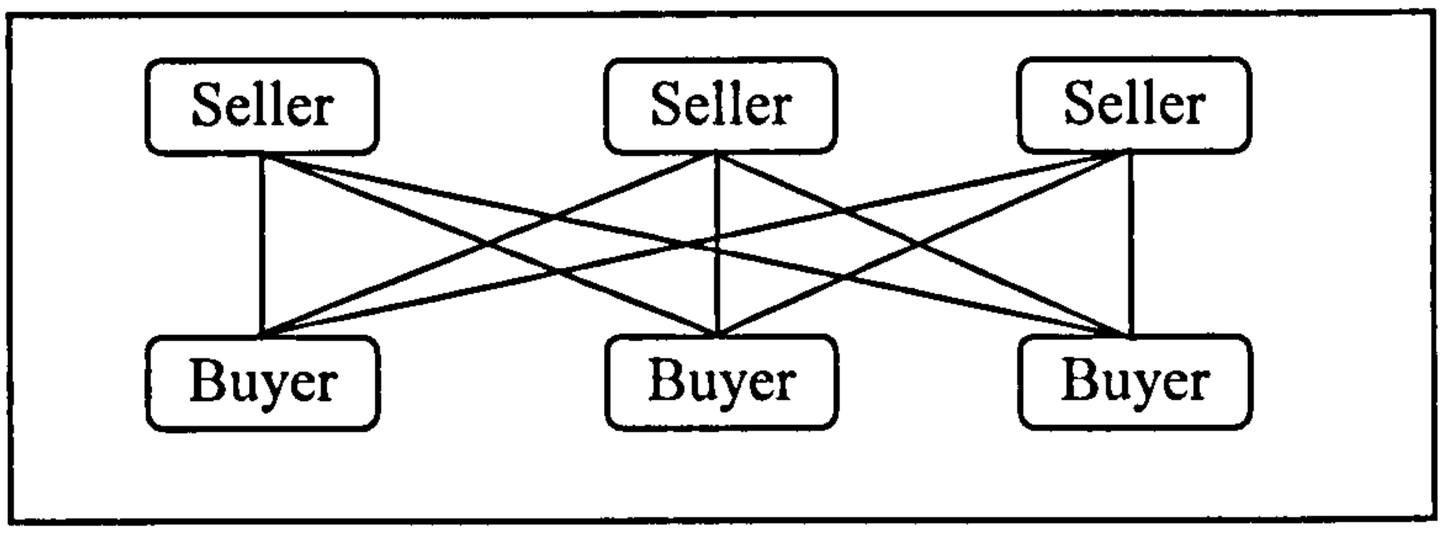

Figure 2.1: The traditional trust relationship model (Cavili, 1995).

Based on Figure 2.1, trust within a traditional commerce environment is created between parties directly involved in the transaction. The creation of direct trust is possible since the method of interaction is in a physical world (Olson and Olson, 2000). Physical existence while doing transaction and satisfied experiences and expectation on the transaction and product purchased can be verified instantaneously. The ability of consumers to verify the perceived values of goods before completing the transaction and the ability of sellers to confirm the value of instrument used by consumers in the transaction create a transparent exchange of trust which formed the prerequisite for trust to initiate within the customer-

merchant relationship. Based on this trust relationship model, completing a transaction can be done easily. As long as the perceived value of the product and the instrument used as an exchange of the product meet both parties expectation, this transaction can be used as a reference for future transactions. This is what creates 'customer loyalty' towards a particular brand, product or company.

Since trust on the buyers' side towards the seller is one of the pull-factor for transaction, the burden of trust creation in traditional commerce is on the merchants' shoulders. The merchants have to be creative in promoting trust toward their businesses, products or services. Policies such as product warranty, money back guaranteed, no hassle return policy and low prices are examples of how sellers project their image as trustworthy business entities for buyers to complete their transactions (Consumer Protection Working Group, 1999). By having these policies, merchants are minimizing the element of risk on the users' side and put themselves as a party who will bear the loss if consumers decide to cancel the transaction. Such policies also position the image of merchant empathy in the transaction process. In addition, sellers are also giving more control to buyers to ensure the output of the transaction is as expected through certain advertised policy such as money back guarantee. By having more control on the transaction, buyers will perceive lower risk, which in turn can increase the perceived trust towards sellers (Tan and Thoen, 2000).

It is also important to note that trust elements created in the above environment will deteriorate if the value expected from the transaction does not exist as expected or as iterated by the policies provided by the sellers which fail to protect the consumers' interests. A broken relationship may exist as illustrated in Figure 2.1 due to the breach of trust between the involved parties (consumer/customer-merchants). The need to bring another party into the trust relation is unavoidable. The involvement of lawyers by signing contracts or agreements can re-establish the broken chain. The existence of contracts or agreements has shifted the direct relationship of trust to intermediary relationship. In addition the creation of laws

and regulations from government can also create intermediary trust relationship. The basis of trust with the presence of law and regulations is built and developed with the assumption that any party who fails to fulfill the duties or expectations advertised within the contract can and will face the penalties provided by legal and regulatory framework (Turban *et. al*, 2000).

While traditional commerce provides the physical world as the meeting place between parties involved in the transaction, EC has created a different world for them. In EC setting, business activities have been moved into the cyber world which is made possible by telecommunication technologies and the development of the Internet. The network has created the means for anybody to contact and be able to be contacted by others without knowing each other. When this situation is extended to the business entity, the creation of virtual market is inevitable and the parties involved have to deal with a different type of trust element.

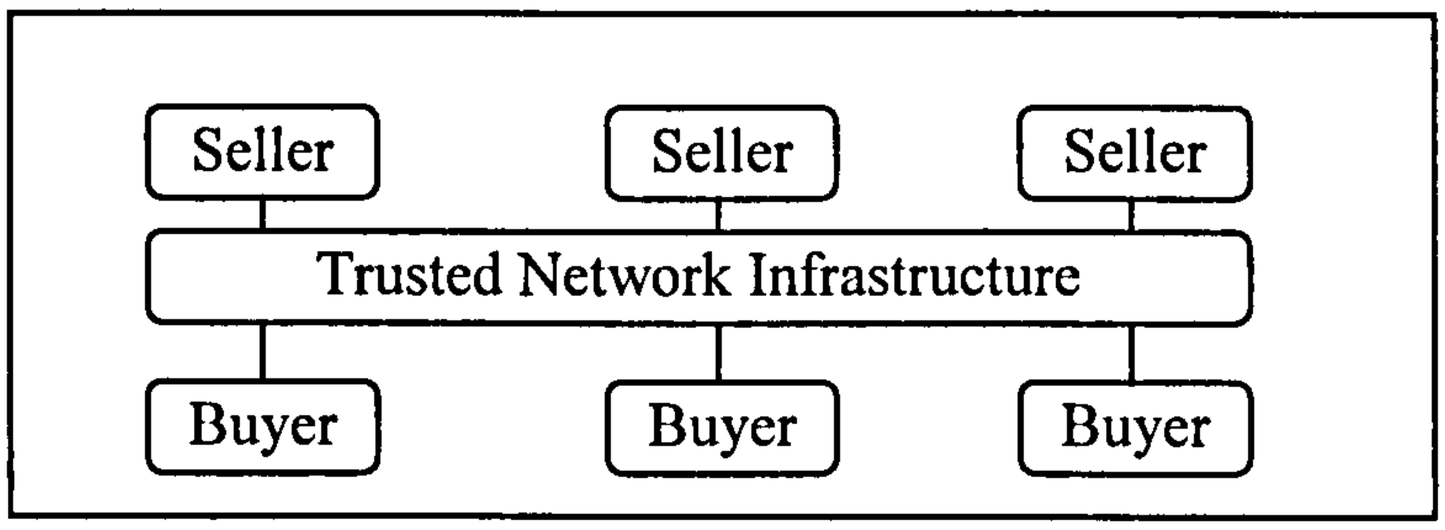

Figure 2.2: The new trust relationship model (Cavili, 1995).

The network has created a space for businesses to put their products in the cyberspace and consumers can reach the product virtually by using the same network. The network has created another layer of trust relationship when the involved parties believe that the network is capable of delivering what they expect to get. Based on Figure 2.2, direct trust relationship between buyer and seller is no longer important in EC since trust from both parties toward the network infrastructure is enough to bind them in a transactional relationship. Advanced technology development, standard protocol and acceptance security practice have made the network as a broker for the development of trust in EC.

However, research indicates that the requirement for the network to be able to accommodate existing trust factor within the physical world is still important and relevant in the transactional relationship of EC. In reality, the creation of an additional layer in the trust relationship model also poses an additional constraint on trust relationship within the model. Other researchers like Konrad *et al.* (1999) believe that creating trust in EC is partly dependent on the 'hard-technology', which has been the major research and development focus of Information and Communication Technology (ICT) industry. The socio-technical aspects such as greater understanding of the users, business practices and related institutions will complete the picture and create better foundations for creating overall trust in EC.

A model put forward by Matthew and Turban (2001) and shown in Figure 2.3, acknowledges not only the importance of network technology (Salam *et al.*, 2005) but also other factors such as merchant and third party certification factors. Meanwhile, Cheung, Lee and Matthew (2000) recognize the legal framework role in creating a trusted environment in EC. They also recognize the role of individual trust propensity in determining the level of trust required before someone is ready to commit in a trust relationship. This trust propensity is influenced by individual personality traits, culture and experience (Jarvenpaa *et al.*, 2000).

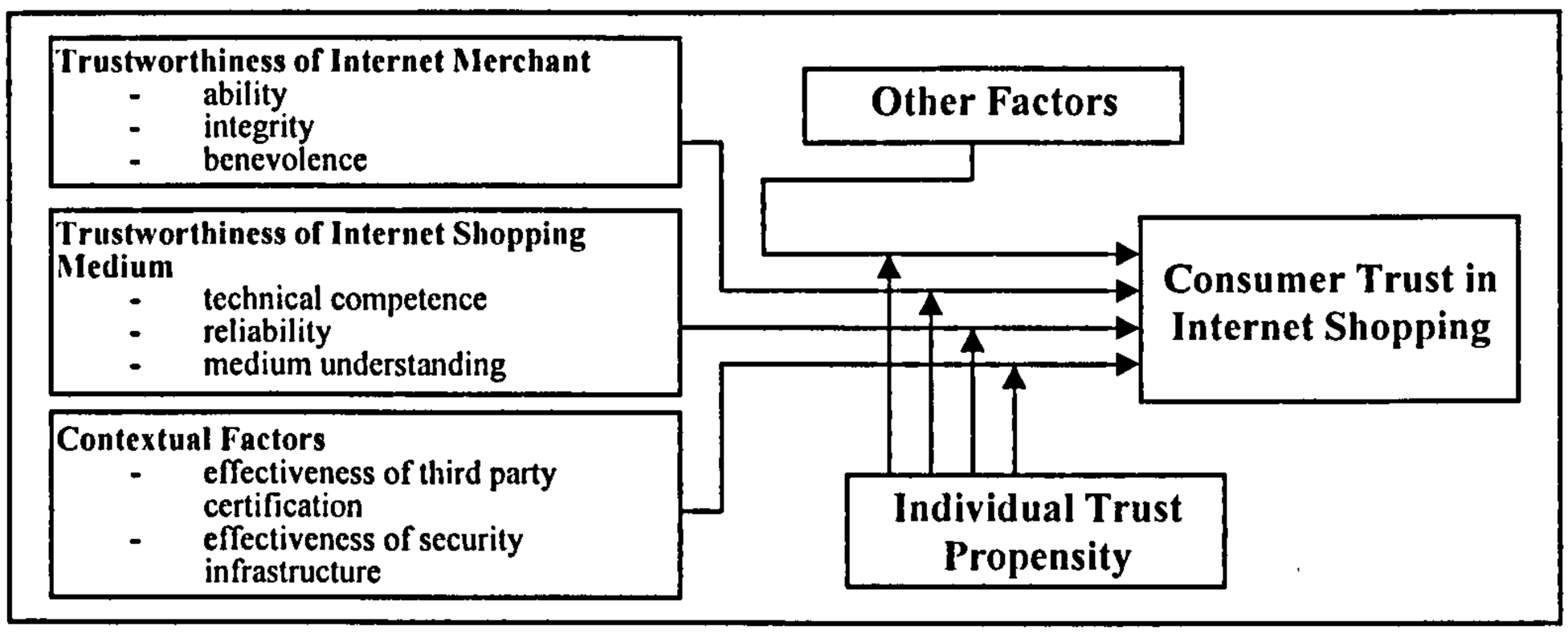

Figure 2.3: A trust model for consumer Internet shopping (Matthew and Turban, 2001).

The most related factor to this thesis is the trust toward merchants, which is referred to as merchant trust in this thesis. The initial model of merchant trust is adapted from Mayer , Davis and Schoorman (1995) and shown in Figure 2.4. The adoption is based on the argument that in EC, consumers place their trust on business organizations to fulfill the obligations stated in their transaction trust relationship.

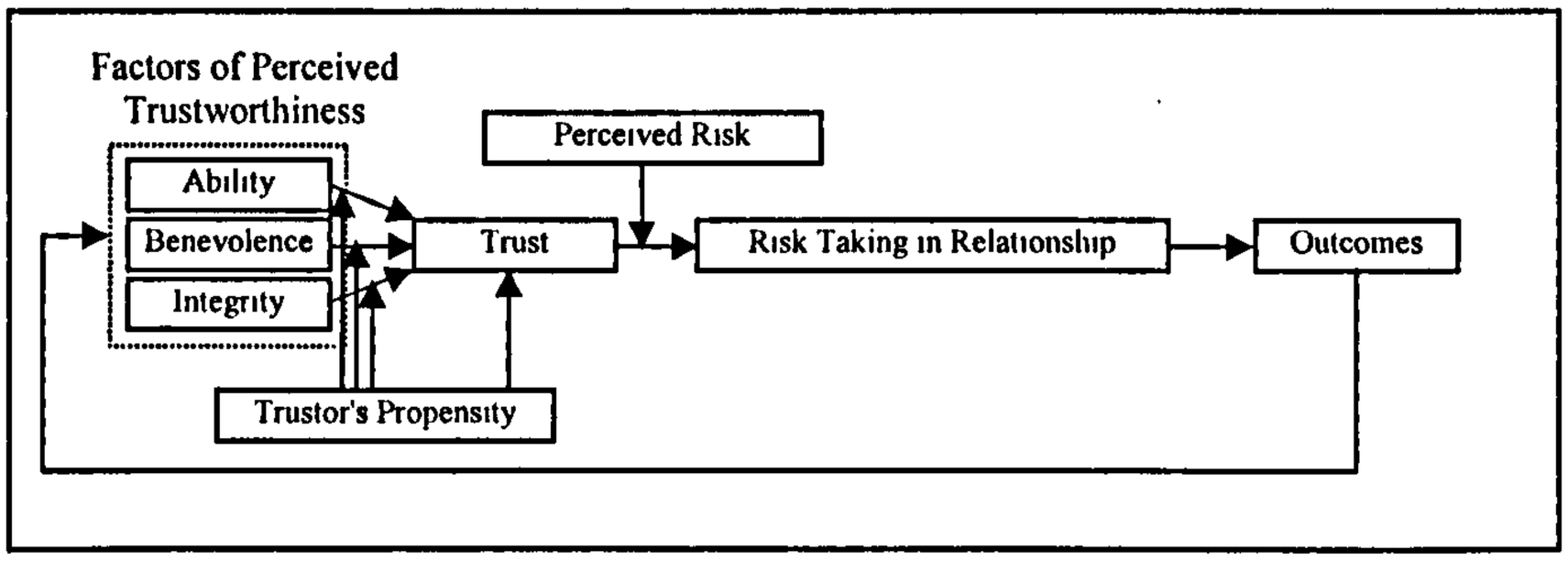

Figure2.4: An integrative model of organizational trust (Mayer, Davis and Schoorman, 1995).

Therefore, it is important for consumers to have confidence that the business organization is capable of fulfilling the obligation, benevolence in their relationship and have very strong integrity not to take opportunistic action in the transaction relationship (Ratnasingham, 2000).

2.1.5. Trust Development Stage

A trust relationship between two parties usually needs clues to be established especially between two strangers. Physical appearance or surrounding environment can help establish these clues and use them to evaluate the other party. After these clues have been gathered, they start to strategize the next course of action. If the clues gathered point towards a positive step for trust relationship, then this experience will be used as a basis to further this relationship. However, if the clues points towards a negative impression, then they tend to look for more clues or start to abundant the possibility of establishing a trust relationship. In other words, the first impression can be a determinant factor for establishing a

trust relationship between two parties which have no prior experience dealing with each other.

In the cyber world where information exchange is the main method of establishing clues especially with a new trust relationship partner, correct and sufficient information will be very important as suggested in this thesis. When they have enough experience in dealing with each other and accumulate enough building blocks for trust relationship, the role of the surrounding clues will become less important. This trust relationship, if nurtured and maintained, will take these two parties to different levels of trust.

A more concrete argument of this topic has been put forward by several researchers who describe how trust relationship develops from one stage to another. In the domain of negotiation where trust relationship is one of the critical factors for a successful negotiation process. Shapiro *et al.* (1992) argue that a trust relationship can evolve into the following three stages (1) Stable Deterrence/Calculated-Based Trust (Some Relationship), (2) Stable Knowledge-Based Trust (Many Relationships) and (3) Stable Identification-Based Trust (Few Relationships). The relationship of these three stages and the function of previous experience/time are well described in Figure 2.5. The same model was refined by Lewicki and Bunker (1996) and shown in Figure 2.6 where the transition of stages is further illustrated.

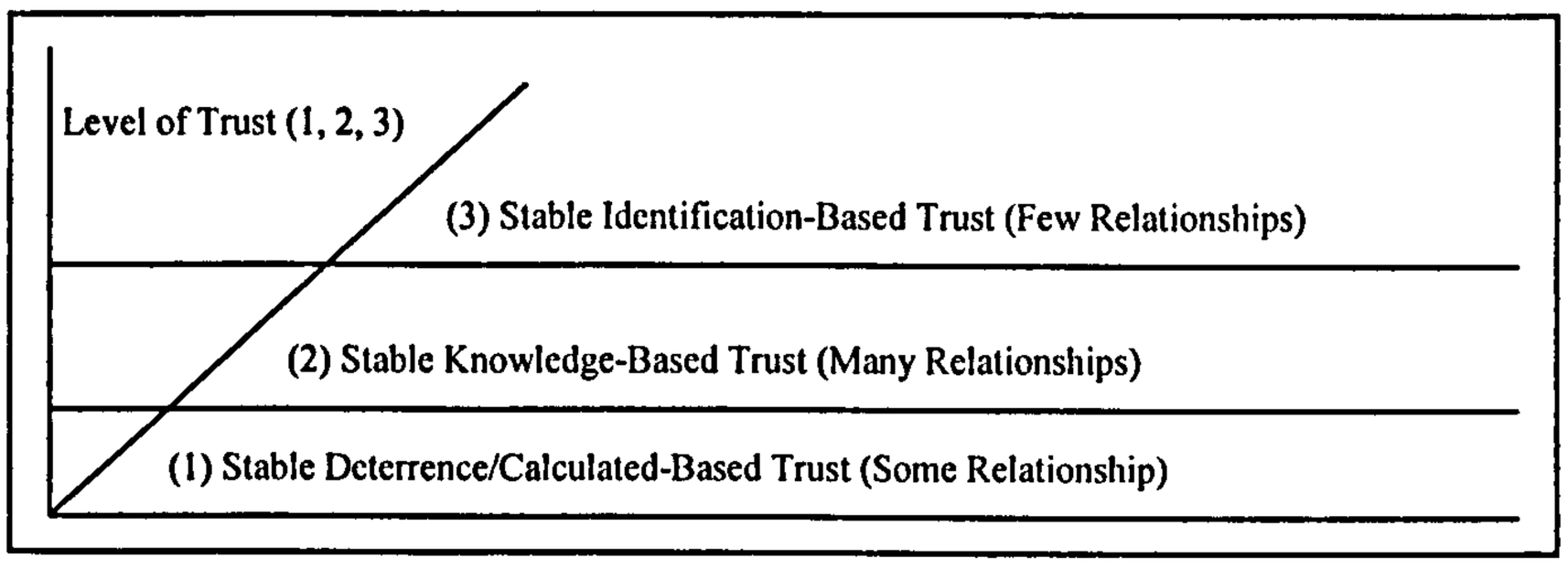

Figure 2.5: Trust development (Shapiro *et al.* 1992).

