Cape Peninsula
University of Technology

USER-CENTRED DESIGN TO ENGENDER TRUST IN E-COMMERCE

by

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Thesis submitted in fulfilment of the requirements for the degree

Master of Technology: Information Technology

in the Faculty of Informatics and Design

at the Cape Peninsula University of Technology

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Cape Town
April 2016

DECLARATION

I, Chinonye Leuna Obioha, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed **Date**

ABSTRACT

Consumer trust is a core element for any e-commerce website. This study aimed to explore attributes of business-to-consumers (B2C) e-commerce websites that can communicate and engender trust from the users' perspective using user-centred design. E-commerce websites are known to have features such as security certificates and encryption methods to ensure trust, but this requires technical knowhow to understand. The technologies used to develop websites have improved so far, but it has little effect on improving the trust of the users of e-commerce mostly in developing countries (Africa in particular). E-commerce users do not realise that these features have been put in place for the trustworthiness of the websites which contributes to their reluctance to conduct business transactions online, thus reducing their buying intentions. There is a need to design e-commerce websites to communicate/ convey trust from the users' perspective.

The study explored various sources of data to obtain insight and understanding of the research problem—user-centred design (UCD) group activity with users, interviews with developers, and secondary prior literature. Using UCD as the main methodology, an intensive UCD workshop activity with a group of eight e-commerce users was carried out. Furthermore, to obtain the view of experts (developers) on what is currently done to engender trust in B2C e-commerce websites, interviews with four respondents were also carried out. These interviews were intended to reduce any prejudice or bias and to obtain a clearer understanding of the phenomenon being studied.

The findings from the study revealed six main attributes to engender trust, namely aesthetics design, security and information privacy, functionality design, trustworthiness based on content, development process, and vendor attributes. Proposed guidelines for each of the attributes were outlined. The findings from the users showed that those who were acquainted with the e-commerce technologies were those whose backgrounds are computer and technology related. Most users focused on aesthetics design, functionality, and security of their privacy and private details. Less emphasis was placed on the technology behind the e-commerce websites. Users use their aesthetic and cognitive value in their judgement for trust. The findings from the research were further validated using the Domestication of Technology Theory (DTT), which resulted in the development of a user-centred e-commerce trust model.

This study furthermore contributed theoretically to a better understanding of e-commerce, trust, e-commerce trust issues, user-centred e-commerce trust, and the user-centred design (UCD) body of knowledge. The study also contributed practically with proposed guidelines to

consider when developing B2C e-commerce websites that will engender e-commerce trust and domesticate the e-commerce technology.

Keywords: User-centred design (UCD), e-commerce trust, Domestication of Technology Theory (DTT), user trust, e-commerce attributes.

ACKNOWLEDGEMENTS

To Him who is able to do exceedingly abundantly above all that we ask, imagine or think, be all glory, honour and praise.

I wish to thank:

- My parents, Mr and Mrs Silas Obioha, for their continuous support, prayers and encouragements throughout this journey.
- My supervisors Mr Jay Barnes and Dr Andre de La Harpe, for their guide and support throughout this research.
- Prof Retha de La Harpe, Dr Izak van Zyl and Prof Heike Winschiers-Theophilus, for the opportunity to learn the effective use of user-centred design methods used in this study through UFISA and MAD4MAD.
- Pastor Alex Ezekwere and his wife Mrs Lillian Ezekwere, thank you for your tremendous encouragement and prayers throughout the period of this study.
- Pastor Don Lawrence and the Life Builder's family, for your prayers.
- My siblings for your support and prayers. I am proud to have you all.
- Ms Veda Naidoo and Ms Konosoang Mpiti for their tireless support, I am grateful.
- All postgraduate students, thank you for making this long journey a lovely ride.
- To a special person, thank you for making this journey a memorable one.

DEDICATION

To the unsung heroines all over the world
Especially to Mrs Rita Obioha

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GLOSSARY

Terms/Abbreviations	Definition/Explanation
E-commerce	The general term for electronic commerce; the aspect of e-business which deals with servicing customers, collaborating with business partners, and buying and selling (usually online)
E-commerce vendor/ retailer	An e-commerce website owner
DTT	Domestication of Technology Theory—a theory within the sociology of technology fields to describe and analyse the processes of technology's acceptance, rejection and use
TAM	The Technology Accepted Model posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system with the intention to use serving as a mediator of actual system use
TRA	The Theory of Reasoned Action posits that individual behaviour is driven by behavioural intentions where these intentions are a function of an individual's attitude toward the behaviour and subjective norms surrounding the performance of the behaviour
ISO	International Organisation for Standardisation
UCD	User-Centred Design is a framework, philosophy, practice, discipline or method that places the human (as opposed to the 'thing') at the centre of the design process
Personas	A fictional, detailed archetypical character that represents groupings of behaviours, goals and motivations observed and identified during the research from the primary stakeholder group
Cryptography	The science or study of the techniques of secret writing, especially code and cipher systems, methods, and the like
WOT	Web of Trust is a web browser add-on tool for users to rate and review websites

CHAPTER ONE: INTRODUCTION

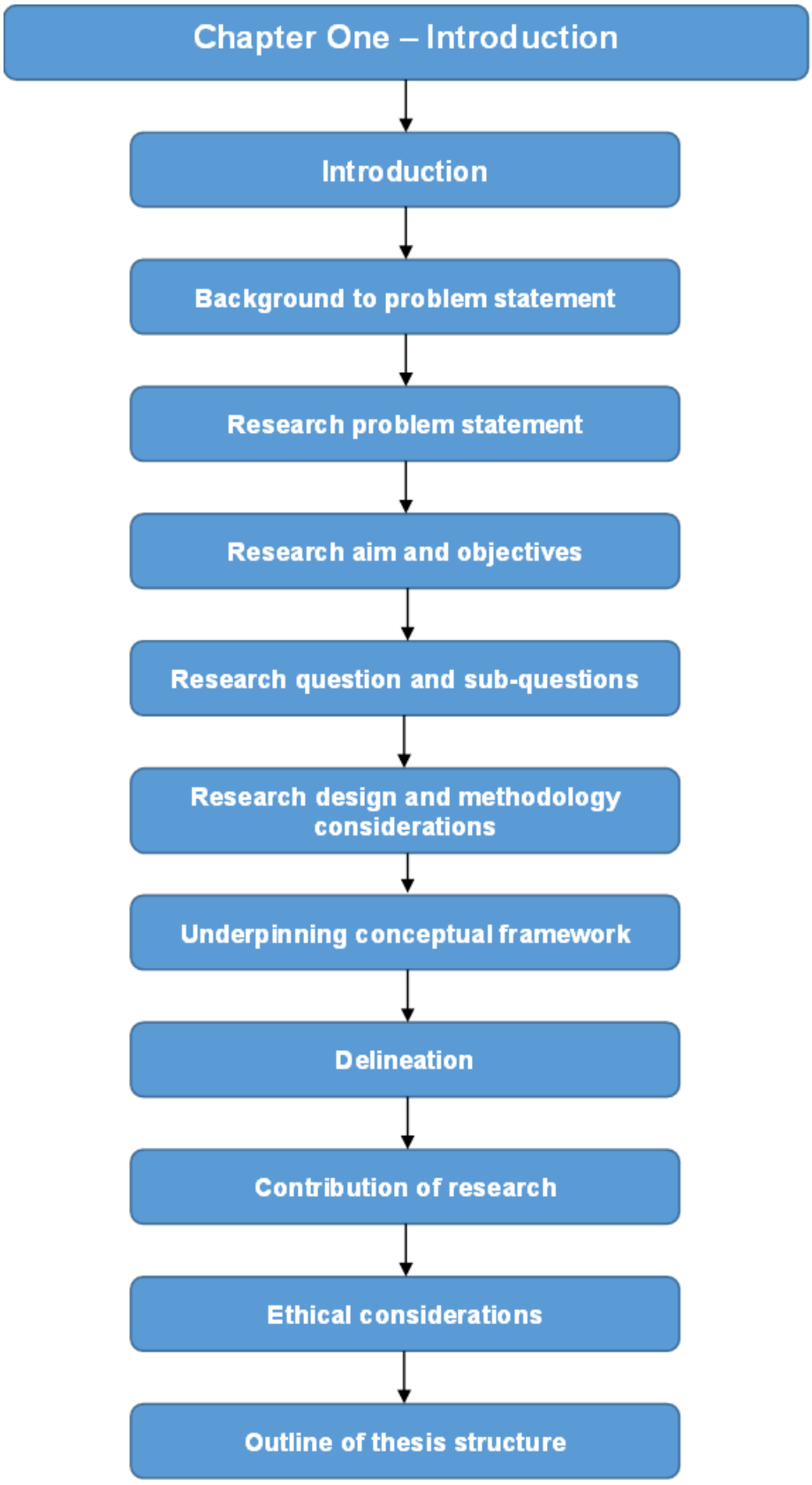

Figure 1.1: Graphical representation of Chapter One

1.1 Introduction

The continuous and steady development of the Internet has brought many transformations to the human way of life. Most noticeable is the social networks which have brought family and friends closer; communication and meeting new people are possible with the click of a button. Internet banking (e-banking), instant messaging, e-governance, e-library, and e-commerce are just a few of the services available on the Internet. In e-commerce, consumer trust can be said to be the key factor for e-commerce to thrive. The concept of user trust in e-commerce has been given attention as the issue has a great impact on e-commerce. For e-commerce to thrive and develop, online businesses have to build a relationship with customers, with trust as the key to this relationship growth. As an e-commerce website is the online identity of the vendor, there is a need for the online vendor to appear trustworthy to customers. Knowing how the users view the trustworthiness of e-commerce websites could help create design guidelines for e-commerce websites that are user-centred.

1.2 Background to problem statement

Trust in e-commerce is the core of all online transaction sustainability and development (Chellappa, 2002; Beatty, Reay, Dick & Miller, 2011) but a number of trust-related issues persist. Trust is believed to be the key for businesses to build relationships with their customers in e-commerce (Corbitt, Thanasankit & Yi, 2003; Chen, Hsu & Lin, 2010). Many individuals (customers) are still reluctant to conduct business transactions on the Internet despite the increased growth of e-commerce, mostly in developing countries such as South Africa (Portz, Strong & Sundby, 2011**;** Hubbard, 2014). This reluctance is related to users' lack of trust when an e-commerce website feature fails to convey a sense of trustworthiness (Fang, Chiu & Wang, 2011).

E-commerce trust and its antecedents such as competence (ability), benevolence and integrity have been explained (Mcknight & Chervany, 2002; Newman & Eisenegger, 2011)**.** Other studies have led to the development of trust certificates (WebTrust, 2013) and online secured transactions (Yasin, Haseeb & Qureshi, 2012). These features to ensure trust are not well known or difficult to recognise by e-commerce users as these are developed without input from the users (Jiang, Li & Xu, 2010; Bronkhorst, 2013). These studies of trust antecedents are limited on the detailed attributes an e-commerce website should possess from a user perspective. There is little that has been done to understand the way the users view e-commerce trust or to determine what attributes and features of e-commerce websites would

make users recognise that an e-commerce website is trustworthy (Winter, 2012; Bronkhorst, 2013). The issue of consumer trust is gaining more importance with the increased use of the Internet as new technologies are introduced in commerce and business (Corbitt *et al*., 2003; Lee, 2007; Laeequddin, Sahay, Sahay & Waheed, 2012).

For e-commerce to achieve its potential, the reluctance of consumers to engage in its use has to reduce by understanding the features of e-commerce that communicate trust (Palvia, 2009). Global online sales in 2012 was estimated at 6% of all global retail sales (Dangelmaier, 2012). Hence, there is room for growth in e-commerce and generally for online sales retailers if more customers engage in the use of e-commerce websites (Hubbard, 2014).

In online e-commerce, the goal of the online business is to make available their business to their customers anywhere, irrespective of location (through the Internet as medium) and to ease transactions between them and their customers (Kamari & Kamari, 2012). An e-commerce website is susceptible when it fails to communicate and create a trusting relationship with its customers (Beatty *et al*., 2011). This relationship can be created by the design of the e-commerce website, as websites have personalities that can attract consumers (Chen & Rodgers, 2006; Chang, 2012). It is important to have the users of e-commerce in mind when designing e-commerce websites to understand their perception and how they view trust in these websites (Bai, Law & Wen, 2008). This could aid in the design and development of e-commerce websites with attributes that may improve the use of e-commerce which is easy to use, convenient, cost effective and secured.

Studies focus on developing new technologies to build trust, but few discussions centre around users' perception of trust (Jiang *et al*., 2010; Hasan, Krischkowsky & Tscheligi, 2012). Researchers are busy dealing with sending messages in a secured way, but are rarely concerned with how the users view the communicated message through the interfaces (Jiang *et al*., 2010). Jiang *et al*. (2010:459) go on suggesting that the users' perceptive in the design of software plays a huge role in the user trusting the software "by all means". User-centred design (UCD) can be used in the process of understanding the users' perception of e-commerce trust, which will be integrated in the design of User-centred e-commerce websites (Dix, 2009; Preece, Rogers & Sharp, 2015). A user of e-commerce can complete an online transaction only if there is perceived trust from the e-commerce website (Sienkiewicz & Bochicchio, 2002; Beatty *et al*., 2011; Dangelmaier, 2012).

1.3 Research problem statement

E-commerce websites are known to have features such as security certificates and encryption methods to ensure trust, but this requires technical knowhow to understand. E-commerce users do not realise these features are put in place for the trustworthiness of websites, which contributes to their reluctance to conduct business transactions online, thus reducing their buying intentions.

1.4 Research aim and objectives

1.4.1 Aim

The research aim is to explore e-commerce attributes that can communicate and engender trust from the users' perspective using user-centred design.

1.4.2 Objectives

The following objectives have been set to realise the research aim:

- Identify the trust issues and challenges of users in e-commerce websites
- Identify users' perception of the trustworthiness of e-commerce websites
- Identify techniques that can be used to engender trust in e-commerce
- Identify design attributes that can be used to engender trust in e-commerce
- Create guidelines for e-commerce website developers to help them engender trustworthiness in their products

1.5 Research question and sub-questions

1.5.1 Research question

What e-commerce website design attributes can engender trust from a user point of view?

1.5.2 Sub-questions

1. How does the user perceive e-commerce trustworthiness?
2. What trust issues are related to the design of an e-commerce website?
3. What design attributes can be identified for a trustworthy e-commerce website?
4. How can user-centred design contribute to the trustworthiness of websites?

Table 1.1 summarises the research questions, methods and objectives.

Table 1.1: Research questions, method(s) and objectives

Research problem	E-commerce websites are known to have features such as security certificates and encryption methods to ensure trust, but this requires technical knowhow to understand. E-commerce users do not realise these features are put in place for the trustworthiness of websites, which contributes to their reluctance to conduct business transactions online and thereby reducing their buying intentions.	
Research question	What e-commerce website design attributes can engender trust from a user point of view?	
Research sub-questions	**Research method(s)**	**Objectives**
1. What trust issues are related to the design of an e-commerce website?	Literature review, interviews and UCD methods	Identify the trust issues and challenges of users in e-commerce websites.
2. How does the user perceive e-commerce trustworthiness?	UCD methods	Identify users' perception of the trustworthiness of e-commerce websites.
3. What design attributes can be identified for a trustworthy e-commerce website?	Literature review, interviews and UCD methods	Identify techniques that can be used to engender trust in e-commerce. Identify design attributes that can be used to engender trust in e-commerce.
4. How can user-centred design contribute to the trustworthiness of websites?	UCD methods	Create guidelines for e-commerce website developers to help them engender trustworthiness in their products.

1.6 Research design and methodology considerations

Research design is a detailed plan for collection of data or how the research is conducted in a research project (Manheim, 1977; Bhattacherjee, 2012). Kothari (2004:31) refer to research design as "the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data." Research methodology evaluates and describes the reasoning behind research techniques and methods used to answer research questions (Welman, Kruger & Mitchell, 2005). In research methodology, research methods as well as the logic behind the methods are considered within the context of the research (Kothari, 2004).

1.6.1 Research design/approach/philosophy

The research in line with the research aim was conducted inductively and was interpretative in nature. With an inductive approach, theoretical and hypothetical concepts and patterns are developed from collected data through data analysis.

Saunders, Lewis and Thornhill (2009:126) describe inductive approach as an approach “to get a feel of what is going on, so as to understand better the nature of the problem”. This study adopted an inductive approach so as to explore e-commerce attributes that can communicate and engender trust from the users’ perspective using user-centred design. To facilitate a clearer understanding of the phenomenon to be explored, the research further interviewed developers of e-commerce websites. A qualitative research method is used in carrying out the research. Babbie and Mouton (2008:270) avers that “the primary goal of using a qualitative research method is defined as describing and understanding rather than explaining human behaviour.” Qualitative researchers strive to understand a phenomenon by observing and interpreting meanings in context.

This research adopted an interpretivist philosophical approach as it seeks to explore in gaining more understanding of e-commerce trust from the users’ perception. According to Bhattacherjee (2012:103), interpretivism “is a research paradigm based on the assumption that social reality is not singular or objective, but is rather shaped by the human experiences and social contexts and is therefore best studied within its socio-historic context by reconciling the subjective interpretations for its various participants”. The ontological stance is subjectivity and is supported by Saunders *et al*. (2009) who aver that from the interpretivist philosophy, it is important to explore the subjective meanings motivating the actions of social actors in order for the researcher to be able to understand these actions.

The research strategy is guided by the research question(s) and objectives, the unit of analysis and the philosophical underpinnings as advised by Saunders *et al*. (2009) and Bhattacherjee (2012). In this study, the phenomenological research strategy is used. By using phenomenological research, the researcher identifies the “essence” of human experiences concerning a phenomenon, as described by participants in a study (Creswell, 2009:15). This exploratory study was carried out to seek insights, assess the phenomenon and understand the users’ perspective on e-commerce trust and furthermore what web developers’ are currently doing to ensure trust.

1.6.2 Research methodology

Research methodology evaluates and describes the reasoning behind research techniques and methods used to answer research questions (Welman *et al*., 2005). The data of the study is collected from various sources to obtain more insight and information on the research question. In doing this, two main methods of carrying out exploratory research as suggested by Saunders *et al*. (2009:140) include

conducting UCD activity (with users of B2C e-commerce; section 3.8.2) and interviewing 'experts' on the subject (web developers; section 3.8.4) as primary source of data, and carrying out a literature review as secondary source of data. User-centred design (UCD) was the main chosen methodological framework for this research. UCD is a framework, practice, philosophy, method or discipline that places the human (as opposed to the 'thing') at the centre of the design process (Katz-Haas, 1998; Williams, 2009). The first step taken to ensure the effective use of the UCD methods was to undergo two UCD training workshops; User-centred Design for Innovative Services and Applications (UFISA) and Mobile Application Design for Medical Application and Development (MAD4MAD) in 2013 and 2014 respectively at Cape Peninsula University of Technology, Cape Town. This multi-disciplinary, participatory and user focused approach was used to answer the research questions and provide design guidelines to consider when designing to engender trust in an e-commerce website.

1.6.3 Units of analysis

Unit of analysis is described as the case, unit, or part of social life that is under the research consideration. These include individual people, groups, organisations, movements, artefacts, institutions and countries (Neuman, 2011:58). The units of analysis for this study are the users of B2C websites and web developers (section 3.6).

1.6.4 Sampling

This study used two non-probability sampling techniques, namely self-selection sampling (section 3.7.1) for selecting the users of e-commerce websites and purposive sampling (section 3.7.2) for selecting web developers. Non-probability sampling technique is a technique wherein some units of the study population have zero chance of selection or where the probability of selection cannot be accurately determined (Bhattacherjee, 2012). Using the self-selection technique, eight users of B2C e-commerce websites were used. This number of users satisfies the number sufficient for the UCD activity as suggested by Smithson (2008), Babbie (2014) and Preece, *et al*. (2015). For the developers, four respondents were interviewed.

1.6.5 Data collection methods

The research used two different qualitative data collection techniques (associated with phenomenological research) within this study. A multi-method qualitative study (Saunders *et al*., 2009) was used in the collection of data, namely UCD group activity, semi-structured/unstructured interview, and secondary literature reviews.

A focus group, used as the data collection technique for the UCD activity as advised by Dix (2009) and Preece *et al*. (2015), is an informal discussion of a phenomenon of interest which involves a small group of individuals selected for a specific subject per data collection session (Wilkinson 2004; Bhattacherjee, 2012). The aim of using a focus group is to bring together participants in a private, comfortable environment to engage in a user-centred activity to help foster a better understanding of the perception of users on the issue of e-commerce trust. This enabled the researcher to explore and understand meanings and interpretations of the e-commerce users to gain an understanding on the issue of trust from their perspective as participants. The literature review provided the theoretical base for this research.

Semi-structured interviews were conducted with the developers of e-commerce websites. An interview method is a purposeful interaction between an interviewer and a respondent(s) in which the interviewer has a general plan of inquiry to gather reliable and valid data that are pertinent to the research aim, objectives, and question(s) (Babbie & Mouton, 2008; Saunders *et al*., 2009). According to Babbie and Mouton (2008), an interview conducted qualitatively has a general plan of inquiry but not a particular set of questions that must be asked in particular words and in a particular order. It is used to understand the respondents' point of view, and the meaning of their experiences. Interviews may be categorised as unstructured (or in-depth) interviews, semi-structured interviews, and structured interviews (Saunders *et al*., 2009).

1.6.6 Data analysis

In defining data analysis, Rubin and Rubin (2005:201) state that it is "the process of moving from raw interviews to evidence-based interpretations that are the foundation for published reports." The data collected during the UCD activity was analysed using an affinity diagram. This tool (also called '*K-J method Variation: thematic analysis'*) was created by Japanese anthropologist Jiro Kawakita in the 1960s. The tool was used to organise the large number of ideas from the UCD activity into their natural relationships (Tague, 2005). An affinity diagram was used for the analysis of the UCD group activity to group ideas into meaningful themes.

In analysing the data collected from the interview of the web developers, the study used hermeneutics as a mode of the data analysis which Heidegger (1967) called hermeneutic circle and Ricoeur (1981) hermeneutic arc (Tan, Wilson & Olver, 2009).

The two techniques (using affinity diagrams and hermeneutics) can be grouped under thematic analysis. Thematic analysis is a method for identifying, analysing,

and reporting patterns (themes) within data (Braun & Clarke, 2006). In thematic analysis, the themes emerge from the data and it is not imposed by the researcher.

1.7 Underpinning conceptual framework

The underpinning conceptual framework of this study is adapted from the Domestication of Technology Theory (DTT) (Silverstone, Hirsch & Morley, 1992). The DTT is a concept within the studies of the sociology of technology to describe and analyse the processes of technology's acceptance, rejection and use (Lee, Smith-Jackson & Kwon, 2009). The theory holds that the domestication process of a technology is conducted in six dimensions namely commodification, imagination, appropriation, objectification, incorporation and conversion (Silverstone, 1994; Silverstone, 2006). Some study use the last four dimensions but the six dimensions are used to conceptualise the process of engendering user trust (Lee *et al*., 2009; Harwood, 2011). The conceptual framework is fully discussed in section 2.6.6. The conceptual framework is then used in Chapter Five (section 5.4) to validate the research findings.

1.8 Delineation

This study was limited to Business-to-Consumer (B2C) websites. The users were drawn from Cape Town for convenience and physical availability to satisfy the UCD group activity phase. Similarly, Cape Town website developers were used. The study did not implement any designed solution for public use.

1.9 Contribution of research

This study contributes theoretically to a better understanding of e-commerce, trust, e-commerce trust issues, User-centred e-commerce trust and the UCD body of knowledge. The study provides a conceptual model to consider when developing an e-commerce website that could help engender trust and domesticate the e-commerce technology. The study also contributes practically with guidelines of design characteristics, attributes and features of B2C e-commerce websites that could engender trust in e-commerce users (consumers). This may be beneficial to e-commerce vendors, web developers and researchers at large.

1.10 Ethical considerations

Permission to conduct this research was granted based on a research proposal submitted to the Research Committee of the Faculty of Informatics and Design (FID) at Cape Peninsula University of Technology (CPUT). Ethical clearance for the research was granted by the FID Research Ethics Committee.

The ethical considerations comply with the ethics principles of FID, and with general principles for scientific research such as obtaining appropriate individual consent and ensuring confidentiality in the use and storage of data.

Participant's rights

- Participation in the research was voluntary
- Participants had the rights to refuse to answer any question that posed a threat to them
- Participants had the right to remain anonymous
- Participants had the right to refuse to provide any sensitive data that may be requested
- The research collected data without harming the participants
- If any participant chose to withdraw, all data gathered until the time of withdrawal would be destroyed

Confidentiality and anonymity

The researcher ensured confidentiality, assuring the participants that the information they shared will remain confidential. Their identity would be protected by the use of personas and pseudonyms. The anonymity of the web developers was protected by not using their photographs or company names. (The participants did agree to their photos being used, but anonymity remained protected by the use of coded names.)

Informed consent

Participants were informed of the aims and objectives of this study. They knew what was required from them to make the project a success. Participants were informed of their rights in participating, and that they could withdraw without any implications.

1.11 Outline of thesis structure

The thesis comprises of six chapters which are outlined as follows:

Chapter One: Introduction

The chapter begins with an introduction and the background to the research problem statement. The research problem statement with the research aim and objectives are presented resulting to the formation of the research question and sub-questions. A brief description of the research design and methodology is given. The chapter also provides the delineation, contribution and the ethical considerations of the research.

Chapter Two: Literature Review

Chapter two provides an in-depth review of prior existing literature starting with the three major subject areas of the research, namely e-commerce, trust and user-centred design (UCD). In the e-commerce section, an overview of the start of e-commerce, the introduction of the Internet and the World Wide Web (WWW), e-commerce potential and e-commerce technology is provided. The overview of trust and user-centred design is followed. A further review on the literature is given to elaborate on trust in e-commerce, e-commerce and trust by design as well as e-commerce trustworthiness from the perspective of users. This chapter also includes the theoretical frameworks.

Chapter Three: Research Design and Methodology

The research design and methodology is presented in this chapter. It provides the research approach, research philosophy, research strategy and the step-by-step process of the methodology. This includes the data collection and data analysis methods. The user-centred design methods and the ethical considerations are also presented.

Chapter Four: Data Analysis and Findings

Chapter four presents the data analysis and findings from the interviews and the UCD group activity. The UCD activity analysis and findings are first presented followed by the interview analysis and findings. These findings from the UCD activity and the interviews are triangulated to highlight the resonance and discord.

Chapter Five: Discussion on Findings

This chapter presents the discussion of the findings. The emergent themes from the findings of the data are discussed in relation to prior literatures. In addition, the research conceptual framework underpinning this study is discussed to validate the findings. The answers to the research sub-questions are provided during the discussion in this chapter, which in return answers the main research question. Furthermore, the potential guidelines for B2C e-commerce developers and vendors are provided.

Chapter Six: Conclusions and Recommendations

The conclusions and recommendations are discussed based on the findings from the study. The limitations of the research are stated and a reflection on the entire research process is given.

The next chapter presents the literature review of the study.

CHAPTER TWO: LITERATURE REVIEW

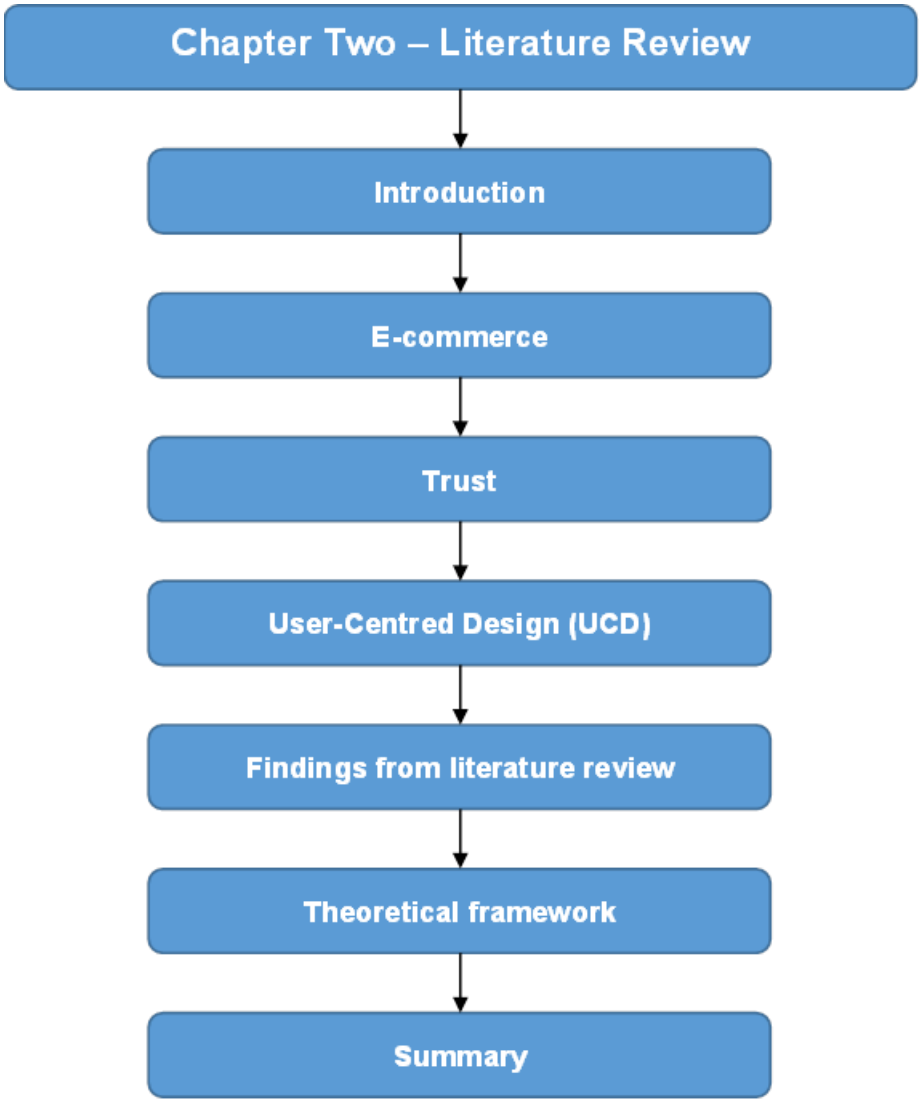

Figure 2.1: Graphical representation of Chapter Two

2.1 Introduction

Chapter One presented the background to the problem statement, and stated the research problem. It listed the research aims and objectives, the research questions and sub-questions, and outlined the structure of the thesis. This chapter presents a detailed literature review on the three major themes of the research, namely e-commerce, trust, and user-centred design. These themes were derived by identifying keywords from the title of the research.

It begins with discussions on e-commerce, e-commerce today, and e-commerce into the future. The Internet, World Wide Web and technologies used in e-commerce, are discussed. This is followed by discussions on trust and user-centred design. The

three major themes are further explored in-depth in terms of e-commerce trust, trust and design, and user perspectives of the trustworthiness of e-commerce design. The chapter concludes with a review of the theoretical frameworks that underpin this study. The chapter also deals with those research sub-questions (1 and 3) that are meant to be answered by the literature review.

2.2 E-commerce

E-commerce—the general term for electronic commerce—is the aspect of e-business which deals with servicing customers, collaborating with business partners, and buying and selling (usually online). In defining e-commerce, scholars use two dimensions stemming from the words *electronic* and *commerce* to yield their definition (Cater-Steel & Grist, 2006). E-commerce is any commercial activity (exchange of goods and services) that takes place directly between a business, its partners, or its customers, through a combination of information and communication technologies and other computer-mediated tools (Tian & Stewart, 2008). It also involves exchange of data to facilitate the financing, payments and delivery (Webb, 2001; Totonchi & Kakamanshadi, 2011).

Well known types of e-commerce include Business-to-Consumer (B2C), Business-to-Government (B2G), Consumer-to-Consumer (C2C), Business-to-Business (B2B), and intra-company transactions. The two main known types of e-commerce are B2B and B2C, with C2C growing in popularity of late. B2B involves businesses conducting business with other businesses such as their suppliers, distributors and other partners. B2C involves businesses selling their products and services to consumers through electronic networks. E-commerce takes various forms, including electronic retail shopping, Internet recruiting and advertising, digital gambling, web-based banking and stock trading, and electronic data interchange (such as purchase orders, product updates, inventory data, and digital invoices and contracts) (Warf, 2013).

The use of e-commerce is slowly increasing with more research focused on how to improve its use. Further sections of the literature review will be focused mostly on B2C e-commerce.

2.2.1 The start of e-commerce

The concept of e-commerce is thought to have started in the mid-1960s with the use of Electronic Data Interchange (EDI). According to Sawabini (2001), EDI enabled companies to perform business transactions such as electronic funds transfer, information exchange, and placing of orders through computers. The EDI

"technology which was used mostly by large organisations because of its high cost, gave companies the ability to conduct electronic transactions and exchange business information from one company's computer to another. EDI brought significant advantages to companies when compared to paper systems. It helped companies save money on information transfer that would have required immense human interaction and numerous paper documents. Other advantages came from its use to electronically store and manipulate data, and thus reduce or eliminate human errors from data entry.

In 1979 the American National Standards Institute (ANSI) chartered the Accredited Standards Committee (ASC) (ASC X12, 2015). Up to that point each company used their own standards for formatting documents (Roos, 2008). ASC developed a set of standards known as ASC X12, a universal standard for EDI to be "an open, and neutral cross-industry environment" (ASC X12, 2015). EDI technologies are considered as the foundation on which e-commerce was built.

Also in 1979, Michael Aldrich connected a television set to a transaction processing computer with a telephone line, and ushered in a new method of online transaction processing (Aldrich, 2011b). He first referred to his invention as "teleshopping" and later "online shopping". It facilitated real-time transaction processing between businesses and consumers, and also between businesses and businesses (Aldrich, 2011a). By the 1990s this had evolved to what is today commonly known as B2C and B2B e-commerce.

The growth of e-commerce really started with the introduction of the Internet and the World Wide Web (Manjunatha, 2013). Today the WWW is used as a Business-to-Consumer commercial tool (Corbitt *et al*., 2003).

2.2.2 Introduction of the Internet and the World Wide Web (WWW)

Internet history started in the early 1960s as an outcome of an Advanced Research Projects Agency (ARPA) project called ARPANET. ARPANET was a computer network project established by ARPA to facilitate communication among firms working on contracts for the US Department of Defence—now known as DARPA, short for Defence Advanced Research Projects Agency (Computer History Museum, 2004). After the development of the TCP/IP protocol (Transfer Control Protocol/Internetwork Protocol), ARPANET was able to evolve into what is now called the Internet (USG, n.d.; Roos, 2008).

According to ARPANET and Internet pioneers Leiner, Clark, Cerf, Kahn, Kleinrock, Lynch, Postel, *et al.* (2009), the idea of the Internet was based on having multiple interdependent networks with an open architecture. This openness promoted the development of computer protocols able to connect one to another rather than just connecting by chance or randomly. Open architecture and standardised protocols led to the interoperability of all compliant networks, producing the open and global connectivity that predominates the Internet today. It was also on this premise that the World Wide Web was built in 1989.

Prior to the development of the WWW, a domain name system (DNS) had been in existence with the Internet. The DNS is the "translation system that turns an Internet host name (domain name) into the unique series of numbers which constitute an Internet Protocol (IP) address for each specific domain name" (Pope, Warkentin & Mutchler, 2012:330). The domain name system is to give an IP address (which is a complex string of numeric characters) a readable and memorisable name. In March 1985, symbolic.com became the first registered commercial (.com) domain name. It was registered by the Symbolics Computer Corporation but was in 2009 purchased by XF.com (Meystedt, 2015). In the mid-eighties applications such as Electronic mail, Telnet (a network protocol and application that allows a connection and communication to a remote computer) (Telnet.org, 2015), and FTP (File Transfer Protocol) were the most used applications. At the time these three applications (Telnet, email and FTP) were known as the "three killer apps" of the Internet (Berghel, 1997).

The World Wide Web was conceived by Sir Tim Berners-Lee, a software engineer working with a team at the European Organisation for Nuclear research (CERN) in 1989 (Gillies & Cailliau, 2000). In October 1990, Berners-Lee identified three fundamental technologies that remain the key to the Web at present—HyperText Transfer Protocol (HTTP), HyperText Markup Language (HTML), and Universal Resource Identifier (URI) (Berners-Lee, 2015). He also created the first web browser ("WorldWideWeb.app") and Web server ("httpd") (Berners-Lee, 2015). This paved the way for the growth of the Internet and, eventually, e-commerce. According to Tian and Stewart (2008), the development of the graphical user interface (GUI) and WWW's ability to navigate through pages changed the nature of Internet use. In 1991 the National Science Foundation (NSFNET) lifted the restrictions on the use of the Internet by commercial businesses, and thus paved the way for the growth of e-commerce (Roos, 2008). The development of Mosaic browser in 1993 made the Internet more user-friendly, and the browser saw further development into Netscape

Navigator in 1994. The development of the browser “ushered in the golden age of e-commerce” (Tian & Stewart, 2008).

2.2.3 The e-commerce breakthrough

The Internet plays a significant role in the wide spread of information and communication. Leiner *et al*. (2009:23) state that:

> “…the Internet is a widespread information infrastructure, the initial prototype of what is often called the Nation (or Global or Galactic) Information Infrastructure. Its history is complex and involves many aspects—technological, organisational, and community. And its influence reaches not only to the technical fields of computer communications, but throughout society as we move toward increasing use of online tools to accomplish electronic commerce, information acquisition, and community operations”.

As research and development of online tools continued, opportunities opened for companies to conduct their businesses online, thereby prompting the breakthrough in e-commerce (Tian & Stewart, 2008). Advances in security protocols and fast connections enabled companies such as Amazon and EBay to be formed. These companies exploited the use of online business payments and transactions. 1995 to 1999 was regarded as the golden age of e-commerce, and this is also when the term “e-commerce” became popular (Tian & Stewart, 2008). Amazon, started by Jeff Bezos in 1995, created a pathway for growth in e-commerce and this positioned e-commerce to be customer-oriented, thereby giving shape to B2C e-commerce websites. EBay was launched a few months later to pave way to online auction e-commerce websites.

The growth in e-commerce continued in the 1990s (referred to as the ‘dot-com bubble') until 2000 and 2001 (‘dot-com burst’) which saw the collapse of the dot-com bubble affecting online businesses, especially e-commerce. Four sectors (Financial, Information Technology (IT), General Industrials, and Non-Cyclical) were seriously affected by the ‘burst’—mainly the IT sector (Anderson, Brooks & Katsaris, 2010). This collapse was due to the stock market crash of the dot-com companies which were overvalued, as their cost of operation was more than their profit. Cassidy (2002) stated that this collapse forced Internet companies to cancel their Initial Public Offerings (IPOs), which in turn brought a decrease in investments for the companies. The result of decreased investment was the shutdown of many online companies and e-commerce businesses—such as Boo.com and Pets.com—that

went bankrupt. Companies such as EBay and Amazon were among the few that survived the collapse and has since seen steady growth in the e-commerce industry.

2.2.4 E-commerce potential

In the United States—considered a major pioneer of the Internet, WWW, and e-commerce—there has been slow but steady growth in e-commerce sales. According to the Census Bureau of the United States Department of Commerce (USDOC 2014), online sales in 2005 made up 2.2% of total retail goods sold in the United States. By 2010 this had increased to 4.2%. In the fourth quarter of 2013 e-commerce sales were estimated at 5.8%, and by the fourth quarter of 2014 online sales made up for 6.7% of the total retail sales in the U.S. (Figure 2.2).

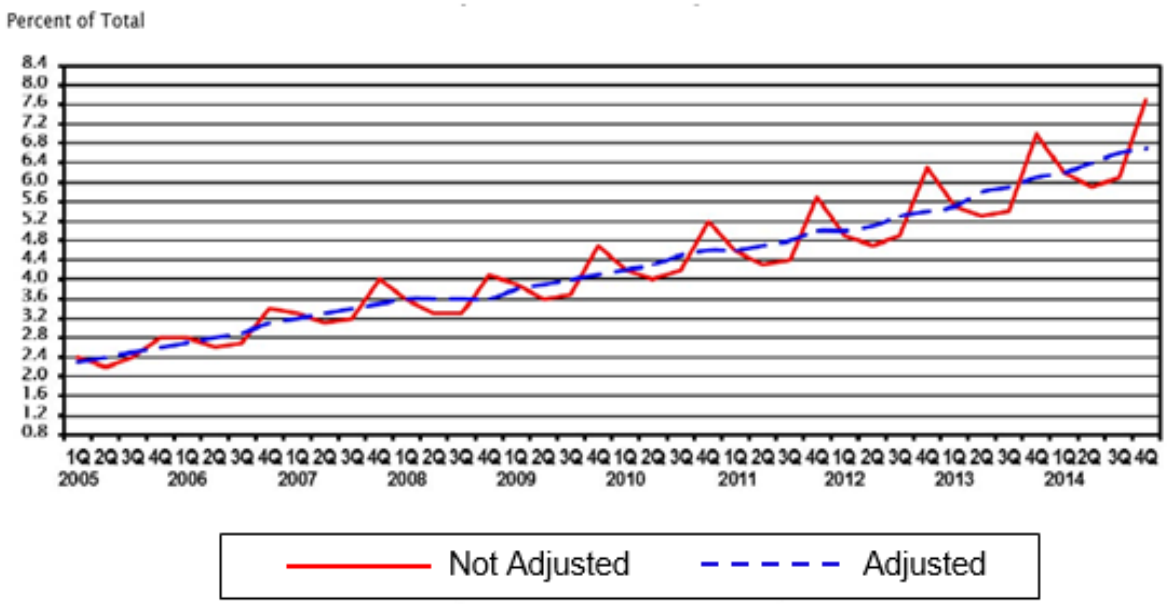

Figure 2.2: Estimated quarterly U.S. retail e-commerce sales as a percentage of total quarterly retail sales: 1st quarter 2005 – 4th quarter 2014
(Source: USDOC, 2014)

In South Africa[1], with estimated online retail sales of around 2% of the overall retail sales, e-commerce is relatively new but has the potential to grow (Hubbard, 2014). Hubbard (2014) indicates that South Africans are gaining more access to the Internet through the decrease in broadband costs. Such access is mostly through the use of smart phones, but there is still "a lingering reluctance among consumers to venture online" to purchase goods and services. Google South Africa's country

[1] This case study is mentioned as the research was conducted in South Africa to give a clearer picture of e-commerce potential, but not to limit the scope of the literature or the research as a whole.

director Luke McKend (as cited in Bronkhorst, 2013) acknowledged that the need to gain the loyalty of customers by meeting their expectations and providing a stable, trustworthy and secure service, is among the challenges faced by online stores in South Africa. A big and growing market is still open for vendors to venture into South African e-commerce, and an even larger opportunity exists in mobile commerce (m-commerce). M-commerce is still largely untapped and has potential in online business.

M-commerce is the use of mobile devices to carry out business transactions, and it has already brought significant changes in e-commerce (Hubbard, 2014). In South Africa, one in three people aged 15 or older used the Internet in 2012. Projections estimate that more than half of the population will be using the Internet by 2014, and two in three adults by 2016 (De Lanerolle, 2012). According to de Lanerolle, more than three quarters of adults own a mobile phone, while less than one quarter own computers. This shows the potential that m-commerce has for vendors in South Africa. In addition to the prospects of m-commerce, findings show that one quarter of adults use the Internet every day, and that close to three quarters of them access the Internet through mobile phones. De Lanerolle (2012) concedes that even with Internet access, e-commerce transactions are still a minority activity online, especially when it involves the use of credit cards.

Despite steady growth, e-commerce has been hampered by challenges such as universal access and trust issues which include privacy and security, content, design, and Internet fraud (Winter, 2012). The future of e-commerce predicts positive growth and profit for businesses especially in South Africa, but for businesses to thrive in their online ventures, they need to address these challenges and build trust in users. Challenges also include the use of the e-commerce technology, as many are not aware of the technology and how it works (De Lanerolle, 2012). As the Internet and World Wide Web is growing, and with more people connecting through smart phones, tablets and personal computers, it is most likely that e-commerce will continue to see a positive rise.

2.2.5 E-commerce (web) evolution

E-commerce uses technologies that have evolved in step with the evolution of the Web (and Internet) (Damanpour, 2001; Eid & Trueman, 2004; Ma, Lui & Misra, 2015). The WWW has experienced evolutions from Web 1.0 (‘the basic publishing and transaction medium’), Web 2.0 (‘the social and co-created web’), and Web 3.0 (‘the semantic and intelligent Web’). It is now heading towards Web 4.0 (‘the mobile, machine and object web’), and even Web 5.0 (‘the sensory-emotive Web’) (Kambil,

2008). The transformation witnessed in the WWW through these evolutions (Figure 2.3) is the same transformation witnessed in e-commerce.

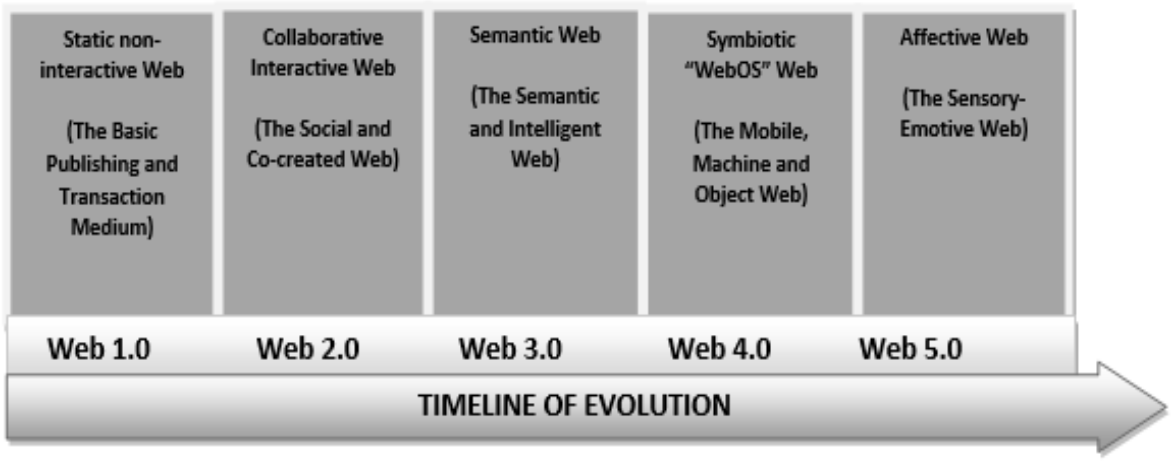

Figure 2.3: Web evolution from Web 1.0 to Web 5.0

The three well known and classic evolutions are Web 1.0, Web 2.0 and Web 3.0. Presently Web 2.0 is the *de facto* standard on the Web while Web 3.0—what Berners-Lee (2006) calls the semantic Web—features are starting to emerge. It is sometimes argued that the evolution from Web 1.0 to Web 2.0 introduced no changes in the technology used on the Web (Cormode & Krishnamurthy, 2008). This is why Web inventor Tim Berners-Lee (2006) criticises the use of these terms to classify the Web. Cormode and Krishnamurthy (2008) argue that, even though there were no significant changes in the "technical comparison between Web 1.0 to Web 2.0", there have been significant changes in the appearance of the Web's structure through enhanced page functionality.

The Web saw a change in page appearance and structure from the static Web 1.0 sites to the more dynamic Web 2.0 structure which can allow users to co-create and contribute to websites. The changes (from Web 1.0 to Web 5.0) are slow, and they do not represent versions of the Web, but stages in its appearance. These evolutions are further discussed below.

2.2.5.1 Web 1.0

Web 1.0[2] is widely considered as the first phase of the Web in which users could only read and share information (O'Reilly, 2007; Cormode & Krishnamurthy, 2008; Nath, Dhar & Basishtha, 2014).

These were static websites, with web pages being connected by hyperlinks to other pages on the Web. Website creators or designers were in sole control of creating and managing contents of websites. The structure of Web 1.0 was non-interactive and users were not able to update or alter the website as can be done presently (Getting, 2007; Alshahrani & Ward, 2014). The intention of the website owners was to themselves establish an online presence which they could use in creating and sharing information with their visitors.

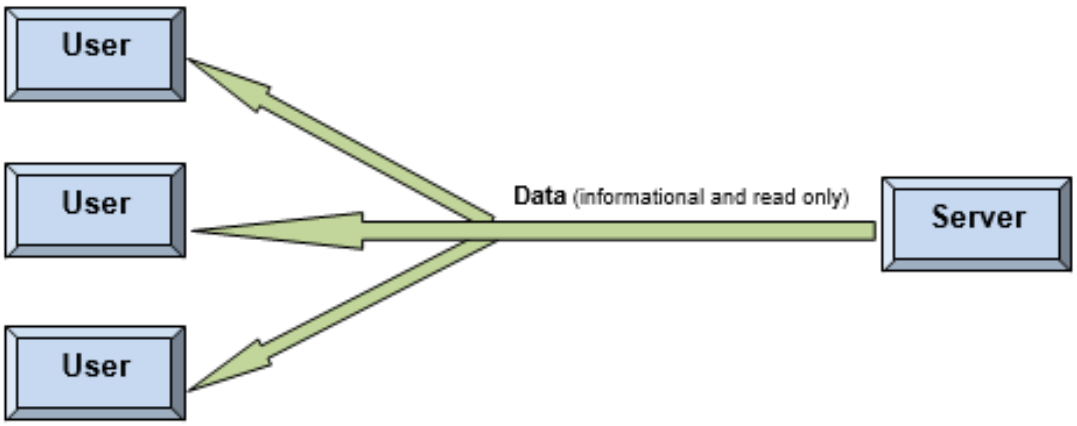

Figure 2.4: Web 1.0 as a platform for sharing information

The Web user was a consumer—and not a contributor—of information saved on servers around the world (Alshahrani & Ward, 2014). Web 1.0 sees the Web as a "publishing, not a participation" platform where information on the websites can only be read by visitors and no communication can be made directly online (Nath *et al*., 2014).

E-commerce websites in Web 1.0 had features which enabled the buyer to see products (similar to a catalogue), and the buyer would likely send an email to order a product (Getting, 2007). The Web was used only as a trajectory for exposure and removal of the geographical restrictions associated with a brick-and-mortar business

[2] Of course, the term Web 1.0 was only invented *after* Web 2.0 had been introduced.

(Getting, 2007). Rao, Metts and Monge (2005) acknowledge that e-commerce websites in earlier stages were an online "presence" which evolved into "portals". At this "presence" stage, e-commerce websites provided only information and primarily one-way communication to its users, while the "portal" stage is viewed as the introduction of two-way communication between customers and vendors (Rao *et al*., 2005). At these stages (presence and portals), e-mails were the main mode of two-way communication.

To post a comment or product review, an e-commerce user would have to fill out an online form which was linked with the website owner's email. The website owners would then themselves further update/upload such review(s) (Rao *et al*., 2005). These posed questions of trust—could the visitors to such a website trust that the reviews were actually those of the users associated with the reviews, or were the posted reviews conjured up by the website owners to manipulate people into trusting their website?

2.2.5.2 Web 2.0

E-commerce websites have since moved to a more dynamic model with the introduction of Web 2.0 and started gaining popularity. Web 2.0 as a term was first used by Darcy DiNucci in 1999:

> "The Web we know now, which loads into a browser window in essentially static screenfuls, is only an embryo of the Web to come. The first glimmerings of Web 2.0 are beginning to appear, and we are just starting to see how that embryo might develop" (DiNucci, 1999:32).

Web 2.0 was made popular by Tim O'Reilly after Dale Dougherty suggested the term during a brainstorming session for the name of the Web conference in 2004 (Musser & O'Reilly, 2007). This led to the naming of the conference as "Web 2.0 Conference" first held in San Francisco. Web 2.0 is a set of social, economic and technology trends which is a collection of open-source, interactive and user-controlled online applications that expand the experiences, knowledge and market power of the users as participants in business and social processes (Musser & O'Reilly, 2007; Constantinides & Fountain, 2008). The applications of Web 2.0 allow for the creation of informal networks of users that facilitate the flow of ideas and knowledge by allowing efficient generation, dissemination, sharing and editing/refining of information content (Constantinides & Fountain, 2008).

It has been argued that the advent of Web 2.0—which enabled users to contribute to the Web or websites—has seen the Web grow significantly, thus acknowledging that

users play a huge part in the growth and use of a technology (O'Reilly, 2007). According to Mata and Quesada (2014), the major difference between Web 1.0 (the 'traditional web') and Web 2.0 is collaboration, allowing the exchange of information between users.

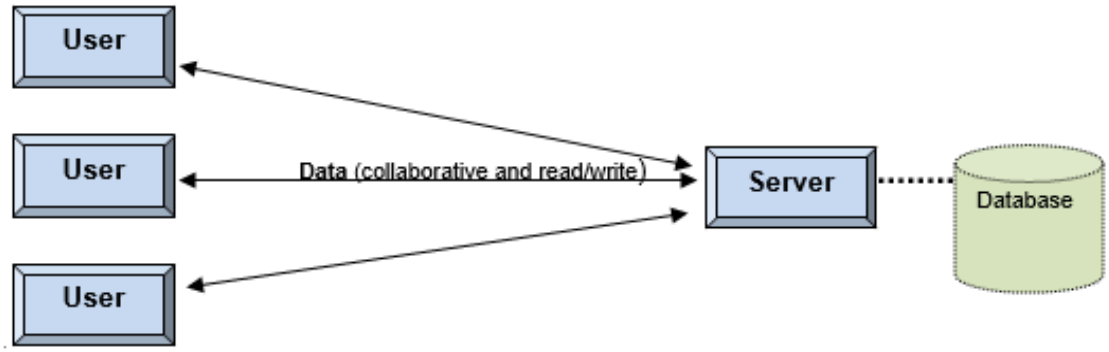

Figure 2.5: Web 2.0 – a collaborative Web

Web 2.0 is used as a term that denotes several concepts, characteristics and website features (Cormode & Krishnamurthy, 2008). These include (but are not limited to):

i) Websites based on the use of AJAX (asynchronous JavaScript and XML) technology which allows a web page to send information to, and retrieve information from, a server asynchronously without having any interference with the web page display.

ii) Websites which incorporate a strong social component, friend links, and involving user profiles which include information such as location, age and testimonials.

iii) Websites which encourage the posting of user-generated content in the form of music, text, photos, video, and the ability to control privacy and sharing.

iv) Collective intelligence such as blogs (informational sites containing entries by one or more individuals which appear in a reverse chronological order) and wikis, creation and editing of web pages collectively by various authors.

v) User-generated comments, ratings, tagging (folksonomy), indexing, and categorising of contents and ratings.

vi) Ability for a user to form connections to other users who are 'friends', and to be a member of 'groups' via social networking links, podcasting and subscriptions or RSS (Rich Simple Syndicate or Rich Site Summary) feeds from users or other websites.

vii) Technical features such as a public API to allow third party enhancements and 'mash-ups', embedding of various rich content types, and communication with other users through internal e-mail and IM (instant messaging) systems for chatting.

O'Reilly (2007) indicates that Web 2.0 can be visualised as a set of principles and practices that "tie together a veritable solar system of sites that demonstrate some or all of those principles, at a varying distance from the core". At the Web 2.0 Conference held in San Francisco, a set of seven principles or patterns that guide the description of Web 2.0 were listed. These are briefly described below:

i) **The web as a platform:** The use of the Web to provide services—rather than packaged software—with cost-effective scalability, is one of the Web 2.0 characteristics. An instance is Google delivering services and the use of 'the long tail[3]' to enable advert placement on virtually every web page.

ii) **Harnessing collective intelligence:** This is the collective architecture of participation and contribution from various web users (or/and websites) that has seen the Web transformed into the Web 2.0 era. Examples include *Wikipedia, the online encyclopaedia* in which entries can be added by any user and edited by any other user; folksonomy, collaborative tagging of sites; 'viral marketing' in which a user can recommend to another user directly; blogging with RSS-feed notifications of changes made on linked and subscribed pages; and online open-source software projects in which anyone can contribute, download and use.

iii) **Data is the next 'Intel Inside':** The information available online is data stored on many databases. Web 2.0 companies' core competencies rely largely on database management. For example, mapping information of streets and directions as well as licencing such data has led to a significant growth of online maps.

iv) **End of the software release cycle (perpetual beta):** Web 2.0 websites put an end to the traditional software release cycle as seen with Microsoft whereby they release new software and users are made to upgrade to the new release. Instead, the online companies include new features on their websites as part of normal maintenance, continuously updating every day through scripting programming languages such as PHP, Ruby and Perl. As

[3] Long tail is a phrase coined by Chris Anderson in 2004 to describe a business retailing strategy for selling a large amount of low in demand products that bring profit instead of only selling popular in-demand products. The profit is made up of reduced cost on marketing and distribution (Hart, 2007; Investopedia, n.d.).

co-developers of open source software online, users also release new software features often and early.

v) **Lightweight programming models (and cost-effective scalability):** Simplicity is the way to go these days and Web 2.0 offers simplicity to users through lightweight programming models such as RSS, SOAP (Simple Object Access Protocol), and XML (Extended Mark-up Language). This encourages the easy re-use of code from other websites to build new websites quickly and cost-effectively since the code can easily be read and transformed for re-use.

vi) **Software above the level of a single device:** The ability for software to run on two or more devices is another Web 2.0 feature. Examples include the simple ability for a web application to run on two computers, one hosting the browser and the other hosting the server. Presently a web application has the ability to span multiple platforms and devices (computers, phones and tablets).

vii) **Rich user experiences:** Web 2.0 is able to provide users with a rich GUI-based interactive experience. These are dynamic, in comparison with the static Web 1.0 applications. This started with the use of JavaScript and DHTML, and more recently with a collection of several technologies called AJAX.

In as much as these principles and practices (or patterns) are unique, they are interdependent rather than independent (O'Reilly, 2007; Musser & O'Reilly, 2007). Musser and O'Reilly's set of common Web 2.0 attributes that support these principles or patterns show that Web 2.0 is massively connected, decentralised, user focused, open, lightweight and emergent (see Table 2.1).

Table 2.1: Common Web 2.0 attributes that support the patterns
(Source: Musser & O'Reilly, 2007:11)

Attributes	Description
Massively connected	Network effects move us from the one-to-many publishing and communication models of the past into a true web of many-to-many connections. In this era, the edges become as important as the core, and old modes of communication, publishing, distribution and aggregation become disrupted.
Decentralised	Connectedness disrupts traditional control and power structures, leading to much greater decentralisation. Bottom-up now competes with top-down in everything from global information flow to marketing to new product design. Adoption occurs via pull not push. Systems often grow from the edges in, not from the core out.

Attributes	Description
User focused	The user is at the centre of Web 2.0. Network effects give users unprecedented power for participation, conversation, collaboration, and, ultimately, impact. Consumers have become publishers with greater control, experiences are tailored on the fly for each user, rich interfaces optimise user interactions, users actively shape product direction, and consumers reward companies that treat them well with loyalty and valuable word of mouth marketing.
Open	In Web 2.0, openness begins with the foundation of the Internet's open technology standards and rapidly grows into an open ecosystem of loosely coupled applications built on open data, open APIs, and reusable components. And open means more than technology—it means greater transparency in corporate communications, shared intellectual property, and greater visibility into how products are developed.
Lightweight	A "less is more, keep it simple" philosophy permeates Web 2.0; software is designed and built by small teams using agile methods; technology solutions build on simple data formats and protocols; software becomes simple to deploy with light footprint services built on open source software; business focuses on keeping investment and costs low; and marketing uses simple consumer-to-consumer viral techniques.
Emergent	Rather than relying on fully predefined application structures, Web 2.0 structures and behaviours are allowed to emerge over time. A flexible, adaptive strategy permits appropriate solutions to evolve in response to real-world usage; success comes from cooperation, not control.

With Web 2.0 features as shown above, users of e-commerce websites can add reviews of products, rate an item, and tag products. They can see lists of items similar to the one purchased, or of items bought by other customers who purchased an item. They can sell items, see recent searches, create profile pages, place orders, and even pay through the use of debit and credit cards (Cormode & Krishnamurthy, 2008).

As the Web has witnessed a significantly positive rise in the era of Web 2.0, so have the challenges and issues surrounding the Web increased. Issues such as information privacy and security, quality of information from users and owners online, and the use (and ownership) of users' data are some of the challenges faced by Web 2.0 (Lawton, 2007). The storage of data on databases by website owners and third parties has seen privacy and security issues increased as users' data can be mined by other people—such as hackers. This is as a result of users increasingly revealing details about themselves online, and such details being stored on server databases, and more recently even in clouds (Musser & O'Reilly, 2007). Lawton (2007) adds that Web 2.0 websites carry more risk than the traditional websites because it allows users to "upload content and require scripting capabilities—which can run code or carry malware—to function properly". These challenges and issues

are discussed in more depth in section 2.2.6. The evolution of the Web is still in process as semantic Web and affective computing (web) are gaining more prominence in the web story.

2.2.5.3 Web 3.0 and the semantic Web

The Web is still very much in the era of Web 2.0, but glimpses of Web 3.0 can be seen. Although some authors and semantic Web technology pioneers such as Nova Spivack (as cited in Nath *et al*., 2014) see semantic Web as a component of Web 3.0, others regard Web 3.0 and semantic Web as the same thing. Spivack (2015) describes Web 3.0 as a "convergence of several key emerging technology trends", as can be seen in Table 2.2: Convergence of several key emerging technology trends

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Table 2.2: Convergence of several key emerging technology trends
(Source: Spivack, 2015)

Web 3.0 Components	Technology Trends
Ubiquitous connectivity	• Broadband adoption • Mobile Internet access • Mobile devices
Network computing	• Software-as-a-service business models • Web services interoperability • Distributed computing
Open technologies	• Open APIs and protocols • Open data formats such as XML • Open-source software platforms • Open data
Open identity	• Open identity (OpenID) • Open reputation • Portable identity and personal data
The intelligent Web	• Semantic Web technologies • Distributed databases—"World Wide Database" (wide-area distributed database interoperability enabled by semantic Web technologies) • Intelligent applications (natural language processing, machine learning, machine reason, autonomous agents)

Web 3.0 (used interchangeably with semantic Web herein) is regarded as the intelligent Web which will not only be designed for humans to read, but for computer programs to read, understand and manipulate its stored data and information automatically (Berners-Lee, Hendler & Lassila, 2001; Shadbolt, Hall & Berners-Lee, 2006; Kambil, 2008). Semantic Web—an extension of the already existing Web—gives web pages a structure by creating an environment where computers (or software agents) can carry out sophisticated tasks for users (Berners-Lee *et al*.,

2001). Semantic Web is a way to specify data (naming and describing data types and properties) and data relationships by a model known as ontology in computer science (Herman, 2012). It encompasses a web of actionable information—information derived from data through a semantic theory for interpreting the symbols (Shadbolt *et al*., 2006). Computers must have access to structured collections of information and sets of inference rules that they can use to conduct automated reasoning for the semantic Web to function (Berners-Lee *et al*., 2001).

The semantic Web allows for computers to perform the tedious work of searching, combining, and working on information on the Web without the input of humans. The semantic Web shifts from documents to data stored in databases. These data elements are semantically structured in a way that enables computers to 'understand' and act in response to sophisticated human requests, based on well-defined meaning (Aghaei, Nematbakhsh & Farsani, 2012). In the semantic Web, data are specified with relationships between data and the sharing of data.