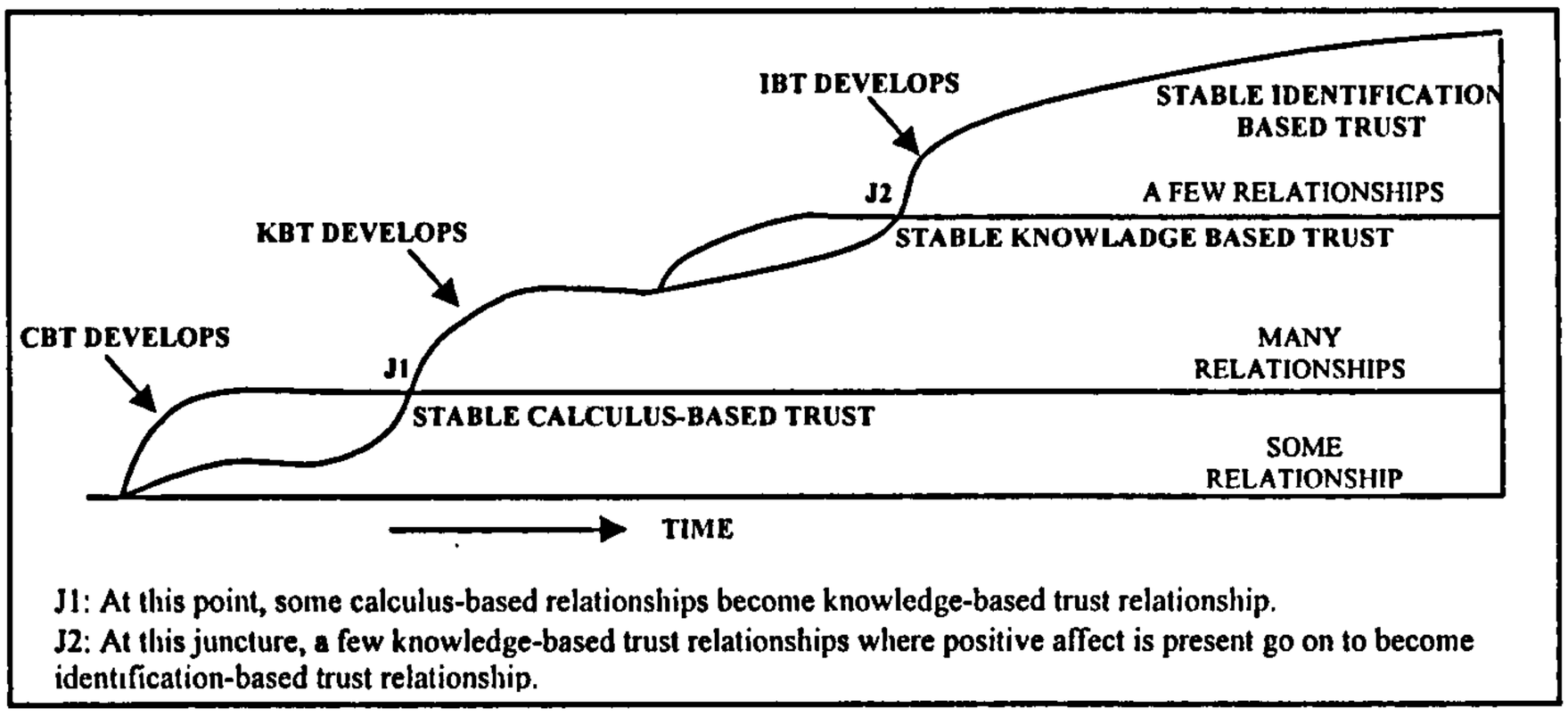

Figure 2.6: Progression of trust development (Lewicki and Bunker, 1996).

2.1.5.1. Stage 1: Stable Deterrence/Calculated-Based Trust

According to Shapiro *et al.* (1992) a strong trust relationship between two parties is based on their experience in dealing with each other. At the beginning of the relationship where the experience factor is still missing, both parties tend to use two major approaches to evaluate the potential relationship; *deterrence-based approach* and *calculated-based approach*. In the deterrence-based approach, both parties depend on deterrence factors such as penalty by law, losing good will/image already created in a community or possible exclusion from certain associations if they fail in performing their duties related to the relationship; while in calculated-based approach, both parties evaluate the benefits and risk factors of being involved in the intended trust relationship. If the calculated gain is greater than the calculated risk, than the intended relationship will be pursued by both parties. This condition is further described by the model put forward by Tan and Thoen (2000) as shown in Figure 2.7.

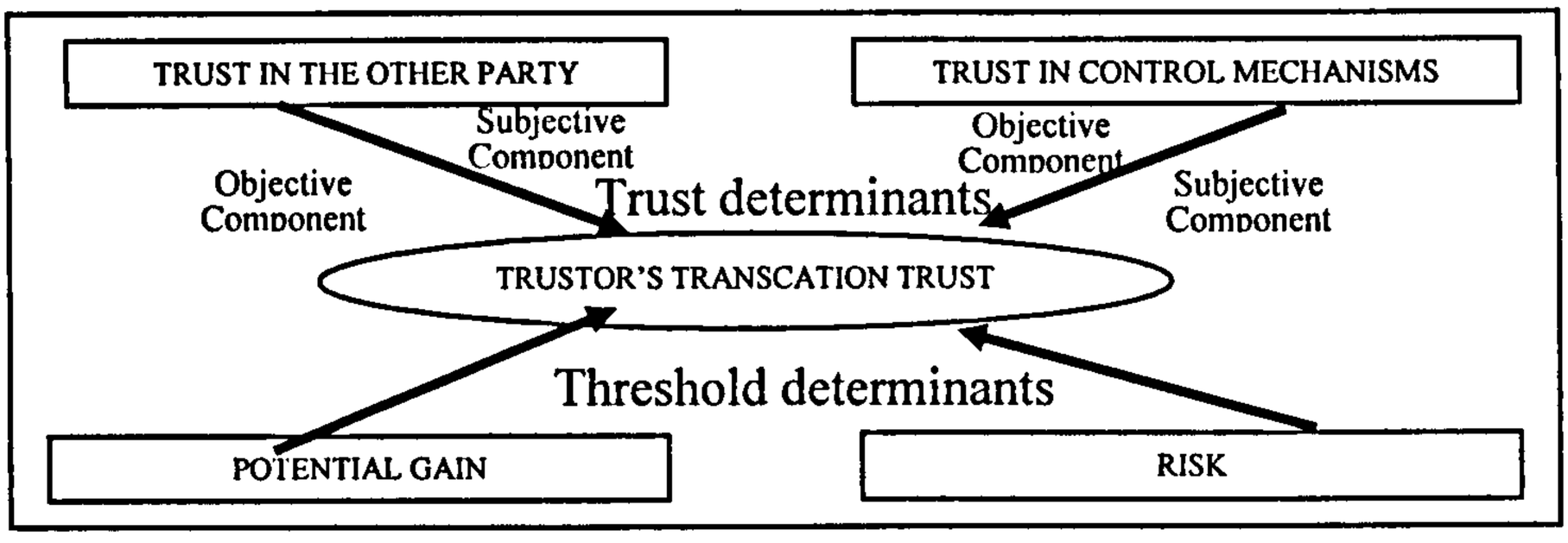

Figure 2.7: Generic trust model in EC (Tan and Thoen, 2001).

The decision either to proceed or to withdraw from a trust relationship depends on the trustor's transaction trust or the state of trust that the individual has in order to proceed with the relationship. This in turn depends on several factors. First, previous trust relationship experience will be referred to and used to determine the level of trust that already exists. Then, trust control mechanism will be accessed to ensure the interest involved in the relationship can be protected. These two factors will be used to determine the trust level that has already been established with the other parties. In addition, these two factors are also important to access the level of risk involved in this particular trust relationship. The assessment of risk level will be compared with the benefits gained to determine the final decision on whether to proceed with or cancel the trust relationship.

2.1.5.2. Stage 2: Stable Knowledge-Based Trust

As shown in Figure 2.6, several experiences in trust relationship between two parties will provide some cumulative knowledge about the other party involvement in the relationship. Both parties will rely on this knowledge for future relationships. If both parties play their role and function well as expected, this accumulated knowledge and experience will be very positive for future relationships. The level of risk in dealing with that particular party will decrease and the role of the trust control mechanism will become less important. However, if one of the player or party fails to perform, then the accumulated knowledge will

bring about failure. Future relationships will be viewed as more risky than the first one where experience is still an absent variable.

2.1.5.3. Stage 3: Stable Identification-Based Trust

Stable identification based trust as indicated in Figures 2.6 and 2.7 is a special kind of trust relationship. This trust relationship is developed based on the special identification where both parties belong together such as membership in certain trade organisation. Stable identification trust relationship requires only few previous successful relationships to be formed and the most important element is the existence of identification variable between these two parties. Within this stage of trust relationship, greater weight is placed on maintaining the existence of identification to each other than taking opportunistic action for short-term benefits out of a particular trust relationship (Ratnasingham, 2000). Meanwhile, within the EC domain, a stage of trust is developed from the un-trusted feelings. The model developed by Cheskin and Studio (1999) suggests that the consumer behavior approach in marketing can be used as a basis to describe the different levels of trust involved in EC transaction. As proposed by their model, trust in real EC starts with a stage deemed as an *un-trusted stage*. At this stage, consumers are using the Internet to browse and search information on various products or merchants for the purpose to compare product pricing before making any decision to purchase.

The consumer builds trust when he moves to the next stage of consumer buying behavior where he starts considering, validating and accessing certain EC websites for the product desired for. Finally when the consumer is able to establish trust, then he will commit himself to the trust transaction by registering and confirming the commitment by purchasing the product from the EC merchant. When the consumer has passed this first purchase threshold, then he will repeat the same process again for another potential EC transaction in the future. After several successful EC transactions have been committed, then the consumer starts confirming his trust to this digital medium. These series of successful EC

transactions will maintain the trust relationship towards EC transactions and create what is known as a habit threshold.

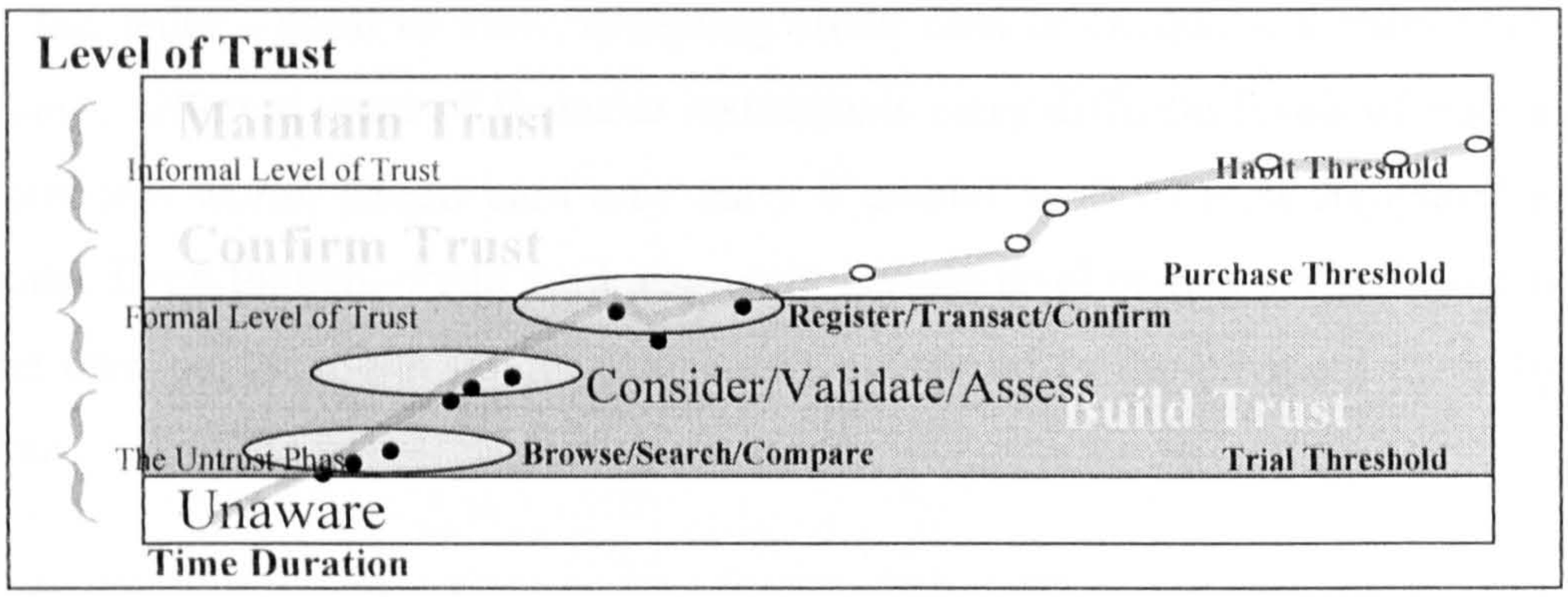

Figure 2.8: Trust development for digital transaction, (Cheskin Research and Studio Archetype/Sapient, 1999)

2.1.6. Sources of Trust

Trust is very difficult to create and sustain in EC because users and their environments are different and volatile. It is also very much dependent on individual's state of perception which is very subjective. In reality, perception on trust, trust relationship and trust sustainability may differ from one individual to another because in the context of EC, trust is influenced by the individual's knowledge, experiences, information as well as acknowledgement of risk that may exist on the surrounding product and merchant.

In the business world, trust is built in a transparent environment of perceived value of goods. Trust is created when both parties take risks to believe that they will receive the expected value of exchanged goods from the transaction. The seller expects to receive a sum of financial instrument (in most cases) in exchange for the goods or services that he provides to the buyer. Meanwhile, the buyer expects to receive the equivalent value of goods with other intangible benefits associated with the goods. The buyer not only expects to get the correct goods but also to get other perceived value of the goods such as brand and quality. If all expectations from both parties are met, then everybody is happy and the transaction would

have produced a solid building block of trust for future relationship and sales. However, the business world is more complicated than what has been described. Fulfilling expectations for every transaction is almost impossible. For example, from the seller's point of view, accepting credit card or cheque will carry some risk since different types of financial instruments carry different levels of trust in the business world. Credit card may carry a greater level of trust compared to cheques. Even though, credit card also carry certain level of risk but the validity of the card payment can be check instantly compared to the payment made by cheque.

Meanwhile in the virtual world, creating trust via storefront image is not an easy task to achieve. The element of transperence in transaction is not present (Gefen, 2002). The transaction is based on a series of conditional promises followed by the actual action from the participants to complete the transaction. This situation causes participants to be exposed to more risks than in traditional transaction. The inability to examine the product involved in the EC transaction, for example, exposes consumers to a risk related to failure of meeting initial product expectation (Salam *et al.*, 2005). In general, creating trust on the consumer side is more difficult since more factors need to be considered. When the buyer initiates a transaction with the seller, he not only places his trust on the product, but also on the seller. Quite often, as customers, he believes that the seller will not take any advantage over the transaction carried out. The consumer expects to get the correct product in terms of quantity and quality. Consumers also place their trust on the laws and policies to protect their rights as consumers.

Another source of trust that is important to be included in an EC transaction is the trust towards the technology used in the system. Starting from computer and communication technologies to specific EC enabling technologies such as security, authentication, digital payment and public key infrastructure technologies, these can be used to gain better trust towards EC implementation in general.

2.2. Electronic Commerce and Risk Factor

Risk can closely be related to the requirement of trust (McAllister, 1995; Sorensen and Perlusz, 2001) in business transactions particularly in an EC environment (McKnight *et al.*, 2000). In general, there are many consumers who still consider EC to be riskier than the traditional brick-and-mortar channel (Noteberg *et al.*, 2001). Transaction on non-digital products requires consumers to commit to the trust relation first, which puts them in a more risky position compared to merchants who can accept or refuse the proposed transaction. In addition, the absence of the ability to feel, touch and see the "real thing" in order to inspect the product involved in the transaction makes internet transaction to be perceived as more risky than traditional business transactions (Jarvenpaa *et al.*, 1999). The feeling of losing control over personal and financial information that is transmitted through the Internet while doing the transaction also contributes to the increase of risk factors within an EC transaction.

2.2.1. Types of Risk in Electronic Commerce

There are three major types of risk that consumers have to face in EC. These are *product risk* (Murry, 1991), *technology risk* (Su and Manchala, 1997) and *vendor risk* (Anderson and Weitz 1992; Jarvenpaa *et al.*, 2000). Product risk is the risk that is associated with the products being bought through the Internet (Sorensen and Perlusz, 2001). The most common risk that is associated with product risk is related to financial loss, performance risk and time/convenience lost. Technology risk is the risk related to the Internet technology as a medium of EC transaction. Issues like security (Kalakota and Whinston, 1996), reliability and authentication have been major concerns for continuous improvement in Internet technology development.

Meanwhile, vendor risk is the risk related to the other party involved in the transaction. Concern about legitimacy of vendor behind the websites (Kasiran and Meziane, 2003), capability of vendor to fulfill the promise made in the

transaction, vendor's honesty (Jarvenpaa *et al.*, 2000) and unfair transaction policies make EC vendors more risky than traditional brick-and-mortar vendors. In addition, a new risk that is specifically a major concern in EC is *identity risk* (Cheskin Research, 2000). This risk involves the misuse of personal information by individuals or organizations. Despite vendor opportunistic behavior to make easy profit on the personal data collected (AICPA 1998; Hoffman *et al.*, 1999; Wang and Wang 1998), most consumers are more concerned about the identity risk caused by hackers who are able to hack into EC merchants' databases and steal important personal and financial information (Cheskin Research, 2000).

2.2.2. Risk Minimizing Mechanism

Knowing the threat of risk in promoting trust in EC transactions, several mechanisms have been developed using different approaches to minimize its effects. Klang (2001) identified three approaches of minimizing risks involved in EC transactions. These are social, legal and technology approaches. On the social approach, the role of reputation for future and long-term relationship has lowered the risk of opportunistic behavior in the transactional relationship (Ratnasingham, 2000, Resnick et.al, 2000). On the social context, reputation is built based on previous behavior of each member especially in the area of trust in question. In other words, the behavior that is related to business transaction will form a strong reputation about the business conduct on that particular member. Any member of the society who wants to build a good reputation needs to act consistently as expected by the society. Well developed reputation will be maintained by honoring all promises made in the society which will lower the risk involved in a transaction with this specific member of society. When the concept of maintaining reputation is extended to everyone in the society, it can be used to minimize the effect of risk in dealing with the society.

Another mechanism of minimizing risk is through the implementation of laws. As mentioned by Klang (2001), laws can be a deterrent agent as well as a compensation agent. The law should provide a means to punish those who fail to

fulfill their duties as promised in the transactional relationship. The punishment provided by the law must be severe enough to ensure it will be a deterrent to those who violate the contract. Even though the law can serve the purpose effectively, it must be used as the last means to solve any problem in transactional relationship since the law can be an "aggressive, expensive and a non productive alternative" (Klang, 2001. In addition, the law must also be able to serve as a compensation agent. While deterrence will punish the parties who fail to fulfill their role as stated in their transactional contract, compensation agent will ensure the party who suffers in the contract will get compensation on the losses incurred.

The third means of minimizing risk is through development of technology in the area that can be rectified and solved through technology advancement. Since EC is driven by the Internet, communication and computer technology, development on these three areas may have an effect of enhancing the EC process. Technology such as public key application is very important to reduce the risk disclaimer between the parties involved in the transaction. The inclusion of digital signature on every important document exchanged between the parties involved in the transaction can verify the originality of the document. Advancement of encryption technology can ensure the movement of information especially related to financial or personal information is safe from being hacked and stolen.

2.3. Trust in Electronic Commerce

Generally, research about trust in EC still has a lot of gaps that need to be filled. Not much literature is available because research in this area is scarce and only started getting some attention in recent years. In addition, the main domain itself, EC, only started to receive significant attention in the late 1980's after the cyber market started to take off in the United States and Europe. With a very broad scope and uncoordinated research activity, research about trust in EC has taken several directions. Some of them are technological based where research and development for enabling technologies for EC are being developed, and some of them are social based where the studies are looking at the interaction between

humans with the EC application and its effect on the society as a whole. Some of them are looking at the factors that can contribute towards trust building and others are looking at the consequences of trust relationship.

In addition, there are also researchers who look into very specific areas of trust in EC such as *affiliation* (Cheskin Research and Studio Archtype, 1999; Cheskin Research 2000; Mahadevan and Venkatesh, 2000 Noteberg, 1999 and Noteberg, *et al.*, 2000) payment method, privacy (Adams and Sasse, 2001; Cheskin Research and Studio Archetype, 1999; Hoffman *et al.*, 1999; Kim and Agarwal, 2004; Nakra, 2001; OECD, 2000; Ranganathan, Malhotra and Zimmerman, 2000) and *the website itself* (Lohse and Spiller, 1999).

For this thesis, the study designed was adopted from several models of trust relationship available in the literature that have been proposed by other researchers i.e. Cheskin Research and Studio Archetype/Sapient (1999); Lewicki and Bunker (1996); Matthew and Turban (2001); Mayer *et al.* (1995); Shapiro *et al.* (1992) and Tan and Thoen (2000). Shapiro *et al.*, (1992) suggested that there are generally three types of trust: *calculated based trust, stable knowledge-based trust* and *stable identification based-trust*. Lewicki and Bunker (1996) extended the work of Shapiro *et al.*, (1992) by looking at the development of trust from one type to another. While these two models are for understanding trust in general, the others are closely related to EC. For example, Cheskin Research and Studio Archetype/Sapient (1999) had developed a model of trust development in EC from the consumer buying behavior point of view. Tan and Thoen (2000) proposed a generic model of trust requirement in Internet transaction, and he identified two trust determinants: trust in other party and *trust in electronic mechanism*. Finally, Mayer *et al.*, 1995 and Matthew and Turban (2001) gave more specific requirements for trust creation. Both of them agreed that benevolence, ability and integrity are key requirements for creating trust towards the other party involved in EC trust relationship.

2.4. Research Gap

Several models of trust relationship were mentioned in the earlier section of this chapter. The Model proposed by Matthew and Turban (2001) suggested that trust requirement in EC transaction can come from several sources such as trustworthiness of the Internet merchant, trustworthiness of the Internet medium and contextual factors. Meanwhile, Tan and Thoen (2001) also proposed a generic trust model in EC where trusting the other party (Internet merchant) is one of the main components in the model. In order to trust Internet merchants, consumers will look to these three contributing factors, ability, benevolence and integrity (Mayer *et al.*, 1995). These three factors have been cited frequently in the literature related to trust in EC and can be safely said as accepted framework for trust creation towards Internet merchants from consumers' point of view (*Brockner et. al.*, 1997; Ratnasingam, 2005).

However, the existence of Internet merchants in the cyber world is based on images created on the websites. The interaction between Internet merchants and consumers will mainly be based on these images. The consumer will browse the websites and find information that can establish the factors which can project the trustworthiness of the Internet merchants. Therefore, this thesis tries to extend the existing knowledge by identifying the information that can establish the trustworthiness image of Internet merchants focusing mainly on the three factors, i.e. ability, benevolence and integrity. In addition, the existence factor is also important since the parties involved in this trust relationship only exist virtually in the cyber world (Jarvenpaa *et al.*, 2000)

2.5. Contributions of the Research

As the business setting of EC is in the cyber world, this research will contribute significantly towards helping consumers to establish trust towards merchants. The framework produced by this research can play an important role on EC website development as it summarizes the required information needed on these websites.

In addition, the framework can also be used by consumers as a guide to evaluate the trustworthiness of cyber merchants.

The output of the second phase has a direct implication on the practical domain. The prototype created in this research should be able to function in the real world. The prototype should be able to navigate the consumer to find the required information. The consumer should be able to find information that can establish trustworthiness of the cyber merchant easily.

2.6. Chapter Summary

This chapter lays out the contextual background based on the literature review of the main subject of this thesis, i.e. trust. Due to the nature of the subject which is very abstract with different interpretations in different areas, the definition adopted in this thesis is that given by Mayer, *et al.*, (1995). This definition has been cited frequently in many articles related to trust in EC. In an attempt to understand the subject better, several characteristics and sources of trust were also included along with the important role that the subject plays in EC transaction in this chapter. This thesis also acknowledges several trust relationship models and development stage models that have been put forward by other researchers. Since trust requirement is based on the assumption of risk, then this subject also receives special attention in this thesis. Discussion on the existing mechanism on how risk can be minimized is also included in this chapter. Finally, the research gap is presented before the contributions of the research are identified. The next chapter looks at the research methodology of this thesis.

Chapter 3

Conceptual Model Development

The two previous chapters presented the purpose of this thesis and the literature review on the main research question. In this chapter, discussion on the research methodology will be carried out in detail. This chapter will first discuss the development of the conceptual model up to the formulation of hypotheses and this is followed by the overall research design and research strategy which identifies the ways of gathering data and conducting this research.

3.1. Conceptual Model of the Research

Research about trust relationship is studied from different angles and in various fields (Lee and Turban, 2001; Shaw *et al.*, 1997). Since not much research has been carried out about trust in the virtual world, most of the models used are taken from the real world. Even though, some differences are expected, the physical world has provided a good starting point in order to understand problems occurring in the digital world. There are several domains of studies that are relevant to this thesis. The foundation of the proposed model is based on the economic perspective of rationality of choice between trust and taking risks. The decision either to trust or not to trust will depend on overall return from the trust relationship. The understanding the risk that consumers have to take when dealing with EC merchants can be based on the organisational trust view point. After the risk involved has been recognised, the general constructs for the framework can

be identified. Based on these constructs, research hypotheses are formulated and at the end of this chapter research design and research strategies will be discussed in detail.

3.1.1. To Trust or Not to Trust?

The decision to trust or not to trust EC as a shopping medium is up to the consumers' evaluation. Their evaluation can be based on many factors. One of them is the economic factor i.e in terms of pricing, convenience and selection. If the economic gain is greater than the risk involved, than the transaction is reasonably viable. As presented in the previous chapter, Tan and Thoen (2000) suggested that if the calculated gain is greater than the calculated risk, then the intended transaction has its own merits to be pursued. A similar point is also forwarded by Ang, Dubelaar and Lee(2001). They suggested that the following equation can be used to evaluate the viability of being involved in EC transaction:

$$G_b = P_b L_b$$

G_b is the gain in entering the EC transaction, P_b is the risk that the consumer takes for trusting the EC merchants and L_b is the loss the consumer has to bear when the transaction does not produce the expected results. Consumers usually proceed with the transaction if the potential gain is greater than the potential loss and will be indifferent if both values are equal. However, some transactions may be entered not based on economic reasons but on other reasons especially for "hard to find" items or "urgently required" items.

3.1.2. The Foundation of the Theoretical Framework.

The basic theoretical framework in this research is based on the relationship between trust, risk and control. According to Mayer *et al.*, (1995), one of the important aspects about trust in EC that needs to be addressed is its association with the element of risk. As being described in section 2.1.2, the higher the risk

involved in the relationship, the higher the level of trust that is needed to establish the relationship.

However, the risk factor involved can be moderated by giving more control to the trustors. By having more control, the trustors will have more confidence that the outcome of the trust relationship will be as intended. Therefore, trust creation can be enhanced by giving more control to the trustor (Tan and Thoen, 2000) as this can reduce the perceived risk, which in turn will reduce the level of trust needed in the relationship. Based on these relationships, the basic development of the conceptual model can be summarised as in Figure 3.1.

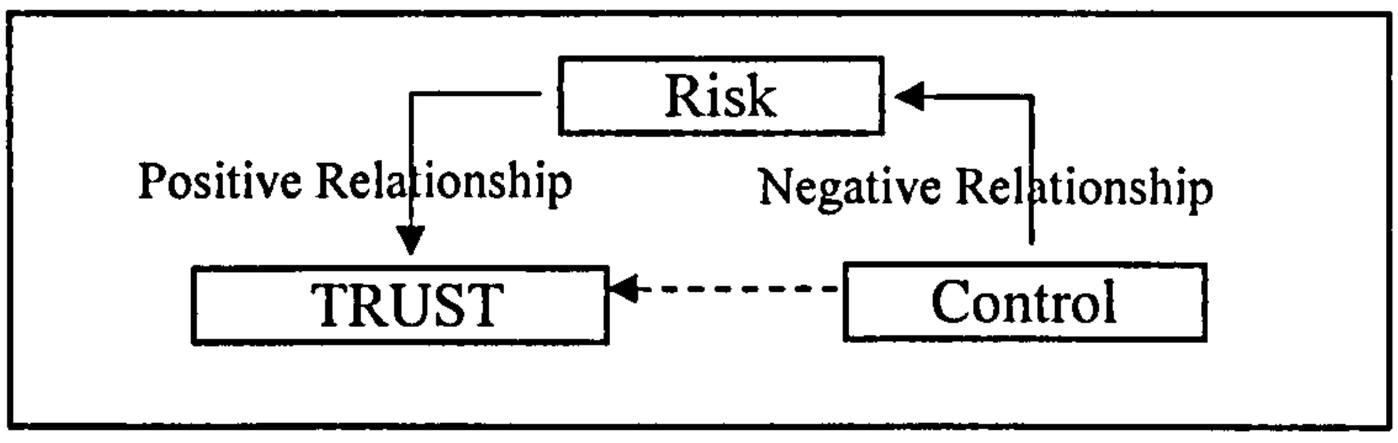

Figure 3.1: Basic theoretical framework

However, the purpose of this thesis is to address trust creation between consumers and merchants in EC transaction relationships. Therefore, the basic model to be used in this thesis should reflect this purpose. The updated basic theoretical framework is shown in Figure 3.2.

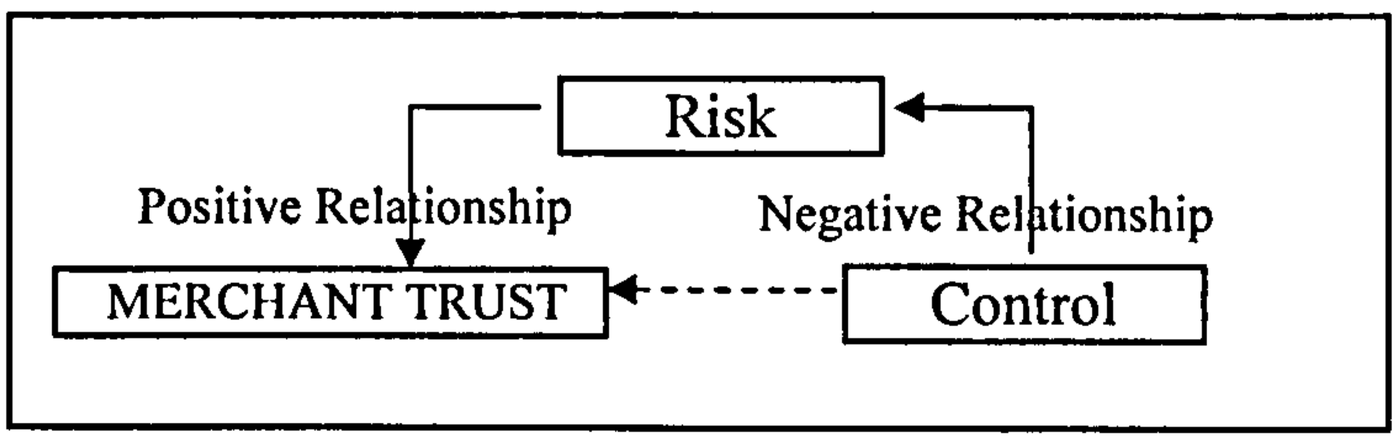

Figure 3.2: Updated basic theoretical framework

Based on this framework, there are three components which are important in developing our theoretical framework. First, are the factors that can contribute to

the creation of merchant trust. Second, understanding the risks involved in EC transaction and third, how control can be used to reduce the element of risk and increase the sense of trust in EC transactions.

3.1.3. Risk to trust EC Merchant

In EC, especially B2C segment, a basic assumption is that an individual consumer is buying products or services from business organisations. From the consumers' point of view, they are dealing with organisations rather than a specific person. Based on this assumption, understanding merchant trust can be from the organisational trust domain point of view. One of the organisational trust model that is referred to by many researchers in the EC domain is proposed by Mayer *et al.*, (1995) and shown in Figure 2.4. In this model, there are three important factors that can be used to develop trustworthiness image of organisations; ability, benevolence and integrity. Ability refers to "group of skills, competencies, characteristics" which are relevant to the specific area where the trust relationship will be based. Meanwhile, benevolence refers to the belief that the trustee has the intention to "do good" towards the trustor and the last factor is integrity which refers to the ability of the trustee to follow a set of rules and regulations that binds the trust relationship between them.

Therefore, when consumers are engaged in transactions with merchants, they take the risk that the merchants are trustworthy organisations. They believe that merchants will have the ability to fulfill the obligation in completing the transaction. The merchants are also expected to always have good intention and not to be opportunistic on the consumers and have strong integrity in following the rules and regulations that bind the transaction. In addition, there is another risk that the consumer takes when dealing with virtual organisations. The fact that the Internet is creating a virtual environment, dealing with organisations that exist based on the websites will raise the question of real existence. Barriers for entering and leaving EC environment are very low. Parties with ill intention such

as credit card fraud can create a very convincing website in order to collect credit card numbers for illegal purposes.

Minimizing the risk mentioned above will be very important to ensure that consumers will continue using EC as their shopping channel in the future. As suggested in the basic framework, providing more control towards the outcome of trust relationship will reduce the perceived risk. Since EC is an information based environment, then information that can give more control on risk minimizing process needs to be identified. Information such as privacy policy can be used by consumers to evaluate how far they can control the data that they give to merchants (Malhotra *et al.*, 2004; Prema, 2001). In addition, consumers can also use the information on the merchant return policy to evaluate the extent of control that they have in getting the right product at the end of the transaction cycle. Meanwhile, information such as telephone numbers, which can give control to consumers to verify the existence of the merchant using other channels of communication, will be important in this thesis. In the following sections, we describe the proposed general construct for merchant trust framework.

3.1.4. The Proposed General Constructs for the Merchant Trust Framework

After the relationship between trust, risk and control has been identified, the theoretical framework was expanded to include factors that can affect merchant trust in this research. In general, the merchant trust framework was based on four constructs, namely: existence, affiliation, policy and fulfillment.

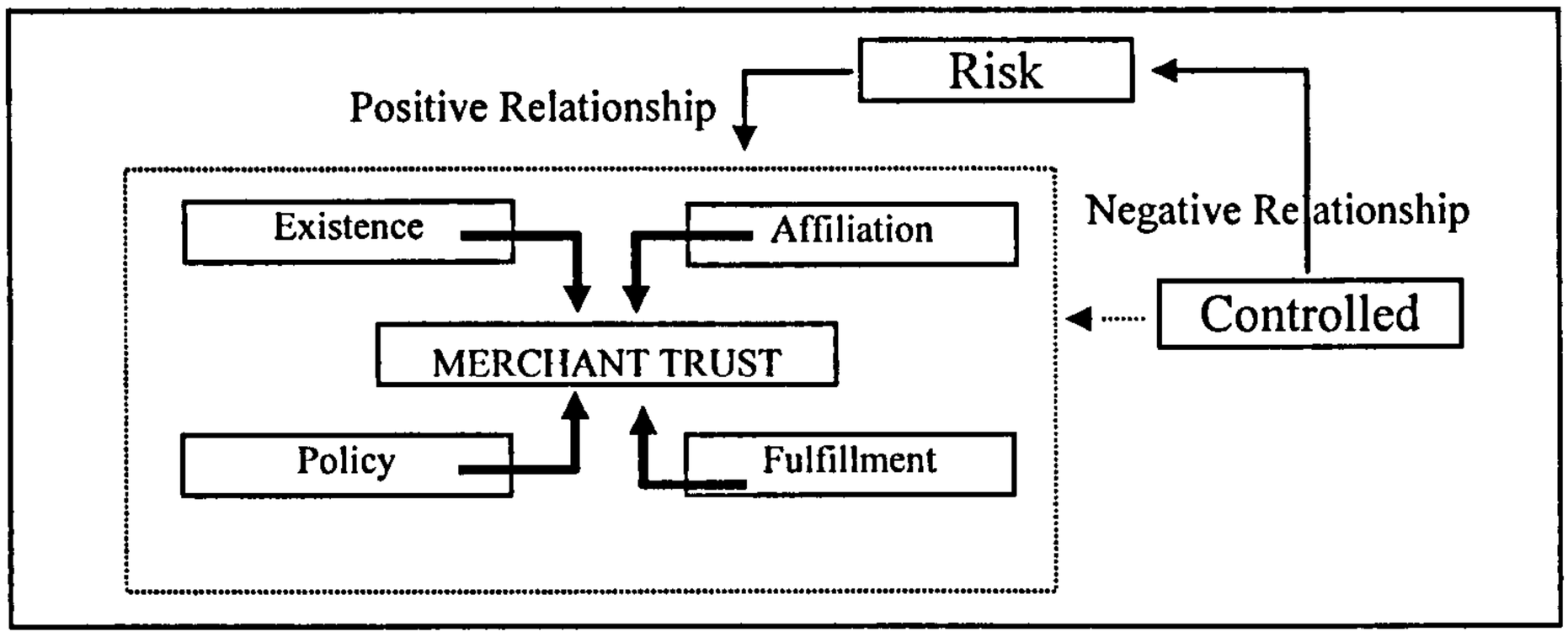

Figure 3.3: Proposed general constructs for merchant trust framework

3.1.4.1. Existence

A trust relationship is a relationship between two parties or more. Therefore, the existence of parties involved needs to be established first before the trust can be developed between them (Jarvenpaa *et al.*, 2000). The concept of authentication and non-repudiation in system security reflect the importance of real existence factor in the real world (Fink, 2000, Gray and Debreceny, 1998; Ratnasingham, 1998). In the traditional commerce trust relationship, the question of existence can be verified almost instantly when consumers go to the merchant's store to do the intended transactions. However, EC offers a different environment for the consumer and merchant to do the transaction (Lohse and Spiller 1999). Consumers can from the comfort of their homes visit merchant digital storefronts on the cyber world through their computers. Therefore, existence is a very important construct in creating trust relationship in EC environment due to this unique nature of the meeting space between the two parties (Primoff, 1998). In the B2C segment, consumers are the initiators of a transaction; merchants need to communicate and ensure that they really exist behind their websites. There are several types of information that can be used to support existence construct in merchant websites as well as providing assurance and control to customers to communicate with the merchant when needed (Berst, 2000).

According to Zimmerman (2000) and Ahuja (2000), providing information about the companies on their websites can generate merchant trust by the existence factor. Consumers can generate better trust towards the merchant if they have more information about the company. Physical information such as address can communicate the physical location of the company (Berst, 2000). By knowing the address, the consumer has an alternative method of communicating with the merchant. This alternative communication path is very important especially when something goes wrong and communication between the consumer and merchant needs to be more personal and detailed.

Another piece of information that needs to be included on merchants' websites in order to create a sense of existence is the telephone number (Berst, 2000). Berst did stress that if the consumer can't found these two information, they should "click away" from the website. Telephone numbers can provide a quick and easy communication alternative between the two parties (Consumer Protection Working Group, 1999). In addition, telephone contact can give a sense of control to the consumer to check instantly on the merchants by calling them. As a result, the consumer is not only able to verify the existence of merchants but can also have a sense of people existence behind their websites and the ability to communicate with them. Consumers can bring the relationship from the digital world to the more familiar physical environment.

Another important information that needs to be included on the merchants' websites is the fax number. A fax number is important to transmit any paperwork involved in the transaction especially when such requirement is needed. Information about the company's physical existence such as address, telephone and fax numbers can convey the message that the company is reachable from outside the cyber world. In addition, the consumer is also able to find the merchants through other means of communication other than the cyber world. Indirectly, consumers are given more choices and control over establishing communication with merchants.

3.1.4.2. Affiliation

A strong trust relationship can be established between two parties if it is developed through direct experience. As stated in the Cheskin/Archtype research report (1999), "trustworthiness is about experience over time where the process of creating trust between two parties is dynamic and continuous". A series of successful trust relationships will not only deepen the relationship but it can also be easily destroyed by one unsuccessful trust relationship.

However, due to its rapid development where its future still depends on its acceptance by more new consumers, EC needs to strengthen its strategy on building the initial trust between consumers and merchants. The challenge is more on creating trust from new consumers who have no direct experience dealing with cyber merchants than from those who already had a lot of experience in the digital market space. Therefore, another method of creating indirect merchant trust such as looking at other parties with whom merchants are affiliated with is needed. According to McCullagh (1998) trust can be in a form of direct trust or recommended trust. Direct trust is the trust that originates from a trustee to a trustor and based on experience through time, while recommended trust is created based on third party certification.

Several studies on third party certification have been conducted in the past by several researchers such as Cheskin Research and Studio Archtype (1999), Noteberg (1999), Cheskin Research (2000), Mahadevan and Venkatesh (2000) and Noteberg, *et al.*, (2000). All of these researches concluded that third party certification has some impact on influencing consumers to proceed with the digital transaction. The influences of third party certification on creating trust toward merchants has become more significant especially to unknown merchants where the perceived risk is higher than well-known merchants like Amazon.com (Cheskin Research and Studio Archtype/Sapient, 1999; Noteberg *et al.*, 2000). In addition, third party assurances can also be very useful especially if they involve endorsement on expertise and skill.

Among major services that are offered by the third party assurances are:

i. verifying the legitimacy of the company (existence).
ii. ensuring certain standard of network security has been put in place by the business organisation (performance).
iii. acting as protector to the consumer if something goes wrong with the transaction (policy/procedure).

Third party certification providers can come from government or private organizations and offer a wide range of assurances such as quality assurance, code of conduct, code of practice, rating service, privacy etc. (Prema, 2001; Malhotra *et al.*, 2004,). Some of these providers require a fee from merchants for the usage of their assurance seals in the merchant's website but some of them provide the service free.

Web merchants can also get third party certification by registering with certain professional bodies or organizations which can also be used to create recommended trust especially in areas where skill and expertise are important. This transfer of trust works well in the same way as referral systems or recommendation systems work. Consumers are willing to put certain level of trust to unknown merchants in the digital world when they are referred to or recommended by a trusted website (Gefen, 2002).

Meanwhile, Jarvenpaa *et al.*, (1999), Resnick *et al*, (2000) pointed out that the reputation of a merchant could be considered as antecedent towards establishing trust environment towards the merchant. Reputation conveys some information about the merchant's fulfillment as well as behaviour in the past. A positive reputation can create basic building blocks of merchant trust and carry some assumption that the merchant will perform and behave in the same manner in the future.

The establishment of reputation is generated from past consumer experience which takes a long time to create and requires persistent fulfillment. According to Silverman "a satisfied customer is likely to tell approximately three people, whereas a dissatisfied customer is likely to tell approximately eleven people" (2001, p 26). This notation should remind merchants to protect and maintain any good reputation they already possess. Since trust is hard to build and takes a long time to establish, merchants who have good reputation should ensure that this reputation is not tarnished by their contradicting behavior (Jarvenpaa *et al.*, 1999; Resnick *et al*, 2000). Therefore, finding what other people say or the comments of the community about the company can stimulate merchant trust relationship (Ba, 2001).

3.1.4.3. Policy

Merchant policy is also important in creating merchant trust in consumers since it sets the guidelines for methods and procedures to run the business (Consumer Protection Group, 1999). In addition, these policies can also show the empathy factors of the merchants towards consumers (Friedman *et al.*, 2000; Gefen, 2000). Closer examination on these policies can show the extend of "the seller interest in the buyer's welfare and motivation to seek a joint gain" (Sorensen and Perlusz, 2001 p.115). In EC, policies such as privacy policy and return policy can help consumers to evaluate the trustworthiness of a merchant as well as their willingness to protect their customer benefits.