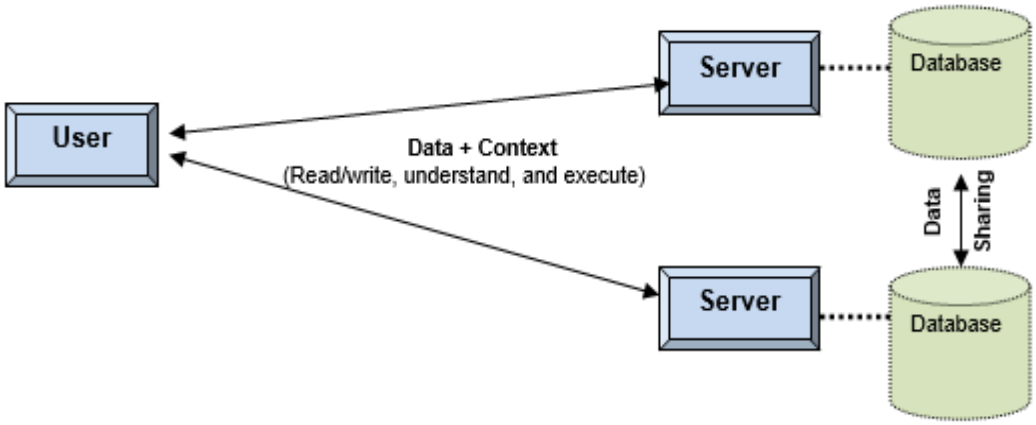

Figure 2.6: Web 3.0 – the intelligent Web

The technologies and components of the semantic Web are listed below and the architecture is illustrated using a semantic web stack (Figure 2.7):

- **XML (Extensible Mark-up Language):** Syntax for content structure that allows users to create their own tags in documents
- **XML Schema:** Formally specifying the description and content of elements contained in XML documents
- **RDF Schema (RDFS):** An extension of RDF vocabulary used in describing related properties and classes of RDF-based resources and the relationships between the RDF-based resources

- **RDF (Resource Description Framework)[4]:** A language for describing and expressing information and data models, and sharing them e.g. RDFa, RDF/XML, N-Triples and Turtle
- **OWL (Web Ontology Language):** Used in documents when information needs to be processed by applications to facilitate machine interpretation of web contents (McGuinness & Van Harmelen, 2004)
- **SPARQL (Simple Protocol and RFD Query Language):** A standard query language for querying semantic data across relational databases, providing a standardised query language for RDF graphs (Segaran, Evans & Taylor, 2009)
- **RIF (Rule Interchange Format):** An XML language for exchanging web rules among web rule engines which computers can execute. It provides multiple versions (called 'dialects') to allow for exchange (Kifer & Boley, 2013)

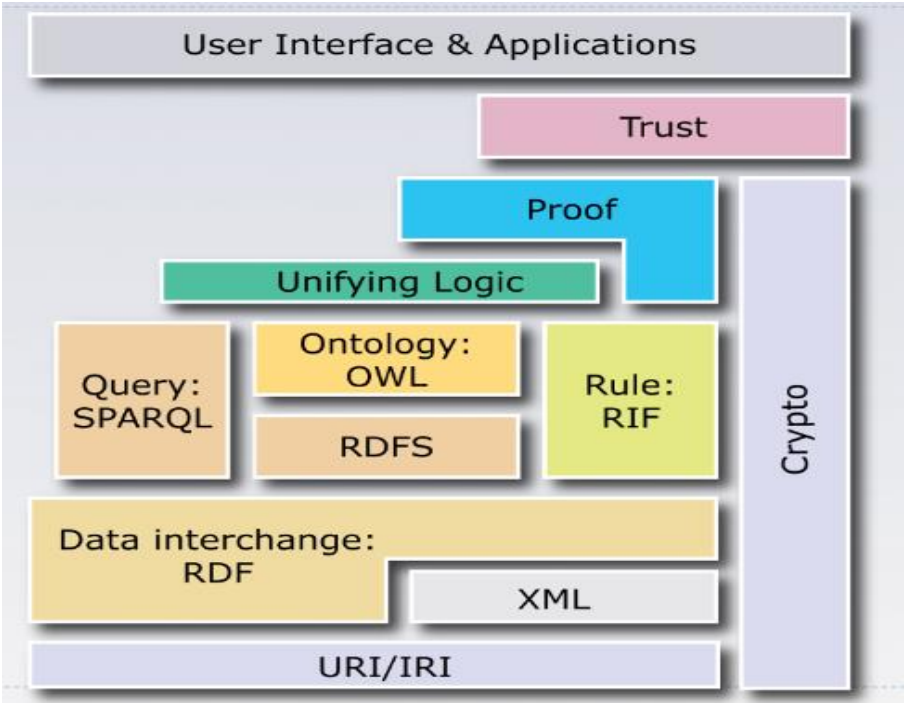

Figure 2.7: The semantic web stack
(Source: Herman, 2012:11)

The integration of the semantic Web in e-commerce is not yet fully documented as its success will largely depend on its ability to mediate a large amount of business

[4] Expressed in triples (subject, predicate and object)

transactions, and this cannot be achieved without a multi-standard approach (Fensel, Facca, Simperl & Toma, 2011). Almeida, Santos and Monteiro (2013) emphasise the challenges to fully integrate Web 3.0 into e-commerce in terms of multi-channel integration of a customer profile across various sources. According to Almeida *et al*. (2013), browsers on users' computers will be able to analyse and learn users' interests with time, based on the users' profile. This will allow a user to have a personalised web experience with precise response. Regarding e-commerce, Almeida *et al*. (2013) stated that the Web will need to use various means to harness knowledge of an individual and integrate this information for Web 3.0 to be feasible.

Mark-up languages such as XBRL (Extensible Business Reporting Language) are used by businesses to better describe their web resources (Kambil, 2008). Users can extract and compare information of corporate disclosure marked-up with semantic XBRL tags across businesses (Kambil, 2008). However, in B2C e-commerce websites there is still no clear direction as to how to fully integrate website data into a Web 3.0 experience.

Some authors and scholars have envisaged the Web moving from Web 3.0 to Web 4.0—the Symbiotic Web. Web 4.0 will be a highly intelligent web that will allow interaction between humans and computers in symbiosis (Aghaei *et al*., 2012; Choudhury, 2014). It will be a web with read-write concurrency that will act as middleware with an open collection of web services and functions such as an operating system termed 'WebOS' (Aghaei *et al*., 2012). The Web and the computing world are evolving from semantics into a sensory-emotive and affective computer in which the Web and computers will be aware of human feelings or emotions.

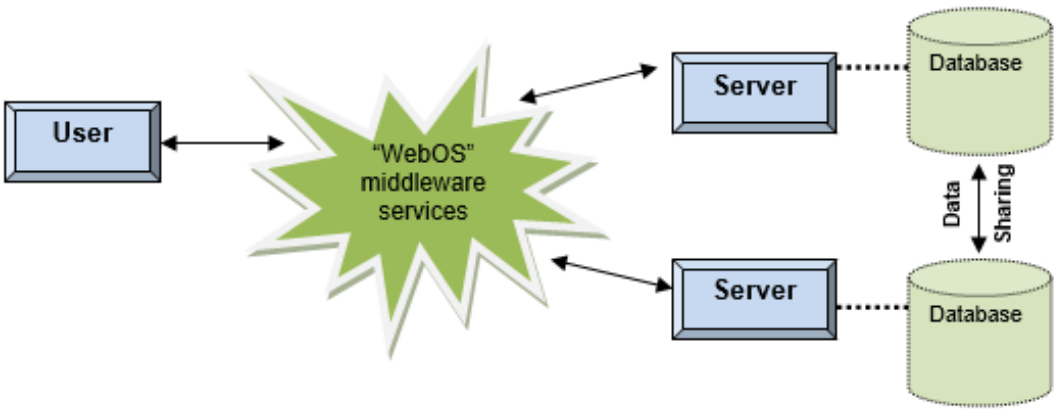

Figure 2.8: Web 4.0 – the WebOS providing middleware services

2.2.5.4 Affective Web—the sensory-emotive Web

Web 1.0 has come and has moved to Web 2.0, which in turn is now moving to Web 3.0. Transitioning from Web 4.0 to Web 5.0 is still very much on the edge and yet to be actualised (Nath *et al*., 2014). Web 5.0 is termed the affective Web (Marsella & Gratch, 2014), or the sensory-emotive Web (Kambil, 2008).

Emotions are said to have a critical role in conveying information or for decision making. Emotions are not easily disguised, and when exposed play a vital role in social interaction. It can communicate (by perception) what an individual believes or desires, and their intentions to others (Marsella & Gratch, 2014). Although Kambil (2008) describes the present state of the Web as "emotionally flat", he acknowledges that we are at the threshold of a quasi-emotive web (which he terms Web 5.0) that is more aware of humans' feelings. Affective computing is gaining more attention in the computer world. It generally refers to a computer gaining awareness of human emotions or feelings. Such becoming aware of human emotions and feelings—and its application on the web—is still being treated as futuristic research (Benito-Osorio, Peris-Ortiz, Armengot & Colino, 2013).

Due to its broad use, there has not been an acceptable definition of emotion in the context of the Web. According to Picard (1997), some definitions of emotion have been recorded over time, but with the imprecise nature of these definitions, Picard describes emotion as based on "solid facts and knowledge". Picard says emotions are largely examined in two components: i) emotions are *cognitive,* emphasising their mental component; and ii) emotions are *physical,* emphasising their bodily component. The cognitive component focuses on understanding what situations give rise to emotions, while the physical component focuses on the psychological response that co-occurs with (or rapidly follows) an emotion. Picard highlights ways in which emotions can be expressed physically through sentic[5] modulation, including facial expression, posture, vocal intonation, gesture, and other bodily changes. Computers can relate to these by sensing responses from people when they are in physical contact with it. The challenge is for the computer to understand what situations give rise to the emotions, and how these emotions influence behaviour in a situation. This is the case of cognition reasoning (Picard, 1997; Marsella & Gratch, 2014).

[5] 'sentiments' and 'sensation'

Interacting with computers and the Web through emotions and feelings still has challenges such as the complexity of mapping emotions and feelings in the brain (Kambil, 2008; Benito-Osorio *et al*., 2013). These challenges, according to Marsella and Gratch (2014), also deal with how emotions arise and change over a range of eliciting conditions, from simple physical events to complex social situations. Secondly, the time span of emotional responses can be in milliseconds, minutes, or days, following some deliberation or inference. Much will have to be considered for the success of a sensory-emotive Web. For a successful affective computing or Web, a computer must be able to recognise emotions, express emotions, have emotions, and have emotional intelligence.

In as much as these challenges limit the speed of the uptake of Web 5.0, there has been some acknowledged success in other areas of computing such as Artificial Intelligence, health, and gaming environments. For example, the company Emotiv has developed devices using electroencephalography (EEG) to read brainwaves and use these to control a variety of applications such as games, interaction with computers, and hands-free control systems. Even with these advances, technologies can only measure some of the effects of emotions (Kambil, 2008). Another example is the IBM Blue Eyes technology research projects that make a computer sense and understand human feelings and behaviours and interact with each other (Mepits.com, 2014).

In e-commerce, the sensory-emotive Web can play a huge role in user trust if a rich, emotionally-resonant experience can be achieved. It will help in creating a more customised, real-time environment for consumers (Kambil, 2008). An e-commerce website that can read and understand the emotions of a user to know whether or not the user trusts the website will not only reduce the trust issues, but also engender trust. For example, a user visits a trustworthy e-commerce website and assumes it to be untrustworthy. The website reads the emotions of the user, and understanding the user' fear, showing the user reasons for it to be trusted.

With this advancement in web technologies towards Web 5.0, we could one day see the Web making decisions for us based on how we are feeling. Another suggestion will be the use of biometric login, as modern phones, tablets and PCs are released with front cameras that can be used as biometric sign-in devices to give customers access to their online and transaction accounts.

2.2.6 Web technologies and challenges

E-commerce, and the WWW as a whole, is experiencing continuous transformation. New programming languages, databases, design and animation software, and networking technologies are reshaping the look of e-commerce and the Web at large. Several client and server side scripting languages and technologies have been developed. Some of these technologies were discussed in previous sections on the stages of the Web evolution. In this section, some important technologies presently used in e-commerce website development are listed and briefly described (Table 2.3) with the evolving challenges they present. Web developers can create e-commerce websites using any of the technologies depending on their expertise and knowledge.

Table 2.3: Some client and server-side software used in web development

Technologies	Programming Languages /Techniques/ Platforms	Description
Files	Hypertext Mark-up Language (HTML/HTML5)	A set of standardised codes used in structuring the display of web pages on WWW browsers.
Programming/ Scripting languages	Extended Mark-up Language (XML)	XML is used for constructing customised (user-defined) mark-up language which can be used to describe or/and transfer any type of data.
	JavaScript	A client-side scripting language developed by Netscape used in adding and enabling interactive functions or effects on web pages.
	Visual Basic Scripting (VBScript)	Microsoft's version of client-side scripting language for interactive functions.
	Cascading Style Sheet (CSS/CSS3)	Used for styling, formatting and defining the appearance of web page(s) elements.
	Asynchronous JavaScript and XML (AJAX)	Uses JavaScript on an HTML page to fetch XML files by asynchronously making calls to a server from which it was loaded. A web page is given the capability to make a server call, retrieve new data, and simultaneously update a section of the page without loading the full page (Lawton, 2007). AJAX is regarded as one of the main technologies for increasing user participation in Web 2.0 (Al-Tameem, 2008).
	Practical Extraction and Report Language (Perl)	A server-side scripting language that can be used in searching and reading text in servers before being sent to web browsers.
	Python	A server-side scripting language similar to Perl in function.
	Hypertext Processor (PHP)	An open source server-side scripting language used in creating dynamic, interactive web pages. Also used in the extraction of data from a database of a web server.
	Java Server Pages (JSP)	Similar to PHP, but uses Java programming language.
	ASP.Net	A server-side scripting language developed by Microsoft, similar in functions to PHP.

Technologies	Programming Languages /Techniques/ Platforms	Description
Databases	Oracle DB	A relational database management system (RDBMS) developed by Oracle, used in storing and retrieval of related data/information.
	MS-SQL DB	Microsoft version of RDBMS.
	My-SQL DB	A popular open source RDBMS used mostly in web development.
	Mongo DB	One of the open source NoSQL databases designed to handle document-oriented storage.
Web servers	Apache Web Server	Open source web server software used in the creation, deployment and management of websites.
	IIS Web Server	Microsoft version of the Apache web server.
Content Management Systems	Joomla	A free and open source content management system (CMS) which assists users to build and manage websites.
	Drupal	Similar to Joomla.
	WordPress	Similar to Joomla.
Local Computer Server	XAMPP	An open source package that works across platforms consisting of Apache server, MySQL, PHP and Perl which can be used on local computers without Internet connection.

Since the advent of Web 2.0, the web has opened up a gateway for hackers to attack in various forms (Lawton, 2007), and these challenges automatically affect e-commerce users. The challenges are echoed by various authors as discussed below.

AJAX vulnerability is exploited by a hacker's site (hijacking site) using the AJAX query that uses a script tag in the form of a query to another site (targeted site). The embedded scripts from the target site are transferred to the hacker's site through the AJAX query function in the GET environment and when session cookies work in the target site (Al-Tameem, 2008).

Malwares (short for malicious software) is software designed to access the resources of a computer system without the informed consent of the owner. It includes worms, spyware, viruses, and other unwanted and malicious software (Chang, Venkatasubramanian, West & Lee, 2013). Malware can be sent through RSS or Atom newsfeed distribution systems to subscribers by inserting code into feeds, or a compromised newsfeed server, which can be distributed directly into the browsers of victims. A client can automatically accept the malicious content without knowing it. Hackers could also include malicious code into videos, photos, audio files and text that they upload on websites.

Mashups are web pages or web applications that combine data or services from more than one source or website into a single new user experience service. They work through a set of Application Programming Interfaces (APIs) published by a website provider. The APIs allow the Mashups to collect information from various websites and combine features from multiple sources. This opens a website up to potential hackers who act as content providers and present security challenges (Magazinius, Askarov & Sabelfeld, 2010).

Hackers can use cross-site scripting (XSS) to attack web pages by injecting their own executable code into legitimate web pages so that when unsuspecting users download the pages, the embedded code executes on the victim's computer through the requested page. With this, a hacker can gain access into the victim's computer and steal data. XSS exploits the user's trust of a website.

Cross-site request forgery (CSRF or XSRF), on the other hand, exploits the trust a website has in the users. It is an attack that deceives a victim to unwittingly send an unauthorised request to a website (Alexenko, Jenne, Roy & Zeng, 2010; Ding, 2013). For instance, an unsuspecting victim is tricked to load a webpage containing malicious code which a hacker uses to hack into the victim's computer. It then sends unauthorised requests to a website where the authentication is assumed to be from the user. A hacker can use the user's computer and profile to initiate transactions online, including buying products online or taking money from the user's bank account.

Hackers can also hide and encrypt their malicious code using Dynamic Code Obfuscation (DCO). They use algorithms that can randomly modify function names on JavaScript based websites. As an unsuspecting user visits a malicious website, the user will receive malicious code which is unique to the computer of the user, as the code is altered dynamically. This code keeps changing pattern, which makes detection by antivirus and antispyware very difficult. Victims are usually lured to such malicious sites through spam (sending of unsolicited electronic bulk messages that could contain a link to a malicious website), phishing[6], and even through hidden redirect codes on known websites.

Other techniques used include worms sent through browsers, and the use of applications that can play videos and audios, and view documents.

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[6] A method of disguising as a trustworthy website in an attempt to acquire the victim's personal information such as credit card details, usernames, passwords, or bank account details.

The reason behind these attacks is to use the malicious code on the victim's computer "to fool the victim's local system into believing that requests are coming from a local user" (Lawton, 2007:15). This is done so that they can gain control of a victim's system, have access to their personal information, or launching denial-of-service attacks (Chang *et al*., 2013). The hackers can connect to local servers, and reprogram a router or firewall to permit outside access to local services and access sensitive information.

The question of vendors trusting their users has also been an increasingly worrisome issue on the vulnerability of Web 2.0 (Chang *et al*., 2013). Since Web 2.0 opened up the web for users to be contributors, hackers can use such opportunities to infect websites by submitting malicious code in posts through embedded HTML and JavaScript. The quality and integrity of information in websites where users can contribute (such as Wikipedia) can also be questioned (Lawton, 2007).

Lawton (2007) suggests that users, in order to prevent these attacks, should always update their browsers and ensure keeping it up-to-date. This is to ensure that the user's browser security is up to date to counter any new malware developed by attackers. Vendors can protect their websites through web application firewalls and application and source-code vulnerability scanners, but according to Chang *et al*. (2013), these detection systems still have limited capability. Al-Tameem (2008) suggests a proposed solution of dealing with AJAX vulnerability by "auditing AJAX and JavaScript based applications with a Web vulnerability scanner that not only parses the HTML code of a webpage to identify embedded JavaScript, but also executes the code". Other ways include better, continuous and improved programmer training, and training staff in safe computing practices and basic computer hygiene.

2.3 Trust

In our everyday living, trust comes into play in our activities. These include our daily interaction with friends and family, buying and selling of goods, driver skills in traffic, and even in our consumption. Trust as a concept is very broad, and cannot be easily defined as it cuts across multiple disciplines with no universally accepted definition (Wade & Robison, 2012). Researchers in different disciplines have several definitions of trust, but all agree that it is based on building a long lasting relationship (Mcknight & Chervany, 2002; Hong & Cho, 2011).

In interactions, the element of trust is human-centric and originates from humans (Hall & McQuay, 2010). Studies on trust have been done in human-computer

interaction, psychology, sociology, social psychology, e-commerce, marketing, ergonomics, economics and philosophy.

Wade and Robison (2012:1) in explaining *trust* states that “trust is not a behaviour, nor is it a one-off decision. It is an underlying psychological state, which is informed by both our emotions and our cognitive (mental) processes”.

From a psychological viewpoint, Wade and Robison (2012) describe trust with two features. There must firstly be a willingness from the trustor (the trusting individual) to be vulnerable. Secondly, the trustor must have positive expectations regarding the trustee (the individual/group to be trusted). The characteristics of the trustee can encourage or discourage trust.

For a trustor to trust involves risk taking by accepting vulnerabilities in decision making (Hall & McQuay, 2010). Wade and Robison (2012) further explain that trust provides a way for an individual to judge whether or not to take the risk when an outcome is uncertain, and involves risking something of human value (money, time, health, reputation). To some extent, willingness to take a risk is a result of trust.

Humans have a natural disposition to trust that can be traced to the neurobiological structure and activity of the brain and brain chemicals such as oxytocin (Kosfeld, Heinrichs, Zak, Fischbacher & Fehr, 2005; Newman & Eisenegger, 2011). Humans’ trust levels are said to be shaped by their life experiences. A person’s underlying trust level, and the indication of how much they are willing to rely on others in general, is known as *trust propensity* (Wade & Robison, 2012). Trust propensity is a person’s inherent (inborn) characteristic to trust; it could be natural, nurtured or both. The intention of a person to trust another person correlates with their trust propensity when information about the trustworthiness of that person was unclear, but it does not correlate when the information about trustworthiness was clear (Gill, Boies, Finegan & McNally, 2005). Wade and Robison (2012:2) list factors that have been found to influence trust propensity as:

i) **Level of extroversion/neuroticism:** People with high extroversion (i.e. outgoing/energetic) and low neuroticism (i.e. secure/confident) tend to be more trusting.
ii) **Participation in religion:** Some studies have found religious participants to have higher trust levels than atheists.
iii) **Family interaction:** Parents who keep the majority of their promises, and are more trusting of their children, are likely to have children with a higher trust propensity.

iv) **Gender:** In some studies men have reported higher levels of trust in formal institutions and governments when compared to women.

Table 2.4: Factors which influence/build trust

Factors	Description	
	Wade and Robison (2012)	**Gill *et al*. (2005)**
Ability (cognition-based trust)	Ability-based trust judgements stem from our thoughts about how responsible, knowledgeable and reliable a trustee is, based on their track record or reputation. Ability is therefore associated with cognition-based trust. Cognition refers to mental processes such as thinking, remembering, and sorting information. Cognition-based trust uses cognitive judgements (i.e. belief-based decisions) to assess the magnitude of risks and benefits.	Ability is connected with cognition-based trust which involves how knowledgeable, skilful, responsible and competent a trustee is.
Benevolence (affect-based trust)	Benevolence is associated with the emotional bond between a trustor and trustee. It is created through the expression of genuine care and a shared regard for each other's welfare. It entails a sense of empathy, rapport and union. Benevolence is therefore an affect-based trust judgement, that is, it provides a more immediate response stemming from our feelings and emotions.	Benevolence is connected with the emotions (affect-based trust) signifying the level to which a trustor believes that a trustee will act in the best interest of the trustor, by having a sense of empathy, rapport and union with the trustor.
Integrity (both cognition- and affect-based)	Integrity is a quality formed through adhering to ethical and moral principles (e.g. honesty). Research has associated integrity-based trust with both cognition-based and affect-based processes. Thus, the integrity of a trustee may influence both our thoughts and feelings regarding them.	Integrity, which can be cognition-based and affect-based, is the level to which the trustor perceives the trustee as acting in accord with a set of principles that the trustor finds acceptable.

McKnight and Chervany (2001) conducted a meta-analysis of articles and monographs that contain definitions of trust from different disciplines. The authors categorised the concept of trust into four high level categories: benevolence, integrity, competence and predictability. Gill *et al*. (2005) and Wade and Robison (2012) confirm McKnight and Chervany's (2001) findings by stating that in order to build, influence or develop a trusting relationship, three main factors are considered as the determinants: ability (competence and predictability), benevolence, and integrity. These three main factors are core characteristics that a trustee will have to possess to inspire trustworthiness (Table 2.4).

There is a connection between cognition-based trust and affect-based trust. A person's emotional instinct (affect-based trust) can influence their sense of judgement (cognition-based trust). Also, affect-based trust can be created and influenced through an established cognition-based trust. For instance, a trustor who has had prior experiences with a trustee whose *ability* has effectively demonstrated trustworthiness can develop an emotional attachment (affect-based trust).

As previously noted, research has demonstrated that the gender of a person plays a vital role in trust. Meyers-Levy and Loken (2014) assert five propositions that reveals gender differences: "i) males are more self-oriented and females are more other-oriented; ii) females are more cautious and avoidance focused while males are more risk-taking and assertive; iii) females are more responsive than males to negative stimuli in their environment; iv) males are more selective in their intake and processing of data, whereas females are more comprehensive; and v) females are more sensitive to environmental cues and differentiating factors, whereas males' responses are more consistent across contexts." These characteristics attribute to women showing they are more trusting than men in general, and people are more likely to trust women than men. In contrast to this, gender differences in trust reverse when being evaluated in e-commerce and online game contexts (Meyers-Levy & Loken, 2014). Men are more trusting in e-commerce technology than women (see more discussion on e-commerce gender trust in section 2.5.1).

In the use of and interaction with computer or web technologies, there is a greater risk of distrust as these technologies tend to become more complex, with a possibility of having an unintended increase of security challenges (Hall & McQuay, 2010). In Human-Computer Interaction (HCI), humans have been found to interact with computers in the way they interact with another human being (Moon & Nass, 1996; Chen & Rodgers, 2006). This can be likened to the *Turing Test*—testing the capability of a computer to show intelligent behaviour which is comparable to that of humans. Humans trust based on the perceived personality of another human. Trust is personal and not generic, but can be inherited from person A to person B. This is also very much the same with the personality of a computer application, since computer personalities are psychologically real to users (Moon & Nass, 1996). A computer applications personality may (or may not) have some characteristics that communicate trustworthiness (section 2.5.2). For example, even though a website is certified trustworthy, a person can still assume the website as being untrustworthy if there are no characteristics of the website communicating trustworthiness.

The next section discusses one of the methodologies (user-centred design, the chosen methodology for this research) used in HCI to involve end-users in interaction design processes.

2.4 User-Centred Design (UCD)

User-centred design can be regarded as a framework, field, craft, philosophy, practice, discipline or method of designing tools for human use by placing the human (as opposed to the 'thing') at the centre of the design process (Katz-Haas, 1998; Williams, 2009). Humans, the end-users, are involved in the design process of building services, products and/or technologies to serve users (Williams, 2009; Church & Whitten, 2009). Abras, Maloney-Krichmar and Preece (2004) express UCD as a broad term used to describe design processes in which end-users influence how an interaction design evolves. They state that there is a variety of ways by which end-users are involved in UCD because of its broad philosophy and variety of methods, but the important concept is that users are involved in one way or another. UCD is not merely usability testing or software engineering, but a methodology encompassing methods of modular (smaller modules) processes (Mao, Vredenburg, Smith & Carey, 2005).

Studies on how humans interact with computers have long been feeding an engaging discussion among scholars and authors which is mostly regarded as HCI. UCD (sometimes called *interaction design*) is an associated design philosophy or methodology of HCI's various methodologies, focused on how to design computer technology so that it is as easy and pleasant to use as possible (Dix, 2009). Others include service design and value-sensitive design.

HCI is a multi-disciplinary field of study concerning the ways in which computer technologies and humans interact, as well as influencing human work and activities with computer technologies (Dix, 2009). It helps to understand the processes humans and computers engage in, the resources they use, and the impact they accomplish (Te'eni, Carey & Zhang, 2007). The study of HCI is concerned with interactive computing systems analysis, design, evaluation and implementation for human use (Preece *et al*., 2015). Te'eni *et al*. (2007) say that HCI should be designed to achieve a *fit* between the user, computer, and task, and it should do so for a given context. This interaction is done by a user interface (in computer terms, graphical user interface or GUI), often referred to as Human-Machine Interface (HMI) or Man-Machine Interface (MMI).

As technological artefacts and applications are increasingly being adopted, integrated and included in our daily living (education, work or leisure), there is a substantial range of users' needs that should be recognised for technology to serve its purpose (Pirhonen, Isomäki, Roast & Saariluoma, 2005). A key characteristic of the design discipline is the notion of "usability", which is often defined in terms of efficiency, effectiveness and satisfaction (usefulness) (Dix, 2009).

The phrase "user-centred design" originated from Donald Norman's Laboratory at the University of California San Diego (UCSD) in the 1980s (Abras, *et al*., 2004). In a short description of the history of UCD, Abras *et al*. (2004) cite two of Donald Norman's works: *"User-centred system design: new perspectives on human-computer interaction"* (Norman & Draper, 1986), and *"Psychology of everyday things (POET)"* (Norman, 1988) as the driving tools for the establishment of UCD. Norman (in POET) recognises the interests and needs of users, with focus on the usability of the design. Norman and Draper (1986:188) proffer four basic recommendations on how to place the user at the centre of a design:

- Make it easy to determine what actions are possible at any moment
- Make things visible, including the conceptual model of the system, the alternative actions, and the results of actions
- Make it easy to evaluate the current state of the system
- Follow natural mappings between intentions and the required actions, between actions and the resulting effects, and between the information that is visible and the interpretation of the system state

With Norman's works as the driver for involving the actual users in the environment for which a product or service is being designed, this began the evolution of user-centred design (Abras *et al*., 2004).

There have been misconceptions on what UCD is, and what it is not. Lowdermilk (2013) in clarifying the misconceptions states that:

i) **UCD is not just usability:** Usability is broad and focuses on the study of humans interacting with any product. HCI is a subset of usability that focuses specifically on humans interacting with *computing* products. User-centred design, emerging from HCI, is a *methodology* used by developers and designers to ensure they are creating products that meet users' needs while user experience (UX) is one of the many focuses of UCD. UX includes the user's entire experience with the product, including physical and emotional reactions.

ii) **UCD is not subjective:** Lowdermilk (2013) argues that UCD is not subjective as it is a conglomeration of various disciplines such as psychology, ergonomics, computer science and anthropology. Lowdermilk holds that by "observing users directly, we remove assumptions and statistically prove what is actually happening". Lowdermilk's use of the word 'subjective' can be misleading here, as subjectivism entails the study of the perceptions of social actors, which UCD strongly supports (Saunders *et al*., 2009)

iii) **UCD is not just design:** It involves much more than making applications aesthetically pleasing. The user interface is important, but even more so is how effective the application is in fulfilling its purpose.

iv) **UCD is not a waste of time and money:** In understanding the need of users, you avoid misunderstandings and costly mistakes which will result in rebuilding the application as it did not meet the expectation of users.

v) **UCD is not a bug report:** Bug reports cannot be substituted with thorough user research. An error or bug a user reports might be the wrong use of the application. Bug reporting should be considered only as a way to augment the overall user-design strategy.

vi) **UCD is not a distraction:** UCD does not distract from getting work done but ensures that the focus is on the right things: meeting the needs of users with proper technological solutions.

As a multidisciplinary design approach, UCD is a methodology based on the active involvement of users to increase the understanding of the user, task requirements, iteration of the design, evaluation, and implementation. It is regarded as key to product usability and usefulness, an effective way to overcoming the limitations of traditional system-centred design (Mao *et al*., 2005). Through participatory co-designing, designers get into the users' world and this enables designers to see as the users would do (and *vice versa*) as well as design solutions that best fit their profile.

UCD methods are having considerable impact in the development of products and artefacts to be effective, efficient, safe, and easy to use (Jenson, 2002; Abras *et al*., 2004; Mao *et al*., 2005; Church & Whitten, 2009). These methods contribute to users having a sense of ownership of the product (Church & Whitten, 2009). Abras *et al*. (2004) and Mao *et al*. (2005) note that using UCD might seem expensive and time consuming, but in the long run it saves development time and money by reducing the amount of rework and redesign needed. In acknowledgement of the

recommendations from Norman and Draper (1986) above, Jenson (2002) notes that simple designs have a tendency to make product managers nervous because they view the design as not having enough features to be competitive. Jenson argues that this is a complete fallacy, as designs can hide powerful features but still have simplicity on the surface. An e-commerce website can be designed to be simple to understand by users, and yet have very complex technology to ensure everyone wins.

UCD also helps in designing products that will quickly integrate into the *environment of use*, and in facilitating more creative design solutions (Abras *et al*., 2004). UCD has a positive impact on products by helping to make them more user-centric. This impact can also be harnessed to improve the design of e-commerce websites and thereby gain additional user-trust of the e-commerce technology.

Seven principles of design are suggested by Norman (1988, as cited in Abras *et al*., 2004:2-3) as being essential for facilitating the designer's task:

i) Use both knowledge in the world and knowledge in the head. By building conceptual models, write manuals that are easily understood and written before the design is implemented.
ii) Simplify the structure of the tasks. Make sure not to overload either the short-term or the long term memory of the user. On average, a user is able to remember five things at a time. Make sure the task is consistent, and provide mental aids for easy retrieval of information from long term memory. Make sure the user has control over the task.
iii) Make things visible by bridging the gulfs of *execution* and *evaluation*. The user should be able to figure out the use of an object by seeing the right buttons or devices for executing an operation.
iv) Get the mappings right. One way to make things understandable is to use graphics.
v) Exploit the power of constraints, both natural and artificial, in order to give the user the feeling that there is one thing to do.
vi) Design for error. By foreseeing and planning for any possible user error, the system can allow the user options to recover from such errors.
vii) When all else fails, standardise. Create an international standard if something cannot be designed without arbitrary mappings (Norman, 1988:189-201).

In developing a user-centric technology, understanding the users, tasks and environments in which the product or artefact will be used is very important. This is

to ensure that the final product or artefact will accomplish its goal or task for the users who use it (Abras *et al*., 2004). Abras *et al*. (2004), in describing how to involve users in the user-centred design process, list five steps:

- Identify the stakeholders
- Investigate, identify and analyse the needs and tasks of users
- Develop mock-up design solutions
- Develop a prototype and have it tested by the users
- Implement the artefact

The steps are also echoed by Frost, Pike, Kenyo and Pels (2012) as they use UCD as a guide to the steps in the Management Information Systems life cycle: *Analysis*, *Requirements*, *Design*, *Development* and *Implementation*.