As stated in many researches, one of the main factors that have hindered consumers from being involved actively in the digital market place is related to consumer privacy (Cheskin Research and Studio Archetype, 1999; Hoffman *et al.*, 1999; OECD, 2000; Zimmerman, 2000; Adams and Sasse, 2001; Nakra, 2001; Ranganathan and Ganapathy, 2002; Malhotra *et al.*, 2004). Consumers are afraid that their personal data will be sold to other parties or be used in marketing databases. It is important for EC websites to specify their privacy policy or privacy statement. Currently the availability of this policy in the website is

generally good. However, they still lack standardisation in terms of what are the basic kinds of protection that need to be there (Benassi, 1999). Several guidelines for privacy policy implementation created by OECD such as Guidelines for Consumer Protection in the Context of EC, Guidelines on the Protection of Privacy and Transborder Flows of Personal Data can be used as a basis for creating this policy. OEDC has also produced software that can generate privacy policy statements called OEDC Privacy Guidelines (OEDC, 2000).

Return policy is very important since this can influence the level of risk involved in the transaction. This policy can lower consumers' risk by giving more control to the users towards the output of the transaction since they can return the products without total loss if they are not satisfied with the quality of the product.

3.1.4.4. Fulfillment

The ability to perform expected tasks for other parties is a basic definition used for trust relationship between two parties in this research. Therefore, it is important for merchant websites to communicate their ability to fulfill their duties to complete the business cycle especially in payment, delivery and tracking method to consumers (Cheskin Research and Studio Archtype/Sapient, 1999; Gefen, 2002).

Information about method of payment is important to create merchant trust. Monetary relating transactions were found to be the most cited concern by consumer while shopping online (Ranganathan and Ganapathy, 2002). In most EC transactions, merchants will require consumers to make the payment in advance for the cost of goods they ordered. Therefore, it is reasonable for consumers to prefer a method that will still allow them to have some kind of control on that financial resource. Consumers should be able to cancel or at least be protected from unfulfilled transactions. Paying by cash is the least preferred since consumers will lose control over the money once it is transferred to merchants. Paying by cheque or credit card can give some control and security to consumers

since they still can cancel the payment (Morgan, 1999). In addition, some credit card companies already make a pledge to waive their cardholders' responsibility up to a certain amount for fraudulent Internet transaction (Morgan, 1999).

Since the cyber world does not provide the means for transferring non-digital goods instantaneously, cyber merchants need to provide consumers with information about delivery methods. Since consumers have fulfilled or partially fulfilled their duty by pay for the goods instantly when completing the transaction by providing credit card details, for example, merchants need to tell consumers how and when they will deliver the product. Therefore the consumer can decide whether to incur extra cost on insurance, for example, to ensure the delivery of the product in good condition. Once the product has been paid for, the consumer will have a sense of ownership on the product. Giving the ability to track the delivery of the product will allow consumers to follow the movement of their goods and detect delivery problems at an early stage.

3.1.5. Information Model Interaction

Based on the previous section, the interaction of the four constructs with the information requirement for merchant websites towards creating merchant trust can be summarised as shown in the following Figure 3.4.

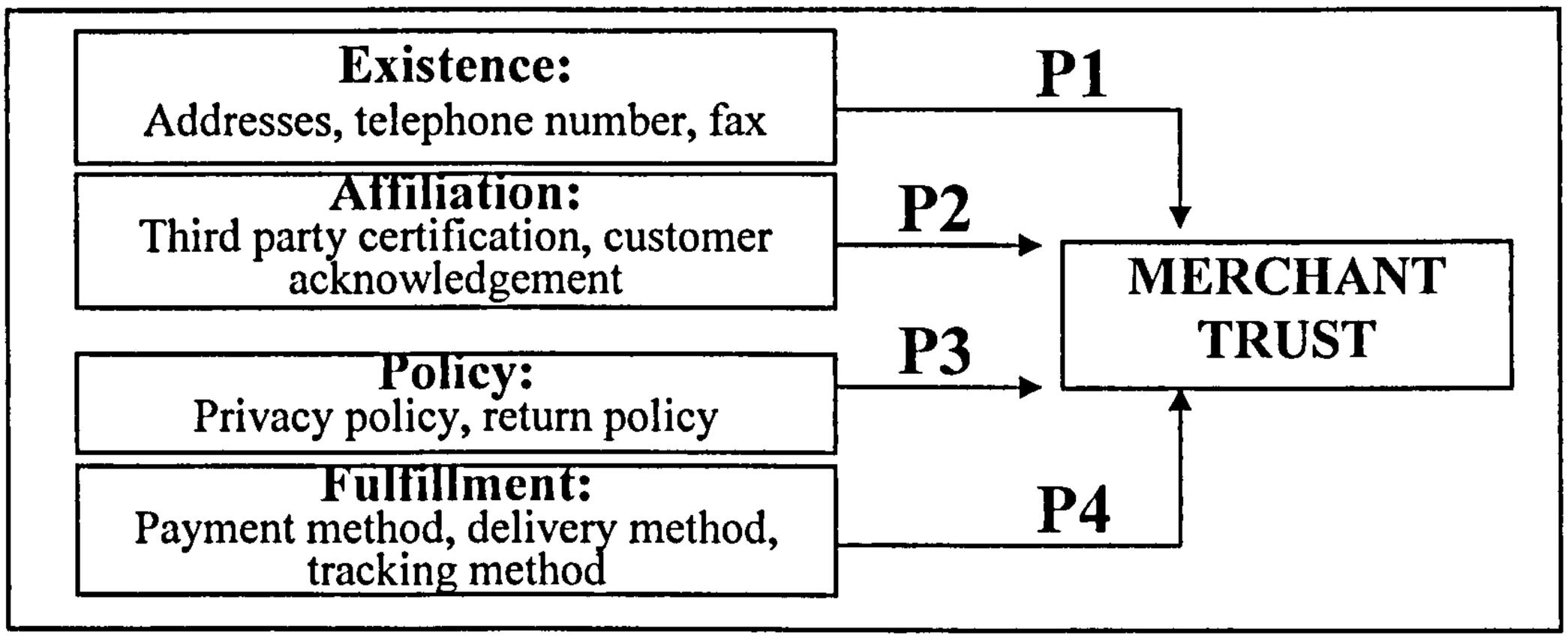

Figure 3.4: Interaction of main constructs with information requirement towards the establishment of merchant trust.

As a summary, the basic framework of this research is based on the interaction of trust, risk and control (Fink, 2000). Trust relationship is usually committed when the benefit gained is greater than the risk of loss. In organizational trust domain, ability, benevolence and integrity are three factors that can be used to evaluate organisational trustworthiness. Therefore, when consumers are dealing with EC merchants, they are taking risks on merchants' ability, benevolence and integrity in completing the EC transaction and need information to evaluate the risk related to these factors. In addition, the cyber world has also imposed the risk of existence on the consumer. Based on this argument, four hypotheses (see Figure 3.4) were formulated for this research. This thesis looked closely on how information about existence, affiliation, policy and fulfillment can influence creation of merchant trust in EC. In order to achieve this, the next section will discuss the research design.

3.2. Research Design

The overall research was divided into three major phases as described in Figure 3.5. The first phase was an exploratory research in order to test the four general constructs and their information requirement to support the merchant trust framework at the theoretical level. Since EC is an intensive information environment, the second phase was on developing a merchant trust information retrieval prototype system for retrieving the four major constructs and their information requirement. The last stage of the research was to verify the four major constructs and their information requirement using the information retrieval prototype on real EC websites.

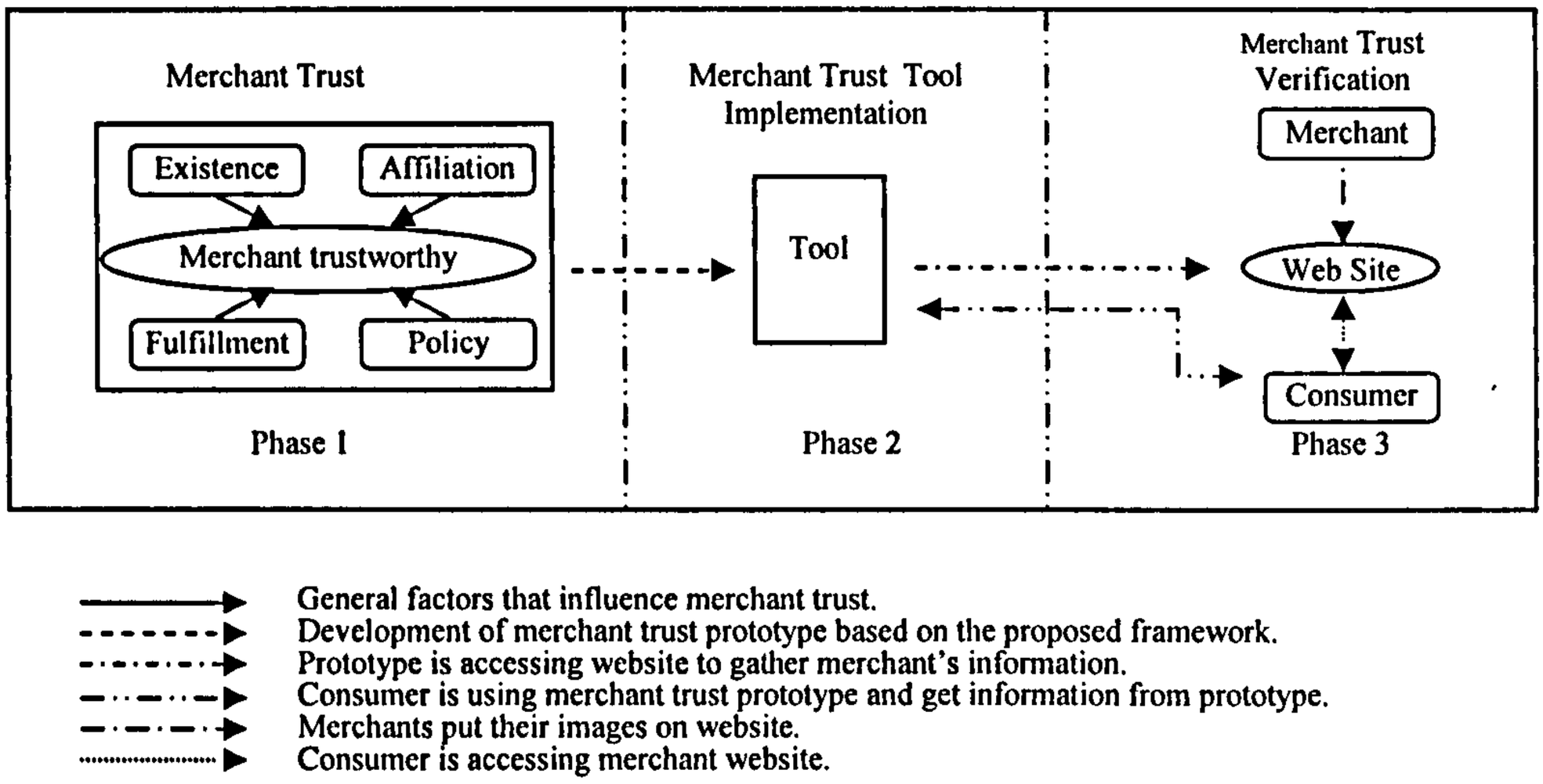

Figure 3.5: Overall research strategies

These three phases were adopted in order to test the hypotheses at the perception level as well as at the action levels. The first phase tested the hypotheses at the perception level where the methodology adopted sought the respondents' views based on their perception and their experience without putting them in the real situation of making the decision either to trust or not to trust EC merchants. Meanwhile, in the third phase, the hypotheses were tested based on the real action of evaluating merchant trust based on the information provided in their websites. The respondents were asked to browse several pre-determined EC websites and verify the importance of each variable based on the proposed framework in this research. In order to perform these two levels of testing, a prototype system was developed to help respondents find the information related to the establishment of a general construct of the information framework in the second phase.

3.3. Research Strategies

Since the overall research strategy is divided into three different phases, three different methodologies were adopted to collect the data required to achieve the goals of each phase. The data required in the first phase was collected through a questionnaire, the data required in the second phase was collected through

manually walk through approach and the data required for the third phase was collected through experimental approach.

3.3.1. Phase 1 : Development of Merchant Trust Framework

Understanding the overall trust problem is not an easy task and many researchers have looked at trust and its requirement (Cazier et al, 2006; Koo, 2006; Corbitt et al, 2003; Araujo and Araujo, 2003; Cheskin Reasearch & Studio Archtype, 2000, Gritzalis and Gritzalis, 2000; Jarvenpa, Tractinsky and Vitale, 2000; Cheskin Reasearch & Studio Archtype 1999;). Some of them looked at the antecedent of trust requirement (Fink, 2000; Gray and Debreceny, 1998; Ratnasingham 1998) , while others looked at the consequences of trust establishment (Matthew and Turban, 2001; Lewinci and Bunker, 1996; Shapiro et al, 1992). Since this thesis aims to study the information requirement for trust creation, then it is more relevant to examine closely the first domain.

There are many factors that can be seen to be the antecedents of trust creation in an EC transaction. As stated in the proposition, information about existence, fulfillment, policy and affiliation are important to establish merchant trust requirement. Therefore, in this phase, these four constructs were tested based on respondents' perception.

3.3.1.1. Phase 1: The Method

Soliciting a view or perception can be done in many ways. One of them is through a survey which involves collecting data from a sizeable population. One of the most widely used techniques for surveying is by questionnaire (de Vaus, 1986). The questionnaire can be administrated by face-to-face interviews, telephone and mail or via e-mail on the World Wide Web (WWW). Due to the selection approach of respondents in this first phase which will be elaborated later, administrating questionnaires through Internet was selected for this study. This research believes that distributing questionnaires through the Internet has

particular advantages over mail. For example, questionnaires administered through the Internet have a more refined appearance and able to provide more dynamic interaction between respondents and questionnaires (Dillman, 2000). Nevertheless, this approach too has its own disadvantages. In particular, the target respondents were limited to those who had access to the Internet and computer facilities. It can be a disadvantage if the respondent population included those who had no access to the Internet but in this research, since the targeted population included only those who had access to the Internet, it can be viewed as an advantage as these are the ones who are most likely to have experience with EC.

The questionnaire was placed on a paid server called my3q (www.my3q.com) based in Hong Kong for three months. The decision to place the questionnaire on the paid server was to ensure the availability and quick response time of the questionnaire. Without these two factors, distributing questionnaires through Internet would have been less effective. In addition, the host had software that can create and manage online questionnaire effectively. Within these three months, the respondents were invited to answer the questionnaire through email. If they wished to be respondents, they just had to click the link that was included in the invitation email. The responses were kept in the host server database and made available to the researcher when needed. The respondents were also able to retrieve unfinished questionnaires and complete it at another time.

3.3.1.2. Phase 1: The Questionnaire

The overall aim of developing a set of questionnaires in this phase was to seek the respondents' opinion and perspectives. According to Berdie *et al.* (1996), the number and quality of responses is positively correlated with format and the layout of the questionnaire. Therefore, few steps were taken into consideration, based on suggestions made by Gillham (2000); Schonlau *et al.*, (2002) and Dochartaigh (2002). Suggestions such as limiting the number of questions per screen, eliminating unnecessary questions, restricting response choice, minimizing forced response, providing indication for questionnaire progress and allowing

several sessions for answering questionnaires were adopted in developing the interface of the questionnaire. In general, the overall questionnaire was not very long. It only had 39 items, which was divided into two general categories, demographic and main questionnaire. The questionnaire began with a brief introduction and the purpose of the research followed the demographic section and the rest of the items followed suit.

The demographic questions intended to capture information such as gender and age as well as frequency of Internet usage and experience in online shopping, while the rest of the questionnaire consisted of 33 questions intended to seek views on four major constructs, namely existence (8 questions), affiliation (4 questions), policy (7 questions) and fulfillment (5 questions). There were also questions regarding the core subject of this thesis, which is trust and risk (9 questions).

3.3.1.3. Phase 1: The Sample

One of the limitations regarding the sampling process in this phase was that the respondent samples were not chosen in a random manner. In order to be able to do a random sampling, a list of all users of the Internet needed to be available in the process. Since such a list is not available, a non-probabilistic procedure in choosing the respondents was used. Any attempt, hence, to impose any finding of this thesis to the overall general population must be made with extra caution and by acknowledging the limitation imposed on the findings.

For this phase, a convenience sampling was used which may cause self-selection bias. However, the element of self-selection bias is present almost in any survey method due to the unwillingness of certain respondents to participate even in a probabilistic sampling process (Swaminathan *et al.*, 1999).

A self-selection method was used after the advertisement on the paid server fails to attract enough respondents. This self-selection was used on university

community consisting of university students, academicians, administrators and other categories of university staff. The invitations to participate in this phase were made through the mailing lists available in Universiti Utara Malaysia and University of Salford. In addition, the invitation also included a group of Malaysian research students studying at various universities around the United Kingdom. However, not all mailing lists were penetrable due to the strict rules imposed by mailing list administrators on distribution of bulk mail into their mailing list. For example, Universiti Utara Malaysia only released the invitation through limited mailing list such as ftmnet, which is the mailing list for academic staff in the Faculty of Information Technology and post graduate students' mailing list. This selection was made because the university community is usually exposed to the technology and has accessibility to the Internet. In addition, the selection of a university community is important to reduce the effect of technology familiarity on the creation of trust in EC. Since this thesis concentrates on the information requirement for merchant trust creation, the university community is more suitable than the general public since the former has free access and extensive background on technology related to online shopping. University communities also have free and unlimited access to the Internet on campus. These factors are important considerations to avoid any costs being incurred on the respondents while answering this questionnaire.

3.3.2. Phase 2: Implementation of Merchant Trust Tool.

Searching and evaluating information in the website can be tedious and a frustrating task since it is estimated that there are more than 200 million web pages available on the WWW (Craven, *et. al.*, 1998; Freitag, 1998) and this number keeps on increasing on a daily basis. It is also stated that computers cannot understand any of these pages (Craven, *et. al.*, 1998) and humans can hardly make use of this wealth of information without the use of tools that guide them towards the desired information. EC is known to be an information intensive business channel. A lot of information such as product, company and marketing information are put forth by the merchants in their websites for their potential

consumers. Consumers have to navigate the website effectively in order to find the information they need. However, the process usually causes a lot of frustration on the consumers' side. The information especially those related to the formation of trust as suggested in this thesis is not easy to locate and is disbursed all over the merchant websites. Therefore, burdening consumers with the task of finding information for establishing merchant trust based on the suggested framework can create a negative shopping experience for consumers. In order to reduce this negative experience, a tool was implemented for the purpose of this research. Therefore, in this phase, an information extraction prototype was developed to help consumers find and locate the required information to create merchant trust as proposed in the framework. The overall objective of this tool was to help consumers find and establish trust towards merchants while they are shopping on-line. This tool attempts to retrieve relevant sections of the document and extract the required information by localising the information within a document rather then just finding the document on the WWW.

3.3.2.1. Phase 2: The Methodology

Developing a software prototype can be done through many approaches. Since the requirement for the software development was well defined based on suggested merchant trust requirements, the more challenging effort was to identify the method and technique to extract and retrieve the information from websites. In this phase, a manual step by step approach was adopted to overcome this problem. First, 150 websites were identified to define rules for retrieving and extracting the required information. The websites were selected randomly based on the results produced while window-shopping using several shopping bots such *as mySimon, Dealtime, StoreRunner, Best Book Buy, BizRate, BottomDollar, BuyBuddy, Cnet, DealCatcher* and *DestinationRX*. The shopping lists used on these shopping bots were for electronic equipment, books, medicine, computers, chocolates, shoes, tools and household products. These websites were then studied and the rules were extracted manually. After this learning stage was completed, these extraction rules were then implemented in the final prototype. However, because of the

limitation in the area of ontology and natural language processing, lack of standardization in EC web site implementation and limited time frame, the prototype that was created only served the purpose of testing the framework in the third phase. The prototype will need further development in order to be distributed in the real software application domain.

The prototype was developed using an object-oriented approch and implemented in Java. An object-oriented methodology was used because it allows users to conceptualise "a computer program as a set of separate objects that interact with each other" (Lemay and Cadenhead, 2001). In addition, an object-oriented approach allows the development process to be done incrementally in order to avoid highly complex development processes. Meanwhile, Java was chosen as the implementation language because of its specific characteristics (Lemay and Cadenhead, 2001). Java is an object-oriented programming language which can implement object-oriented design efficiently. Java excludes several programming language properties such as pointer, manual memory management and multiple inheritances which can lead to serious problems in development and maintenance phases. Without these properties, Java is supposed to be easy to learn. In addition, Java has the capability to run on many platforms without compromising its capabilities.

3.3.2.2. Phase 2: System Architecture

The development of the system was based on the need for consumers to evaluate merchant trustworthiness while they are shopping online. The tool will run at the back of the online shopping activities as a personal tool that requires minimal intervention from the user to start its operation. The overall function of the tool created in this thesis had specific constraints that were deliberately embedded in its function. The tool can be said to be a static module since the tool did not actively search for information outside the merchant website or its linkages. The module only searches the information provided in the merchants' website and information provided by the site that had direct linkage with the merchant website.

This constraint of function was purposely embedded because the objective of the research is to evaluate the trust factors based on the information provided by the merchants in their website. This information must be in a text form and be easily accessible to consumers via manual browsing. The overall architecture of the system is shown in Figure 3.6.

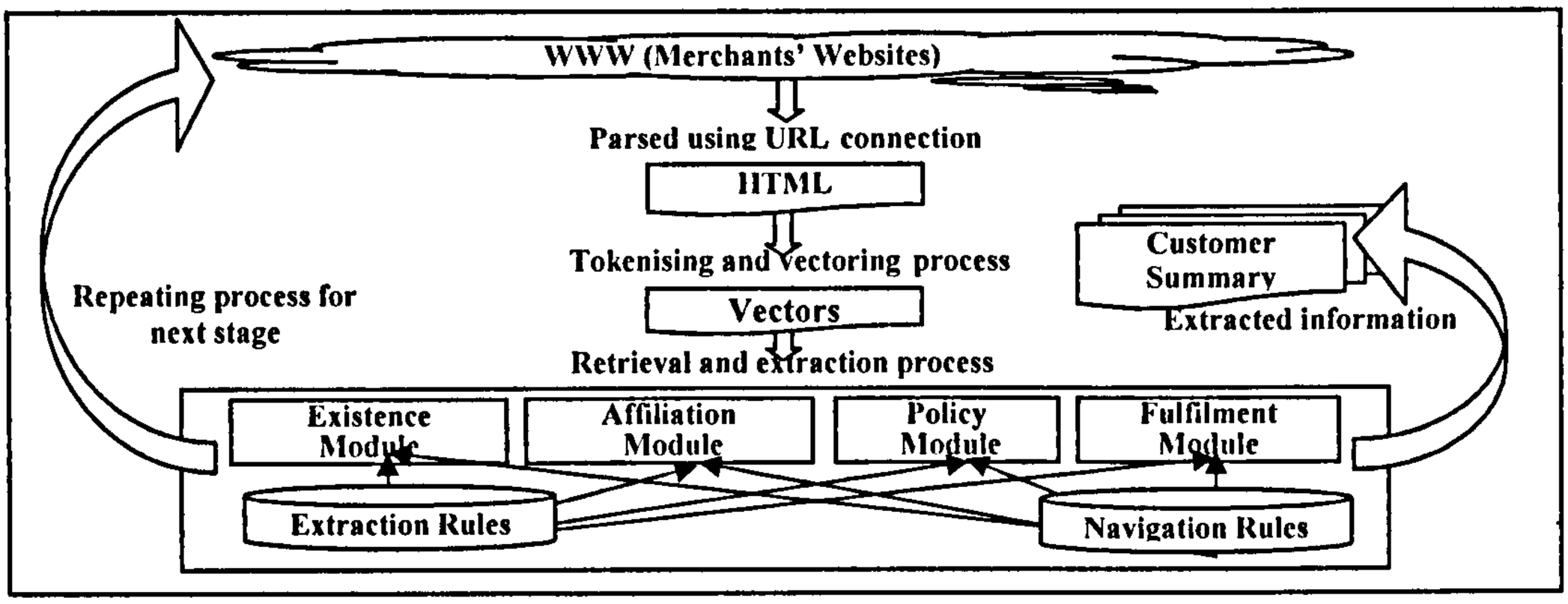

Figure 3.6: The overall architecture of prototype implementation

The process of evaluating information for merchant trust was initiated by user requests. Users wishing to run the prototype have to provide the merchant's URL address as an input to the system. The system starts by downloading the content of the main page of the website through a Java streaming utility and the main module brought in the whole content of the main page to start the process. The main component of the system was the module from which all sub-modules were initiated. This main module had the facility to bring into the system relevant HTTP (Hypertext Transfer Protocol) sites in an HTML (Hyper Text Markup Languages) format. These HTML documents were used as the basis input for the system and were manipulated for further process.

Since the input file is in an HTML format, the main module can also separate plain text and hypertexts. These hypertexts are collected by the main module and distributed to relevant sub-modules based on information required in the merchant

trust framework. For example, existence sub-module tries to find information about merchant existence in the main page such as address, telephone number and fax number. If the information is not available in the main page, the existence module looks at the linkages provided by the main module to be explored. Linkage to the section such as "company background", "contact information" or "about us" is explored by the existence sub-module in order to find the required information. Since other sub-modules do not perform information extraction, this hyperlink is sufficient to be used for information retrieval purposes. It accesses relevant hyper links provided by the main module in order to help consumers locate the information required for establishing information framework requirement for merchant trust. This information is then reported to the user in a summarised form. The summary contain several important information such as merchant address, telephone number, fax number and specific links that contain information to establish each trust factor as described in the model if all of these information are available and can be extracted by the prototype.

3.3.3. Phase 3 : Verification of Merchant Trust Framework

After the initial framework had been tested, and the prototype tool has been developed, the verification process of the proposed merchant trust framework was performed through an experimental setting. In this stage, the respondent was asked to do actual window-shopping and use the developed tool in order to evaluate the merchant trust information requirement as suggested in this thesis.

3.3.3.1. Phase 3: The Method

In this stage, the experiments were carried out in a classroom setting at a computer laboratory at Universiti Utara Malaysia. The availability of facilities and the respondents' location influenced this choice. Fifteen sessions of labs were organized within two months. The maximum respondents per session were thirty four due to the number of computers available in the lab. However, the actual number of respondents in each experimental session varied from ten to twenty

five in each session. Over these 15 sessions, there were a total of 192 respondents who completed the experiments.

3.3.3.2. Phase 3: The Procedure

The experiment started with a brief introduction about the research and the purpose of the session for about five minutes. Then, a questionnaire was distributed which required the respondent to answer part one of the questionnaire which was intended to capture the demographic information. Then, the respondents were asked to run Internet explorer and the prototype simultaneously on their computers (most of the times, these steps had been done earlier). Then, they were asked to choose several merchant websites, which they had never dealt with previously from the list provided by the researcher and type the address into the Internet explorer. The respondents then were asked to pretend to buy something from each particular store. When they had already found what they wanted to buy, they then had to run the prototype in order to evaluate the trustworthiness of the merchant. The prototype will show related information on existence factors if available. In addition, related link to other information factors will also be shown for the user to follow if they required detail information from the merchants' websites. After they had completed this process, they were asked to complete the rest of the evaluation form on merchant trust framework.

3.3.3.3. Phase 3: The Instrument

The overall aim of developing an instrument in this phase was to evaluate merchant trust information requirement based on respondents' experience in establishing trust towards merchants while shopping online. The instrument had several sections. The first section aimed to capture the demographic information, the second section was meant to capture the general level of trust that the respondents had towards online merchants. The following section aimed to capture the level of importance of each of the factors suggested in the merchant trust framework in this thesis.

3.3.3.4. Phase 3: The sample

In this phase, a self-selection method was used on a very specific group of university students. Even though university students are criticised for not being adequately able to represent the target population (Yavas, 1994), demographically, they are significantly active in on-line shopping activities (Yoo and Donthu, 2001; PR Newswire, 2000). In addition, according to College Stores Research and Educational Foundation (CSRE), their contribution to online shopping activities will increase significantly in the future. Furthermore, the selection of university students in the sampling process is not unprecedented especially in the electronic trust domain. The following researches were carried out by using university students as their respondents: Ahmad, 2002; Ang *et al.*, 2001; Borchers, 2002; Chellappa and Pavlou, 2002; Cheung and Lee, 2000; Gefen, 2002; Jarvenpaa *et al.*, 1999 ; Jarvenpaa *et al.*, 2000; Kehoe, 2002; Koufaris and Hampton-Sosa, 2002; Lee and Turban, 2001; Noteberg, 1999 and Walczuch *et al.*, 2001.

In addition to the above arguments on the selection of students as respondents in Internet related research, there are also several arguments available to support the selection of respondents in this research. A selection of university students is important to reduce the effect of technology familiarity on the creation of trust in EC. Since this thesis concentrates on the information requirement for merchant trust creation, university students are more suitable than the general public since they have free access to and have extensive background on technology related to online shopping. University students also have free and unlimited accessibility to Internet on campus. These factors are important considerations to avoid any costs being incurred on the respondent while answering this questionnaire.

Universiti Utara Malaysia was chosen due to several reasons. The university as a whole has the advantage in terms of technology adoption. The university is recognized as one of the many organizations which has the highest usage of

information technology within organizations in Asia by Managing Information Strategies (MIS) magazine (Yap, 2004). Meanwhile, the students also have their own strengths in the EC domain. They have sufficient exposure to several EC applications such as electronic cash within the campus business network.

3.4. Chapter summary

This chapter outlined the details of the methodology used in this research. Since the overall research was developed within three different phases, each phase had its own methodology. The first phase employed questionnaires as a method of collecting data in order to establish the four major constructs for the framework in this research. However, in the second phase where the prototype was developed, an incremental approach was used to establish the rules on extracting and retrieving information required for merchant trust framework. Finally, in the final stage, an experimental approach was used to test the framework in a real EC environment where the respondents were online doing their shopping. The respondents were required to evaluate the detailed framework based on their experience doing the online shopping.

Chapter 4

Results

This chapter will present demographics information for all phases, results of the regression and correlation analyses from the first phase, establishment of extraction and retrieval rules from the second phase and descriptive analysis from the third phase of this research.

4.1. First Phase: Demographic Information

The instrument in phase one was placed online at a rented server located in Hong Kong for three months with the extension of one month. Invitation to participate in answering the questionnaire was made by server administrators to their clients as well as through several advertisements in websites managed by them. In addition, the researcher also invited potential respondents through selected mailing lists available in several universities mainly in the University of Salford as well as Universiti Utara Malaysia. Since the instrument can be accessed by potential respondents internationally, the actual participation came from 15 countries. However this international participation only comprised 19% of the total participation. The rest were Malaysians. The actual distribution of participation in phase one is shown in Table 4.1.

Table 4.1: First phase: Respondents' countries

		Frequency	Percent	Valid Percent	Cumulative Percent
	Cyprus	1	.5	.5	.5
	Germany	3	1.5	1.5	2.1
	Ghana	1	.5	.5	2.6
	Indonesia	1	.5	.5	3.1
	Kenya	1	.5	.5	3.6
	Kuwait	1	.5	.5	4.1
	Lebanon	1	.5	.5	4.6
	Malaysia	158	81.0	81.0	85.6
	Pakistan	1	.5	.5	86.2
	Portugal	1	.5	.5	86.7
	Thailand	1	.5	.5	87.2
	U.S. Minor Outlying	1	.5	.5	87.7
	Ukraine	1	.5	.5	88.2
	United Kingdom	20	10.2	10.2	98.5
	United States	3	1.5	1.5	100.0
	Total	195	100.0	100.0	

At this stage, 232 questionnaires were successfully collected. Out of these completed questionnaires, only 195 (n =195) or 84.1 % were usable. The exclusion of about 16% of questionnaires was due to several reasons. First, the response was incomplete. Since the choice of "uncertain" was available in the response choices, any unanswered question was treated as incomplete. Another reason for exclusion was because where all responses were consistently the same throughout the questionnaire. In addition, any obvious duplication of respondents can be excluded by checking the IP address and matching the response through the questionnaire. Upon the expiry date of the questionnaire's publication in the servers, all data was downloaded and transferred to be analysed with SPSS version 12.0. Table 4.2 will provide information about other demographic information collected during this phase.

Table 4. 2: First phase: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 1	Phase 1	Phase 1	Phase 1
Valid	Female	92	47.2	47.2	47.2
	Male	103	52.8	52.8	100.0
	Total	195	100.0	100.0	

Based on Table 4.2, from the total respondents of 195, 92 of them were female (47.2 %)and 103 were male (52.8 %). Meanwhile in term of age (see Table 4.3), 1 respondent was in the range of less than 20 years old (0.5 %), 83 respondents were in the range of 20 to 30 years old (42.6 %), 78 respondents were in the range of 30 to 40 years old (40.0), 32 respondents were in the range 30 to 40 years old and 1 was over 50 years. Based on this respondents' profile, the majority of the respondents (82.6 %) were in the range of 20 to 40 years old.

Table 4.3: First phase: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 1	Phase 1	Phase 1	Phase 1
Valid	Less than 20	1	.5	.5	.5
	20 to 30	83	42.6	42.6	43.1
	30 to 40	78	40.0	40.0	83.1
	40 to 50	32	16.4	16.4	99.5
	Over 50	1	.5	.5	100.0
	Total	195	100.0	100.0	

Table 4.4: First phase: Frequencies of Internet Use

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 1	Phase 1	Phase 1	Phase 1
Valid	at least once a week	4	2.1	2.1	2.1
	at least once a day	191	97.9	97.9	100.0

Most of the respondents, 191 (97.9%) were connected to Internet everyday (See Table 4.4) and have a lot of experience in actual EC transaction. This conclusion was made based on the figure available in Table 4.5 where 77 respondents (39.5 %) had more than 4 times experience in EC transaction. However, 37 respondents (19.0 %) never did any actual transaction through online shopping. Meanwhile, 22 respondents (11.3 %) had one time experience doing actual online shopping and 59 respondents (30.3 %) had 2 to 4 times experience doing actual EC transaction.

Table 4.5 : First phase: Experience in online shopping

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 1	Phase 1	Phase 1	Phase 1
Valid	Never shopped online	37	19.0	19.0	19.0
	Once only	22	11.3	11.3	30.3
	2 to 4 times	59	30.3	30.3	60.5
	More than 4 times	77	39.5	39.5	100.0
	Total	195	100.0	100.0	

4.2. Second Phase: Demographic Information

As stated in the methodology section, a sample of 150 websites have been selected to define the rules used for retrieving information. This list of websites was selected randomly based on the results produced while window-shopping using several shopping bots such as *mySimon, Dealtime, StoreRunner, Best Book Buy, BizRate, BottomDollar, BuyBuddy, Cnet, DealCatcher* and *DestinationRX* as in Table 4.6.

Table 4.6 : Number of selected websites included in the sample suggested by Shopping Bot.

No.	Shopping Bot	#.of Websites		No.	Shopping Bot	#.of Websites
1	mySimon	22		6	BottomDollar	15
2	Dealtime	16		7	BuyBuddy	17
3	StoreRunner	19		8	Cnet	13
4	Best Book Buy	13		9	DealCatcher	12
5	BizRate	17		10	DestinationRX	6

If the same websites was being suggested by more than one shopping bot or the same shopping bots suggested one website more than once, then the website would only be listed once. The selection was usually made based on the first five websites listed with a different product shopping list. The shopping lists used on these shopping bots can be categorized as electronic equipment, books, medicine, computers, chocolates, shoes, tools and household products. Each category could be based on several specific products. For example, electronic equipment category might be based on the search of the following products: “Canon Digital Camera”, “PDA Phone” or “MP3”.

4.3. Third Phase: Demographic Information

For the third phase, a total of 192 respondents were asked to complete the experiment in 15 different lab sessions. Since all experiment sessions were closely monitored and supervised, all outputs from the respondents were included in the final analysis (n =192). In this phase, all respondents were Malaysians, since it involved lab based experiments and was done in Universiti Utara Malaysia. In term of gender (See table 4.7), 82 of the total respondent were female while 110 respondents were male.

Table 4.7: Third phase: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 3	Phase 3	Phase 3	Phase 3
Valid	Female	82	42.7	42.7	42.7
	Male	110	57.3	57.3	100.0
	Total	192	100.0	100.0	

The majority (64.6%) of the respondents for phase 3 were in the age group 20 to 30 years old (Table 4.8) and this was followed by 33.3% the 30 to 40 age group and the remaining groups only contributed to 2.9 % .

Table 4.8: Third phase: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 3	Phase 3	Phase 3	Phase 3
Valid	Less than 20	-	-	-	-
	20 to 30	124	64.6	64.6	64.6
	30 to 40	64	33.3	33.3	97.9
	40 to 50	2	1.0	1.0	99.0
	Over 50	2	1.0	1.0	100.0
	Total	192	100.0	100.0	

As in the first phase, the respondents for this phase were also very familiar with Internet use (Table 4.9), since 179 of them (93.8 %) reported to use and be connected to the Internet daily. Meanwhile, the rest of the respondents were connected a least once a week. They were not only familiar with the Internet

technology but they also had enough experience in carrying EC transaction. 73 of the respondents (38 %) had experience with EC more than 4 times, 66 of the respondents (34.4%) had carried out between two and four transactions and 13 of the respondent (6.8 %) had carried out one transaction. However, the number of respondent that never had any experience with EC in this phase was 40 respondents (20.8%) which was higher compared to the first phase (Table 4.10).

Table 4.9: Third phase: Frequencies of Internet Use

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase 3	Phase 3	Phase 3	Phase 3
Valid	at least once a week	13	6.8	6.8	6.8
	at least once a day	179	93.2	93.2	100.0

Table 4.10 : Third phase: Experience in online shopping

		Frequency	Percent	Valid Percent	Cumulative Percent
		Phase3	Phase3	Phase3	Phase3
Valid	Never shopped online	40	20.8	20.8	20.8
	Once only	13	6.8	6.8	27.6
	2 to 4 times	66	34.4	34.4	62.0
	More than 4 times	73	38.0	38.0	100.0
	Total	192	100.0	100.0	

4.4. First Phase Result: Regression Analysis

When the output of the questionnaire in phase one was subjected to a linear regression analysis to determine what percentage of the variable trust factors projected by the merchant trust information model, the following findings were elicited. By considering all merchant trust information factors (Constant = Trust, PO = Policy, AF = Affiliation, FU = Fulfillment, EX = Existence) to be included in the model, the following model summary was constructed.

Table 4.11: Merchant trust information requirement : Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.564(a)	.318	.304	.43403

a Predictors: (Constant), PO, AF, FU, EX

Based on Table 4.11, the proposed merchant trust information model can explain only part of the overall trust model (32 %). When a detailed analysis was carried out to determine what percentage of each merchant trust information factor to explain the overall model, a stepwise linear regression was used and the result is reported in Table 4.12

Table 4.12 Merchant trust information requirement (Individual factor) - Regression model summary stepwise method

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.495(a)	.245	.241	.45308
2	.550(b)	.303	.296	.43649
3	.563(c)	.317	.307	.43307

a Predictors: (Constant), PO
b Predictors: (Constant), PO, AF
c Predictors: (Constant), PO, AF, FU

Based on Table 4.12 information about policy factors contribute the most towards the establishment of trust in EC. In the first step of the model, PO (policy) contributed up to 24.5% of overall variance in the model with a significance level of 0.01. This was followed by affiliation (AF) and FU (Fulfillment) factors which form the final contribution towards the establishment of trust of up to 31.7% with a significance level of 0.01. The only component factor which was excluded through regression modeling by stepwise method from the original proposed framework was the existence factor.

4.5. First Phase Result: Correlation Analysis

Correlation analysis was also carried out in order to describe the degree to which one variable is linearly correlated to another (Salkind, 2006). At this stage of analysis, each merchant trust information factor was paired with trust factor in order to know whether each of them had a significant correlation with trust factor. The summary of the analysis is presented in Table 4.13.

Table 4.13 : Correlations of trust and each trust factors.

	TR	EX	FU	AF	PO
Pearson Correlation	1	.445(**)	.460(**)	.456(**)	.495(**)
Sig. (2-tailed)	.	.000	.000	.000	.000
N	195	195	195	195	195

** Correlation is significant at the 0.01 level (2-tailed).

Based on Table 4.13, all factors (EX,FU,AF,PO) had a significant positive relationship with trust ($r = .445, .460, .456, .495$ at $p < 0.01$). The consumer should be able to use the information about existence, fulfillment, affiliation and policy in creating trustworthy feeling toward the online merchants. Therefore, by acquiring information about these four factors from the merchant website, the consumers have the basis to establish their initial trust towards merchants.

Further discussion on the output of this phase will be carried out in the next chapter together with discussions on the third phase output. The next section of this thesis will present the output of the second phase of the research where rules of extraction and retrieval for information needed to established information for merchant trust framework.

4.6. Second Phase Result: Establishing Extraction Rules

When trying to extract existence factor items, the researcher took into account the information that preceded the item, the structure of the item and the information that may follow the item. Each extraction rule comprised a ***precede_expression***, a

valid ***structure*** of the item and a ***follow_expression***. A ***precede_expression*** is an expression we expect to find before the item; and a ***follow_expression*** is an expression that the system expects to find after the item. An extraction rule has this format:

extraction_rule = precede_expression, item__structure, follow-expression

In the following subsections, for each item, a set of precede_expressions, a set of item_structures and a set of follow_expressions are defined.

4.6.1. The Telephone Number Rules

From the sample studied, the common expressions found to precede a telephone number were:

TPList = [By Phone, by phone,
Call, call, Call 24 hours a day,
Call us, call us,
Call us at, Call us at:,
Call us on, call us on:,
Call Toll Free, call toll free,
Call sales at, Call sales at:,
Phone, Phone:, phone, phone:,
Telephone, Telephone:,
Telephone Number, Telephone Number:,
Toll free, Toll Free:, toll free, toll free:, Toll Free Order
]

A telephone number may have many formats on a company's website. Its simplest form is a string of digits. The length of the string varies from one country to another. The country code is also used on some websites which makes it difficult to rely on the length of the phone number. The country code is sometimes written within brackets. On some websites, period (.) and dashes (-) are used to separate groups of digits such as 800.123.3456 or 800-123-5678. To make the phone number easy to remember, some organisations write it using characters. For example, varsitybooks.com which sells books has its phone number written as 1.800.VAR.BOOK. Modern telephone hand sets have a letter associated with each key digit. This phone number previously would have been read as

1.800.827.2665. Based on these findings, the rules used for defining the structure of a telephone number were:

telephone_number = numeric_value
telephone_number = telephone_number, {.telephone_number}
telephone_number = telephone_number, {-telephone_number}
telephone_number = (telephone_number), telephone_number
telephone_number = (telephone_number), char_value

The researcher did not associate any length to the numeric value. However, when the information was extracted, the telephone number was stored as a string of digits only.