Figure 2.9 shows the UCD steps—as adapted from Abras *et al*. (2004)—which are briefly described below:

i) **Identify** the stakeholders (primary, secondary and tertiary) of the artefact—those who will be using the artefact as the primary stakeholders; those who will use the artefact occasionally or use it through an intermediary as the secondary stakeholders; and tertiary stakeholders as those who will be affected by the use of the artefact or make decisions about its purchase.

ii) **Investigate**, identify and analyse through research the needs and tasks of users (e.g. observation, interviews, questionnaires, focus groups, or any other suitable means).

iii) **Design** mock-up solutions (paper/software enhanced sketches) to be evaluated by the users. This is to gain more information and understanding about the artefact that was not revealed from initial observations, interviews, etc.

iv) **Develop** a prototype and have it **tested** by the users. At this stage close attention must be paid to user evaluations as they will help identify ‘measurable usability criteria‘. These criteria address issues related to the effectiveness, efficiency, safety, utility, learnability and memorability (how long it takes to remember to perform the most common tasks) of the product/artefact, as well as the subjective satisfaction of users with it.

v) **Implement** the artefact after a series of iterations.

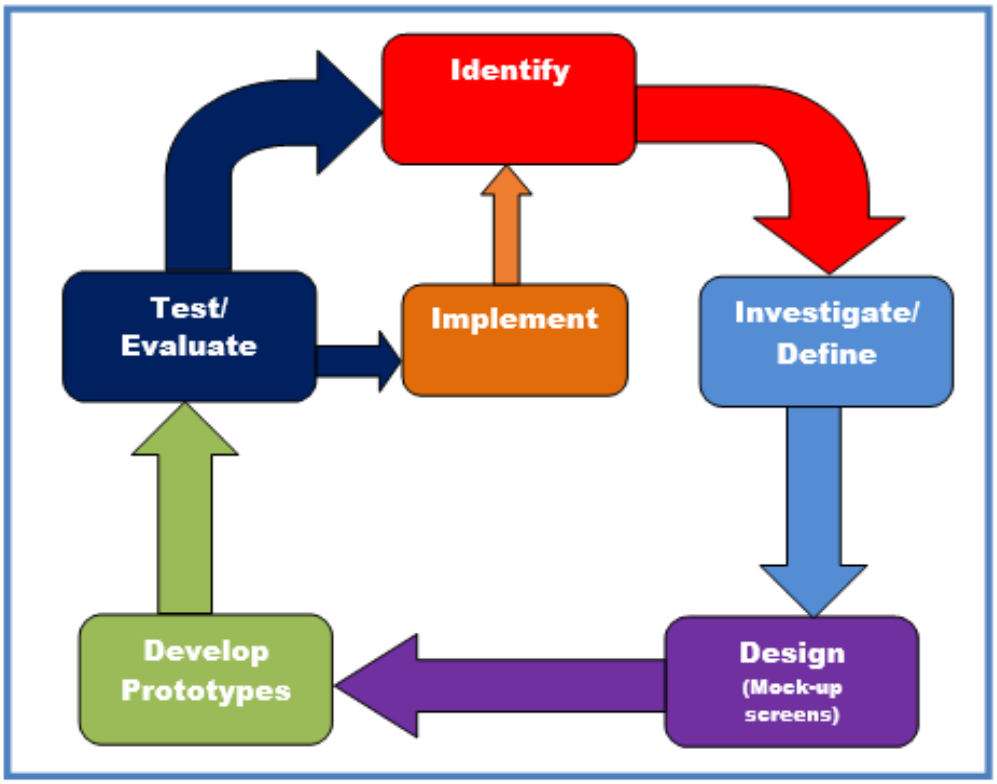

Figure 2.9: The UCD lifecycle
(Adapted from Abras et al., 2004)

The International Organisation for Standardisation (ISO, 2010) has developed standard ISO 9241-210 for human-centred design for interactive systems (formerly known as ISO 13407). UCD methods and similar approaches should follow this standard. It defines a general process for including human-centred activities throughout a development life cycle. The standard does not stipulate any particular method, but the methods described with the UCD lifecycle fulfil the ISO design principles. The *six* ISO (2010) design principles to ensure user-centeredness are:

i) The design is based upon an explicit understanding of users, tasks and environments.
ii) Users are involved throughout design and development.
iii) The design is driven and refined by user-centred evaluation.
iv) The process is iterative.
v) The design addresses the whole user experience.
vi) The design team includes multidisciplinary skills and perspectives.

Mao *et al*. (2005) state that poorly designed e-commerce websites could cause half of their visiting customers to go elsewhere. This is a good reason to consider adopting UCD as the key to user-friendly website design. For instance, almost 20 years ago Norman (1988) had suggested that products be accompanied by a small

pamphlet that can be easily read. It can be drawn from the users' knowledge of the world, rather than large, bulky manuals that are neither friendly nor user-centred. Jenson (2002) notes that the role of designers is to ease the user's task by ensuring that the user is able to utilise the product as intended, and with little effort to learn how to use it.

Table 2.5: Some tools and methods used in user-centred design

Processes	Tools and Methods
Data gathering and idea generation	Observations
	Interviews
	Focus groups
	Questionnaires
	Personas
	Brain writing (method 6-3-5)
	Brainstorming
	Body storming
	Rubber ducking
	Six thinking hats (White, Yellow, Black, Red, Green, Blue)
	5W1H (What, Where, When, Why, Who & How)
Concept visualisation	Scenarios/Storyboard
	Wire framing
	Paper prototyping
	3D prototyping/illustration
	Functional prototyping
Analysis	Affinity diagram
	Grounded theory

In e-commerce it becomes somewhat complicated and cumbersome for a user-centred technology due to the many factors surrounding its use (Mao *et al*., 2005). This includes factors such as developing a user-centred e-commerce website to communicate trust through its design (not limited to usability and aesthetics, but also security and privacy, branding and marketing). There is also design for multiple users of different backgrounds and orientations, users gaining knowledge of the use of these technologies, and making these B2C websites trustworthy and domesticated. These factors are mostly tied to trust, user demography, users' standard of living, and familiarity with the technology (Mao *et al*., 2005), all of which can affect a user's experience with a technology solution. Lowdermilk (2013) argues that UCD could be implemented to ensure that an application maintains a great user experience.

User experience (UX) is a term often used to summarise the entire experience of a technology solution (Lowdermilk, 2013). It does not only encompass functionality,

but also how engaging and pleasant an application is to use (Lowdermilk, 2013). Garrett (2010), in elaborating what user experience is, said that it is not how a product works on the inside, but acknowledges that it sometimes has some influence on the user experience. Garrett stresses that user experience is how a product works on the outside (the interface) where a user is exposed to the product and has to interact with it. Nielsen and Norman (2015) note that UX should encompass all aspects of the end-user's interaction with the company, its services, and its products. They explain that UX should firstly meet the exact need of the customer. Secondly, it must produce products with simplicity and elegance that are a joy to own and use, and thirdly, it must merge the services of multiple disciplines.

Preece *et al*. (2015) point out that one cannot design a user experience, but one can design for user experience. This means that one cannot design a sensual experience but a technology can be designed that can evoke it. The user experience of an e-commerce website is influenced by the users' assessment of the website characteristics (Perdue, 2001), with only the users' common sense and experience to guide them (Garrett, 2010). This makes the user experience less pleasurable if the user finds it difficult to communicate/interact with the website.

2.5 Findings from literature review

This section presents the findings from literature on trust in e-commerce, e-commerce and design, and trust and design.

2.5.1 Trust in e-commerce

In defining e-commerce trust, Nah and Davis (2002) say trust is the willingness of the consumer (trustor) to be vulnerable to the actions of an online party (trustee) by engaging in an online relationship exchange with the party. Trust in e-commerce is the willingness of a customer (trustor) to believe in an online vendor's (trustee's) benevolence, integrity, competence and predictability[7] by engaging in an online relationship exchange. Building a successful and lasting relationship with customers is an essential component for successful e-commerce. Every relationship on e-commerce websites are based on trust and the absence of physical cues in a B2C e-commerce environment increases the need to rely on elements that will convey and engender trust in e-commerce (Kolsaker & Payne, 2002).

[7] They are called the trusting beliefs by McKnight and Chervany (2002).

Mcknight and Chervany (2002) say the disposition to trust has the two sub-constructs of faith in humanity, and trusting stance. Faith in humanity means underlying assumptions about people, while trusting stance is a personal choice or strategy to trust others. Connolly and Bannister (2007) identify two trust antecedents in e-commerce. These are firstly the social antecedents of trust, which relate to the vendor's perceived integrity, and secondly the technical antecedents of trust, which relate to the perceived competence of the vendor. E-commerce is very much a transaction between humans viewed with trust. Humans cannot be taken away from the discussions of e-commerce trust, considering their social, psychological and philosophical approaches to trust.

Trust in e-commerce is core for any online transaction sustainability and development (Chellappa, 2002; Beatty *et al*., 2011). The technological improvement and increasing use of the World Wide Web, especially as a B2C e-commerce tool, has increased the need to understand key issues regarding e-commerce vendors and customer relationships (Corbitt *et al*., 2003). In understanding these issues, trust can be built for the sustenance of e-commerce relationships.

Corbitt *et al.* (2003) highlight three predominant sources that influence trust in e-commerce. These are e-commerce reputation, the customers, and the specific e-commerce website. The reputation of e-commerce, based on the general impression of its trustworthiness, plus how popular the technology is of a country's people, has a strong impact on customers' willingness to trust e-commerce websites. E-commerce has not gained as much reputation in South Africa and in Africa as a whole compared to the better infrastructure and wealth of Western and European countries. This has slowed down the impact of its use in the African region as users generally are yet to trust the technology fully. The experience of customers who have used these technologies can affect their future decision making positively or negatively. This depends on the specific e-commerce website they visited or used.

In distinguishing the difference between Internet stores and traditional brick-and-mortar stores, Jarvenpaa, Tractinsky and Vitale (2000) say that as there is no intermediary (such as a salesperson) between the consumer and vendor in an online store, the vendor becomes "the primary target of the consumer's trust". This gap in transaction is argued to be one of the challenging factors that affect the trust of consumers. The e-commerce website can be seen to take the same role of mediator or facilitator between the consumer and the vendor as that of the salesman in a brick-and-mortar store. For an e-commerce website to be trustworthy, there

should be an assurance that the technology will perform as expected—safe, secured, reliable, and ensuring privacy (Hall & McQuay, 2010).

Women are generally more trusting than men. However, as previously noted in section 2.3 regarding gender differences on trust, women trust and value e-commerce technology less. When purchasing online, women perceive a higher degree of risk than men, but for women (when compared to men), the perceived risk is greatly reduced—with a stronger increase in their willingness to buy online—if the e-commerce website is recommended by a friend (Garbarino & Strahilevitz, 2004). This inherited trust derived from a recommendation by a friend can be spread by a technique known as positive word of mouth (Corbitt *et al*., 2003). Women's concern about online privacy and the control and misuse of their information online is seen as one of the reasons for this perceived risk (Midha, 2012). Midha (2012) also notes that women show more concern than men when reading privacy policies, and are more in support of enacting laws that protect confidentiality.

Another reason for women valuing the use of e-commerce less than men is that women find online shopping less attractive or appealing (Hasan, 2010; Meyers-Levy & Loken 2014). Hasan (2010) avers that the cognitive, affective and behavioural online shopping attitudes are more developed in men than in women. Gender differences in online shopping show that motivations and perceptions of using e-commerce vary between men and women. Women prefer shopping in a brick-and-mortar shop rather than online, when compared to men. Meyers-Levy and Loken (2014) explain that females appreciate the financial control that online shopping offers, but view shopping online as being impersonal, less involving, and lacking in social sensory experience. For instance, females want to feel the thrill of bargaining, or window shopping. They prefer to check the size and fit of a garment before they buy, rather than sitting somewhere, viewing a screen, and clicking buttons.

These emotional and social limitations of e-commerce may limit the motivation for females to buy products online. Women trusting less in e-commerce may be linked to the fact that they generally trust based on affect and emotions—which is rarely found in e-commerce technology (Meyers-Levy & Loken, 2014). The solution to this might be to develop e-commerce websites to be more engaging, emotional, affective and social-sensory involving—like brick-and-mortar stores.

To build initial online trust, Chen and Barnes (2007) found that perceived good reputation, perceived security, perceived privacy, perceived usefulness, and willingness to customise are important. They did not take into consideration how

users are influenced by aesthetics, usability, functionality (ease of use), and levels of convenience in using websites. They do note that trust propensity affect the perception of customers towards websites with regard to online initial trust. Chen, Yan, Fan and Gordon (2015) argue that the intention of consumers to re-purchase would be determined by their perception of perceived risk, perceived benefit, and overall satisfaction derived from the use of the e-commerce website. They further note that the interaction of gender differences and trust propensity play "a significant joint moderating role in affecting the impact of perceived benefit on intention to purchase" (Chen *et al*., 2015:272).

In psychology there are different levels of trust which are related to e-commerce—trust based on intimacy, trust based on insight, trust based on integrity, and trust based on competence (Newman & Eisenegger, 2011). This raises questions of how well the e-commerce vendor knows the customer. Do they act in the best interest of their customers? How honest are these e-commerce websites? Do the e-commerce vendors have the expertise, knowledge and qualifications to run an efficient e-commerce website? An e-commerce website with features that communicates trust can help to encourage changes in the behaviour of users and the acceptance of the technology in the same way that a salesman can convince a customer to purchase a product. When trust is damaged or lacking, it can lead to resistance in one form or another (Wade & Robison, 2012).

2.5.2 E-commerce and trust by design

Every website has a personality which it displays to whoever visits. This displayed personality comes from the design of the website—its physical attributes, features, and characteristics. Chen and Rodgers (2006) argue that websites have "personalities" that attract and detract Internet users. These can be compared to human and brand characteristics, but only those characteristics unique to the web technology (information characteristics) are relevant in determining the site's "personality". An e-commerce website is a medium of interaction between a consumer and a vendor, such as the salesman is in a brick-and-mortar store. It is also a brand carrier and a marketing tool for vendors (Palmer & Griffith, 1998). As such, the design can communicate trustworthiness or untrustworthiness to consumers.

In measuring website personality, Chen and Rogers (2006) developed an instrument they called the Website Personality Scale (WPS) as shown in Table 2.6. Their findings did not include factors that will build trust, distrust, or mistrust, but rather to show general personality characteristics (attributes) that websites have.

Table 2.6: Item condensed WPS factorial structure
(Source: Chen & Rogers, 2006)

Factors	Facet#	Facets	Items
Intelligent	I1	Proficient	Searchable Satisfying
	I2	Sophisticated	Comprehensive Knowledgeable
	I3	Effective	Easy Competent
	I4	Systematic	Fast Concise
Fun	F1	Engaging	Colourful Attractive
	F2	Exciting	Flashy Action-packed
	F3	Vital	Interactive Dynamic
Organised	O1	Confusing	Irritating Discouraging
	O2	Overwhelming	Intensive Cluttered
Candid	1		Orderly Straightforward
Sincere	1		Sincerely Down-to-earth

Online trustworthiness cannot be measured by way of body language or environmental cues such as consumers use in trust decision making when communicating with a store salesman (Lumsden & MacKay, 2006). It can be measured by the design, and it can detract consumers if the attributes of the e-commerce website appear vague, impersonal, and difficult to understand. The design attributes of an e-commerce website can affect and influence the customer-business relationship and sales effectiveness, just as a salesman's personality can do in a brick-and-mortar store (Chen & Rodgers, 2006). The design of an e-commerce website influences the preferences of users and their choices of which site they shop with. It has the potential to increase (or decrease) the site's attractiveness, and thus positively (or negatively) affect the relationship the business has with its customers.

According to Stewart (2006), an e-commerce website requires a unified storefront which is a well-displayed showcase of products, a shopping cart system where the client places the selected products, and a system that integrates the online data transactions and e-commerce payment solutions with the provider's existing accounting system. These requirements are similar to those of the brick-and-mortar stores. The one major difference is that they are not living online. To enable users to

have a similar experience as with a brick-and-mortar store, simplicity in design can make it more user-friendly (Jenson, 2002).

Jenson (2002) says businesses can suffer from four kinds of product blindness, namely user blindness, feature blindness, innovation blindness, and implementation blindness. User blindness occurs when an e-commerce website is designed with an assumption that the developer/designer knows the users and their preferences. A user is seen as someone just like the developer/designer. Without taking time to find out what the actual users of the website need—essential for trust to be communicated through the website—the developer/designer is prevented from seeing the site from the users' perspective. Feature blindness occurs when an e-commerce website is so saturated with sophisticated features that they make it difficult for users to understand. By having so many sophisticated features the website might end up overwhelming the users and they would not know where to start. It is important that the design of e-commerce websites should contain detailed but simple cues (attributes) that can trigger and engender trust in users of the websites (Lumsden & MacKay, 2006). However, Chang (2012) states that in as much as the personality of the website is derived from the site's visual design, it can only influence a consumer if there is an agreement between the depicted personalities and the consumer's own self-concepts.

The attributes of an e-commerce website can attract or drive away visitors through its design. The design of e-commerce websites has been marred with trust related issues. These issues trigger when the design of e-commerce websites fail to convey a sense of trustworthiness to the consumers (Fang *et al*., 2011). To attract consumers to purchase online products, making them stay, or return to repurchase, website quality is very critical (Bai *et al*., 2008). A well-designed e-commerce website, according to Liu, Arnettn and Litecky (2000), would lead to an improved consumer recall and acknowledgement, with a positive attitude towards the website and its products. Liu *et al*. (2000) list information quality, service quality, playfulness, system design quality, and system use as key design factors for a well-designed e-commerce website.

The user interface is mainly the element of consumer experience (Egger, 2001) and it should have features that have trust designed into it (Lumsden & MacKay, 2006). Nevertheless, Jarvenpaa *et al*. (2000) argue that older customers of e-commerce who do not have daily Internet experience may use perceived store size, reputation of the vendor, and familiarity with the vendor, as determinants of trust. This suggests that a vendor's physical known reputation and identity can encourage the use of e-

commerce websites. Corbitt *et al*. (2003) found that users of e-commerce are likely to purchase from a vendor if they have more experience in using the Internet (or the Web) and they perceive a higher degree of trust in e-commerce in general. They continue by stating that the level of perceived market orientation, site quality, technical trustworthiness, and user's web experience influence the trust levels of customers.

Studies on e-commerce in the western and developed countries have also shown that education, income, and native country have an impact on trust. Corbitt *et al*. (2003) indicate that it would be worthwhile to take a further look into how exactly customers' demographic characteristics influence their online purchasing behaviours and perceptions. Money back warranties and partnerships with well-known businesses (Corbitt *et al*., 2003), an improved search engine to easily locate products (Stewart, 2006), and content of the website (Rao *et al*., 2005) can also influence trust.

2.5.3 E-commerce trustworthiness from users' perspective

Some scholars argue that it is essential to evaluate the effectiveness of e-commerce website design from the consumer's perspective (Liu *et al*., 2000; Chen, Hsu & Lin, 2010). Jiang *et al*. (2010) suggest that researchers and developers should be concerned about how the users view communicated messages through the interfaces as the users' perspective plays a huge role in designing for trust.

Tolvanen and Ala-Kleemola in 2005 developed a rating and review tool, a web browser add-on called Web of Trust (WOT) (Chia & Knapskog, 2012). WOT is used to collect public opinions from users on the security, vendor reliability, privacy, and child safety of websites (Chia & Knapskog, 2012). This raises further questions on users' perceptions and view on how users determine if an e-commerce website can be trusted or not. There is a need to clarify the features and characteristics an e-commerce website should have before it can be rated (trustworthy or not) by users using the WOT tool. The results obtained can then be integrated into the design of future e-commerce websites to engender trust among users. Perdue (2001) developed and tested a conceptual model for website evaluations in resort settings. He found that overall website quality is a function of site accessibility, site navigation, visual attractiveness, and information content.

Palvia (2009) proposed a unified model of e-commerce relational exchange—exchange between vendors and consumers—using the Technology Acceptance Model (TAM) and Theory of Reasoned Action (TRA). This study showed that the

usage attitude of customers was not only influenced by EOU (ease of use) and usefulness, but also by the perceived trustworthiness of the web vendor. Perceived trustworthiness is based on shared beliefs in the integrity, competence and benevolence of the web vendor.

Bai *et al*. (2008) also developed, and empirically tested, a conceptual model of the impact of website quality on customer satisfaction and purchase intentions. The results indicate that website quality has a direct and positive impact on customer satisfaction, which in turn has a direct and positive impact on purchase intentions. Website quality influences on customers' purchase intentions also exist, but customer satisfaction significantly mediates this effect. The visual attractiveness of an e-commerce website can make a user perceive a business or vendor as being of high quality and standard. The perceived quality of a website design can have a direct effect on the perceived market orientation, the trustworthiness of a vendor's e-commerce website, and the overall trustworthiness of the business organisation (Corbitt *et al*., 2003; Bai *et al*., 2008).

Security must be included in the design of e-commerce websites, as security vulnerability considerations are important for e-commerce to thrive (Kraft & Kakar, 2009; Yasin *et al*., 2012). The Internet uses cryptography to secure communication from third parties. Phil Zimmermann in 1992 put forth a concept he called Web of Trust—a trust model for sending information securely by using PGP (Pretty Good Privacy) or OpenPGP identity certificates which include public key(s) and owner information (Reed & Johnston, 2011). OpenPGP identity certificates can be digitally signed by others who, by the act, endorse the association of that public key with the person or entity listed in the certificate. It is commonly done at key signing. Security issues are important in e-commerce, and although the Internet is secured using encryption techniques, people do not feel safe enough to trust it (Keen, Ballance, Chan & Schrump, 2000; Jiang *et al*., 2010).

Effective use of colour to improve the appeal of an e-commerce website can be a significant determinant for user trust and satisfaction, but there are differences across cultures (Cyr, Head & Larios, 2010). Humans are "feeling" and "thinking" beings (Kambil, 2008) and the success of a system is decided by the users and not by the technical quality (Bai *et al*., 2008).

It is also worth noting that some web principles, standards, and practices have been developed for the Web and websites to ensure quality and consumer satisfaction. Examples include the Canadian Institute of Chartered Accountants (CICA) which, in

September 1997, developed their Trust Services Principles and Criteria jointly with the American Institute of Certified Public Accountants, Inc. (AICPA). Called WebTrust, it comprises trust services principles and criteria for security, availability, processing integrity, confidentiality and privacy of users (WebTrust, 2013). This was intended to improve users' confidence and trust in e-commerce. It dealt with issues of security, privacy and confidentiality in terms of the technology, but did not cover all trust issues of users. Another notable standard is the Payment Card Industry Data Security Standard (PCI DSS), which offers a framework for developing a strong information and payment card security process for organisations (PCI 2015).

2.6 Theoretical framework

A theory is used to present and explain a natural or specific phenomenon. It comprises of an orderly "set of logical premises that present an explanation to a particular phenomenon by representing and showing the relationship that exist between the phenomenon and others" (Zikmund, Babin, Carr & Griffin, 2013:39). In building theories, findings from prior and related studies are reviewed and applied in order to draw logical inferences from these studies, as well as to seek the theoretical knowledge of relevant areas of study.

This section presents theoretical frameworks supporting this study. To guide the researcher on appropriate and applicable theories to explore and understand the trust perceptions of B2C e-commerce users, and to understand how to engender trust in these websites, some prior theories and models on trust in e-commerce are discussed here. The theoretical framework underpinning this study is presented in this section and the conceptualised framework is presented in Chapter Five (section 5.4).

Chigona and Licker (2008) acknowledge four benefits of using theoretical frameworks:

i) The ability to make predictions: if the theory is generally true, the predictions should be true too.
ii) It is purely procedural: it allows researchers to proceed systematically, to observe or to measure some objects and not having to measure everything.
iii) To explain what is happening using the theory terms: leading indirectly to empowerment, since the control of the explanatory forces lead to improvement.
iv) To put the theory under stress to improve it: if the theory does not do a good job of predicting, managing or explaining.

In understanding trust in e-commerce, several theories and models have been linked in the conceptualisation of trust and the e-commerce technology. Trust in e-commerce is influenced by various factors, including natural disposition, human behaviour, trust propensity, and emotions. Researchers have used various theories in conceptualising the trust of users and how it influences their adoption and use of e-commerce technology (Kumar & Sareen, 2012).

Some of the notable theories and models developed over time and identified in relation to this study are discussed below. These theories and models include:

- Theory of Reasoned Action (TRA)
- Theory of Planned Behaviour (TPB)
- Technology Acceptance Model (TAM)
- Expectation-Confirmation Theory (ECT)
- Egger's (2001) MoTEC Model
- Domestication of Technology Theory

2.6.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) posits that individual behaviour is determined by behavioural intentions, and that these are in turn influenced by an individual's attitude towards the behaviour and subjective norms (Ajzen & Fishbein, 1977; Ajzen & Fishbein, 1980; Hale, Householder & Greene, 2002). The theory developed and proposed by Martin Fishbein and Icek Ajzen (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1977; Ajzen & Fishbein, 1980) suggests that individuals are rational beings who use information available to them, together with prior understanding, to evaluate and justify the implications of their actions prior to making decisions or performing behaviours (Kumar & Sareen, 2012; Ajzen & Fishbein, 1980). In essence therefore, the theory states that for e-commerce users to make a decision on entering into a trusting relationship with a vendor, they have to make use of information available to them.

TRA, as studied widely from the social psychology domain, is underpinned by three major constructs that lead to behaviour, namely behavioural intention, attitude and subjective norm (Davis, Bagozzi & Warshaw, 1989; Ajzen & Fishbein, 1980):

i) Behavioural Intention (BI) is jointly determined by an individual's attitude and subjective norm concerning a specific behaviour. It is a measure of the depth of an individual's intention towards an actual behaviour.
ii) Attitude (A) is an individual's positive or negative feelings (evaluative affect) about carrying out the particular behaviour.

iii) Subjective Norm (SN) is an individual's perception, based on the influence that most of the people (or social environment) important to the individual, think that the behaviour being considered should (or should not) be performed.

Ajzen and Fishbein (1980) however propose that these norms and attitudes are not of the same weight when predicting behaviour. It depends mostly on the individual and the situation involved, and the effect of these factors might differ depending on the individual's behavioural intention.

Hale *et al.* (2002) summarise TRA in a simplified equation:

$$BI = (AB)W_1 + (SN)W_2$$

Where:

- BI = an individual's behavioural intention
- (AB) = the individual's attitude toward performing a behaviour
- W = weights empirically derived
- SN = individual's subjective norm related to performing a behaviour

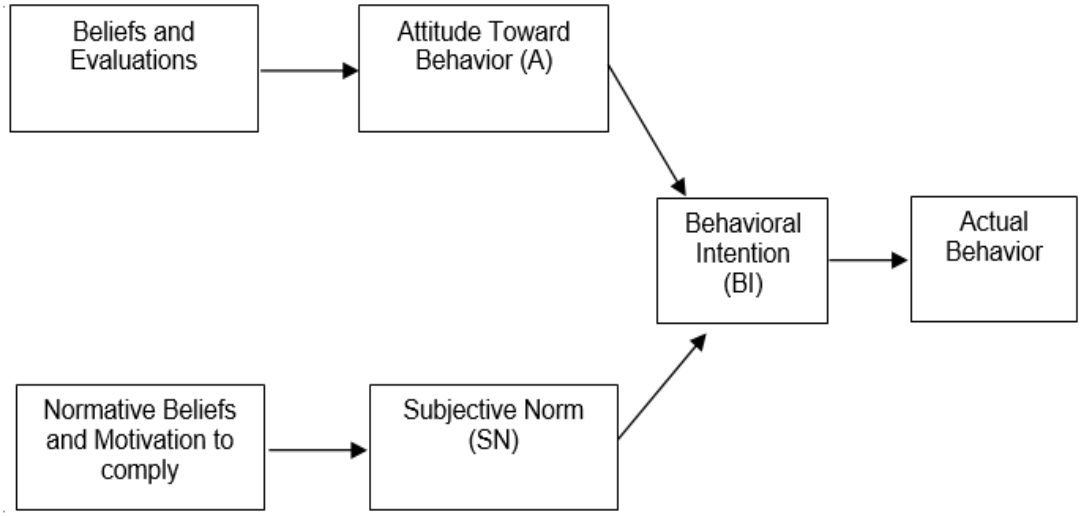

Figure 2.10: Theory of Reasoned Action
(Source: Davis et al., 1989:984)

Considering TRA, in the context of e-commerce trust, would suggest that an individual's intention to trust an e-commerce website would result from a reasoned and calculated exchange between the trustor (the individual) and the trustee (the vendor), within a trusting relationship. The trusting relationship would be driven by

an expectation that it would be of value to the trustor (Kumar & Sareen, 2012). This perceived trust would then influence the individual's belief system which in turn would influence the attitude, the intention, and finally the behaviour of the individual to use the e-commerce website.

TRA is argued to be a theory that performs well in the study of predicting consumer intentions and behaviour. It provides a simple way to identify where and how to target consumers' behavioural change attempts (Sheppard, Hartwick & Warshaw, 1988; Hale *et al.*, 2002; Venkatesh, Davis & Morris, 2007). Hale *et al*. (2002) further argue that the aim of TRA is to describe behaviours made by decision and excludes an extensive collection of behaviours which are spontaneous, impulsive, habitual, the result of cravings, or simply scripted or mindless as these behaviours are not voluntary, or are conscious decisions made by the individual.

Sheppard *et al. (*1988) note three limitations on TRA:

i) **Goals versus behaviours:** knowing the distinction between a goal intention and a behaviour intention.
ii) **The choice among alternatives:** When a factor is more positive, there is a greater likelihood that the individual will perform the behaviour. In a situation of choice, however, the nature of the intention formation process and the role of intentions in the performance of behaviour change dramatically.
iii) **Intentions versus estimates:** there is a distinction between what an individual intends to do and what the individual actually does.

TRA became a foundation for other theories and models, such as TPB and TAM.

2.6.2 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) was developed and proposed by Icek Ajzen in 1985 as an improved extension of the TRA (Ajzen, 1985; Ajzen, 1991). The theory states that three considerations guide an individual's behaviour:

i) Behavioural beliefs about the likely results of the behaviour and the results evaluation.
ii) Normative beliefs about other people's normative expectations.
iii) Control beliefs about factors present that may promote or hinder the behaviour performance (Ajzen, 2002).

Behavioural beliefs produce the individual's attitude toward the behaviour; normative beliefs produce the subjective norm; and the control beliefs produce perceived

behavioural control, as the behaviour may or may not be difficult to perform. In essence, the TPB suggests that individual behaviour is driven by behavioural intentions which are a function of an individual's attitude toward the behaviour, the subjective norms, and the individual's perceived behavioural control (Ajzen, 2002). Ajzen also states that the more the attitude and subjective norm are favourable with an increased perceived control, the more likely that the individual will perform a given behaviour.

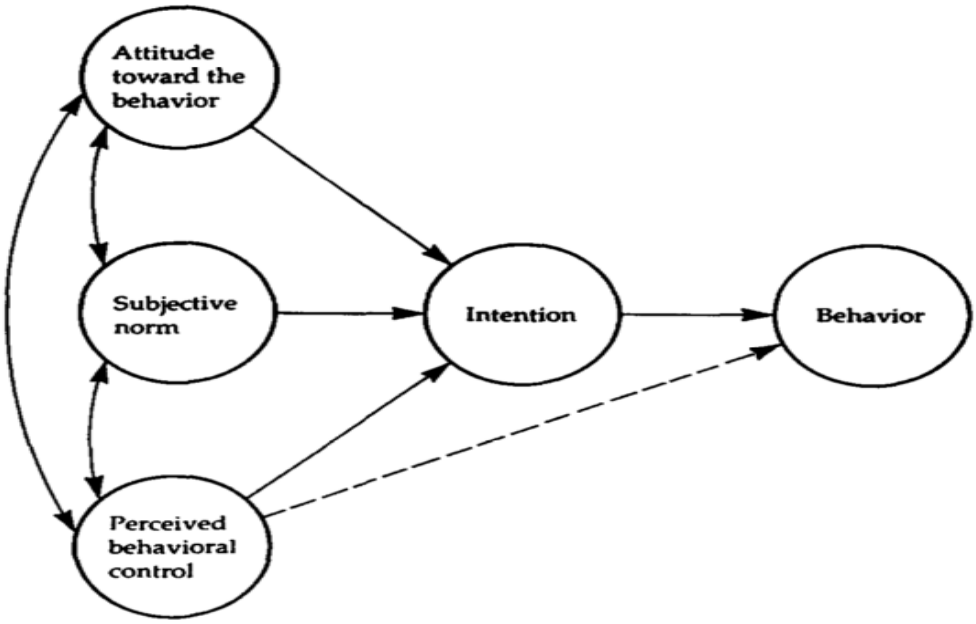

Figure 2.11: Theory of Planned Behaviour
(Source: Ajzen, 1991:182)

It is represented in an equation as:

BI = (W1) AB[(b) + (e)] + (W2) SN[(N) + (m)] + (W3) PBC[(c) + (p)]

Where the following factors are represented:

- BI = Behavioural Intention
- (AB) = An individual's Attitude towards performing a Behaviour
- (b) = Strength of the belief
- (e) = Evaluation of the result of the belief
- SN = Individual's Subjective Norm relating to actual behaviour
- (n) = Strength of each normative belief
- (m) = Motivation to comply with a previous antecedent
- (PBC) = Perceived Behavioural Control
- (c) = Strength of individual control belief
- (p) = Perceived power and influence of control factor
- W = Weights derived empirically

The major limitation and criticism is that this theory does not consider emotional variables such as fear, happiness, threat and (or) any other effect of negative and positive feelings (Dutta-Bergman, 2005). It can be argued that 'trust' is an affective belief, and therefore relates to emotive dimensions. Other variables or factors that TPB does not account for are such as past experiences, its assumption of behaviour being linear and not considering that it can change over time, and environmental and social factors (Bagozzi, 2007).

2.6.3 Technology Acceptance Model (TAM)

In 1986, Fred Davis introduced the Technology Acceptance Model (TAM) in his doctoral thesis (Davis *et al*., 1989). By 1989 it had become known in the Information System (IS) field. The TAM model seeks to explain factors that influence user acceptance and use of a technology (Davis, 1989; Davis *et al*.,1989). TAM is known to be an adaptation of TRA (Davis *et al*., 1989) and one of the foremost extensions of TRA (Bagozzi, 2007). It has undergone a series of upgrades such as TAM 2 (Venkatesh & Davis, 2000), Unified Theory of Acceptance, and Use of Technology (Venkatesh, Morris, Davis & Davis, 2003), and even TAM3 (Venkatesh & Bala, 2008) due to its limitations (Figures 2.12 to 2.14).

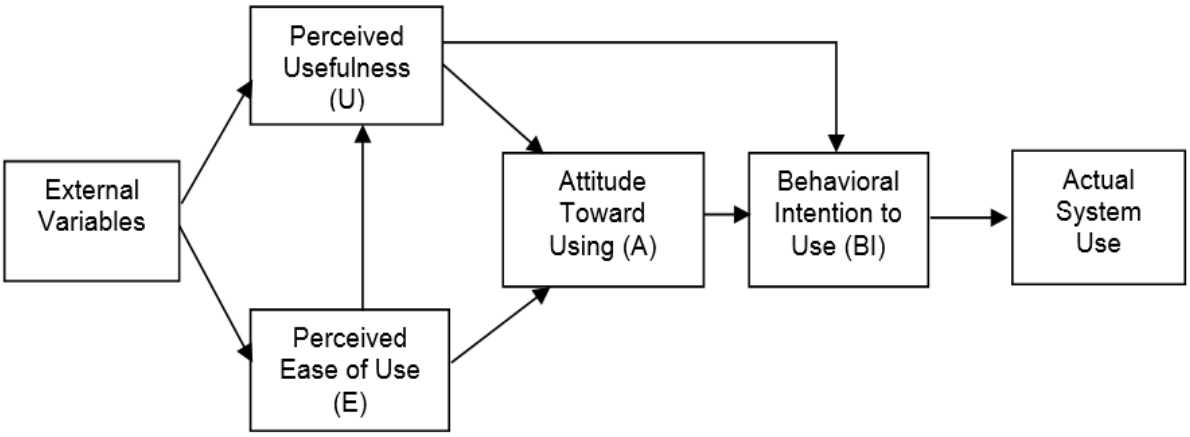

Figure 2.12: Technology Acceptance Model
(Source: Davis et al., 1989:985)

TAM posits that two theoretical constructs, perceived usefulness (PU) and perceived ease of use (PEOU), determine an individual's *intention to use* a technology. The *intention to use* serves as a mediator of the actual technology use.

Davis (1989:320) describes these constructs:

- Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance"
- Perceived ease of use, in contrast, refers to "the degree to which a person believes that using a particular system would be free of effort"

The TAM theory was developed to predict individual adoption and use of new technologies (mostly in organisations). It was developed when information systems were introduced into organisations and would be beneficial and more applicable in the study of technology in organisations. This study looks at engendering e-commerce trust in users. The nature of TAM is simple to determine but too repetitious, and does not consider other factors such as the effects of social influence and affect (Bagozzi, 2007), which influence e-commerce and trust.

Although TAM has been used in studies of e-commerce adoption and trust (Pavlou, 2003; Klopping & McKinney, 2004; Çelik & Yilmaz, 2011; Kesharwani & Bisht, 2012), its limitations reduce its ability to fully understand users' perception and characteristics that will engender trust. These limitations of TAM (which also apply to TRA and TPB) have caused researchers to criticise its appropriateness and depth with questions about its "parsimony" and "fragmented" nature (Bagozzi, 2007). Continuous use and upgrades to fill these gaps in IS caused TAM to be thrown into a state of chaos. To quote Bagozzi (2007):

> "Almost no research has deepened TAM in the sense of explaining PU and PEU, reconceptualising existing variables in the model, or introducing new variables explaining how the existing variables produce the effects they do. Large gaps exist in TAM between intentions and behaviour and between PU and PEU on the one hand and intention on the other… The study of technology adoption/acceptance/rejection is reaching a stage of chaos, and knowledge is becoming increasingly fragmented with little coherent integration" (Bagozzi, 2007:244-245).

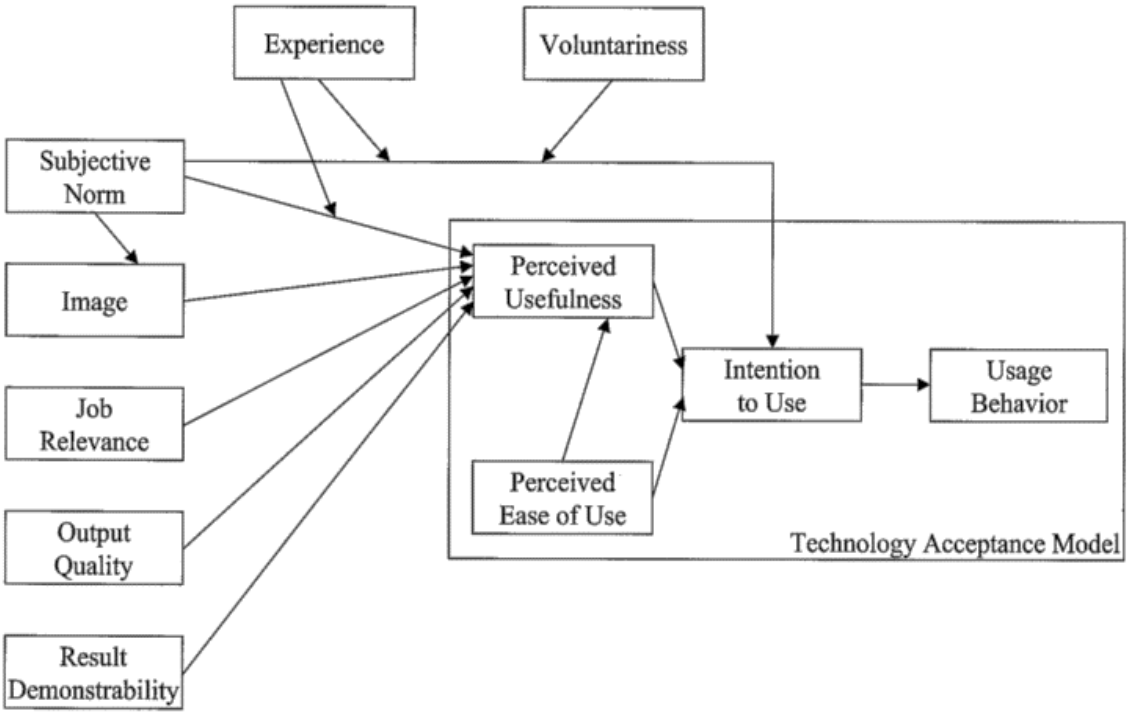

Figure 2.13: TAM2
(Source: Venkatesh & Davis, 2000:188)

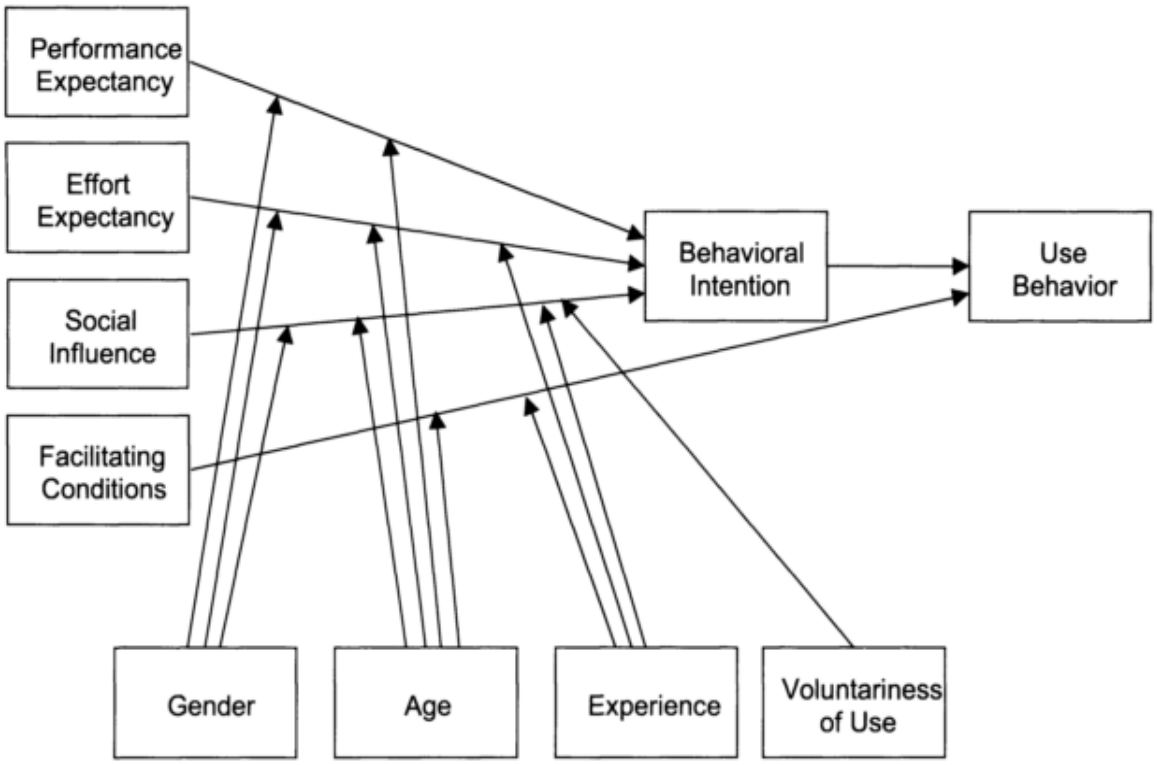

Figure 2.14: UTAUT
(Source: Venkatesh et al., 2003:447)

The TAM model assumes if a user finds a technology useful and easy to use, then the user will use the technology (Davis, 1989; Te'eni *et al*., 2007) but according to

Preece *et al.* (2015) the user experience should also be considered. They argued that, for example, a cell phone can be designed to be useful and easy to use, but turn out to be heavy and awkward to hold, and thereby giving a user an uncomfortable and unpleasant experience. This can result in users discarding the technology. The use of TAM in studying B2C e-commerce and trust will lead a researcher to focus more on cognition than on affect, which is an "insufficient explanation for consumer contexts" where users have the freedom to adopt or reject the e-commerce technology based on how they feel or think (Kulviwat, Bruner II, Kumar, Nasco & Clark, 2007).

TAM, (like TRA and TPB) does not consider some of the more nuanced social and cultural (*inter alia*) variables that could engender technology adoption. Bagozzi (2007) summarises the primary shortcomings of TAM (also of TRA and TPB):

i) Having two critical gaps with the proposed linkages in the framework.
ii) The absence of a sound theory and method for identifying the determinants of PU and PEU, as well as other bases for decision making.
iii) Neglect of group, social, and cultural aspects of decision making.
iv) Reliance on naïve and over-simplified notions of affect or emotions.
v) Over-dependence on a purely deterministic framework without consideration of self-regulation processes.

2.6.4 Expectation-Confirmation Theory (ECT)

Richard Oliver's Expectation-Confirmation Theory (ECT) is also called the expectation disconfirmation theory (Oliver, 1977; Oliver, 1980). It proposes that a consumer will repurchase products or services based on their previous level of satisfaction, and this satisfaction is derived from 'confirmation' or 'disconfirmation'. This (dis)confirmation derives from the match between a consumer's initial expectations (based on e.g. marketing initiatives or word of mouth from previous users), and the perceived actual performance of the vendor over a period of time, influenced by the use and evaluation of the products or services (Oliver, 1980; Chen, Huang, Hsu *et al*., 2010). The (dis)confirmation is of three types:

i) Negative disconfirmation which occurs when actual performance fails to meet the consumer's expectations.
ii) Positive confirmation when actual performance exceeds the consumer's expectations.
iii) Simple confirmation when actual performance meets the consumer's expectations (Oliver, 1980; Santos & Boote, 2003; Chen, Huang, Hsu *et al*., 2010).

The theory has formed the basis on which some scholars (Bhattacherjee, 2001; Egger, 2003; Yang, Hu & Chen, 2005; Zhang & Zhang, 2005) have studied initial trust in e-commerce and developed other models.

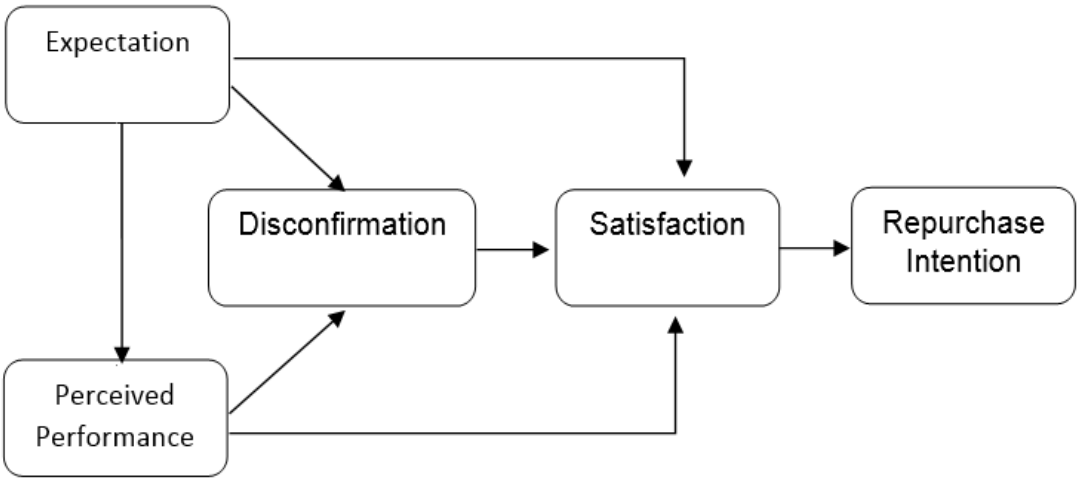

Figure 2.15: The Expectation-Confirmation Theory
(Source: Oliver, 1980)

2.6.5 Egger's MoTEC Model

Florian Egger proposed a Model of Trust in Electronic Commerce (MoTEC) which went through series of iterations (Egger, 2000; Egger & de Groot, 2000; Egger, 2002) up to the final revision (Egger, 2003). It is said to explain "factors that can affect one person's judgement of an e-commerce site's trustworthiness". The model largely draws from some theories and models such as TAM and ECT (Kumar & Sareen, 2012). Using a Human-Computer Interaction approach in a B2C e-commerce situation, Egger lists the factors and classifies them into different components or interaction phases.

The model distinguishes between initial trust (built on perceived trustworthiness) and trust acquired over time (built on experienced trustworthiness). It focuses on initial trust to identify website design elements that affect consumer trust experience (Egger, 2003; Kumar & Sareen, 2012). The MoTEC model groups those factors that influence or affect consumer judgement of the trustworthiness of an e-commerce website into four constructs or dimensions (Figure 2.16):

i) Pre-interactional filters
ii) Interface properties
iii) Informational content
iv) Relationship management

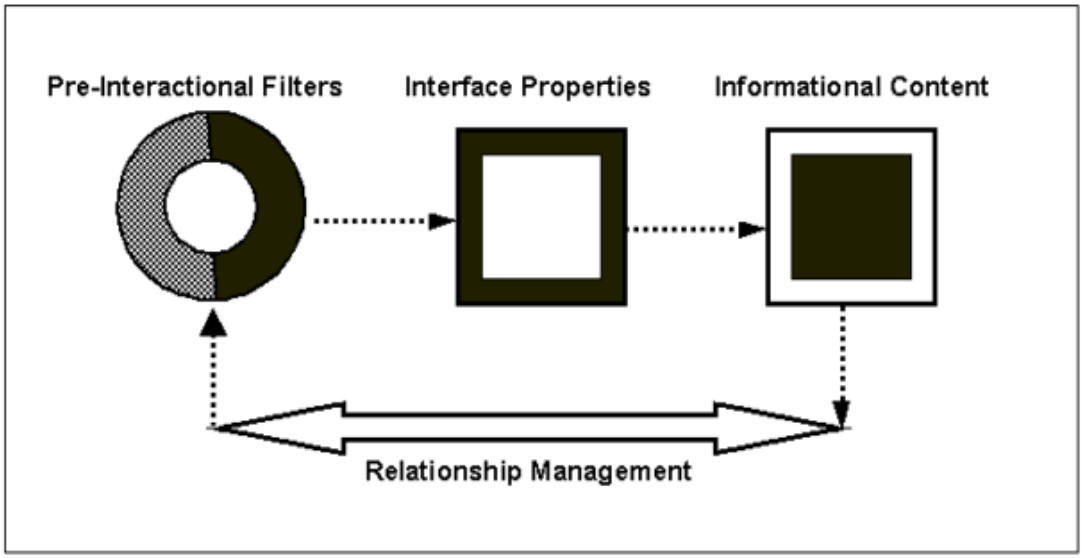

Figure 2.16: The MoTEC Model
(Source: Egger, 2003:35)

The model follows the sequence of the phases a user goes through when exploring an e-commerce website for the first time. Egger (2003) argues, at the hand of the model, that the initial trust value of consumers before assessing a vendor's website is determined by their predisposition to trust and their pre-knowledge of the vendor—all pre-interactional filters. This trust value is re-assessed when the user first explores the site, noting first impressions in terms of graphic design and usability—the interface properties. The trust value is bound to change again when the consumer explores more cognitive factors such as the risk of a transaction, or the vendor's competence—informational content. Finally, the trust level can again be altered by the responsiveness and the quality of help provided by the vendor in handling inquiries and/or orders over time (relationship management). These four constructs or dimensions are discussed below.

2.6.5.1 Pre-interactional filters (PIFs)

The PIFs are factors that affect the perception of consumers before they visit a particular e-commerce website for the first time. The two main types of PIFs are user psychology and pre-purchase knowledge.

User psychology

Three types of psychological predisposition are highlighted in the user psychology:

i) **General propensity to trust** which varies among different individuals based on the variety of philosophical and moral attitudes about the goodness of other people, personal experiences, and cultural factors**.**

ii) **Trust in IT and the Internet** is dependent on the individual's level of experience with IT (Information Technology). It can affect how confident a person feels about using the technology.

iii) **General attitude towards e-commerce** is dependent on the individual's level of experience in using e-commerce. Egger (2003) argues that a negative experience is more likely to be reported than a positive experience, which leads to bias in clearly understanding attitudes towards e-commerce. Egger further states that novices, with little or no knowledge about security, are not worried about lack of security or encryption, but it is the opposite among experienced users.

Pre-purchase knowledge

The second factor affecting pre-purchase knowledge is the users' prescience, based on the reputations of the industry and the company, plus transference.

i) **The reputation of an industry** in which one has more trust, can positively affect a user's trust perception (Egger & de Groot, 2000), and hence such a user will have more trust in e-commerce websites associated with such an industry.

ii) **The reputation of the company** with reference to the consumers' direct or indirect offline experience can also affect the consumer's trust perception. Indirect experience is related to the consumer's awareness of the company and its brand, knowing of its existence, and its position in the market. Direct experience on the other hand comes from the consumer's physical interaction with the company, walking into the store and buying from it. This offline trust can be transferred to the online presence of the company.

iii) **Transference (offline and online)** of trust means a person's trust can be affected by the experience of sources that the person trusts. This transference can be offline or online. The offline trust transference can be as a result of word of mouth advice from friends and family. Online trust transference comes from many online sources relating to the vendor's reliability and quality of service. Sources may include search engines, reviews from influential websites, and newsletters.

2.6.5.2 Interface properties

This dimension refers to the superficial aspects of an e-commerce website and has two main types or components, namely branding and usability.

Branding

Branding refers to the visual design characteristics of the e-commerce website and has to do with the two aspects of appeal and professionalism. Appeal is the first impression consumers have when they visit a website for the first time. It has to do with the effectiveness of the graphic design and layout of the website. Other elements which influence appeal include what makes the business unique in identity, such as their logo or slogan. Professionalism refers to the company's investment in having a professional looking website. This may convey to the consumer the impression that the company is a 'financially viable business with a reputation to defend'.

Usability

Usability encompasses the functionality and features of the website interface and includes organisation, navigation, relevance and reliability. The layout of the website and presentation of content in a way that is pertinent to the user largely makes up its organisation. It includes the provided information structure, availability of guidance (mostly for first time users), ease of use when navigating to find relevant information, the relevance of information on the website (including localisation issues), and the reliability of the underlying systems (such as website servers). These are all components that contribute to website usability.

2.6.5.3 Informational content

The two main components of informational content are competence and risk.

Competence

Users measure an online vendor's competence at the hand of the vendor's company profile and the products and services the vendor provides. The profile may relate to the company's identity (its reputation), its communicated philosophy and values, the company's contact details, achievements, and partnerships with trusted and high profile companies.

Risk

In the e-commerce context, Egger (2003) divides the concept of risk into security and privacy.

i) **Security** involves the vendor's security policies, encryption on website pages, alternative payment methods, third parties in the transaction process, contractual terms of the vendor based on return policies and warranties, and consumer redress mechanisms for dispute resolution.

ii) **Privacy** involves policies on the use of personal information, the type of personal information needed during registration, ease to access and modify data, and subscriptions of users.

Egger (2003) adds that risk can also be reduced when consumers are given free samples of unfamiliar products, a sneak preview, or a free trial of a new online service.

2.6.5.4 Relationship management

Relationship management refers to the interactions between vendors and their consumers during trust development (pre-purchase interactions) and maintenance of the developed trust (post-purchase interactions).

Pre-purchase interactions

Pre-purchase interactions include means through which a company can be contacted offline and online, which conveys how important the company considers customer care and services. The company's prompt and informative response after consumer contact is crucial in building trust. The response should provide high-quality help to the consumer. In addition, Egger (2003) argues that consumers value a personal touch, such as being referred to by name, or a personal message written to them by an identifiable individual.

Post-purchase interactions

Post-purchase interactions include mechanisms that the vendor put in place to facilitate order processing—placing an order, confirmation of order, and tracking of order. The customer experience relating to the condition, packaging, presentation, correctness and completeness of the delivered product is referred to as "consumer fulfilment". The ease with which after sales customer service can be contacted (should there be anything wrong in the order) is also crucial in maintaining trust.

2.6.6 Domestication (of Technology) Theory

The conceptual framework of this research is an adaptation from the Domestication (of Technology) Theory (Silverstone, Hirsch & Morley, 1992; Silverstone, 1994; Lie & Sørensen, 1996). Domestication, developed from the 'social shaping of technology' viewpoint, is recognised as a concept within the studies of the sociology of technology (Lee *et al*., 2009), and also within media and communications studies (Haddon, 2006). It was developed to describe and analyse the social and cultural processes of technology acceptance, rejection and use in our everyday lives (Silverstone & Haddon, 1996; Haddon, 2006; Hynes & Richardson, 2009; Harwood,

2011). The concept of domestication, with reference to technology, is the process whereby technologies such as phones, laptops, the Internet, the Web, and (in the present case) e-commerce technologies are 'tamed' (Silverstone, 1994; Silverstone & Haddon, 1996) and become embedded into a local context of use in people's everyday lives (Hynes & Richardson, 2009; Harwood, 2011).

Domestication has also been defined as a process whereby active technology consumption transforms the end-user and the technology through interacting with each other (Silverstone, 1994; Silverstone, 2006). In describing what domestication means, Silverstone (1994) posits that:

> "…by domestication I mean something quite akin to the domestication of the wild animal; that is a process by which such an animal is accustomed 'to live under the care and near the habitations of man', a process of taming or bringing under control… Technologies, and television and television programmes must be domesticated if they are to find a space or place for themselves in the home" (Silverstone, 1994:83).

Ward (2006) states that domestication is perceived as a process where the outcomes are "heterogeneous and sometimes irresolvable" and not "harmonious, linear or complete". For example, the consumer's needs may change, creating an emergence of new needs from the technology in the household. This underlines that the end-user is perceived to influence the functions, scope and nature of the technology which is known as the social construction of technology (Tobbin, 2013). Hynes and Richardson (2009:486) argue that "domestication is used to find the crossover where technologies and people adjust to each other and find (or do not find) a way to co-exist". Thus, there are continuous mutual adjustments on both the technology and the users and this is where social shaping comes into play as the users shape the technology to fit in with their lives (Hynes & Richardson, 2009).

Haddon (2003) highlights five key assumptions as themes for domestication, the first of which holds that domestication places more emphasis on consumption rather than mere use. This means a greater focus is on the 'meanings and experiences' that the consumer gains from the use of the technology. These meanings result from external influences, which could be derived from marketing, or from what other people have said about the technology (Tobbin, 2013). Thus, to clearly understand the adoption and use of technology, we need to appreciate the negotiation and interaction with other external influences that lead to the use of the technology (Haddon, 2003).

The second theme in domestication theory perceives adoption as a process rather than an event. Adoption of a technology is perceived to start with the individuals' imagining the (potential) role of a technology in their everyday lives, and the negotiations around its acquisition. These perceptions (from imaginations and negotiations) could result in acquisition—or sometimes resistance to acquisition—of the technology. If the technology is acquired, then these imaginations and negotiations become the processes of identifying 'appropriate' usage of the technology. Haddon (2003) stresses that these understandings can also change over time as the individual tries to fit the technology into existing routines, or create new ones.

Thirdly, domestication is not a once-off process. Haddon (2003) argues that in as much as the term suggests taming of technology acquired from the public space and integrated into a private space, the role of the technology may be re-assessed. Thus, domestication should not be assumed to always be entirely successful; technologies can sometimes get out of individual control, leading to an undesired lifestyle. There is always ongoing discussions, negotiations or arguments regarding the role of the technology (Ling, 2004). For example, the overuse of a phone can make individuals question their lifestyle and even abandon or reject a technology at an early stage of adoption.

The fourth theme of domestication is that it is viewed in a three-way interaction among the end-user, the technology, and other individuals (called 'gatekeepers'). In as much as the key interest of domestication is the relationship between the end-user and the technology, the contribution of others is given considerable attention. For instance, the continued use of e-commerce websites may also depend on the customer service. This attribute is what Ling (2004) identifies as a better analytical tool when compared with other notions of interactions including "technical determinism", "social determinism", and "affordances" approaches.

In the fifth and final theme, Haddon (2003) posits that the role and meaning of technology in the lives of end-users are shaped by our lives, and the technology in turn shapes our life. Since end-users of the technology are not passive, but active users, the experiences they gain from it are not entirely predetermined by the functions of the technology, but are also structured by social life. In turn, the introduction of a technology can also lead the end-users to live their lives differently, have different perceptions, and affect the end-user to interact differently with others.

2.6.6.1 The domestication theory dimensions

The domestication theory originally proposed four major dimensions or phases in the technology adoption process, namely appropriation, objectification, incorporation and conversion (Silverstone *et al*., 1992; Silverstone, 1994; Silverstone & Haddon, 1996). Two further dimensions, commodification (Silverstone, 1994; Silverstone, 2006) and imagination (Silverstone, 1994; Ling, 2004)**,** have been added, bringing the total to six. Even though these six dimensions of the domestication theory were presented by Silverstone (1994), most studies preferred using the four dimensions as shown in figure 2.17.

Figure 2.17: Process of Domestication Theory
(Source: Tobbin, 2013:65)

The processes in the domestication theory do not necessarily follow a sequential approach to adoption and consumption of technology (Silverstone 1994; Ling, 2004). For instance, a person can start, mentally, at the incorporation phase before the appropriation phase. Ling (2004), in stressing this important feature of the domestication theory, stated that:

> "While there are linear elements to domestication, i.e. the introduction of the artefact, its purchase, and finally it being an imbedded part of the presentation of self, it is not necessarily the case that all of the stages are entered sequentially. People seem quite agile in their ability to mentally objectify items long before the actual purchase has taken place" (Ling, 2004:31).

For the purpose of this study, the six dimensions are recognised and described below.

i) **Commodification:** Domestication processes are seen to be a consumption process. It begins from the invention or development of a product in the public sphere to the private (sphere) life of an individual and *vice versa* (Silverstone, 2006). These moments of domestication are known as commodification. It assumes consumption or use of a technology as cyclical, rather than having a linear trajectory which ends at conversion (Silverstone, 1994). It is to say that the dependent 'moments of

consumption' (imagination, appropriation, objectification, incorporation and conversion) themselves gives feedback, especially conversion, to influence and define the structure and pattern of commodification itself (Silverstone, 1994:124). Exchange is required in commodification.

A product or technology receives its aesthetic, functional and/or symbolic meanings in a developer's workshop or factory, and moves from the workshop to the marketplace. These meanings provide the technology with specific characteristics that expresses the ideals and values of its societies (Tobbin, 2013). It also leads to the beliefs and views that a user creates around the technology (Silverstone, 1994; Tobbin, 2013). These meanings are known as the '*formal economies'* and are the embodiments of the product design. Marketing defines to the user what the product can be used for (Silverstone & Haddon, 1996). While the technology goes through these 'moments of consumption', the adjustments and negotiations in the private sphere of the individual (*'moral economies'*) with the technology results in the shaping, creation or translation of new meanings. These new meanings are then expressed in the public sphere in the developer's workshop and in the marketing of the technology. Thus, this concept exhibits the cyclical approach of consumption in domestication from the formal economies to the moral economies and *vice versa* (Tobbin, 2013). Hence, commodification is the axis for technology consumption in domestication (Silverstone, 2006).

ii) **Imagination:** Imagination is the stage at which a technology or other product enters into our minds and consciousness (Ling, 2004). These imaginations enter our minds through the 'cultural system' created by the advertising of the products, or through media discourses (including word of mouth) (Silverstone, 1994; Haddon, 2003). These technologies come pre-formed with social meanings and roles in the pre-adoption process whereby the consumer imagines the potential role (or lack of it) of the technology in their lives, and the negotiations around it (Haddon, 2003). These social meanings create the desire or dreams for the use of the technology in the consumer's mind (Silverstone, 1994). Silverstone (1994:126) further adds that the process of imagination is a "dialectical one, driven by stimulation and desire, stalled by frustration and indifference, transformed by the active engagement of consumers in the very process of commodification".

iii) **Appropriation:** Appropriation arises from the imagination created by advertising and people around us that help in understanding the need for a

technology or service. Appropriation is the point in the consumption process that describes the stage where the technology leaves the public sphere and enters into our private sphere. This stage of the cycle includes the belief that a consumer has the knowledge of the technology and also a knowledge that the technology could somehow fit into their lives (Ling, 2004). Appropriation is seen as the moment whereby a technology crosses the threshold between the public (formal economies) and the private (moral economies) (Silverstone, 1994; Hynes & Richardson, 2009). In the context of e-commerce websites, this stage can be seen as when a consumer identifies a need or motive to use an e-commerce website, and visits it (Harwood, 2011).

iv) **Objectification:** Objectification occurs when a consumer's tastes, values and styles are expressed (Hynes & Richardson, 2009) through the physical dispositions of objects in the spatial environment of the home (Silverstone, 1994), or through the display of the new technology (Hynes & Richardson, 2009). Silverstone (1994:127-128) opines that this physical arrangement and display of the objects objectifies the "values, the aesthetic and the cognitive universe" of the consumer. Ling (2004) argues in support of Silverstone that objectification describes how a product comes to play out in a consumer's values and sense of aesthetics. Ling (2004) further stressed that objectification, to a certain degree, focuses on aesthetics. In essence, in an e-commerce context this will relate strongly to the aesthetics and cognitive values of the e-commerce website.

v) **Incorporation:** Ling (2004) states that while objectification focuses mainly on aesthetics and cognition, incorporation focuses more on functionality, but concedes that these two go hand-in-hand as they are two sides of the same coin. Incorporation is the actual use of the technology through its functions. A technology may also be made functional in ways not originally among the designed intentions of the developers (Silverstone, 1994). The level of a technology's functionality in an individual's life depends largely on how well the technology has been incorporated into the routines of the individual's everyday life (Silverstone *et al*., 1992; Silverstone, 1994; Lee *et al*., 2009). Technologies are chosen by a consumer with specific functionality intentions in mind. However, sometimes these technologies do not fit the intention of the consumer and could lead to a discarding of the technology (Haddon, 2006; Lee *et al*., 2009). This moment of incorporation determines how well a technology integrates (or not) within the moral economy of the individual's everyday life.

vi) **Conversion:** This moment, like appropriation, defines the relationship between a consumer and the public sphere. However, unlike appropriation which transits from the formal economy (the public sphere) to the moral (private) economy, conversion transits in the opposite direction. The moral economy of the consumer provides for the negotiations and transformation of new meanings of the technology (Silverstone, 1994). At this stage there is a conversion of the appropriation experience—of meanings derived from the technology—to the individual's expressed meaning. This individual meaning becomes "part of the public meaning of the future appropriations and versions of the product" (Tobbin, 2013). This is the moment also when a technology can be said to become part (or not) of an individual's life (Lee *et al*., 2009). This final point brings us back, full circle, to domestication (Silverstone, 1994).