In some websites, the telephone number was followed by the expression given in the TFList.

```
TFList =[       Mail Order,
                Outside US      ]
```

4.6.2. The Fax Number Rules

The fax number was extracted using rules similar to those defined for a telephone number. The common expressions that preceded a fax number were:

```
FPList = [      By fax, By Fax, by fax, By Fax:,
                Fax, Fax:, fax, fax:,
                Fax 24 hours a day:,
                Fax on demand,
                our fax number is:]
```

There were fewer problems with the fax number as all of them used a string of digits. However, to be on the safe side, the researcher used the same rules as the phone number. It was also found that some fax numbers are followed by some expressions. These are given in the FFList list.

```
FFList = [      Fax US,
                Fax outside US ]
```

4.6.3. The Address Rules

The address part of the existence factor represents the physical location of the company. Some companies only exist in the virtual world, while others have both physical stores and internet presence. In the latter category of companies, most websites lead the customer to their physical stores through a list of stores or a search engine where the customer can find the nearest store by a town name and or a post code (zip code) search. Although for EC model, this information is important, it is not for the current work which represents an information extraction system; this information was ignored and not used in the extraction process. All the store locations return address is either based in the United States or in the United Kingdom. Hence, only addresses from these two countries were considered in the rules formulation. The following are the common expressions found to precede a postal address:

APList = [About Us, About Us:, about us, aboutus:,
Address, By Mail, by mail, By Mail:, by mail:,
By regular mail, Contact Us, contact us,
Headquarters, Mailing, Mailing Address, mailing address:,
Mailing address for return, Our address is:
Return Instructions:, Send a request to:,
Store location:, Warehouse, Write Us, write us,
WriteUs:, write us:, You can write us at:, you can write us at]

The structures of US addresses have two formats depending on whether they are physical address or postal box (Po. Box) addresses. A US address has the following format:

Organisation name, (numeric value/PO Box, numeric value),
String, numeric value (5)

A bracketed number that follows a numeric value indicates its length. The researcher expects the value of string to contain words such as Street, Avenue, Square, etc. The last numeric value indicates the post code or zip as it is called in the US.

A UK address has a similar structure except that the post code is not all numeric. It is a combination of characters and digits. A general format of a UK post code is:

CCDD DCC where D is a digit and C a character.

There are no common expressions following a postal address.

4.7. Extraction Rules Formulation

The information that is to be extracted will not be represented by web pages or the link between the web pages. They represent a small part of text embedded in the pages. Rules used for the information extraction process were formulated using Horn clauses similar to (Craven, *et. al* .,1998). Only the rules for the telephone number are illustrated as the rules for extracting other existence items are similar.

```
telephone ( String ) :-  before (String, String1),
                         member(String1,TPList),
                         tstructure(String1),
                         after(string, String2),
                         member(String2,TFList).
telephone ( String ) :-  before(String, String1),
                         member(string1,TPList),
                         tstructure(String1).
telephone ( String ) :-  tstructure(string1),
                         after(String, String2),
                         member(string2,TFList)
                         telephone ( String ) : tstructure(string).
```

Where

before (String1, String2) : means String2 appears just before String1 in the text.
after (String1, Sttring2) : means String2 appears just after String1 in the text.
tstructure (String) : means that String has the structure of a telephone string.
member (X, List) : is the usual membership relation where X is member of the list List.

4.8. Establishing Retrieval Rules

Websites contain a collection of hypertext documents. A hypertext document is typically composed of nodes and links. The nodes are the document part and the links are the relationship between the documents. A node contains the information

and the link allows the navigation process of the overall documents in the hypertext collection. A link $\lambda(n_1,n_2)$ therefore represents a connection between the source node n_1 and the destination node n_2 (Frei and Stieger, 1992). Thus, a hypertext document is better represented as a directed graph. Furthermore, the researcher distinguished two types of links (Frei and Schuble, 1991), referential and semantic links. Referential link is used for a improved organisation and easy reading of a document. However, the purpose of semantic link is to provide more details and additional or similar information about specific topics. Any content-specific retrieval system should consider both nodes and semantic links. A semantic link is a link that can be indexed by one or more words from a predefined set of key words. This restrictive view of semantic link is used to target primarily those links that have a high probability of containing the information sought by the system. Hence, improving the overall search time of the extraction process as a single node may contain hundred of links.

In addition to the source node and destination node already associated with a link, the researcher also associated a list of indices for each link. Furthermore, semantic links were divided into three subtypes depending on how they appear on the node and the nature of the destination node. The link name can appear as a simple text or represented by an image. The target node can be a static HTML node or dynamic node (the result of querying a database). The prototype tool does not deal with extracting information from images and needs therefore to understand the URL of the target node. The following are some types of semantic links:

```
<A HREF="http://www.1bst.com/res_comp.asp?scat=CP&mid=6">
Computers and Internet</A>

<A HREF="http://www.1bst.com/xt\_add.asp?"><IMG SRC="/cart.gif"
ALT="—" BORDER="0" WIRTH="34" HEIGHT="40"></A>

<A HREF= "http://www.1bst.com/book1.html">A Dog Lover's
Collection</A>
```

The indexation process starts with the tokenisation of the link name and target URL. Each token was then compared to a predefined list of indices. If the link

name was textual, indexing of both link name and target URL was done, however; if the link is an image, only the target URL was indexed.Once again, using the list of the first 50 websites selected, the following indices were extracted given in the list NameIndexList and URLIndex name below. No differentiation was made between the three existing items (address, telephone and fax) as most indices are common to all of them.

A link whose NameIndexList or UrlIndex Name is not empty is considered as a semantic link. Others were considered as referential links. During navigation, only semantic nodes were used.

NameIndexList = [About xxx, About Us, Company Info, Company Information, Contact Us, Customer Service, Customer Support, FAQ, Help, Location, Private Policy, Policies, Privacy Statement]

UrlIndexList = [about, aboutus, companyInfo, contact, contactus, contact_us, customerservicemain, customer_service, CustomerService, customer_support, cservice, faq_page, ftr_contact, help, info, sevice, location, policies, privacy]

Using the same method as described above, similar rules have also been used to establish retrieval rules for other factors and these are the NameIndexList and UrlIndexList for other factors that are important for merchant trust information framework suggested in this thesis.

The payment factor

NameIndexList = [help, support, about, policy, policies, Contact, info, customerService]

UrlIndexList = [payment, Payment, pmnt, pay, order]

The shipping factor

NameIndexList = [help, policy, policies,]

UrlIndexList = [Shipping, ship]

The affiliation factor

NameIndexList = [policy, policies, privacy]

UrlIndexList = [Verisign, Bizreate, Bbbonline, Scanalert, dealtime, Resellerating, Aol, Gomez, Safeshoppingnetwork, Eponions, PubliceyeForbes]

The tracking factor

NameIndexList = [order, status]

UrlIndexList = [tracking, ordersearch, orderstatus, ordertrack, =ot, SubmittedOrder, ordstat, orderlookup, shopper_lookup, prevorder, fedex, Ups, order_history, track_order, orderStatus, track]

The privacy factor

NameIndexList = [policy, policies]

UrlIndexList = [Privacy]

The customer comment factor

NameIndexList = [policy, help, info, about]

UrlIndexList = [bizreate, pricegrabber, testimonial, epionion]

The refund factor

NameIndexList = [about, return, policies, service, support, help, info, about, term]

UrlIndexList = [return, term, ship,]**

** By using UrlIndexList, the search produced high recall but low precision, therefore a keyword (RMA, RMA#, RA) search inside all links produced by UrlIndexList was used to improve this situation.

4.9. The Retrieval Rules Formulation

The retrieval process can be summarised as follows:

```
retrieve (page, existence_item)
        { apply retrieval rules to page
                if existence item found
                return item
                else
                { extract all links in the current  page
                        index all links in current page
                        let S be the set semantic links
                        for each link ks in S
                        retrieve (ks, existence_item)
                        return extract
                }
                return "not found"
        }
```

The same retrieval formulations are also being established for other item factors identified in this research.

4.10. Third Phase: Descriptive Analysis

The proposed merchants trust information framework was not only tested through a set of questionnaires in the first phase but was also tested through experimental work. As was described in the methodology section, a tool was developed to be used to test the importance of each of the factors used in the framework. The following section presents the results from the third phase experiment. Based on Table 4.14, the mean value for overall merchant trust factors is led by Policy factors (7.4046 ± 0.45590) followed by Endorsement factors (7.0938± 0.56135), Existence Factor (7.0690± 0.50273) and finally by Fulfillment Factor (6.9802 ± 0.46739). The importance of this result will be discussed in next chapter specifically in section 5.2.

Table 4.14 Descriptive: Overall merchant trust factors

	N	Minimum	Maximum	Mean	Std. Deviation
Existence	192	5.50	8.33	6.9802	.46739
Policy	192	5.83	9.00	7.4046	.45590
Fulfillment	192	6.00	9.00	7.0690	.50273
Endorsement	192	4.75	8.25	7.0938	.56135
Valid N	192				

4.11. Analysis for Each Individual Factor

The contribution of each individual item towards the establishment of the four factors used in this model is discussed more elaborately in the following subsections.

4.11.1. Existence

The first trust factor was developed based on the physical address, telephone number and fax number items. Table 4.15 shows the descriptive analysis for each item that form the overall existence construct. The results show that address scores the highest mean with 7.5859 (± .84019) followed by telephone with 7.4141 (± .73196) and fax with the means score of 6.1849 (± .81120).

Table 4.15 : Detailed items for existence factors

	N	Minimum	Maximum	Mean	Std. Deviation
Address (EX)	192	4.50	9.00	7.5859	.84019
Telephone (EX)	192	5.00	9.00	7.4141	.73196
Fax (EX)	192	4.00	8.50	6.1849	.81120

4.11.2. Policy

The second trust factor was also developed based on three items (Table 4.16). They are privacy, refund and payment policies. Out of these three policies, privacy policy (mean score is 7.7578 ± .69962) was viewed as the most important policy followed by refund policy (means score is 7.3411 ± .65883) and payment policy (mean score is 7.1146 ± .76569).

Table 4.16: Detailed items for policy factors

	N	Minimum	Maximum	Mean	Std. Deviation
Privacy (PO)	192	5.50	9.00	7.7578	.69962
Refund (PO)	192	5.50	9.00	7.3411	.65883
Payment (PO)	192	4.50	9.00	7.1146	.76569

4.11.3. Endorsement

When dealing with digital entities in a cyber community, the element of trust can be nurtured by having somebody who knows the merchant to provide endorsement. The third trust factor in this research is built on the two items as described in Table 4.17. The results show that customers comments scored 7.4870 ± .69296, compared to third party certification which only scored 7.2240 ± .76189 which was based on the third phase respondents. Customer comments carry more weight compared to third party certification.

Table 4.17: Detailed Items for Endorsement Factors

	N	Minimum	Maximum	Mean	Std. Deviation
Customer comments (AF)	192	5.50	9.00	7.4870	.69296
ThirdParty (AF)	192	4.50	9.00	7.2240	.76189

4.11.4. Fulfillment

Consumers are also concerned about the capability of the online merchant to fulfill their obligations in delivering the product that they buy from online merchants. The two items that were used to form fulfillment factors were delivery and tracking and the descriptive analysis on these two items are given in Table 4.18. Delivery with a mean score of 6.9766 ± .68509 scored slightly higher then tracking with mean score of 6.8516 ± .90235.

Table 4.18 : Detailed elements for fulfillment factors

	N	Minimum	Maximum	Mean	Std. Deviation
Delivery (FU)	192	5.00	9.00	6.9766	.68509
Tracking (FU)	192	3.50	9.00	6.8516	.90235

Chapter 5

Discussions and Conclusions

EC as iterated in this thesis is a virtual business arrangement, where merchants place their business setting in the virtual world through web technology. This business setting can be transferred throughout the world in a few seconds and be visited by consumers anywhere, anytime from the comfort of their own places. However, as specified by this research focus, EC could only become a success if the general public can place their trust on this virtual business channel.

Since consumers are the initiators for transaction especially in the B2C segment, creating trust towards merchants is very crucial. Due to the nature of EC operations which take place in the digital world, the creation of merchant trust mostly depends on the information provided on the merchant websites. Thus, the primary purpose of this thesis is to answer the question of what is the information that needs to be included in the merchant website in order to create merchant trust while consumers are online doing their window-shopping on a particular merchant website.

5.1 Compatibility Demographic Analysis between First Phase and Third Phase.

There are several demographic factors that need to be analyzed due to the involvement of different group of respondents used in the first and third phase. The researcher believes that this shifting of potential respondents from

international to all Malaysia respondents has minimal effect on the overall conclusion for this research. A test of Independent - Sample T test on the perceived trust (Malaysian and non-Malaysian) proved that these two groups of respondents are not significantly different from each other as shown in Table 5.1 where the value of t-test significant is 0.565 which is far than the acceptable level of 0.001.

Table 5.1 t-test between Malaysian and Non-Malaysian with trust.

Country	N	Mean	Std. Deviation	Significant
Malaysian	158	3.4968	.54079	.565
Non-Malaysian	37	3.4414	.47826	

In terms of gender participation (Table 5.2), both phases attracted nearly equal participation from female and male respondents. Based on previous research, it is quite normal for Internet related research that uses university population to result in nearly equal participation from both genders.

Table 5.2: Comparison of phase 1 vs. phase 3: Gender

		Frequency		Percent		Valid Percent		Cumulative Percent	
		Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3
Valid	Female	92	82	47.2	42.7	47.2	42.7	47.2	42.7
	Male	103	110	52.8	57.3	52.8	57.3	100.0	100.0
	Total	195	192	100.0	100.0	100.0	100.0		

Meanwhile, in terms of age distribution, the respondents were mostly young people. More than 50% of respondents from phase one and three were under 30 years of age. This distribution of age is also common in Internet based research as confirmed by other studies (GUV, 1988; Noteberg, 1999). However, based on table 5.3, phase one was more widely distributed compared to the respondents in the third phase. This was due to the availability of the instruments to potential respondents. In phase one, the instrument was available to a wide range of potential respondents while in the third phase, the respondents were limited to

Universiti Utara Malaysia students only. Most of the respondents were in the age range of between 20 to 40 years (82 % in phase 1 and 97% in phase 3). A close examination revealed that age range 20 to 30 years was more dominant in phase three than in phase one.

However, as stated above, further analysis using Independent – Sample T test between these two groups (20 to 30 and 30 to 40) revealed that their responses towards the instruments in phase one is not significantly different (Table 5.4). This conclusion is based on the value of t-test significant of p=0.613 which is more than the acceptable level of 0.001. Due to this finding, the researcher believed that the selection of respondents in the third phase had minimal effect on the overall conclusion.

Table 5.3: Comparison of phase 1 vs. phase 3: Age

		Frequency		Percent		Valid Percent		Cumulative Percent	
		Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3
Valid	Less than 20	1	-	.5	-	.5	-	.5	-
	20 to 30	83	124	42.6	64.6	42.6	64.6	43.1	64.6
	30 to 40	78	64	40.0	33.3	40.0	33.3	83.1	97.9
	40 to 50	32	2	16.4	1.0	16.4	1.0	99.5	99.0
	Over 50	1	2	.5	1.0	.5	1.0	100.0	100.0
	Total	195	192	100.0	100.0	100.0	100.0		

Table 5.4: t-test between group age 20-30 and 30-40 with trust

Group age	N	Mean	Std. Deviation	Significant
20-30	83	3.5542	.58151	.613
30-40	78	3.3974	.53400	

Pertaining to respondents' use of Internet in both phases, almost all of them were online everyday (more than 95 %) and the others accessed the Internet once a week (Table 5.5). This pattern of Internet accessibility can indirectly show that respondents were comfortable with the technology and could access the Internet quite easily. This consideration is very important in this research in order to

minimize the effect of technological trust factor to interfere with the overall conclusion. Most of the respondents have shopped online previously (Table 5.6). From both phases, nearly 80 % had the experience of online transaction with 38 % having had the experience more than four times and 30 % having had the experience of between two to four times. In other words, most of the respondents did have some kind of experience and were familiar with the online transaction environment.

Table 5.5: Comparison of phase 1 vs. phase 3: Frequencies of Internet use.

		Frequency		Percent		Valid Percent		Cumulative Percent	
		Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3
Valid	at least once a week	4	13	2.1	6.8	2.1	6.8	2.1	6.8
	at least once a day	191	179	97.9	93.2	97.9	93.2	100.0	100.0

Table 5.6 : Comparison of phase 1 vs. phase 3: Experience in online shopping

		Frequency		Percent		Valid Percent		Cumulative Percent	
		Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3	Phase 1	Phase 3
Valid	Never shopped online	37	40	19.0	20.8	19.0	20.8	19.0	20.8
	Once only	22	13	11.3	6.8	11.3	6.8	30.3	27.6
	2 to 4 times	59	66	30.3	34.4	30.3	34.4	60.5	62.0
	More than 4 times	77	73	39.5	38.0	39.5	38.0	100.0	100.0
	Total	195	192	100.0	100.0	100.0	100.0		

5.2. Discussion on First Phase and Third Phase Result

As presented in the previous chapter, regression modeling has been carried out in determining the influence of the merchant trust information model on the creation of trust in EC transaction. The proposed merchant trust information model can only influences part of trust creation in EC transaction. Even though this percentage is considered to be low but it is expected since the trust model constitutes a bigger picture which focused on the information requirement which was covered in this research. If this finding is compared to the model suggested

by other researchers such as Matthew and Turban (2001), Chung, Lee and Matthew (2000) and Tan and Thoen (2000), the findings are consistent with their model. According to them, creating trust for EC transaction requires more than only providing information as suggested in the model. Constructs like technology, contextual factors, law and regulation as well as individual propensity of trust will influence the formation of trust in virtual environment. In addition, previous relationship experience can be very important in establishing trust.

When a detailed analysis was carried out in order to determine what percentage of each merchant trust information factor can explain the overall model by using a stepwise linear regression, an existence factor has been excluded from the model (Table 4.12).The fact that the existence factor made up only less than one percent contribution towards the explanation of the model can be attributed to several reasons. First, one of the main reasons for the proliferation of EC is the ability of the Internet to create a cyber word as a platform for the existence of EC. They do not depend on the real world existence or brick and mortar form. Therefore, the information about real world existence is to be perceived as not important to create trust in EC especially for those who are familiar with the virtual environment. Second, based on the demographic information, 70 % of the respondents were repeating online customers. One of the assumptions that can be made is that they may not have any problems with their previous purchases. If not, they would not have repeated their online purchase. Since most of the respondents had gone through positive experience in dealing with these virtual organizations, their response to the question on the real world existence factors was less important in order to create trust towards merchants from customers. A different situation might arise when the respondents are being asked about real existence if they have faced setbacks with online merchants.

The other reason that might influence this result is multicollinearity problem between existence factor and other factors. This problem might happen between existence factor and policy factor and third party certification factor. Information about existence can be assumed as being available in policy factor such as return

policy or payment policy. In this policy, the information about existence factor such as address and telephone numbers is made available to the consumer. In addition, there are also third party certifications that provide the service of confirmation on the existence of the online merchants. These merchants may not have a specific address or telephone number but they really exist in the virtual world and are able to fulfill any online transactions.

Comparing the result from the regression analysis through stepwise method and correlation analysis, it seemed that the results were in conflict with each other. However, a closer examination revealed the reasons for this difference. Based on the regression analysis with stepwise method, the existence factor was excluded from the model due to its small contribution in explaining the overall model. In other words, when all factors are being considered, existence factor becomes insignificant in the overall regression model. However, if the existence factor alone is considered and its correlation with trust factor is tested, it still has some significant correlation at .445 with 0.01 significance (2 tailed). The reasons for this have been explained above.

This finding is supported by the findings in the third phase where information about policy was identified as the first factor to create trust towards merchants and information about existence as the last factor. However there are some differences in terms of information about fulfillment and affiliation. In the first phase, fulfillment was identified as being the greater influence when compared to affiliation while in the third phase, this sequence is in reverse. However, if more attention is given to the detailed results, the mean differences between these two factors in the third phase is only 0.0248 (7.0938 – 7.0690). Therefore, a conclusion can be made that the findings from phase one and phase three are in tandem.

5.2.1. Policy

Other detail results in the third phase also merits further interesting discussion. For the policy factor, privacy scores the highest mean (7.7578 ± 0.69962) followed by refund policy (7.3411 ± 0.65883) and payment policy (7.1146 ± 0.76569). This finding is well supported by other research findings where privacy has been a major concern relating to the trust creation especially in EC transaction. Meanwhile, information available in refund and payment policy were well acknowledged to be very important in creating trust in electronic environment.

Within a virtual environment, policies such as refund policy, customer satisfaction policy and guarantee policy can help consumers to evaluate the trustworthiness of a merchant (Malhotra *et al.*, 2004). Consumer satisfaction policy and guarantee policy are very important since they can influence the level of risk involved in the transaction. Policy such as "money back guarantee" can lower the consumers' risk by giving more control to users towards the output of the transaction since they can return the product without total loss if they are not satisfied with the quality. In addition, information about payment policy is also important to the customer. They usually prefer a policy that will put them always in control while completing the EC transaction. They will usually prefer a method of payment where they are in control of canceling the payment for unfulfilled transactions. Paying by cash by depositing the money to the merchant account is least preferred since the consumers lose control over the money once it is deposited to the merchants' accounts. Paying by cheque or credit card can give some control and security to the consumers since they still can cancel the cheque or credit card payment. A preferably escrow method will give more security to both parties.

Privacy policy was viewed as very important since it provides consumers with the details on how the online merchants will handle the consumers' data that has been collected (Adams and Sasse, 2001). The issue of credit card fraud and unsolicited

mail either online or offline make consumers take more cautious steps before they enter their personal information online.