2.7 Summary

This chapter started with a review of prior literatures on the three main themes of this study—e-commerce, trust, and user-centred design. E-commerce is discussed based on its history, the introduction of the Internet, and the WWW which transformed Information Technology—and e-commerce with it. The review also examined the evolution which e-commerce (and the Web) has undergone, and its possible future technologies. This was followed by a review on trust and UCD.

In answering some of the sub-questions through the literature, a further review was done of trust in e-commerce, e-commerce and trust by design, and also of studies regarding e-commerce trustworthiness from user perspectives. The chapter concluded by discussing some of the theories and models that have been used in e-commerce. It concluded with a further discussion of the adapted theory (Domestication of Technology Theory) for this study's conceptual framework to be used in Chapter Five. The next chapter discusses the research design and methodology used in conducting this research.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

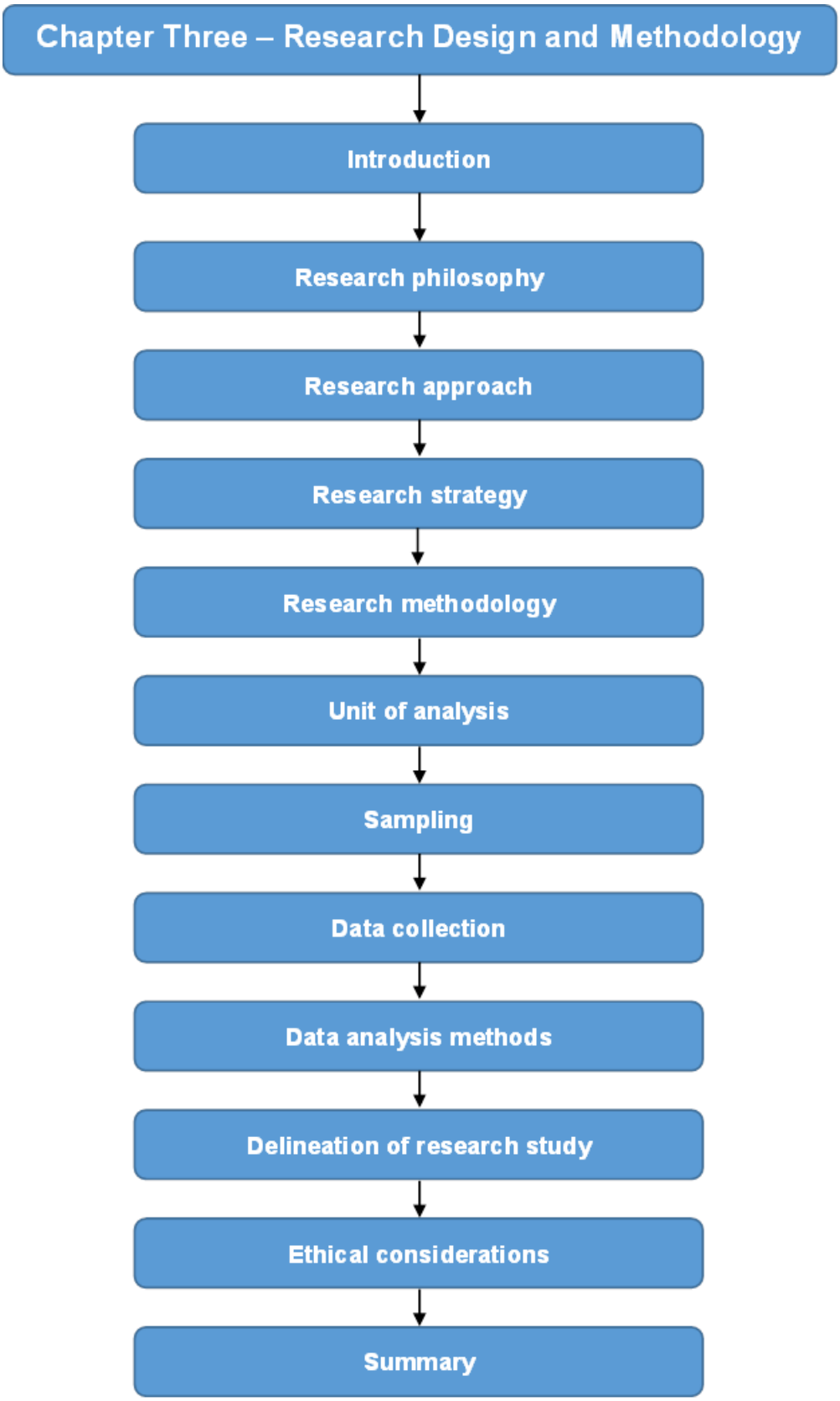

Figure 3.1: Graphical representation of Chapter Three

3.1 Introduction

Chapter Three presents details of the research design and methodology applied in the study. It provides comprehensive details as to how the research was conducted, including the research process, where it was conducted, and the population involved. The aim of the research is to use user-centred design to explore attributes for engendering and improving users' trust of B2C e-commerce websites. Although centred on users, the research further explored insights through interviewing web developers to know ways through which they engender trust in B2C e-commerce websites. The rationale behind this was to understand the gap between what the users expect in e-commerce websites to be deemed trustworthy and compare what the developers are doing to bring about trustworthiness in the e-commerce websites. As outlined in Chapters One and Two, the context of trust in e-commerce is the willingness of a customer to be vulnerable to a vendor in order to complete an online transaction. The users and web developers were drawn from Cape Town, largely for convenience in the research process.

This chapter is divided into sections, being the research philosophy, research approach, research strategy, data collection, data analysis, delineation, and ethical considerations.

All scientific studies follow iterative steps of observation, rationalisation and validation (Bhattacherjee, 2012). At the observation phase, researchers observe the social or natural phenomena, events, or behaviour that fancies their interests. The researcher tries to make sense of the observed phenomena, events and behaviour by logically connecting the different pieces of the puzzles that they observe at the rationalisation phase. Finally, at the validation phase, they test their theories—using a scientific method—through a process of data collection and analysis. Bhattacherjee (2012) contextualises the process in a "functionalistic research process" diagram (Figure 3.2).

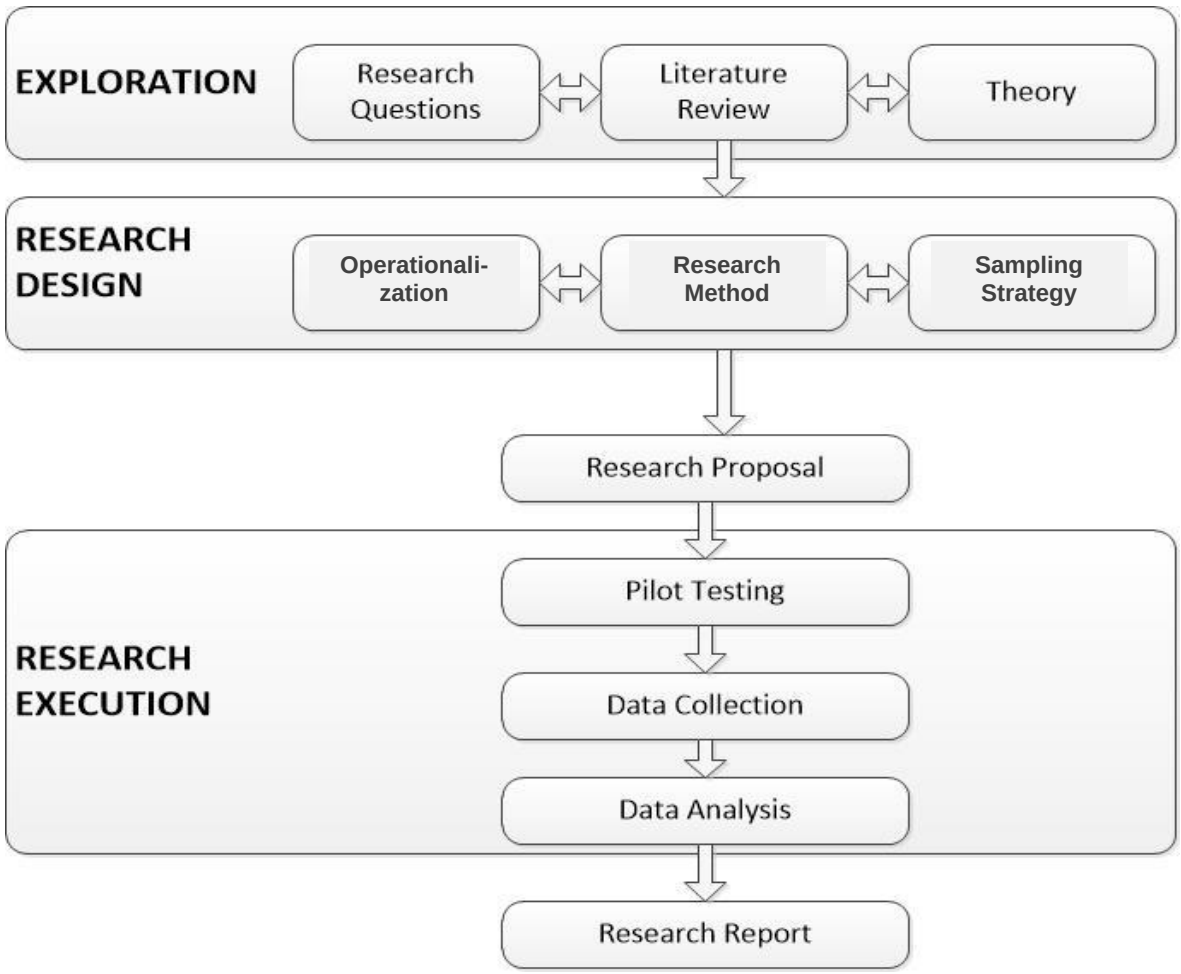

Figure 3.2: Functionalistic research process
(Source: Bhattacherjee, 2012:20)

Research design is a comprehensive plan for data collection and how the research is conducted in an empirical research project (Manheim, 1977; Bhattacherjee, 2012). Kothari (2004:31) describes research design as "the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data." Research methodology, on the other hand, evaluates and describes the logic behind the research techniques and methods used to answer the research questions (Welman *et al*., 2005). In research methodology, one does not only consider the research methods, but also the logic behind the methods used in the context of the research (Kothari, 2004). Babbie and Mouton (2008) in distinguishing between research design and research methodology, summarise the differences as shown in Table 3.1. Babbie and Mouton aver that research design centres on the end-product while research methodology centres on the research process—the kind of tools and procedures to be used. For research design, the point of departure is the research problem and the research question, while research methodology looks at the specific tasks (such as sampling or data

collection) at hand. The authors conclude that research design focuses on the logic of the research, while research methodology focuses on the individual steps in the research process.

Table 3.1: Differences between research design and research methodology
(Source: Babbie & Mouton, 2008:75)

Research Design	Research Methodology
Focuses on the end-product; what kind of study is being planned, and what kinds of results are aimed at.	Focuses on the research process and the kind of tools and procedures to be used.
Point of departure = Research problem or question.	Point of departure = Specific tasks (data collection or sampling) at hand.
Focuses on the logic of research: What kind of evidence is required to address the research question adequately?	Focuses on the individual (not linear) steps in the research process and the most "objective" (unbiased) procedures to be employed.

In line with the summary in Table 3.1, this research was planned and designed to adequately answer the research sub-questions, and thereby resolve the main research question. The research problem was carefully considered with a view to how best the research question and sub-questions could be answered. In essence, the type of research data that would be needed, as well as the best research approach was carefully considered. A qualitative research approach based on UCD group activities (section 3.3.1) and interviews was deemed most suitable for a user-centred design project.

3.2 Research philosophy

In research, paradigm (philosophy) is a part of ontology (how we see the world) in a philosophical sense. An assessment of how much we know about it would depend on the epistemological (our assumptions about the best way to study the world) stance we take (Göktürk, 2005; Bhattacherjee, 2012). Of the ontology (subjectivism and objectivism) Saunders *et al*. (2009) say subjectivism holds that social phenomena are created from the perceptions and consequent actions of the social actors concerned with their existence. Objectivism on the other hand portrays the position that social entities exist in reality external to social actors concerned with their existence. Subjectivism is often associated with the term constructivism, or social constructionism (Flick, 2009; Saunders *et al*., 2009). According to Myers, (1997) and Neuman (2011), there are three dominant underlying philosophical assumptions (or epistemologies) in research, namely Positivist, Interpretivist and Critical (Figure 3.3).

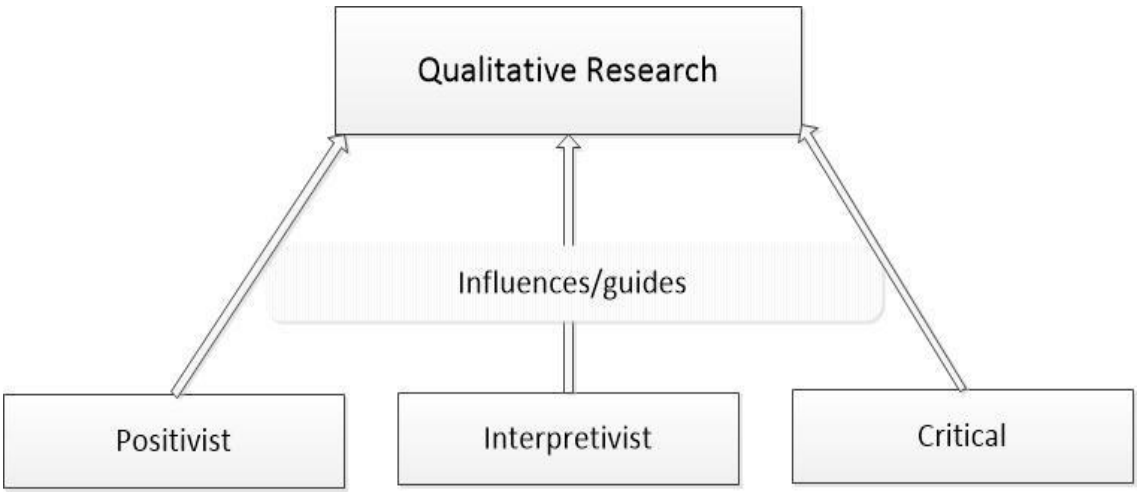

Figure 3.3: Underlying philosophical assumptions in qualitative research
(Source: Myers, 1997:241)

This research adopted an interpretivist philosophical approach as it explores to gain more understanding and shared meanings of e-commerce trust from the users' perception (Walsham, 2006). The interpretivism research paradigm is based on the premise that social reality is not objective or singular. It is rather "shaped by human experiences and social contexts and is therefore best studied within its socio-historic context by reconciling the subjective interpretations for its various participants" (Bhattacherjee, 2012:103). The interpretivist researcher adopts the position that our knowledge of reality is a social construction of human actors (Walsham, 1995; Walsham, 2006). The research relies on the participants' views of the situation being studied with broad and general questions to aid interaction for a constructive meaning of the study (Creswell, 2009). The ontological viewpoint of subjectivity used is supported by Saunders *et al*. (2009) who say that—from the interpretivist philosophy—it is necessary to explore the subjective meanings motivating the actions of social actors in order for the researcher to be able to understand these actions.

Klein and Myers (1999) propose a set of principles for evaluating interpretative field research in information systems. They argue that "the principles are, to some extent at least, interdependent". According to Walsham (2006), it is insufficient to apply these principles without an accompanied outcome. This research follows the seven principles of interpretative research as outlined in Table 3.2, with resulting outcomes outlined in Chapters Four, Five and Six.

Table 3.2: Principles of interpretative research as applied to this study
(Adapted from Klein & Myers, 1999:72)

Summary of Principles	Applied in this study
1. The fundamental principle of the hermeneutic circle This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles.	By iterating between the separate ideas of the individual e-commerce users of the UCD activity and the separate individual transcripts from the interviews of the developers as parts of the global context, an understanding of how to engender e-commerce trust as a whole was achieved.
2. The principle of contextualisation Requires critical reflection on the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.	The critical historical study of relevant literature, methodologies for engendering trust in e-commerce, and the reflection of the present ways of ensuring trust in the design of e-commerce websites provided a clear picture of the context been explored.
3. The principle of interaction between the researchers and the subjects Requires critical reflection on how the research materials (or 'data') were socially constructed through the interaction between the researchers and participants.	The UCD activity using unstructured interviews with the users and the in-depth interviews with the developers provided a platform of interaction between the researcher and the participants. This interaction helped in removing biases that would have affected the interpretations, thereby aiding correct assumptions from the findings.
4. The principle of abstraction and generalisation Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action.	The data collected from the UCD activity and the interviews were analysed and further linked with the historical background of the research to get a general and clearer understanding and interpretation.
5. The principle of dialogical reasoning Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ('the story that the data tells') with subsequent cycles of revision.	The prior knowledge from the relevant literature gave the basis of which this research was conducted. The conclusions derived from the findings of the research were only reached after reflection upon reflection on the data collected was done in comparison with the theoretical prejudices.
6. The principle of multiple interpretations Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.	The researcher examined the findings from the users with the findings from the interviews of the developers and documented the multiple viewpoints resulting from their interpretations of the phenomenon. A further analysis of the findings led to a better understanding of these interpretations.
7. The principle of suspicion Requires sensitivity to possible 'biases' and systematic 'distortions' in the narratives collected from the participants.	The further analysis of the findings was triangulated to further remove any biases and systematic distortions.

3.3 Research approach

Research study and scientific inquiry are of two forms (approaches), namely the inductive and deductive approaches. In the inductive approach, theoretical and

hypothetical concepts and patterns are developed from collected data as a result of data analysis. In the deductive approach, concepts and patterns known from theories and hypotheses are tested using new empirical data (Saunders *et al.*, 2009; Bhattacherjee, 2012). Saunders *et al*. (2009:126) continue by describing the inductive approach as an approach "to get a feel of what is going on, so as to understand better the nature of the problem".

Creswell (2009) lists three key considerations in deciding the choice of research approach in a research design—the research problem, the personal experiences of the researcher, and the audience(s) for whom the report will be written. This research seeks to explore the best practices in designing B2C e-commerce websites to communicate/convey trust from the users' perspective. The researcher's personal experience and training tends to involve humans in the research and design process when designing for human use. Having previously conducted research using observations, open-ended interviews, and a participatory research approach, the research approach for inquiry follows suit. The targeted audience of the resulting report comprise the e-commerce vendors, web developers, web designers, and researchers.

In view of the stated considerations above, this research adopted an inductive approach to achieve the research aim and objectives. The research philosophy and the inductive approach facilitated the need for qualitative data to be collected which assisted in understanding the users' perspective and in addition the web developers' perspective of e-commerce trust. The collection of qualitative data followed a systematic procedure in analysing the collected data.

3.3.1 Qualitative research

Qualitative and quantitative research methods refer to the type of data being collected and analysed. Qualitative research relies more on non-numeric data such as individual interviews, focus groups, and observations whereas quantitative research employs numeric data such as scores and metrics (Bhattacherjee, 2012). Babbie and Mouton (2008:270) state that the primary goal of using a qualitative research approach is describing and understanding human behaviour, rather than explaining it. Qualitative researchers strive to understand phenomena by observing and interpreting meanings in context. Qualitative researchers carry out research using qualitative data methods such as participant observation, interviews, recordings, documents, and focus groups. Using the UCD (focus) group and interviews for the data gathering thus places this study squarely in the qualitative realm.

Dilthey (as cited in Babbie and Mouton, 2008), uses the term *hermeneutics* to further clarify the nature of understanding in human enquiry. Dilthey believes that the aim of human sciences should be to understand rather than to explain human behaviour. This research also looks at understanding the issue of trust in B2C e-commerce websites from the viewpoint of the users themselves. Myers (1997) argues that hermeneutics can be treated as both an underlying philosophy and a specific mode of analysis. “As a philosophical approach to human understanding, it provides the philosophical grounding for interpretivism. As a mode of analysis, it suggests a way of understanding textual data” (Myers, 1997:242). Hermeneutics refers to the development and study of theories of interpreting and understanding texts (Cole & Avison, 2007). Text is extended beyond written documents. It also includes verbal and non-verbal communication, and extends to any number of objects that may be subject to interpretation such as experiences. The need to explore e-commerce trust from the user perspective to better understand the research problem underpins the use of hermeneutics.

In as much as careful consideration was given in selecting qualitative research design, quantitative research was also examined. As described above, quantitative research makes use of numeric data such as metrics and scores by using standard instruments. It uses mathematical and statistical techniques to investigate social phenomena. The kind of empirical data collected from participants will lose its context if quantified in numerical terms. Kaplan and Maxwell (2005) advise that the goal of qualitative research is to understand a phenomenon or particular situations by investigating the perspectives and behaviour of the participants in a given situation or context. When textual data are quantified, its particular social and institutional context is largely lost. When using focus groups and interviews in data collection with a small population, a qualitative research design was ideal when compared to a quantitative approach. The reasons stated above facilitated the choice of a qualitative research design in this study.

Babbie & Mouton (2008:270) distinguish qualitative research in terms of the key features shown in Table 3.3 below.

Table 3.3: Key features of qualitative research mapped against this study
(Adapted from Babbie & Mouton, 2008:270)

	Features of qualitative research	Used in this research study
1	Research is conducted in the natural setting of social actors.	The interviews and setup of the focus groups were in a conducive environment where the researcher observed and investigated the respondents and participants in a non-intrusive way.
2	A focus on process rather than outcome.	The methodologies used assisted the researcher to study the process of events as they occur in the UCD focus group and the interviews.
3	The actor's perspective (the 'insider' or 'emic' view) is emphasised.	Using qualitative research enabled the researcher to study the phenomenon through the perspectives of the users and developers, and to observe how they interpret their world.
4	The primary aim is in-depth 'thick descriptions' and understanding of actions and events.	The study from the users' perspective gave the researcher an in-depth understanding of the phenomenon being studied. The researcher had to do a qualitative description on the data collected to get "thick descriptions".
5	The main concern is to understand social action in terms of its specific context (idiographic motive) rather than attempting to generalise to some theoretical population.	The research explored to understand how trust could be engendered in e-commerce trust including the non-salient context.
6	The research process is often inductive in its approach, resulting in the generation of new hypotheses and theories.	The data collected were analysed to make sense. It was developed into themes and codes through the researcher's informed interpretations of key concepts.
7	The qualitative researcher is seen as the main instrument in the research process.	The research data collection, analysis and interpretations were carried out primarily by the researcher.

3.4 Research strategy

Saunders *et al*. (2009) and Bhattacherjee (2012) argue that the choice of research strategy is guided by the research question(s) and objectives, the unit of analysis in a research problem, the extent of existing knowledge, the amount of time and other resources available, as well as the philosophical underpinnings. Saunders *et al*. (2009) continue by stating that these strategies should not be thought of as mutually exclusive. In this study, users of e-commerce websites, including the developers, were the unit of analysis. The best strategy to facilitate the study of the research problem, achieving the objectives of the study, and best methods on how the data should be collected was sought after.

A number of strategies associated with qualitative research have been identified over the years. These include grounded theory, phenomenological research, ethnographies, case studies, and narrative research (Creswell, 2009). In this study, the phenomenological research strategy is used. In phenomenological research,

"the researcher identifies the *essence* of human experiences concerning a phenomenon as described by participants in a study" (Creswell, 2009:15). This is intended to understand the context of the research through the study of a small number of subjects using prolonged and extensive engagement to develop relationships and patterns of meaning. This exploratory study is carried out to seek insights, assess the phenomenon, and understand the users' perspective on e-commerce trust.

In the research strategy outlined above, likely data collection techniques include a search of the literature, interviewing experts in the subject, and conducting focus group interviews (Saunders *et al*., 2009). Qualitative data collection techniques, typically associated with phenomenological research, were used within this study. The researcher used a multi-method qualitative approach (Saunders *et al*., 2009) in the collection of data, namely UCD group activities, semi-structured/unstructured interviews, and a secondary literature review. This allowed the researcher to triangulate the evidence from different sets of data and thus aid in correct interpretation. Given that the research adopts the interpretivism paradigm, the research starts by undertaking a literature review on studies related to e-commerce, trust, user-centred design, and finally narrowing it down to e-commerce trust issues.

3.4.1 UCD focus group activities for users

User-centred design (UCD) is the main methodological framework selected for this research. UCD is a framework, field, craft, philosophy, practice, discipline or method of designing tools for human use by placing the human (as opposed to the 'thing') at the centre of the design process (Katz-Haas, 1998; Williams, 2009). End-users are involved from the process of data collection to the implementation of services, products and/or technologies to serve users. UCD is a process in which the end-users influence how an interaction design evolves (Abras *et al*., 2004) (refer to section 2.4 for more details on UCD). To have multiple viewpoints of the users' perspective that will highlight areas of consensus and conflicts during data collection in UCD, Preece *et al*. (2015) advise the use of focus groups for data collection.

Table 3.4: Overview of data gathering techniques and their use
(Source: Preece et al., 2015:270)

Technique	Good for	Kind of data	Advantages	Disadvantages
Interviews	Exploring issues	Some quantitative but mostly qualitative	Interviewer can guide interviewee if necessary. Encourage contact between developers and users.	Time-consuming. Artificial environment may intimidate interviewee.
Focus Groups	Collecting multiple viewpoints	Some quantitative but mostly qualitative	Highlights areas of consensus and conflict. Encourage contact between developers and users.	Possibility of dominant characters.
Questionnaires	Answering specific questions	Quantitative and qualitative	Can reach many people with low resource.	The design is crucial. Response rates may be low. Unless carefully designed, responses may not provide suitable data
Direct observation in the field	Understanding context of user activity	Mostly qualitative	Observing gives insights that other techniques do not give.	Very time-consuming. Huge amounts of data are produced.
Direct observation in controlled environments	Capturing the details of what individuals do	Quantitative and qualitative	Can focus on the details of task without interruption.	Results may have limited use in the normal environment because the conditions were artificial.
Indirect observation	Observing users without disturbing their activity; data captured automatically	Quantitative (logging) and qualitative (diary)	User does not get distracted by the data gathering; automatic recording means that it can extend over long periods of time.	A large amount of quantitative data needs tool support to analyse (logging). Memories of participants may exaggerate (diary).

A focus group involves a selected small group of individuals taking part in an informal discussion of a phenomenon of interest, covering a particular topic per data collection session (Wilkinson 2004; Bhattacherjee, 2012). Focus group is one of the methods used in data gathering at the investigate stage in UCD (Figure 2.9) (Abras *et al*., 2004; Preece *et al*., 2015). The suggested number of participants involved varies among authors; Smithson (2008) suggests a group of 6 to 12 participants, while Babbie (2014) calls for 5 to 15 participants. Focus groups are also referred to as focus group interviews, group interviews, or group depth interviews (Liamputtong, 2011; Babbie, 2014). Hennink (2007:6, as cited in Liamputtong, 2011), says that focus groups "encourage a range of responses which provide a greater understanding of the attitudes, behaviour, opinions, or perceptions of participants on the research issues". Participants in the focus group become the core of the data collection method by putting control of the interaction into the hands of participants rather than the researcher. This gives more prominence to the points of view of the respondents. In doing this, the voice and perceptions of the research participants are clear "by giving him or her an opportunity to define what is relevant and important to understand his or her experience" (Liamputtong, 2011).

In this study, focus groups are used in the user-centred design data gathering process to better understand the perception of the users on the issue of e-commerce trust. The aim of using a focus group is to bring together participants in a private, comfortable environment to engage in a user-centred activity. It enabled the researcher to explore and understand meanings and interpretations from the e-commerce users to gain understanding on the issue of trust from their perspective as participants. Using this method enabled the researcher to gain more insight on users' trust through their experiences, points of view, beliefs, needs and concerns on trust issues, and ways of engendering trust in e-commerce. Liamputtong (2011:4) says a focus group interview has several important features which are also the reasons for the choice of the collection technique:

- It enables in-depth discussions and involves a relatively small number of people
- It is focused on a specific area of interest that allows participants to discuss the topic in detail
- Interaction is a unique feature of the focus group interview. In fact, this characteristic distinguishes the method from the individual in-depth interview. It is based on the idea that group processes assist people to explore and clarify their points of view. Such processes tend to be less accessible in an individual interview
- A moderator, who is often also the researcher, introduces the topic and assists the participants to discuss it, encouraging interaction, and guiding the conversation. The moderator plays a major role in obtaining good and accurate information from the focus groups. There can be more than one moderator facilitating and moderating in one focus group
- The participants usually have shared social and cultural experiences (such as age, social class, gender, ethnicity, religion, and educational background) or shared particular areas of concern (in this case, e-commerce user trust in B2C websites)

3.4.2 Interview for web developers

An interview is a purposeful interaction between an interviewer and respondent(s) in which the interviewer has a general plan of inquiry to gather valid and reliable data that are relevant to the research question(s) and objectives (Babbie & Mouton, 2008; Saunders *et al*., 2009). According to Babbie and Mouton (2008), "a qualitative interview has a general plan of inquiry but not a specific set of questions that must be asked in particular words and in a particular order". It is used to understand the respondents' point of view, and the meaning of their experiences. Interviews may be

categorised as unstructured (or in-depth) interviews, semi-structured interviews, and structured interviews (Saunders *et al*., 2009).

In-depth and semi-structured interviews provide the interviewer with the opportunity to 'probe' answers where the interviewer wants the interviewees to explain or build on their responses (Saunders *et al*., 2009). It was important to use this data collection technique as the research adopted an interpretivist epistemology. The research was concerned with understanding the meanings that respondents ascribed to various phenomena. Semi-structured interviews were conducted with the developers of e-commerce websites.

3.5 Research methodology

Research methods and research methodology are often mistakenly used interchangeably. Research methods represent all those methods and techniques that are used for conducting research, hence research methods or techniques refer to the methods that researchers use in performing research operations (Kothari, 2004). It is a constituent part of research methodology. Research methodology is a systematic way to solve the research problem, and may be understood as part of studying how research is done scientifically. The various phases that are generally adopted by a researcher in studying his research problem, along with the logic behind them are considered (Kothari, 2004:8).

Research methodology considers and explains the logic behind research methods and techniques used to answer research questions (Welman *et al*., 2005). The data of this study was collected from various sources to get more insight and information on the research question. In doing this, three principal ways of conducting exploratory research were explored as suggested by Saunders *et al*. (2009:140). These comprised a literature search as the secondary source of data, conducting the UCD focus group activities (with users of B2C e-commerce) as the primary source of data, and interviewing subject 'experts' (web developers of B2C e-commerce sites).

3.6 Unit of analysis

Unit of analysis is the unit, case, or part of social life that is under consideration. These include individual people, groups, organisations, movements, artefacts, institutions and countries (Neuman, 2011:58). The units of analysis for this study were the users and developers of B2C websites.

3.6.1 UCD

As stated above, the source of the primary data was from the focus group activities with in-depth interviews conducted with 8 users of e-commerce websites using UCD methods. Using B2C e-commerce websites as the unit of observation, the research used user-centred design methods during data collection, through which personas were later created.

3.6.2 Interviews

To understand the present techniques used by developers to engender trust in e-commerce, in-depth semi-structured interviews were also conducted with four B2C e-commerce web developers.

3.7 Sampling

This study used two instances of non-probability sampling, namely self-selection sampling in selecting the users of e-commerce websites and purposive sampling in selecting web developers. Non-probability sampling is a sampling technique where the probability of selection cannot be accurately determined (Bhattacherjee, 2012). In using non-probability sampling, statistical inference could not be made from the sample used, but it was never envisaged. The need to use a non-probability sampling was clearly outlined by Saunders *et al*. (2009:233):

> "To answer your research question(s) and to meet your objectives you may need to undertake an in-depth study that focuses on a small, perhaps one, case selected for a particular purpose. This sample would provide you with an information-rich case study in which you explore your research question and gain theoretical insights. Alternatively, limited resources or the inability to specify a sampling frame may dictate the use of one or a number of non-probability sampling techniques".

3.7.1 UCD

In selecting the eight users of e-commerce for the UCD workshop focus group activity, this study used a self-selection sampling method as advised by Saunders *et al*. (2009). According to Saunders *et al*. (2009:241):

> "Self-selection sampling occurs when you allow each case, usually individuals, to identify their desire to take part in the research. You therefore: 1) publicise your need for cases, either by advertising through appropriate media or by asking them to take part, and 2) collect data from those who respond".

The purpose of using this sampling method was in order for the cases to self-select because of their feelings and opinions about the research question, aim and objectives (Saunders *et al*., 2009). It also enabled users to participate based on their judgement that they understand the study, considered it important, and be willing to devote time to the focus group activity.

The awareness was placed through a publicised invitation to participate (Appendix B) to friends and colleagues, lecturers of various departments and faculties, and through general e-mail to the postgraduate students in Information Technology with a summary of the purpose of the study. The use of the sampling method was to ensure the physical availability of participants for the user-centred workshop. Those interested responded through emails. The number of respondents was enough to carry out the UCD focus group activity and in-depth interviews. On the day of the UCD focus group activity, eight users of e-commerce websites were present. Crouch and McKenzie (2006) support the use of a small sample, arguing that qualitative research is concerned with meaning and not making generalised hypothesis statements. The study gained in-depth knowledge of the perception of users on e-commerce trust using a small sample.

3.7.2 Interviews

In selecting the web developers, there was a need to select informants who were actively involved in the development of e-commerce websites (especially B2C) in Cape Town. This was done by using purposive sampling. The logic on which the strategy was based for selecting cases for a purposive sample was taken from research sub-questions 1 and 3. The purposive sampling strategy used was homogeneous sampling (Saunders *et al*., 2009) which focuses on sample members being similar (web developers in the case of this study). Purposive or judgemental sampling enables you to use your judgement to select cases that will best enable you to answer your research question(s) and meet your objectives (Saunders *et al*., 2009). Purposive or judgemental sampling involves “a non-random sample in which the researcher uses a wide range of methods to locate all possible cases of highly specific and difficult-to-reach population” (Neuman, 2011:267).

This sampling method was intended to gain in-depth insight into the developers’ views on B2C e-commerce trust. Thus Google search engine was used to identify top e-commerce development firms in Cape Town. Five firms were selected based on their expertise, number of e-commerce websites designed and running, and their years of experience in the industry. They were contacted to ask for an interview with any of the top web developers in their firm. Four of the firms responded positively,

and an e-mail was later sent with a summary of the purpose of the study. This was to enable the researcher to book an appointment for the interview with an expert on e-commerce web development.

In total, four respondents from three firms were interviewed. A description of these interviewees is given in Chapter Four (Table 4.2) in summary. The fourth firm did not respond to the e-mail sent; hence only the four respondents were interviewed. Although the resources of time and money were limited, the data collected from these respondents were sufficient as they held similar views and it was clear that data saturation had been achieved.

3.8 Data collection

The research process conducted during data collection is described below.

3.8.1 UCD focus group activity

The first step taken to ensure effective use of the UCD methods was to undergo two UCD training workshops—User-centred Design for Innovative Services and Applications (UFISA), and Mobile Application Design for Medical Application and Development (MAD4MAD) in 2013 and 2014 respectively at the Cape Peninsula University of Technology, Cape Town. This multi-disciplinary, participatory and user focused approach was used to answer the research sub-questions (thereby answering the research question) and provide design principles and attributes to consider when designing to engender trust in an e-commerce website.

For the UCD workshop activity, the focus group data collection technique was used. The UCD workshop activity guide was prepared to give direction on how the activity should proceed (Appendix C). The researcher secured enough participants (eight users) to ensure the objectives of the UCD focus group activity were achieved (refer to section 3.7.1). Four B2C e-commerce websites in South Africa were identified prior to the day of the activity. In planning the UCD focus group workshop activity (hereafter referred to as the UCD activity), a small team was selected which comprised of:

- **The moderator** (who is the researcher) to guide the UCD activity
- **The media personnel** in charge of covering the activity (videos and pictures)
- **The note taker** making hand-written notes and observations during the discussion to serve as a ‘back-up’ in case something happens with the recording equipment or participants wish not to have their discussion recorded (OMNI, 2013)

- Two **users** knowledgeable on the UCD approach (who were also participants) placed in each group to help guide others in their group in the effective use of UCD methods and tools

The environment chosen was quiet and comfortable. The tools/materials used include highlighters, white board makers, permanent markers, Prestik (temporary rubber-like adhesive), A4 paper, scissors, four-coloured sticky notes, flip chart, and name tags. Light meals were also provided as the activity was scheduled during lunch time.

3.8.2 Conducting the UCD activity

On arrival the participants wrote their names on the code sheet (Figure 3.4) as well as the code name (to ensure anonymity) by which they preferred to be called. This code name was then written on a name tag and given to the participant to be recognised throughout the UCD activity by the code name. Participants were individually informed of their rights. They also read and signed the consent forms as agreement to participate. This also helped to clarify terms in the consent forms they did not understand clearly to be explained to them, for instance the need to use a code name to provide anonymity. The activity started with the researcher's supervisor explaining the need for an open mind and that no idea or suggestion would be right or wrong. Hereafter the participants introduced themselves to each other while enjoying a light meal.

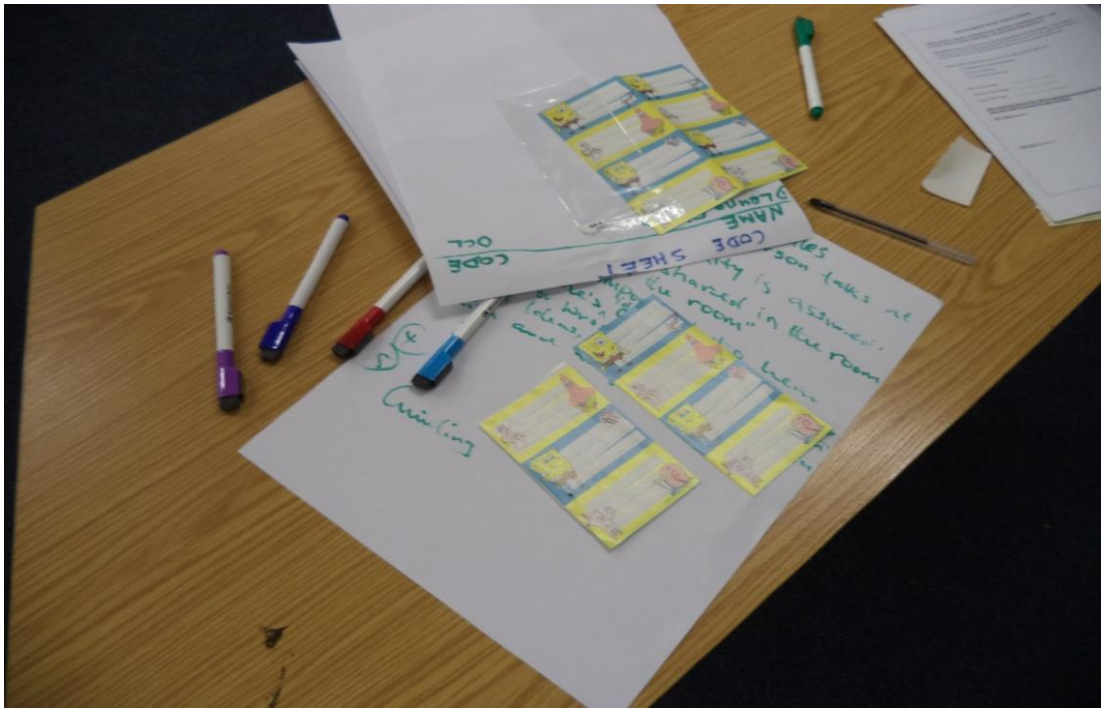

Figure 3.4: Showing the code sheet, name tags and other materials

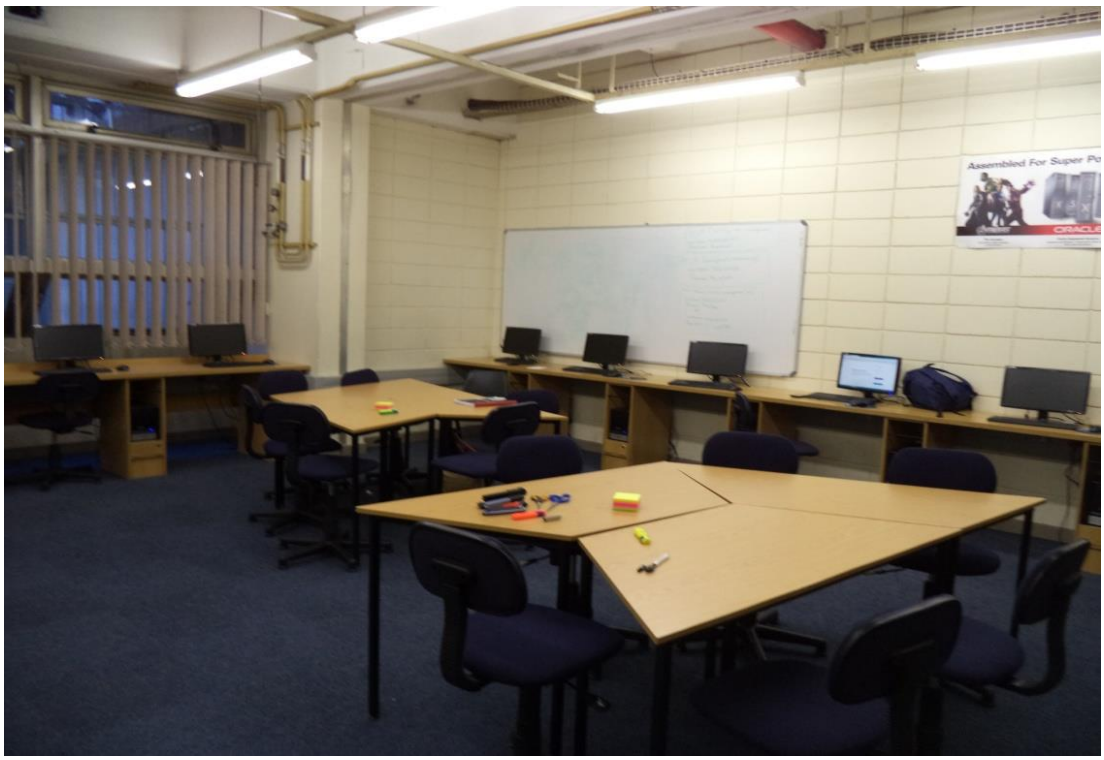

Figure 3.5: The venue for the UCD activity with some materials

The UCD group was divided into two smaller groups named GP1 and GP2, consisting of four (4) individuals per group. This was to foster better discussion and *brainstorming* among participants. The UCD activity fully got under way with the researcher explaining the aim of the research, what was expected of the participants, the activity process, and the guidelines (‘ground rules’) for the UCD activity.

The ground rules were helpful in sharing pointers to make the groups proceed smoothly and with respect for all participants (OMNI, 2013). The ground rules included pre-written guidelines which were presented to the group on two flip chart pages mounted on the wall. The guidelines (Figure 3.6) were read aloud to the participants and they were asked for their opinions and if they had anything to add.

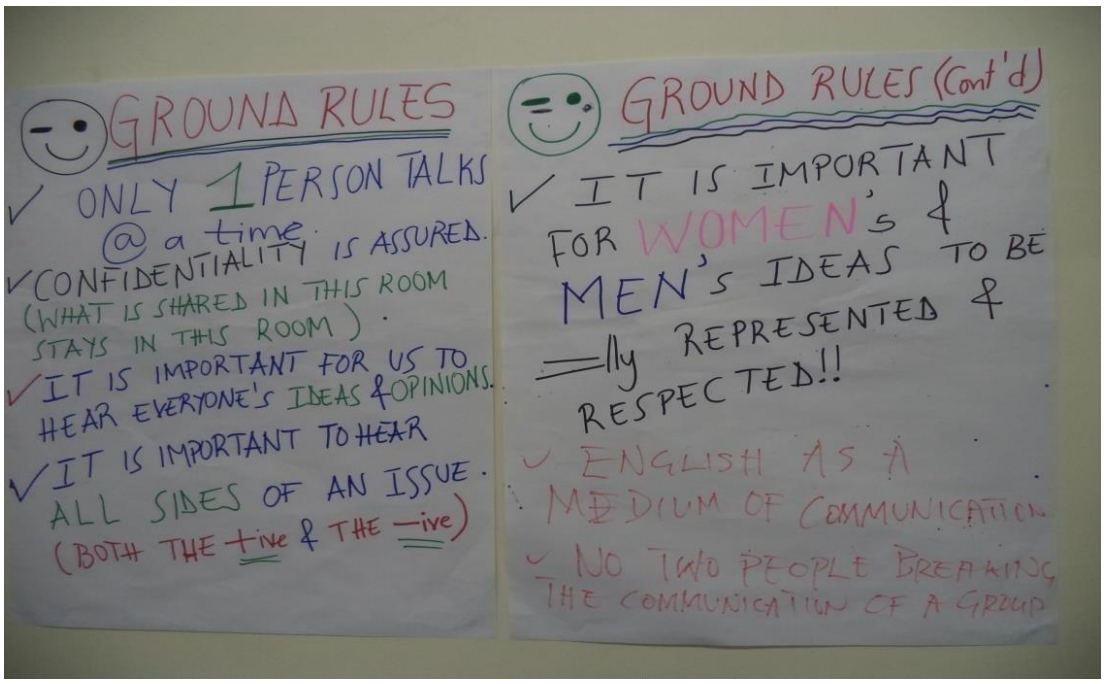

Figure 3.6: Guiding principles for the discussion

The list of guidelines are as follows, adapted from OMNI, (2013):

- "Only one person talks at a time"
- Confidentiality is assured. "What is shared in the room stays in the room" (the participants decided to remove this rule)
- "It is important to hear everyone's ideas and opinions. There are no right or wrong answers, just ideas, experiences and opinions, which are all valuable"
- "It is important to hear all sides of an issue, both the positive and the negative"
- "It is important for women's and men's ideas to be equally represented and respected[8]"

Two more guidelines were added to the list by the participants:

- English as a medium of communication
- No two people breaking the communication of a group (by discussing between themselves)

After the first part (Part A, the introduction) was concluded (see Appendix C), the activity moved to Part B—data collection. By then the participants were relaxed and

[8] In the African context men's opinions are more highly regarded than those of women. This rule was accepted to ensure gender equality during the course of the interaction.

displayed eager interest in the discussion. They confirmed that they understood what was required of them. The researcher listed the websites to be explored. The participants were expected to identify key themes:

a) Identify trust issues related to security and information privacy.
b) Identify the trustworthiness of the websites based on content (what they see in the contents of the websites that communicate trust).
c) Identify trust issues related to aesthetics design (the overall look and feel of the websites).
d) Identify trust issues related to functionality (challenges experienced by users in using the websites' functionality to complete a transaction).

These were summarised as trust issues, trustworthiness, usability and aesthetics design. The four colours of the sticky notes were used to identify the summarised themes as agreed upon with the participants. The colours for the different themes were:

- Green = Trustworthiness
- Yellow = Usability
- Orange = Trust Issues
- Pink = Aesthetics design

Figure 3.7: Participants exploring the e-commerce websites

The participants were asked to firstly identify (individually) the major key issues in order to understand the present system (and the presumed ideal system). Then they returned to their groups (GP1 or GP2) for another session of brainstorming to discuss and refine their findings. These findings were written on the applicable sticky notes and stuck onto the affinity diagram (see Figure 3.8 to Figure 3.12).

This was followed by further discussions with the researcher and the entire group to clarify these findings and prompt the participants to share their opinions on these issues. Further issues identified and agreed upon by the participants were written on sticky notes and stuck onto the affinity diagram. The rationale in performing this first stage was to obtain a clear picture of the general perceptions of users on e-commerce trust for existing websites. This assisted in leading them to the next phase of the UCD.

The participants were given a break after this session before moving on to the *idea (or concept) generation* phase.

Figure 3.8: GP2 discussing and refining findings from the B2C e-commerce websites

Figure 3.9: GP1 discussing and refining findings from the B2C e-commerce websites

Figure 3.10: Findings of GP2

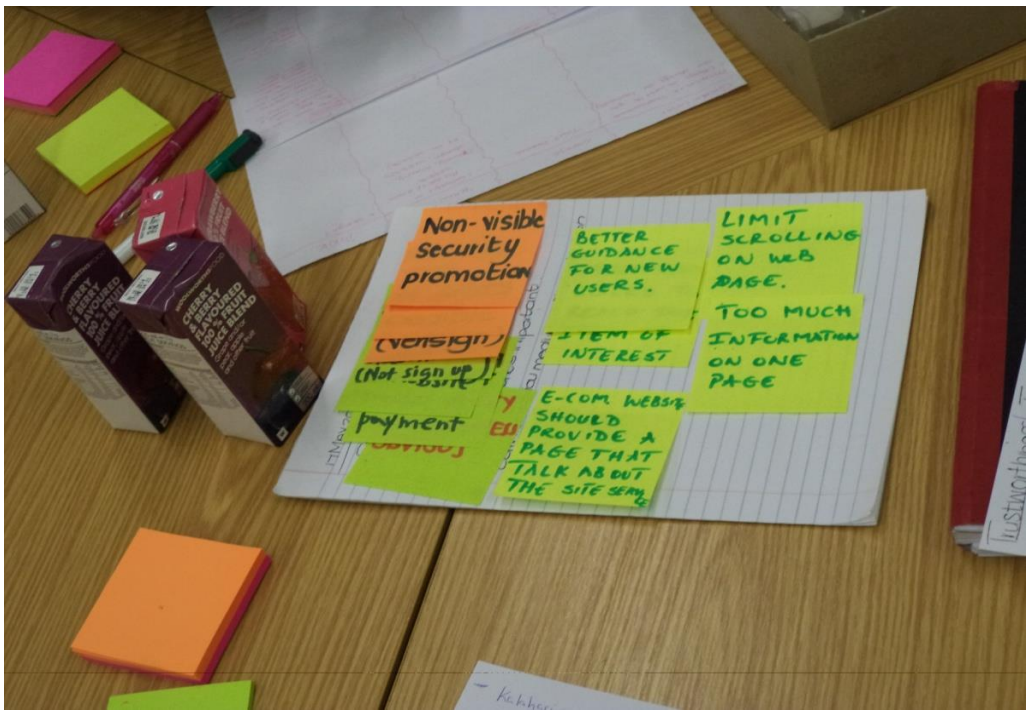

Figure 3.11: Findings of GP1

Figure 3.12: Findings on users' perception on e-commerce websites explored

After the break, the UCD group entered the ideation (idea generation) phase, which is the concept development phase of an ideal B2C e-commerce website that would engender trust. This phase used the *brainwriting* method to ask participants to write

out ideas of things (recommendations) in each theme that will help engender trust in B2C e-commerce websites. This was based on the findings from the previous stage.

The brainwriting ideation process followed the steps below.

Using the 6-3-5 method (6 people write 3 ideas in 5 minutes), the moderator illustrated the method to the participants. In this case, 3-3-5 (one of the group members left early for a personal engagement) for GP1 and 4-3-5 for GP2 were used. For each group, each member started with one theme; in 5 minutes 3 ideas were written, then rotated to the next person who read the earlier entries, added 3 new entries, and rotated again until the full circle had been completed. This prompted the participants “to empty their minds on paper” (Tyllinen & Fred, 2014).

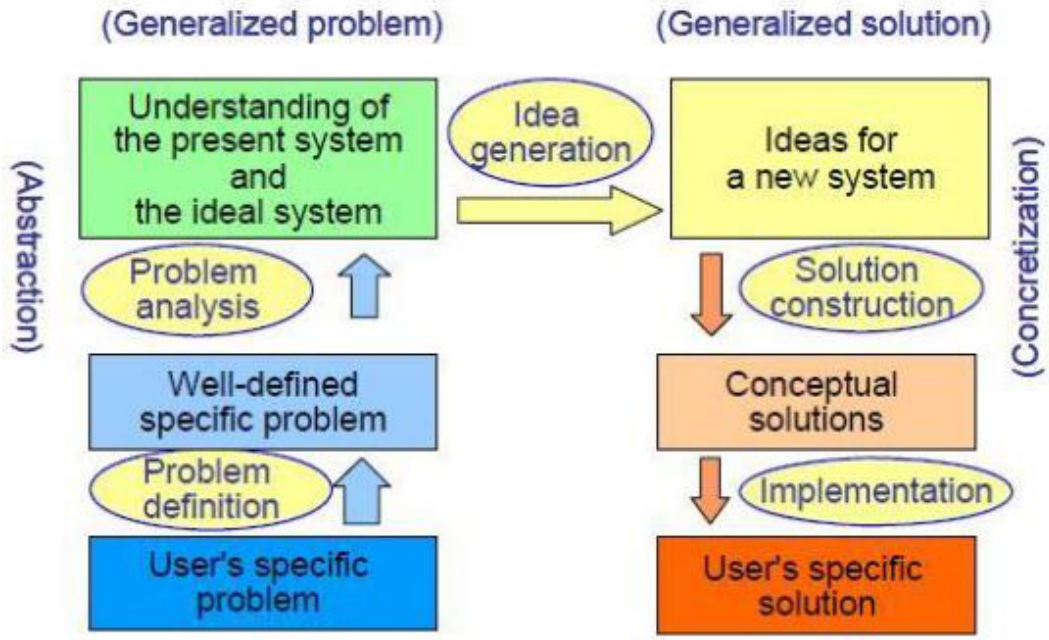

Figure 3.13: Creative problem solving and idea generation process
(Source: Nakagawa, 2011:584)

After the brainwriting session the participants were asked to select and validate the ideas by:

- Rating the “goodness” of the ideas on a scale of 1 to 3, with 1 being the lowest and 3 the highest
- Rating the relative “goodness” of the ideas by pair rating where two ideas seemed similar

The evaluation was first done by each group separately, and then combined results were analysed by the full group. The ideas were analysed by listing the top rated three ideas on the affinity diagram (see Figure 3.14). It was agreed that some of the ideas overlapped in the different themes. This process helped in forming concept candidates.

Figure 3.14: The moderator with the affinity diagrams showing the users' perception and ideas generation

The exciting and intensive activity took thirty minutes longer than was expected as the participants kept drifting into discussing aspects outside the research focus. The moderator (researcher) had to guide the participants back towards the research study and what was expected of them. The UCD activity lasted three and a half hours, and ended with the moderator offering a vote of thanks to the participants.

3.8.3 Interviews with web developers

To ensure in-depth interviews individually with the respondents (web developers), a semi-structured interview was used to gather data. A semi-structured interview is a qualitative method of inquiry that combines a pre-determined set of open questions (questions that prompt discussion) with the opportunity for the interviewer to explore particular themes or responses later (Evaluation Toolbox, 2010). This involves asking questions, listening, probing to get more insights, and at the same time

recording the verbal responses and taking notes. Open-ended questions were used to prompt respondents to think, express values, and provide answers in their own words (Evaluation Toolbox, 2010). A detailed interview guide/plan of open-ended questions was formulated (Appendix D). Questions to the web developers explored the general design and technology of e-commerce websites, and how they engender trust on the e-commerce websites they develop. The questions inquired about the development process of e-commerce websites, and how the developers design or develop e-commerce websites to communicate/convey trust to the users.

The rationale to use personal interviews to collect data includes the following:

- To collect in-depth information from respondents about their practices, opinions and beliefs on e-commerce trust
- The interview enabled the probing of respondents' experience and expert knowledge of the development process, and how they design to communicate/convey trust in e-commerce websites
- The interview allowed the researcher to have close contact with the interviewees at their place of comfort, thus allowing them to feel at ease. This resulted in a relaxed atmosphere
- The interview created an interactive and developmental relationship. This facilitated the exploration of emergent issues

An introductory e-mail (attached to the summary of the purpose of the research) was sent to the web developers after the selection of the informants to give them insight into the questions to be asked. During the interview, the interview guide was used to ensure the research themes and interviewees were kept focused on the key questions.

3.8.4 Conducting the interviews

The designed interview guide was first piloted with a web designer before it was administered to the respondents. This was done to confirm that respondents were able to understand the questions and identify the themes. After the first pilot interview, the questions were reviewed and another pre-test was conducted. After the second pre-test the final draft was administered to the respondents.

3.9 Data analysis methods

Data analysis is defined by Rubin and Rubin (2005:201) as the "process of moving from raw interviews to evidence-based interpretations that are the foundation for published reports." In analysing the data collected from the interview, the researcher applied hermeneutics—a mode of data analysis which is both an art and a science

of interpreting text (Cole & Avison, 2007; Tan *et al*., 2009). It involves "conducting a very close, detailed reading of text to acquire a profound, deep understanding" (Neuman, 2011:101). Affinity diagrams were used for the analysis of the UCD focus group activity and to group ideas into meaningful themes.

3.9.1 Using affinity diagrams for UCD data analysis

The data collected during the UCD activity was analysed using *Affinity Diagrams*[9]. This tool (also called *K-J method Variation: thematic analysis*) was created by Japanese anthropologist Jiro Kawakita in the 1960s. The tool was used to organise the large number of ideas from the UCD activity into their natural relationships (Tague, 2005). The use of affinity diagrams helped the moderator and the focus group to sort out ideas generated during a brainstorming and brainwriting session. According to Tague (2005) and Holtzblatt, Wendell and Wood (2005), affinity diagrams are used to analyse data from brainstorming or brainwriting sessions to identify patterns and similarities so they may be placed side by side in their related themes. The rationale for using affinity diagrams was firstly to sift through large volumes of data and organise it into groups, and secondly to encourage new patterns of thinking to develop a creative list of ideas (Balancedscorecard.org, 2014).

The ideas were written on sticky notes of four colours, based on the group where they belonged. Header themes were written on the affinity diagrams (flip chart pages) mounted on the wall. The sticky notes with ideas were then stuck onto the flip chart pages under their related header themes. A further analysis with the affinity diagrams was conducted to ensure the ideas were placed under the right theme that speaks to it. No changes to the ideas as presented by the users were required (see Chapter Four).

3.9.2 The qualitative interview analysis

The data collected during the interviews were analysed qualitatively. After listening to the audio recording of the interviews, they were transcribed and filed with the hand-written interview summaries as the textual format transcripts. According to Bleicher (1980, cited by Cole & Avison, 2007:821), "hermeneutics is consequently engaged in two tasks: ascertaining the exact meaning—content of a word or phrase; and defining guidelines to facilitate interpretive explication".

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[9] Affinity diagram is a tool that gathers large amounts of language data (ideas, opinions, issues) and organises them into groupings based on their natural relationships (Source: Balancedscorecard.org, 2014).

The qualitative analysis followed Ricoeur's (1981) theory of interpretation described by Tan *et al*. (2009). In reporting the process, Tan *et al*. identified the key concepts of the interpretation process as distantiation, appropriation, explanation and interpretation.

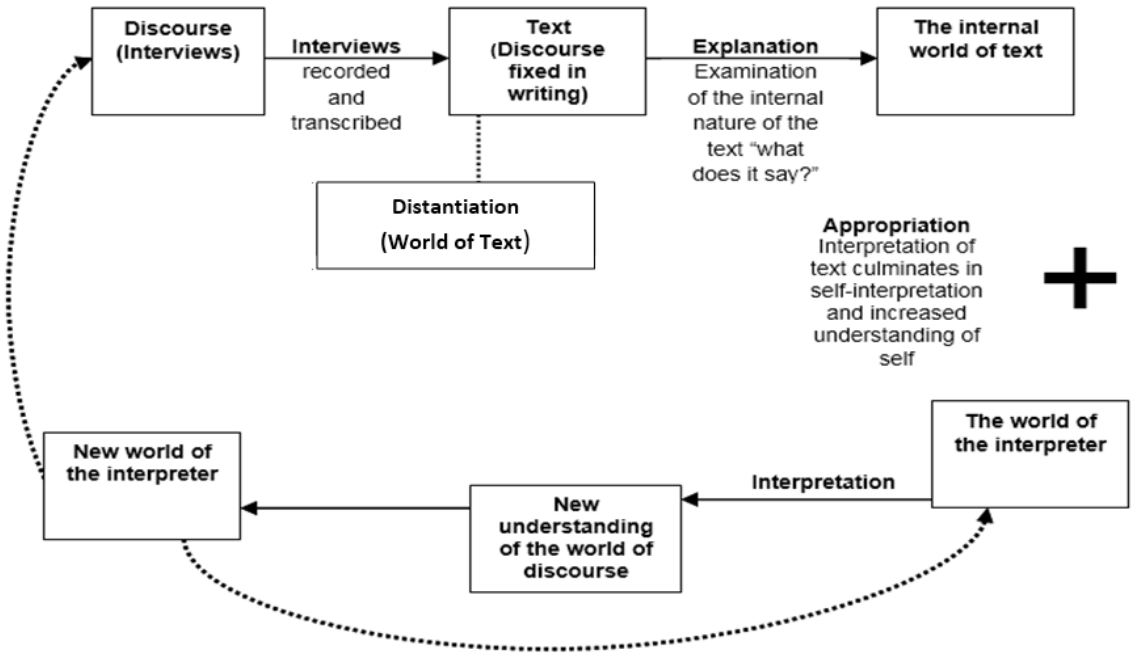

Figure 3.15: Ricoeur's Theory of Interpretation
(Source: Tan et al., 2009:6)

Distantiation holds that the translation of a discourse into text cannot completely preserve the content and nuances of the original. This is due to the nature of the relationship between speech and writing, of text as a structured work, text as a projection of a world, and text as a mediation of self-understanding. Ricoeur (1981) argues that "discourse, being an event occurring at a particular point of time, is not preserved entirely unchanged when committed to written form such as interview transcript". The audience (potential readers) "is also now distanced from the social and psychological context of the original intended audience" (Tan *et al*., 2009). They further say that "it is not possible to entirely recreate the event" when analysing transcripts of interviews with the participants, and "what remains is an impression only of the interview" (Tan *et al*., 2009:7). The researcher attempted to reduce the effect of distantiation by listening to the audio of the interviews repeatedly to pick up the intonation and nuances of the interviewees.

Appropriation is a point where researchers appropriate self-experience and that of the interviewees to open up a new world of possibilities in their interaction with the

world of text. The researcher, by immersing himself into the data, made the collected data part of himself, to incorporate himself into the interviewees' world and self-interpretation.

Explanation, interpretation and understanding "involves the movement back and forth between the parts of the text and a view of the whole during the process of interpretation" (Tan *et al*, 2009). This back-and-forth movement is what Ricoeur (1981) termed hermeneutic arc, and what Heidegger (1967) called hermeneutic circle (Cole & Avison, 2007).