Meanwhile, ordering especially products that cannot be checked and touched can cause concern about the actual quality and standard when the product is actually delivered. Therefore, return policy was very important to ensure any hassle related to returning products and their charges can be anticipated early. The consumer can read and calculate the risk involved if they receive low quality or sub-standard products and the cost associated with returning the products. Payment policy was the last item under the policy factors. The respondent also rated this policy as very important. From the payment policy, the consumer should be able to get information about method of payment that the online merchant can accept for the intended transaction. By knowing the payment policy, the consumer can choose to use the less risky method. The use of credit cards or escrow service can help online customers to reduce the risk of losing their money for nothing.

5.2.2. Fulfillment

With regards to fulfillment factor, information on how the merchant will deliver the products, and how the customer can track their delivery progress are important in creating trust toward EC merchant. The delivery scored a mean of 6.9766 ± 0.68509 and tracking scored a mean of 6.8516 ± 0.90235. The ability to perform expected tasks for other parties is a basic definition of fulfillment for trust relationship between two parties in this thesis. Therefore, it is important for merchant websites to communicate their ability to fulfill their duties to complete the business cycle especially in delivery and tracking the delivered merchandise. Since the cyber world does not provide means of transferring non-digital goods instantaneously, cyber merchants need to give consumers' all information about delivery method. Particularly, information pertaining to delivery progress is also important to develop merchant trust. Consumers need to be informed about the progress of their delivered merchandise.

Information about delivery and tracking capability were viewed as very important but scored less than other items from other factors. The respondent may assume that delivering and tracking capability is not totally dependent on the online merchant. The online merchants are usually sourcing out this function to the courier company such as Federal Express or DHL. It depends on this courier company whether to provide the capability of tracking or not. In addition, online consumers are usually given an option on which courier company the consumers want to choose and are willing to pay since most of the time, the courier charges are not included in the products' price. In short, delivery progress is an important factor that must be assured and protect by the merchant to instill trust worthiness and accountability on their part towards the purchase made and customers.

5.2.3. Affiliation

Affiliation needs to be included because a strong trust relationship can usually be established between two parties if developed through direct experience. However, for new users, recommended trust can be used to establish an initial trust relationship which can be created based on another party's recommendation. The influences of affiliation, for example will become more significant especially to unknown merchants where the perceived risk is higher than well-known merchants like Amazon.com. For the affiliation factor, the respondents gave higher weightage to other customer comments (7.4870 ± 0.69269) compared to the agencies of third party certification (7.2240 ± 0.76189). The consumers believe that the previous customer experience is more important than the pre-endorsement of third party certification provider in generating trust toward the merchants.

Previous customer comments are viewed as very significant in this matter. As suggested by Cheskin Research (1999), past experience with a particular online merchant can be a very strong factor for creating digital trust among online customers. If personal previous experience is not available, other peoples'

previous experience can also be used to a certain extent for this purpose. Experience from other online consumers can be reliable if they are collected by an independent party and are managed properly.

The second item that forms the affiliation factor is the third party certification or third party endorser (Mahadevan and Venkatesh, 2000). This type of endorsement can vary from basic existence endorsement to policy endorsement as well as technical competency endorsement. This endorsement can come from the government, private or business community initiatives and their endorsement comes with certain charges or terms that can be viewed as a penalty to the online merchants if they fail to comply with the endorsement terms and references. Both parties, endorser and online merchant will always try to avoid breaking the terms and references in order to build and maintain their reputation as endorser and online merchant as well as maintain their business existence.

5.2.4. Existence

For the existence factor, address (7.5859 ± 0.84019) and telephone (7.4141 ± 0.73196) score a very high mean compared to the fax number (6.1849 ± 0.81120). The information about merchant real existence is not only vital in virtual world but also in a real world because such information support the building of trust creation process. Existence is important since trust is a relationship between two or more parties. Therefore, in a trust relationship, the existence of the parties involved needs to be first established before trust can be developed between them. Existence becomes less important when they already had an experience dealing with each other.

These items were chosen in order to give consumers control to initiate communication between the parties involved. By giving this control, consumers who have any doubts about the merchant's existence can use this information to reconfirm their doubts. As pointed out by the third phase experiment results, these three items were viewed as very important towards establishing trust. Address is

viewed as the most important factor, followed by telephone number and the fax number. The address can bring the element of virtuality to real world of the online merchant. The address can point out the exact location of online merchants in the real world if available. The consumer can verify by sending letters to the online merchant especially when the transaction involves a big sum of money. Combined with telephone numbers, the consumer has better options to check the actual existence of the online merchant. The phone number can be cross checked with the phone book if it is available or be verified by calling the number itself. The ability to check the merchant's actual existence will ensure any problems at a later stage of transaction which could be resolved amicably. Another important information that can be used to check the real existence of online merchants is their fax number. Having more means of communication with online merchants should give more control and confidence to the consumer to do transaction with that particular online merchant.

As a conclusion, among the four constructs that were included, policy is the most influential construct followed very closely by third party certification and fulfillment. The least influential but still significant is existence. Similar results were also found in the third phase where policy is still the most important factor followed by the other two constructs, fulfillment and affiliation and lastly by existence.

5.3. Discussion on Second Phase Result: System Evaluation

In this section, we discuss the results of the first prototype of an information extraction system that was developed to support a trust model in EC. Table 5.7 summarizes the performance of the system in terms of precision and recall with regards to the extracted information.

Once the extraction and navigation rules have been defined and implemented, a processes similar to that described in section 3.3.2.1 was used to select another set of 50 commercial websites for the evaluation of the system. The websites were

visited manually to get the actual number of websites which contains each factor used in the framework (second column). After that, the prototype is used to find out the number of websites where the information required are managed to be extracted (third column) which will give the percentage of recall (fourth column). The information being extracted then is being compared with the actual information to get the number for correct recall (fifth column) which will be translated to precision percentage (sixth column).

Table 5.7: System evaluation based on recall and precision

	Actual	Extracted	Recall %	Correct Recall	Precision %
Telephone number	45	33	73	25	75
Fax Number	25	16	64	11	68
Address	29	18	62	12	66
Customer Comment	35	30	85	29	96
Privacy Policy	45	38	84	38	100
Refund Policy	27	15	56	14	93
Affiliation	38	35	92	34	97
Tracking	31	25	80	20	80
Shipping	38	21	55	20	95
Payment	38	18	47	15	83

Based on Table 5.7, the overall performance of the prototype is still having a lot of space for improvement. A well define link for factors such as affiliation (92%) , customer comments (85 %) and privacy statement (84 %) get the highest percentage for recall as well as precision. Among the reasons that contributed to this high percentage is the textual representation of these information and having a consistent name or description for their semantic link. While the others may use inconsistent name for their semantic link or use graphical representation which is not being recognize by the prototype. However other factors which score low precision are payment (47 %) where most website uses a picture of credit card without any meaningful phrase in the link and shipping (55 %) where most websites only use graphical representation of the agent that the online merchant used such as DHL or Federal Express.

Although the precision is not high at this stage, it is believed that it can be improved with a larger sample size. The efficiency of the system will surely improve if more techniques are used. The researcher learned that when it comes to WWW, the information is not always in the textual form. Many websites use images to convey information. It is worthwhile to include a module to extract information from images in future implementations of the system. This is something that will improve the overall search and extraction time. The second aspect that needs to be improved is the indexing process of the links. For the moment, the same weight is given for all the links' indices. A better approach would be to weight (using ranking) these indices and start with the links that have the most significant index. This significance will depend largely on the type of information being extracted. Different extraction modules need different weights for indices. For example the weight should be used differently to look for a telephone number or an address.

5.3.1. The Extraction System

An experiment was also conducted to localise the level where the information was extracted. This experiment is important as the researcher felt the need to know the exact place where the information is stored to improve the efficiency of the system (Table 5.8). It was assumed that the home page (the page that was accessed when using the website's URL) is referred as level 1. It was noted here that sometimes the information is available earlier than the level where it was extracted. This was particularly true for those websites that display the information as an image at level one and then the information is repeated textually at another level. Searching for information should start at the homepage (level 1) and if the user need to click the link available in level 1 in order to go to the next page then this next page will be referred to as level 2. The number of levels will increase based on the links available at each level. The researcher noticed that the prototype will become very slow if the information is located beyond level 3. This

experiment has shown that in general, if the information was not found after searching at level 3, then it is more likely that the information is not present at all. There was only one case where the address was extracted at level 4. Such findings would surely influence the implementation of the system in term of how far the prototype will tray to search the information in websites. The researcher believes that a larger sample is needed to have a better understanding about the localisation of the information before making any changes to the current implementation of the system.

Based on the table 5.8, most of the information is available at level 1 or level 2 and some at level 3. Important factors for trust creation such as privacy policy and affiliation and customer comments are usually available at level 1. However, this research shows that not all information regarding merchant trust information framework are available in level 1 or level 2. Sometimes, this important information are available at level 3 which requires consumers to navigate deep into the website. Therefore, all important information suggested in the framework should be available at level 1 or 2 only. This will help consumers to find this information easily.

Table 5.8 : Extraction Level

	Level 1		Level 2		Level 3		Level 4	
	Total	%	Total	%	Total	%	Total	%
Tel. Number	13	39%	18	55%	2	6%	0	0%
Fax Number	0	0%	12	75%	4	25%	0	0%
Address	1	6%	10	56%	6	33%	1	6%
Customer Comment	16	53%	14	47%	0	0%	0	0%
Privacy Policy	30	79%	7	19%	1	2%	0	0%
Refund Policy	0	0%	8	54%	6	40%	1	6%
Affiliation	33	94%	2	6%	0	0%	0	0%
Tracking	8	32%	15	60%	2	8%	0	0%
Shipping	6	29%	11	52%	4	19%	0	0%
Payment	3	16%	14	78%	1	6%	0	0%

5.4. An Overall Model to Evaluate Merchant Trust

Providing information on EC websites as indicated by the proposed model in this research will be the responsibility of the merchants. This information then will be extracted by the prototype developed for this research. However the real use of this information still depends on the individual consumers themselves. They are the one who will decide which information is most important and which is less important. If certain privacy policy information is available on the merchant websites and is positive (the policy stated clearly on how the information collected from consumers will be handled by the merchant), then the value of 1 can be assigned to that variable, otherwise the value 0 is assigned.

This conclusion is being made since some customer give different weights (importance) to a different information requirement variable. For example, some may find people existence is not important, third party endorsement is fairly important and return policy very important. The system then assigns a weight for each variable. 1 if the variable is judged as important; 0.5 if fairly important and 0 if not important. The model use the following equation to calculate the confidence factor T which is again given as a percentage. If the user has no preferences, then the default values of the weights are 1 for all variables.

$$T = \frac{1}{4}\left(\frac{\sum_{i=1}^{3} E_i w_i}{3} + \frac{\sum_{j=1}^{2} A_j w_j}{2} + \frac{\sum_{k=1}^{2} P_k w_k}{2} + \frac{\sum_{l=1}^{3} F_l w_l}{3} \right)$$

Where:

E_i - Existence, A_j = Affiliation, P_k = Policy, F_l = Fulfillment, w_i = Weight assign

5.5. Limitations

There are several limitations concerning this thesis. The first one is the overall limitation and the second one is the operational limitation. The first overall limitation is about the focus area. The focus of this research is on business to

consumer (B2C) segment of EC. Other segments such as business to business (B2B) or customer to customer (C2C) are beyond the research scope of this thesis. Even though some result from this research can be applied to these segments, extra caution needs to be taken on this limitation. The second overall limitation is on the source of trust. There are many sources of trust that need to be incorporated in the EC environment. They are merchant trust, technology trust, product trust, legal trust and procedural trust. However, in this research, only merchant trust will be considered and the output of this research will reflect this limitation.

Meanwhile for operational limitation, is about the respondents of the research. The respondents of this study relate is relatively small and non-random sample. For the first phase, 232 respondents respond to our questionnaire out of which only 195 were useful. The initial anticipation of attracting enough respondents by placing the questionnaire on the rented server and made available in the Internet twenty hours, seven days a week (24/7) for four months did not materialize. Due to this situation, extra cautious need to be taken before imposing the result of this thesis on the general population. In addition, the sample for the third phase was also small and was only limited to university students. Even though, this sample was justifiable as in the argument in section **3.2.3.4** extra cautious is needed to be taken before transferring and generalizing the findings and result onto the general population.

In addition, the shopping experience in third phase was not based on the real purchasing experience with real money on real products. This setup can influence the evaluation of risk involved toward the merchants. If real money was involved, the assessment of risk may be stringent compared to a role play shopping experience.

Other operational limitation is on the prototype development. While developing a prototype in the second phase, the process of retrieving was based on text only. However, if the representation of information is not in the text form, the prototype

will not be able to retrieve the information. This would lead and affect the level of successful retrieval rate presented in the Table 5.7.

5.6. Implication of Findings on Theoretical and Practical Domain

This research will have an impact on both theoretical and practical domains. In the theoretical domain, the framework has extended the knowledge in the area of information requirement which identified the information that needs to be available on the merchant website and be conveyed to consumers while they are window shopping on merchant websites. Information such as merchant existence, affiliation, policy and fulfillment can generate merchant trust via factors like benevolence, ability and integrity.

Meanwhile in the practical domain, as EC is based in cyber world, this research will contribute significantly towards helping consumers establish trust toward merchants. The framework produced by this research can play an important role in EC website development. The framework will summarize required information needed in EC website development. In addition, the output of the second phase can be used to help consumers to find related trust information in the merchants' websites and show them in a form of a report that can be easily understood by the consumers. This report can help consumer to decide whether to continue their EC activities with that particular merchant or not.

5.7. Conclusion

As increasingly more products and services are sold over the Internet, it becomes all the more important to build up knowledge in EC-specific user interface and user experience design. Whether a website is an extension of a familiar off-line company, or whether it is the only touch point with an unknown company, consumers must be confident that they have significantly more to gain than to lose when entering a transaction. Losses can take the form of frustration, deception, dissemination of confidential information, as well as wasted time and money. The

entire user experience must therefore be designed to induce a positive affective state by strategically addressing consumers' concerns on the issue of developing trust and trustworthiness.

As an overall result, all factors suggested in the framework as being put forward as following hypotheses have an important role in creating merchant trust from consumers' point of view. Therefore, the hypotheses stated in the section **1. 6** are all accepted based on the following discussion.

Based on the findings from phase one and phase three, there are several factors that are suggested constantly as important to form the basis for information requirement for merchant trust framework. Policy factors are considered as the most important factor. Information about privacy policy, refund policy and payment policy can be used to inform consumers how online merchants are protecting consumers' interest when they do transaction with them. There are some small differences in terms of results for the second and third important factors. In the first phase, the second most important factor is *affiliation* while in the third phase; *fulfillment* is the second most important factor. These two factors exchange places with each other between the first and third phase. Last but not least, both phases reveal that *existence* factor is ranked in the fourth place. Even though existence factor has been excluded in the step wise regression method, it still scores a very important rating in the third phase. The existence information factor is important when the consumer wants to physically contact the online merchant.

Based on the above summary, the overall conclusions of this research are:

1. The information about the four constructs; policy, fulfillment, affiliation and existence can be used to create merchant trust from the consumers' point of view.
2. Information about the four constructs included in this research should be available in the merchant website.

3. Consumers should be able to evaluate the trustworthiness of an online merchant by evaluating the risk involved based on the information provided by these four constructs.
4. However, providing information about these four construct is not the only factor that can create merchant trust. Trust theory goes beyond to the technology used in the websites, design of websites, external environment such as law and regulation and previous relationship experience.
5. The prototype developed in the second phase may not be perfect enough to be distributed as a real functioning shopping assistant to consumers at large yet, but it has the merit to be further developed and distributed in order to guide consumers finding the required information for merchant trust creation for online transaction.

The implementation of the prototype in the second phase has made the information searching and retrieval to establish merchant trust much easier. Consumers need to activate the system by running the system and providing the websites address to the system while doing their online shopping. The prototype will then search the information as specified in the framework. The user will be presented with the specific existence information such as address, telephone number and fax number when they are available on the websites. Meanwhile, for the information on the other factors, the user will be given a link to the webpage which contains information such as privacy policy, refund policy or customers' comments. Consumers can read and evaluate the information provided and decide on the level of risk involved in committing trust transaction with that particular online merchant.

5.8. Future research

As it has been mentioned before, the suggested information framework only explains part of the overall trust model. Future research should include other constructs as proposed by other researchers. Although certain relationships between trust and risk are mentioned and included in the initial development of

the research model, no direct relationship between these two was elicited in this research. Therefore, further research can be carried out to look at how information framework suggested can influence the overall level of risk on EC transaction.

In addition, there are also two other problems regarding the information requirement trust model. The first one is the verification process of the information available on the website. It is widely known that some information found on EC websites is not correct. For example it has been reported that many websites used third party certifications illegally (Kasiran and Meziane, 2004), others do have a privacy policy but do not respect it, and there is no guarantee that the comments found on some websites are from genuine customers. We have only kept in our model those variables that can be verified by other objective means such as calling a third party, getting in touch with customers or phoning the company. The second problem is about the process of information search by the consumer. To support this process, we developed an information extraction system. Making this information available to the user without the effort of searching for it, will remind customers about the dangers of EC and hopefully make them think before engaging in a transaction with unknown merchants.

The presented in this research has already being considered and implemented by some commercial organisations. Verisign (www.verisign.co.uk), the well known company that provides third party certification for EC sites with regards to security, is introducing what they label as the new generation of browsers. The browser they are developing is able to recognize if the website being viewed is endorsed by Verisign. This research might be extended as a plug-in to current web browsers running in the background and providing the collected information on users request. However, before attaining this stage, the precision of the current information extraction system needs to be improved. As more and more websites are conveying some information using images, the system needs to be extended by a module able to identify information from images.

Further work can also be carried out to refine the prototype system. The system should be able not only to search text information but also to extract information from graphics elements on the merchant websites. For example for payment option, the refined system should recognise the logo of visa and master cards. The availability of these logos indicates that the online merchants are accepting other means of payment other than cash (through a deposit to a bank account, a common payment method in some Asian countries where credit cards are not available to the general public). The current system can also be developed further as an autonomous shopping agent where it can search automatically the merchant trust information framework whenever the consumers are visiting any EC websites. The agent should have the preference of the user and able to detect the risk involved in dealing with particular online merchant. With these information, the agent should be able to recommend or rate the trustworthiness of the online merchant. Ultimately, the agent should be able to recommend the best online merchants for any product to the consumer. The recommendation is not only considering the trustworthiness of the merchant but can also include other factors such as price, quality or features of the product.

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www.botspot.com [20/4/2002]

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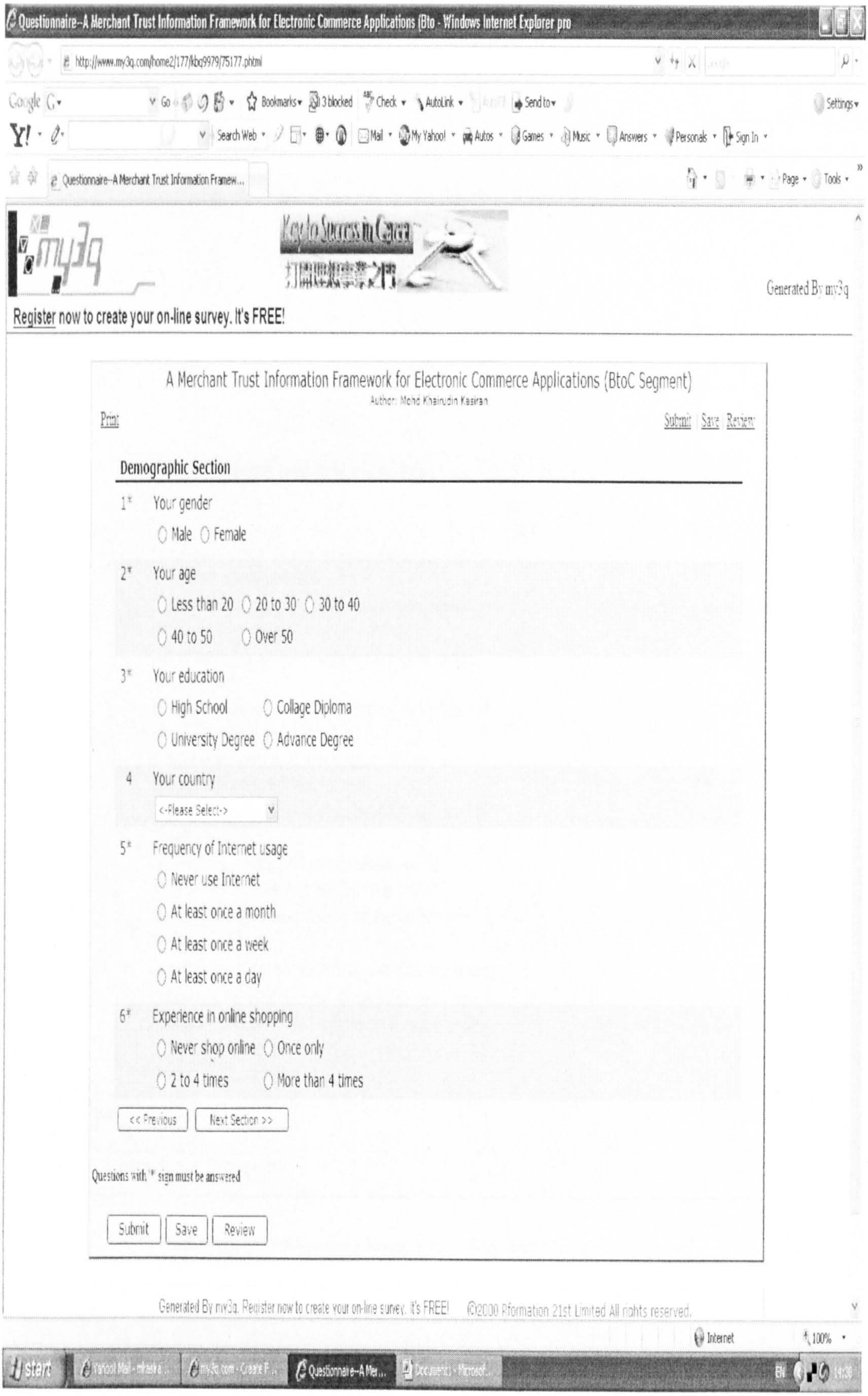
Appendix 1
Snapshots of online questionnaires (Phase 1)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Register now to create your on-line survey. It's FREE!
A Merchant Trust Information Framework for Electronic Commerce Applications (BtoC Segment)
Author: Mohd Khairudin Kasiran
Print
Submit | Save | Review
Demographic Section
1* Your gender
Male Female
2* Your age
Less than 20 20 to 30 30 to 40
40 to 50 Over 50
3* Your education
High School Collage Diploma
University Degree Advance Degree
4 Your country
<-Please Select->
5* Frequency of Internet usage
Never use Internet
At least once a month
At least once a week
At least once a day
6* Experience in online shopping
Never shop online Once only
2 to 4 times More than 4 times
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Generated By my3q. Register now to create your on-line survey. It's FREE! ©2000 Riformation 21st Limited All rights reserved.
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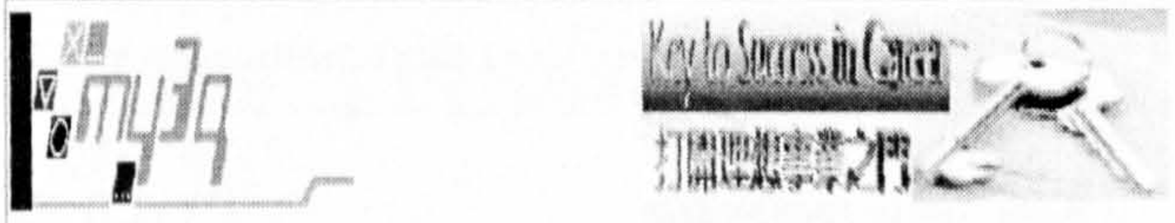

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Register now to create your on-line survey. It's FREE!

A Merchant Trust Information Framework for Electronic Commerce Applications (BtoC Segment)

Author: Mohd Khairudin Kasiran

Print | Submit | Save | Review

Please "click" your responses based on the scale provided.

		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
7*	I sometimes have doubt about the real existence of a business entity behind certain eCommerce websites.	○	○	○	○	○
8*	I believe that it is important for online merchant to convince online shopper of their real existence behihd their websites.	○	○	○	○	○
9*	I will not make a purchase from an online merchant, whose existence cannot be varified.	○	○	○	○	○
10*	Knowing online merchant address (mailling address) are very important to me before making any order from them.	○	○	○	○	○
11*	By having mailing addresses of online merchants, I will have more options to communicate with them if required.	○	○	○	○	○
12*	I assume that all online merchants provide their telephone numbers on their websites.	○	○	○	○	○
13*	I would rather communicate with an online merchant over telephone when I have any problem with my order than using an email.	○	○	○	○	○
14*	Having online merchants' fax numbers will give me more option to communicate with them.	○	○	○	○	○
15*	I sometimes have doubt about the legitimacy of an eCommerce website.	○	○	○	○	○
16*	I believe that it is important for online merchants to be endorsed by independent parties and this should be clearly stated on their websites.	○	○	○	○	○

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Questions with * sign must be answered

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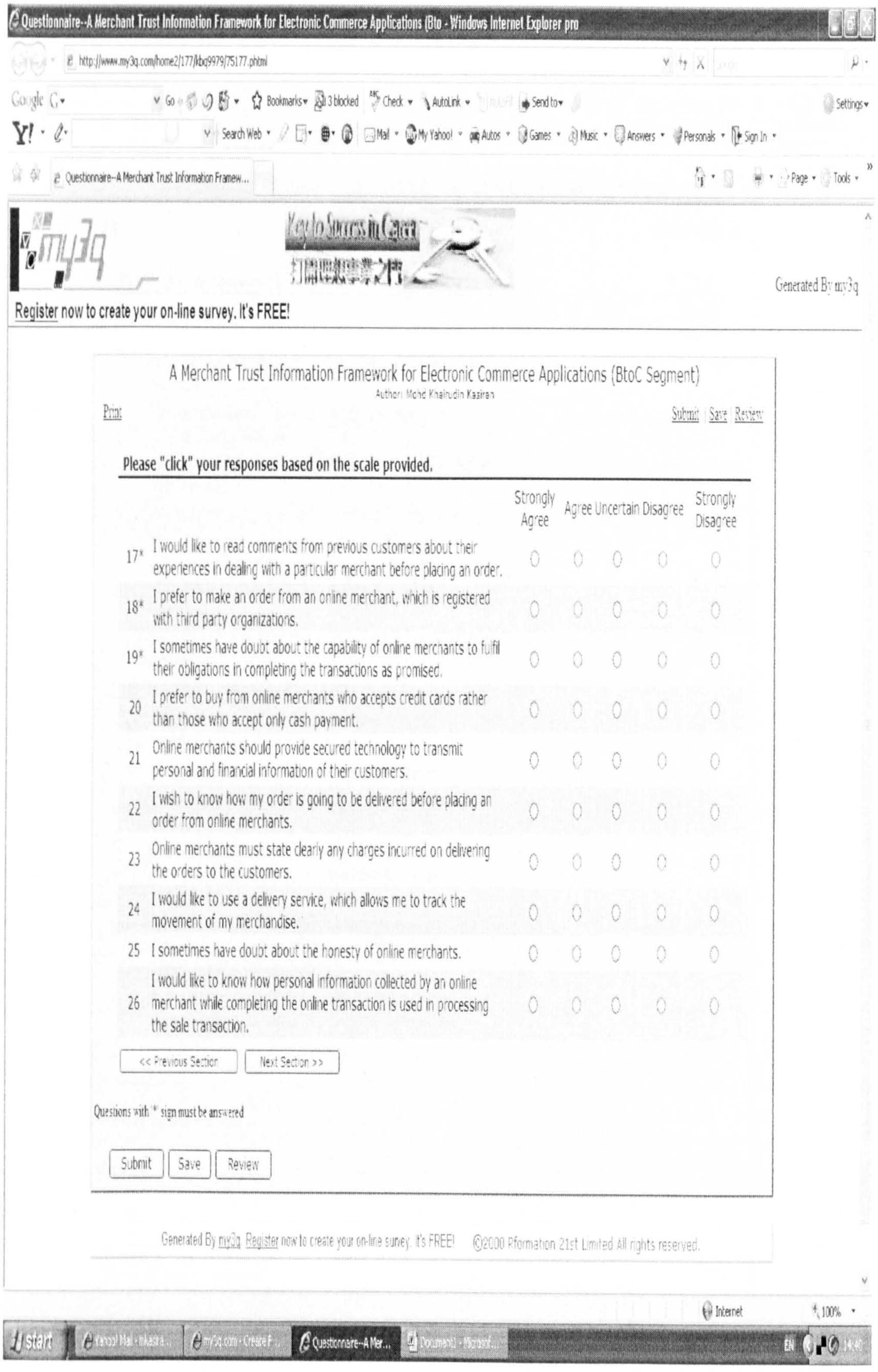
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A Merchant Trust Information Framework for Electronic Commerce Applications (BtoC Segment)
Author: Mohd Khairudin Kasiran
Print
Submit | Save | Review
Please "click" your responses based on the scale provided.
Strongly Agree
Agree
Uncertain
Disagree
Strongly Disagree
17* I would like to read comments from previous customers about their experiences in dealing with a particular merchant before placing an order.
18* I prefer to make an order from an online merchant, which is registered with third party organizations.
19* I sometimes have doubt about the capability of online merchants to fulfil their obligations in completing the transactions as promised.
20 I prefer to buy from online merchants who accepts credit cards rather than those who accept only cash payment.
21 Online merchants should provide secured technology to transmit personal and financial information of their customers.
22 I wish to know how my order is going to be delivered before placing an order from online merchants.
23 Online merchants must state clearly any charges incurred on delivering the orders to the customers.
24 I would like to use a delivery service, which allows me to track the movement of my merchandise.
25 I sometimes have doubt about the honesty of online merchants.
26 I would like to know how personal information collected by an online merchant while completing the online transaction is used in processing the sale transaction.
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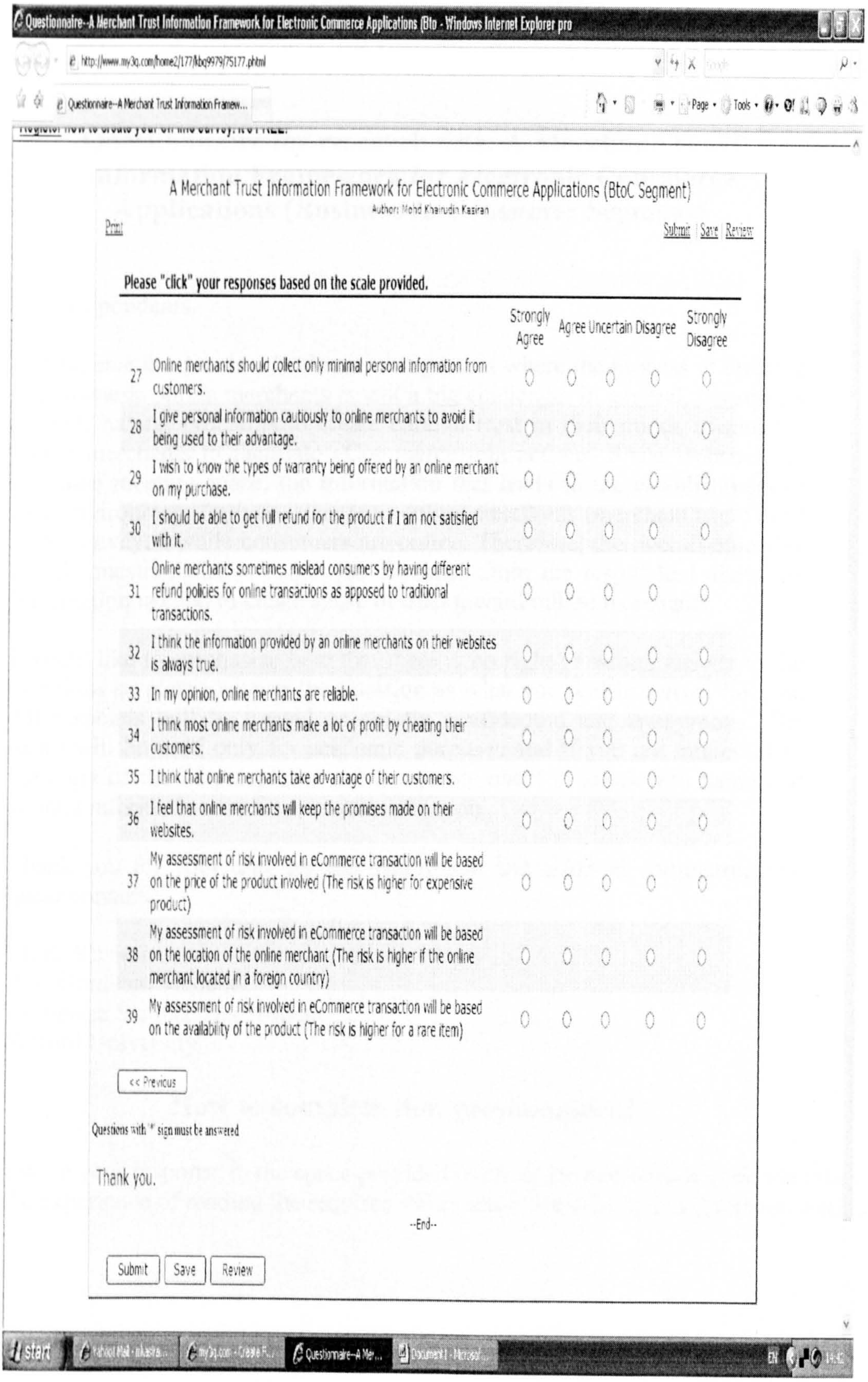
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Tools
A Merchant Trust Information Framework for Electronic Commerce Applications (BtoC Segment)
Author: Mohd Khairudin Kasiran
Print
Submit | Save | Review
Please "click" your responses based on the scale provided.
Strongly Agree
Agree
Uncertain
Disagree
Strongly Disagree
27 Online merchants should collect only minimal personal information from customers.
28 I give personal information cautiously to online merchants to avoid it being used to their advantage.
29 I wish to know the types of warranty being offered by an online merchant on my purchase.
30 I should be able to get full refund for the product if I am not satisfied with it.
31 Online merchants sometimes mislead consumers by having different refund policies for online transactions as apposed to traditional transactions.
32 I think the information provided by an online merchants on their websites is always true.
33 In my opinion, online merchants are reliable.
34 I think most online merchants make a lot of profit by cheating their customers.
35 I think that online merchants take advantage of their customers.
36 I feel that online merchants will keep the promises made on their websites.
37 My assessment of risk involved in eCommerce transaction will be based on the price of the product involved (The risk is higher for expensive product)
38 My assessment of risk involved in eCommerce transaction will be based on the location of the online merchant (The risk is higher if the online merchant located in a foreign country)
39 My assessment of risk involved in eCommerce transaction will be based on the availability of the product (The risk is higher for a rare item)
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Appendix 2
Questionnaire used in Phase 3.

Questionnaire for research title: A Merchant Trust Information Framework for Electronic Commerce Applications (Business to Consumer Segment)

Dear respondents.

eCommerce is a faceless business arrangement where the process of creating trust towards online merchants is still a big challenge. In general, consumers are still having problems to create enough trust in their minds toward the online merchants to facilitate eCommerce transactions. Since websites are the main meeting space, the information that leads to the establishment of trust environment from consumers to online merchants (merchant trust) need to be conveyed while consumers are online. Therefore, the overall objective of this questionnaire is to get the feedback from the respondent about the information needed to create sense of trust toward online merchants.

I would like to emphasize here that there is no right or wrong answer to the questions so please answer the question as what you feel is correct for you. All responds will be treated as strictly confidential and anonymous. The result will be used only for academic purposes and if you are interested to the copy of the output please use a separate sheet to attach you name and contact information for future communication.

Thank you for your time for the experiment and effort in completing this questionnaire.

M. K. Kasiran
Post Graduate Student
Computer Science Department
Salford University

How to complete this questionnaire?

Please write your response in the space provided or circle the appropriate code after they have the experience of reading the required information from the real eCommerec websites.

Demographic Information

1 Sex

Male ☐
Female ☐

2 Age ☐

3 Frequency of Internet usage

Never use Internet ☐
At least once a month ☐
At least once a week ☐
At least once a day ☐

4 Experience online shopping

Never shop online ☐
Once only ☐
2 to 4 times ☐
More than 4 times ☐

General Framework

		Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree	
5	I always have doubt about the real existence of a business entity behind any eCommerce website.	10	9	8	7	6	5	4	3	2	1
6	I always believe that it is important for online merchant to communicate clearly that they really exist behind their website.	10	9	8	7	6	5	4	3	2	1
7	In order to be trustworthy, online merchants need to communicate clearly that they really exist behind their website.	10	9	8	7	6	5	4	3	2	1
8	The real existence of business entity is not important on trust creation toward online merchants in eCommerce.	10	9	8	7	6	5	4	3	2	1
9	In order to be trustworthy, online merchants need to publish their business policy such as privacy policy or refund policy on their website.	10	9	8	7	6	5	4	3	2	1
10	Publication of business policy on the web site is important for trust creation toward online merchants.	10	9	8	7	6	5	4	3	2	1
11	I always believe that it is important for online merchant to be endorsed by independent party and this should be clearly stated on their websites.	10	9	8	7	6	5	4	3	2	1
12	In order to be trustworthy, the merchants need to have endorsement by other parties on their web site.	10	9	8	7	6	5	4	3	2	1
13	Endorsement by other party on online merchants website does not have any effect on trust creation toward them.	10	9	8	7	6	5	4	3	2	1
14	I always have doubt about the capability of online merchant to fulfil their obligation in completing the transaction as promised.	10	9	8	7	6	5	4	3	2	1

General Framework (Continue)

15	I always believe that it is important for online merchant to be always capable of fulfilling their obligation to complete online transaction as promised.	10	9	8	7	6	5	4	3	2	1
16	In order to be trustworthy, the online merchants need to give information about how they will fulfil their obligation in completing the transaction.	10	9	8	7	6	5	4	3	2	1
17	Information on how the online merchants can fulfil their obligation to complete the online transaction is not important on trust creation toward them.	10	9	8	7	6	5	4	3	2	1

Detail Framework (Existence)

		Very Important		Important		Uncertain		Less Important		Not Important	
	How important are these information to be available online in order to establish the legitimacy of an online merchant :-										
18	Online merchant's address	10	9	8	7	6	5	4	3	2	1
19	Online merchant's telephone number	10	9	8	7	6	5	4	3	2	1
20	Online merchants fax number	10	9	8	7	6	5	4	3	2	1

Detail Framework (Policy)

		Very Important		Important		Uncertain		Less Important		Not Important	
	How important are these policy statements to be available online in order to establish a sense of trustworthy toward online merchants :-										
21	Online merchant's privacy policy	10	9	8	7	6	5	4	3	2	1
22	Online merchant's refund policy	10	9	8	7	6	5	4	3	2	1

Detail Framework (Fulfilment)

		Very Important		Important		Uncertain		Less Important		Not Important	
	How important are these information to be available online in order to create a sense merchant competency in handling order through online transaction : -										
23	Information related to payment process	10	9	8	7	6	5	4	3	2	1
24	Information related to shipping process	10	9	8	7	6	5	4	3	2	1
25	Information related to tracking process	10	9	8	7	6	5	4	3	2	1

Detail Framework (Policy)

		Very Important		Important		Uncertain		Less Important		Not Important	
	How importance are these endorsement to be available online in order to establish a sense of trustworthy towards online merchants:-										
26	Endorsement through third party	10	9	8	7	6	5	4	3	2	1
27	Endorsement through Customer Comment	10	9	8	7	6	5	4	3	2	1

Moderating Factors (Risk)

		Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree	
	My assessment of risk involved in eCommerce transaction will be based on these factors :-										
28	Price of the product involved (The risk is higher for expensive product)	10	9	8	7	6	5	4	3	2	1
29	Location of the online merchant (The risk is higher if the online merchant located in a foreign country)	10	9	8	7	6	5	4	3	2	1
30	Availability of the product (The risk is higher for a rare item)	10	9	8	7	6	5	4	3	2	1

Moderating Factors (Trust propensity)

		Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree	
31	I always trust online merchants.	10	9	8	7	6	5	4	3	2	1
32	I never hesitate to buy online.	10	9	8	7	6	5	4	3	2	1
33	I will only give my credit card information to online merchants if it is being transmitted through secured channel.	10	9	8	7	6	5	4	3	2	1
34	I will never buy anything from online merchants.	10	9	8	7	6	5	4	3	2	1

Thank You.

Appendix 3
List of publications.

Year 2002

Kasiran, M. K. and Meziane, F., "*An Information Model for A Merchant Trust Agent in Electronic Commerce*", In the **Proceedings of Intelligent Data Engineering and Automated Learning – IDEAL 2002: Third International Conference.** Manchester, UK. Vol. 2412/2002, Springer-Verleg Heidelberg. pp. 243-249.

Year 2003

Meziane, F. and Kasiran, M. K., *"Extracting Unstructured Information from the WWW to support Merchant Existence in eCommerce"*, In the **Proceedings of the Eighth International Conference on Application of Natural Language to Information Systems (NLDB).** Burg, Germany. pp. 175 – 186.

Year 2004

Kasiran, M. K and Meziane, F., *"The Usage of Third Party Endorsement in eCommerce Websites"*, In the **Proceedings of the Seventh International Conference on Works with Computing System (WWCS 2004),,** Kuala Lumpur, Malaysia, pp 794-798.

Year 2005

Nefti, S, Meziane, F and Kasiran, M. K., "A Fuzzy Trust Model for E-Commerce", In the **Proceedings of the Seventh IEEE International Conference on E-Commerce Technology (ECE 2005),** Munich, Germany. pp. 401 – 404.

Year 2006

Kasiran, M. K., Ahmad, F. and Meziane, F., *"The Implementation of Third Party Endorsement as Knowledge Repository Trust in Malaysian's Electronic Banking Industries"*, In the **Proceedings of the First International Conference on Computing and Informatics (ICOCI 2006),** Kuala Lumpur, Malaysia.

Kasiran, M. K. and Hassan, S., *"Current Implementation of Third Party Certification in Malaysian eCommerce Websites"*, In the **Proceedings of The International Conference of eCommerce – IcoEC 2006**, Penang, Malaysia. pp. 10-16.

Year 2007

Meziane, F and Kasiran, M. K., *"Evaluating Trust in Electronic Commerce: A Study based on the Information Provided on Merchant Websites"*, **Journal of the Operational Research Society, Vol. 59, No 4,** 2008. pp 464-472.

Appendix 1
Snapshots of online questionnaires (Phase 1)