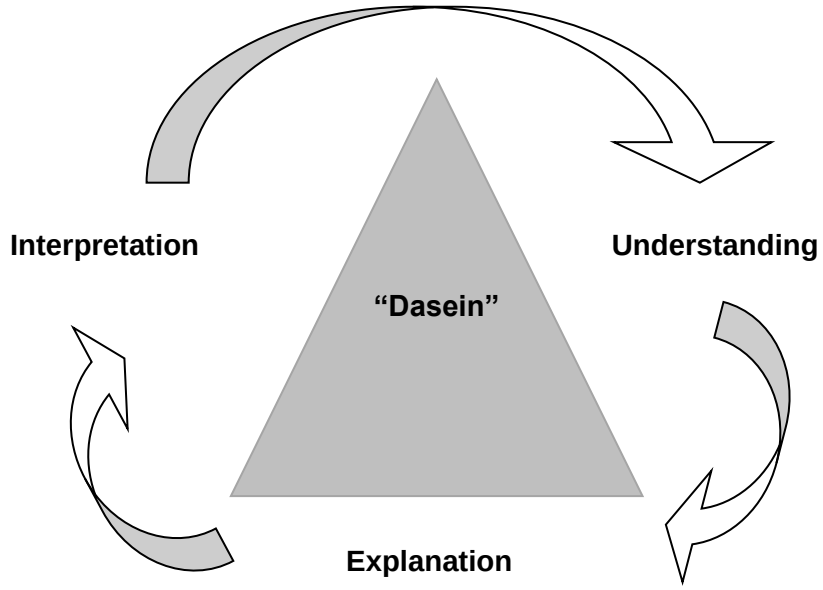

Figure 3.16: The structure of understanding
(Source: Cole & Avison, 2007:823)

In interpreting the collected data using Ricoeur's (1981) theory of interpretation, the analysis followed three levels as advised by Tan *et al*. (2009). These levels are explanation, naïve understanding, and in-depth understanding.

Level 1 analysis: Explanation

At this first level of analysis, the transcripts and notes taken during the interview were examined by the researcher. Rubin and Rubin (2005) and Saldaña (2009) advised that field notes and transcripts be analysed in two phases. In the explanation phase therefore the researcher hand-coded (as free nodes) the interviews individually in order to find, redefine, elaborate, and integrate identified concepts, themes, and events (Rubin & Rubin, 2005).

This was done to enable the researcher to retrieve what the interviewees had said and begin to code[10]. The data was reduced and simplified to words or phrases (but retaining their essential meanings) to identify implicit and explicit ideas that exist within the data (Monette, Sullivan, DeJong, Cornell & Hilton, 2014:429). This process involved individually coding phrases, sentences, groups of sentences, or words to "free nodes (unorganised or emergent ideas)" (Tan *et al*., 2009). This process helped the researcher to systematically examine the different interviews and clarify what is meant by specific concepts and themes, while synthesising different versions of events and putting together a clear understanding of the overall narrative (Rubin & Rubin, 2005). The researcher checked for accuracy and that no ideas were missed by rereading all documents, and also giving it to the research supervisor to validate that they interpreted the data as having similar meanings (Tan *et al*., 2009).

Level 2 analysis: Naïve understanding

In this process, the researcher examined the free nodes (the hand coded ideas), combining ideas that are connected or refer to the same idea. For clarity, the hand-coded individual interviews were then typed up with the source and the code in two columns of a Word document. The researcher next placed the interview questions, the responses from the interviewees, and the code side by side to show an in-depth view of the responses for each of the interview questions. The further re-analysing and re-organisation of the codes (see Appendix F and G) led to the grouping of these ideas into six main themes (see Table 4.3). This was done using an Excel spreadsheet.

Level 3 Analysis: In-depth understanding

Level 3 analysis involved "moving back and forth between explanation and understanding" to arrive at an in-depth understanding (Tan *et al*., 2009). This back-and-forth movement called hermeneutic circle or hermeneutic arc is also referred to as 'Dasein' (Figure 3.16) This process was to understand the existing knowledge better (Cole & Avison, 2007)—first for the pre-understanding of the researcher, and secondly for the new knowledge gained from the individual interviews.

A further description of the process of interpretation for the data analysis at the three levels appears in section 4.3.1.

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[10] Coding involves systematically labelling concepts, themes, events, and topical markers so that you can readily retrieve and examine all of the data units that refer to the same subject across all your interviews (Rubin & Rubin, 2005).

3.10 Delineation of research study

This research explored how user-centred design can be used to improve/engender trust in e-commerce websites. The study was limited to only Business-to-Consumer (B2C) websites and did not consider other e-commerce websites such as Business-to-Business (B2B) or Consumers-to-Consumers (C2C) sites. The users of e-commerce was drawn from the BTech, MTech and DTech level of various departments of Cape Peninsula University of Technology, Cape Town for convenience and physical availability to satisfy the UCD focus group phase.

Similarly, only website developers drawn from Cape Town were used. During the focus group phase, the website developers were not available due to commitments at their place of work and their place was taken by MTech students from the Information Technology department who have technical knowledge of website development. The study did not implement any designed solution for public use.

3.11 Ethical considerations

Permission to conduct this research was granted based on a research proposal submitted to the Research Committee of the Faculty of Informatics and Design (FID) at Cape Peninsula University of Technology (CPUT). Ethical clearance for the research was granted by the FID Research Ethics Committee.

The ethical considerations comply with the ethics principles of FID, and with general principles for scientific research such as obtaining appropriate individual consent and ensuring confidentiality in the use and storage of data.

According to Babbie (2014), ethical issues in research deal with what is right and wrong, and considerations may include religion, political ideologies, or simply the pragmatic observation of what seems to work and what does not. Monette *et al.* (2014:54) listed seven basic ethical issues that arise in social science research. These are “informed consent, deception, privacy (including confidentiality and anonymity), physical or mental distress, problems in sponsored research, scientific misconduct or fraud, and scientific advocacy”.

Particular attention was paid to the ethical issues during data collection and analysis, and these were addressed verbally and in written form (see Appendix A for the individual consent forms for research participation completed by the users and web developers).

Participant's rights

- Participation in the research was voluntary
- Participants had the rights to refuse to answer any question that posed a threat to them
- Participants had the right to remain anonymous
- Participants had the right to refuse to provide any sensitive data that may be requested
- The research collected data without harming the participants
- If any participant chose to withdraw, all data gathered until the time of withdrawal would be destroyed

Confidentiality and anonymity

The researcher ensured confidentiality, assuring the participants that the information they shared will remain confidential. Their identity would be protected by the use of personas and pseudonyms. The anonymity of the web developers was protected by not using their photographs or company names. (The participants did agree to their photos being used, but anonymity remained protected by the use of coded names.)

Informed consent

Participants were informed of the aims and objectives of this study. They knew what was required from them to make the project a success. Participants were informed of their rights in participating, and that they could withdraw without any implications.

3.12 Summary

This chapter discussed the research design, the methodology used in carrying out the study, and the methods used in analysing the data. The study, although focused on the users, also collected data from web developers. The chapter showed the philosophy of the research and the need to seek further insights from web developers. The chapter was structured to show the steps taken in the research from data gathering to data analysis for the users and for the developers. The next chapter describes the steps taken in analysing the collected data and presents the findings of the research.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

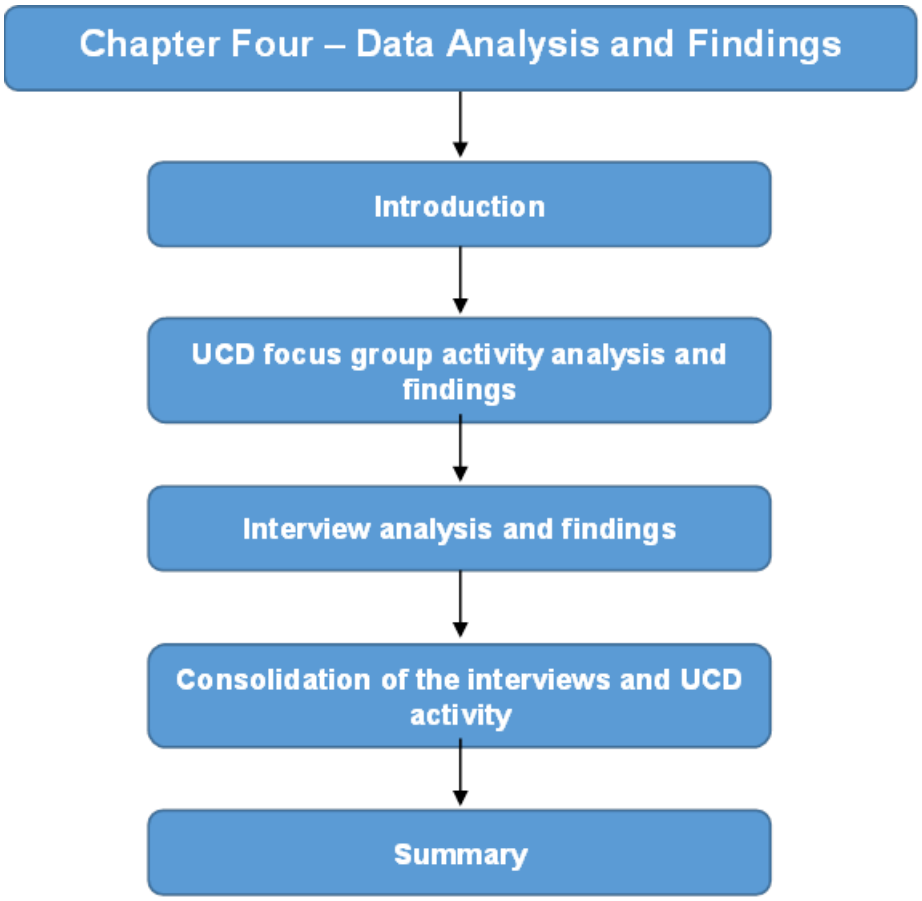

Figure 4.1: Graphical representation of Chapter Four

4.1 Introduction

The aim of this study was to explore e-commerce attributes that can communicate and engender trust in potential users. Once users have enough trust in such websites, the technology can be domesticated to the point where users may see e-commerce websites as part of their lives. Data was gathered through a user-centred design activity with e-commerce users and interviews with developers of e-commerce websites. The study contributes practically with design guidelines and principles for developing e-commerce websites that will engender trust in potential users. To establish design guidelines, and to avoid bias from consulting only users, there was a need to include views from experts on the issue. This was done by semi-structured interviews with web developers intended to explore techniques web developers currently use to engender trust.

This chapter analyses the data collected from the user-centred design focus group activity of the users and the interviews with the web developers.

4.2 UCD focus group activity analysis and findings

This section discusses the user-centred design (UCD) analysis and presents the findings. This includes the findings on users' perceptions, analysis and findings of the UCD activity, a further analysis by the researcher for data interpretation with developed themes, and also the personas which evolved to interpret the data collected.

4.2.1 Findings on users' perceptions

The UCD focus group activity focused on users' perception(s) on e-commerce trust, and generating ideas for a user-centred e-commerce website that will engender trust. Two techniques/tools used were *brainstorming* and *brainwriting* (section 3.8.2).

On a personal note, there were some interesting findings from the observations of the note taker, the focus group interactions, and probes. Some of the findings were expected, but others were unanticipated. Below are the findings on users' trust issues and perceptions of B2C e-commerce websites, which also answers research sub-questions 1 and 2:

i) The users showed excitement and interest in the topic and the opportunity to be heard. They gave their total attention and focus throughout the UCD activity. When asked, this was stated to be due to how directly the topic affects them in their everyday life. As observed by the note taker, they were relaxed and quick to understand what was required of them.

ii) When asked how many of the users were comfortable using e-commerce to purchase goods and services, all replied negatively, as they believe there are still a lot of trust issues to deal with. Only a few admitted to the use of one or two e-commerce websites in South Africa. All of these sites were recommended by friends or relatives and all are well-known (popular) brands. They all admitted that e-commerce websites could play a huge role in their daily lives, as long as they perceive the sites to be trustworthy.

iii) As observed during the individual group (GP1 and GP2) discussions, most of the users do not know the use of https, the padlock indicator, security signatures, and certificates. During the general group interactions and probe, a participant admitted not knowing what https does, but does know that it has to be present for a website to be deemed secured. The use of https was explained and everyone agreed that such information should be made known to users when they visit e-commerce websites. They also called for a means to click on these security signatures and certificates to show information concerning it. Another observed phenomenon was users

admitting that they are lazy to read and complaining that things like terms, conditions, and product descriptions should be short and to the point.

iv) It was found that users were more ready to trust the better-looking e-commerce websites; the sites that were aesthetically pleasing and easy to use. They commented on this, noting that some of the sites simply did not do enough to convince the users that the site is trustworthy. For example, when describing users' trust issues on the websites explored, statements such as "Website graphics look too simple to be trusted", "No professionalism in terms of designing the home page", "Home page is not defined and it makes it difficult to access the home page", and "Lack of visible options to cancel a process" were repeatedly observed, with firm agreement from all users. They explained that there should be a balance between text and graphics on websites. Users admitted that they need guidance, either in pictures or videos, and a step-by-step guide to using the websites; the users got lost during the process of carrying out a transaction. They also had more trust in websites that do not have pop-ups.

v) Among identifiers of a trustworthy website, users mentioned the removal of non-relevant adverts, quick search for products to be purchased with less non-relevant information, and a quick transaction process. All agreed it was tiring to scroll through pages cluttered with unnecessary information; it creates confusion on which steps to take. They all want a straightforward way to find what they want, click on it for a brief straightforward description, confirm payment, and leave. As summarised by a user: "We don't care about much stuff, we just want to get there and complete our transaction as quickly as possible".

vi) One aesthetically attractive website used images or symbols on the navigation bar. It was surprising to observe that the users had difficulty in navigating through the website. They struggled to get to the home page and other important pages. During the probing and brainstorming session, it emerged that this can be attributed to them not understanding the meaning of the symbols used for the navigation. They insisted on having words with symbols to help those who do not understand the images.

vii) Another noteworthy finding was that the users showed more trust in the e-commerce sites that offered sign-up as an option, or used guest accounts, thus letting a user transact and peruse the site without necessarily opening an account. Users preferred sites that provide various payment options. They wanted control over where their purchases should be delivered, including their place of work, a public place, or post office. They said this

was to reduce the amount of personal information and "one's life being exposed on internet".

viii) Another observation was that the users seemed largely to agree on most of the trust issues and ideas put forward, except for a few disagreements during the discussions on security technology, certificates and signatures, and information privacy. Users raised different things to look out for on websites to show that it is secured. The technical users with IT backgrounds gave more importance to the security and use of mobile verification for transactions, while the non-technical people stressed information privacy and the collection of less user information. All agreed that the first thing for any e-commerce website to display up front (at the header of the first page) when users visit the website is an assurance of the security of customers' data, and the privacy of their information.

4.2.2 UCD analysis and findings

The data gathered from the UCD activity was analysed in two stages. It was firstly analysed with the users on the day of the activity to guard against bias and misinterpretation by the researcher. The second stage was done by the researcher alone, with both stages of analysis using affinity diagrams. User personas that represented the e-commerce users were created from the findings. Using affinity diagrams for the analysis provided more insights. It facilitated categorising and re-categorising of perceptions and ideas into the themes that best fit them.

4.2.2.1 Affinity diagram for analysis

An affinity diagram was used in analysing the data gathered from the UCD focus group activity (section 3.9.1). In line with the suggestions of Tague (2005) and Holtzblatt *et al*. (2005), an affinity diagram was developed during the UCD activity. The users (with the guidance of the facilitator/researcher), used brainwriting in the ideation process. This resulted in generating 84 ideas/concepts from the two groups. They were further asked to validate their ideas and rate the relative "goodness" of each idea (refer to section 3.8.2 for details). The ideas were analysed by listing the users' top rated ideas under labels that describe them. This resulted, after consolidating overlapping and duplicated ideas, in a set of 61 validated ideas/concepts[11].

[11] Resulted in 63 ideas after re-analysis as two ideas appeared in two themes, *Functionality Design* and *Trustworthiness based on Content.*

The further analysis was to gain a better understanding and interpretation of the data in order to group the ideas under the themes (or labels) that best describe them (Appendix E). This included the reassessment and re-analysis of the video recordings, the notes taken by the note taker, and the initial analysis done with the users.

During this re-analysis, the researcher made sure there were no deviations in words, meanings or concept validations from the data originally collected from the users. The researcher ensured that they were placed under the labels/themes that best describe them. This resulted in five themes, one up from the previous four themes used during the UCD activity. The findings are presented below.

Figure 4.2: Affinity diagram showing re-analysis done by the researcher

4.2.2.2 User personas (description of the e-commerce users)

Based on the research data collected from the e-commerce users, fictional personas were created to make the users more authentic when designing or developing B2C websites. Characteristics of likely users were taken from the data collected and were used to create personas.

Two personas were created to represent two ends of the e-commerce user group, namely technologically inclined, and a technology novice. These personas are indicated below.

Persona 1

Letsego, a 32-year-old tech-savvy person currently doing his Masters in Information Technology, living in Bellville, Cape Town. He frequently makes purchases from e-commerce websites, although quite sceptical about some of the websites. He chooses the ones he buys from based on a variety of technical features of the site such as the security certificate (security signatures), if it uses https, third party certification, and how well-known the site is. He has trust issues with sites that are not monitored or well managed, and which do not reflect a certain level of expertise. He suspects it might be built to defraud people, and he would not do any transaction on it.

Expectations

- Keep security information/awareness obvious and easily accessible
- Limit annoying pop-up 'ads'
- Security certificates ensure customer privacy
- Provide visible option to cancel transaction
- Items being displayed should be obvious
- Make site navigation friendly
- Ensure one-to-one connections through mobile or e-mail verification

Persona 2

Mafune is 35 years old and an administrator at a private company. She lives in Gardens, Cape Town. She is a mother of two pre-schoolers. She buys a lot of groceries, loves fashion, and enjoys traveling for vacations. She does most of her shopping and payments in brick-and-mortar stores. She would love to shop online as she believes it is easier–but for some challenges. She does not really trust shopping online as she believes e-commerce websites have lots of trust issues. She is afraid of her private information being hacked or used fraudulently. Afraid of being defrauded, she is uncomfortable paying online by credit card. In addition, she finds e-commerce websites frustrating to use and understand as there is little or no directions on how to use it.

Expectations:

- E-commerce websites should request less personal information
- Provide better guidance for new users
- Easy and simple navigation
- Provide various payment options
- Essential pages should not be hard to find
- Provide a more direct search with exact results
- Have a direct path to goods required – no superfluous hits

4.2.3 UCD findings themes

This section presents the themes according to their importance, based on the findings of the UCD activity. The importance is based on the emphasis and number of ideas grouped under each theme by the users. The five themes as discussed below (Figure 4.3) are *Aesthetics Design*, *Security and Information Privacy*,

Functionality Design, *Trustworthiness Based on Content*, and *Development Process*. For the detailed list of ideas and conceptualisation please see Table 4.1 and Appendix E.

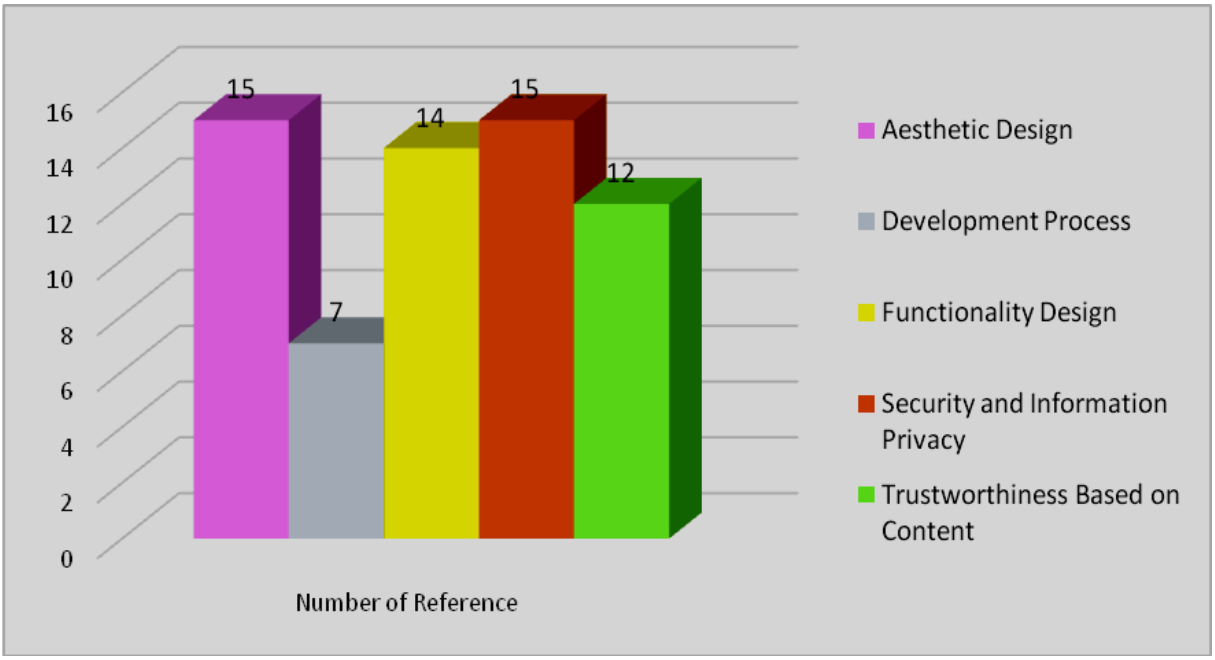

Figure 4.3: Graphical representation of the UCD findings

4.2.3.1 Theme 1: Aesthetics design

Aesthetics design emerged as one of the most important criteria for engendering trust in e-commerce. The theme was rated as having the same importance and emphasis as security and information privacy. Each of the two themes cover 15 of the concepts generated through the UCD activity—nearly one quarter of the findings (15 out of 63). It is clear that the users place a lot of value on the look and feel of websites. They emphasise that the more 'nicely-designed' a website looks, the more likely they will be attracted to it. Aesthetics design creates the first impression of perceived trustworthiness. The users shared the view that since they cannot see the technology behind the website, the extent to which the website looks aesthetically attractive, will indicate to them how much effort has gone into designing the website. The data reveals that effort put into the aesthetics design of an e-commerce website equates to perceptions of effort invested in trustworthiness.

4.2.3.2 Theme 2: Security and Information Privacy

Security and information privacy was rated joint first for its ability to engender trust in e-commerce web sites. Having garnered the same number of occurrences as Theme 1, with nearly a quarter of the findings, security and information privacy

emerged as an important criterion for a B2C e-commerce website to be perceived trustworthy. The users stressed the need for vendors to ensure internet security through security certificates that can be authenticated by the users themselves. These should be displayed very prominently at the top of the e-commerce website pages. Although internet security was considered as important, it was the collection and use of their personal information—including card details—that was the main issue users want to be dealt with. They feel if there is less information concerning them out there, then there is less chance of them being defrauded. Having an option to sign in or transact as a guest, without supplying any personal information, would make them feel secure and more likely to trust the e-commerce website.

4.2.3.3 Theme 3: Functionality Design

The amount of attention that users devoted to functionality design and usability of the website came as no surprise, with 14 of the 63 ideas directed to this theme. Functionality plays a huge role, both in establishing user trust and in fostering on-going trust. Users say if an e-commerce website is easy to use, and it is navigation friendly, even for novice users, then they will trust it. The videos and notes from the UCD activity show that the main incentive for users to return (on-going trust) to an e-commerce website is that they find it easy to use. Concepts such as keeping page scrolling to a strict minimum, optimised search functionality, and navigation guidance to direct users are just a few examples of features that can help to domesticate the technology. All the users acknowledged that the functionality and usability of a website has a lot to do in ensuring user trust. One participant summed it up saying “If I can’t use it, I can’t trust it.” They also insisted on the need for the vendor to have physical contact details which include physical offices, phone numbers and e-mails which can be verified.

4.2.3.4 Theme 4: Trustworthiness Based on Content

Just under 20% (12 of the 63 mentions) referred to the role of trustworthiness based on the content of the website as a factor likely to engender trust. The kind of information likely to improve a user’s trust of an e-commerce website includes dialog boxes for user feedback, having up-to-date security seals or certificates displayed on the site, having on-point information for terms and conditions, and providing various modes of payment. Having a brand ambassador who endorses the site can further improve trust in B2C e-commerce websites. These features can help a vendor in re-branding and building an e-commerce website as a known resource. As a brand known by B2C e-commerce website users, this will encourage them to try it out and keep using it.

4.2.3.5 Theme 5: Development Process

Although it does not directly affect them, the users did give suggestions on the development process, and the need to involve users in the process. They acknowledge that developers do not really know how users will see or use the websites. The development process should involve users working with the developers, sharing the design activities with potential users, allowing users of different ages to 'test-drive' the website, and also having creative input from another, separate developer/designer. The need to have a 'home' developer that will check and handle issues when websites break down or buttons do not work was also stressed.

Table 4.1 summarises emergent themes and ideas.

Table 4.1: Emergent themes and ideas

Themes					
IDEAS	**Security and Information Privacy**	**Aesthetics Design**	**Functionality Design**	**Trustworthiness Based on Content**	**Development Process**
	Security certificates should be genuine	More elaboration on pictures of products	Buttons for retraction of transaction	Up-to-date certificates should be displayed on website	Adhere to e-commerce best practice
	Ensure one-to-one connections (via email and/or SMS confirmations)	Provide visible option to cancel transaction	Provide good ease of use of websites (if I can't use it, I can't trust it)	Keep security info/awareness obvious and easily accessible (more visible)	Allow users to give input on ease of use
	Certificate should ensure customer info privacy	Allow users to return to home page anywhere on the site (with 'Home' written as text not only as an image)	Make website navigation friendly mostly for novice users (telling users what to do next)	Limit annoying popup adverts on website	Get children to play with website (development process)
	There should be standard signature (security) certificates for all e-commerce websites	Professional and consistent design on all web pages	Provide guidance to navigate website for new users (telling the user what to do before they start any process)	Promote ads that are only related to the item or category searched	Get a new web designer's different creative input
	Request less personal information	Maintain website by including proper images related to the product description	Keep page scrolling to a strict minimum	Dialogue box for customer to comment (customers' feedback)	Design with potential users
	Visible security certificates (top of page)	Design homepage properly (not too much text)	Easy to use and understand	Provide different modes of payment	Have developers that will check and handle issues when website breaks or buttons do not work
	Websites should ensure privacy of customer data	Very prominent name of the company and logo	Categorise and group related information (products)	Have a brand ambassador (a popular star who endorses the website)	Allow users of different ages to 'test drive' website (different levels of 'techie')
	Control of personal data and informed consent	Any button not working or in use should be greyed out (it causes confusion)	Use short descriptive text (Don't like too much text. Get tired of reading)	On-point information in terms and conditions	
	Retraction of personal information/ data	Develop a website in such a way that it attracts customers to the site	Obvious location of information needed by customers	Ratings, comments and reviews	
	Avoid misinformation (do not market security you do not have)	Use appropriate colours—consistency on website	Availability and on point information on each product or item displayed	Retraction of transaction	
	Security certificates or signatures verification of originality	Put in more effort when designing websites to avoid easy manipulation or phishing	Icon to easily cancel transaction as and when needed	Branding of the websites	
	Provide medium of secure information storage/usage	Design websites to reflect some level of professionalism	The use of optimised search box to help customers find what they are looking for quickly	The use of optimised search box to help customers find what they are looking for quickly	
	Have an option to deliver to post office	The most essential pages should not be hard to locate e.g. Home Page, About us	Minimum clicks to reach the item(s) of interest		
	Having sign-up/guest accounts to give users the option to have an account or not	High-quality graphics (such as colour blocking)	Make available website's verifiable physical contacts		
	URL with visible https or padlock as an indication of it being secured	Items being advertised should be obvious as real product			

4.3 Interview analysis and findings

This section presents the analysis and findings derived from the data that was collected during the interviews with the web developers. These semi-structured interviews were conducted to explore present techniques that developers use to engender trust in B2C e-commerce websites, thereby answering research sub-questions 1 and 3. Four respondents were interviewed. Three of the respondents are senior web developers with different companies, while the fourth is an owner of a B2C e-commerce website. All are located in Cape Town, Western Cape, South Africa, and Table 4.2 summarises their details.

Table 4.2: Summary of interview respondents

Interviewees	Position	Location
WD1	Senior Web/Software Developer	Interviewee's office, Athlone, Cape Town
WD2	Senior Web Developer	Interviewee's board room, Durbanville, Cape Town
WD3	CEO of E-commerce Vendor	Interviewee's board room, Durbanville, Cape Town
WD4	CEO/Senior Web Developer	Interviewee's board room, Observatory, Cape Town

4.3.1 Interview analysis using Ricoeur's Theory of Interpretation

The following section details the steps to analyse the data from the interviews with e-commerce website developers. It also presents the findings from that analysis (section 4.3.2).

The interview data was analysed by using hermeneutics to interpret the text (Cole & Avison, 2007; Tan *et al*., 2009; Neuman, 2011). Specifically, the study used Ricoeur's (1981) theory of interpretation described by Tan *et al*. (2009). This analysis followed the key interpretation processes of distantiation, appropriation, explanation, and interpretation as outlined in Chapter Three (section 3.9.2). After transcribing the audio interviews (which gave distantiation), the appropriation followed, absorbing the interviews and blending self-experience with that of the interviews. This led further into explanation and interpretation (naïve understanding and in-depth understanding) of the data. This process as described below was done on three levels—explanation, naïve understanding, and in-depth understanding as suggested by Tan *et al*. (2009).

Level 1: Explanation

This process involved examining the transcripts and field notes taken during the interviews to begin the analysis. This was the first phase of coding, as advised by Rubin and Rubin (2005) and Saldaña (2009). The researcher hand coded the

transcribed interviews individually, using a highlighter to accentuate emergent ideas as free nodes, a pencil to write the ideas down, and an eraser when needed to change previous ideas into new and clearer form. Words, phrases and sentences were coded based on any mention of e-commerce development processes, e-commerce trust issues, e-commerce design, techniques used to engender trust in e-commerce, and generally anything that the interviewees stressed. This resulted in a list of more than 80 emergent ideas.

Classification and coding at this level was only done only at face value, with no attempt to interpret the data. Some examples are start-up firms, using analytics to judge, navigation friendly, development process, customer guarantee, and others. Some of these ideas were retained, with the same name, after the second level of coding and interpretation, while others where integrated into new categories. To ensure no ideas were missed or inaccurately coded, the researcher went over and reread the transcripts and field notes before proceeding to the second level of analysis.

Level 2: Naïve understanding

After coding the data as free nodes, the researcher started the second phase of analysis by examining the nodes. This was done to understand which ideas were connected or referred to one another. It was first done for each individual interview, and then extended to compare the interviews in combination, again to identify ideas that were closely connected or referred to one another. This process produced a list of 33 main emergent ideas or code. The researcher, using Microsoft Word, created a document with these ideas placed side by side with the interview questions and responses from the respondents (see Appendix F for example).

The next step at this level was to create an Excel spreadsheet to show the progression from raw data (responses and codes), to the coded data (code, references, and number of references), and finally to the major themes (themes, sub-categories, and number of references) (see Appendix G, Appendix H and Table 4.2). This was achieved by reanalysing the 33 ideas and reorganising those with related (common) meanings into six emergent major themes. These groupings were each given a description that identified the main theme of all the data items grouped thereunder (see Table 4.2). For example, codes such as information privacy, internet security, paying online, security certificates and third party auditors were grouped together under the main idea (major theme) of security and information privacy.

These codes were re-examined and individually checked within their major themes, and two were found which could fit into two major themes. The first was *payment options,* which could both fit into Vendor Attributes and Trustworthiness Based on Content**.** The second was *security certificates*, which corresponded both with Trustworthiness Based on Content and of course Security Certificates as a theme. To accommodate their additional meanings, both were placed accordingly.

Level 3: In-depth understanding

Moving back and forth through the hermeneutic arc (between explanation and understanding), the interpretation of the data collected were informed by the researcher's pre-understanding of e-commerce trust and the researcher's knowledge gained from the interviews with the web developers. At this level in-depth meanings from the data started to become apparent. For instance, the interviewees see branding as a more important factor for trust than the aesthetics of design. "I believe that design does play a role in it, but it's about brand" (Respondent WD2). Respondent WD2 believes that "people trust brands. It really becomes a point where you need to establish your brand". They were defensive in their approach to development of e-commerce and the reason to say more about building a brand.

During the in-depth discussions some interviewees did acknowledge some importance of aesthetics in trust besides how it can help build brands. For example, "design is important because if you don't have a site that looks aesthetically nice, you are not going to feel comfortable in buying" (Respondent WD2). Respondent WD4 said: "So if your design is really high and it's beautifully put together, people will see it to be trustworthy". They all found it difficult to answer questions with regard to users' involvement to bolster the design of trust in websites. The interview findings are discussed below.

4.3.2 Themes of the interview findings

This section presents the findings of the data collected from the interviews with the B2C e-commerce developers of Western Cape Province. In using the steps described above with the three levels (section 4.3.1), six major themes emerged with thirty sub-themes (see Table 4.3, Figure 4.3, and Figure 4.4). Two of the sub-themes appear twice (i.e. in two major themes each).

Table 4.3: Major themes with sub-themes and number of references

Major themes	References	Sub-themes
Aesthetics Design	10	Aesthetics
		Aesthetics cognition
Trustworthiness Based on Content	26	Customer's guarantee
		Payment options 1
		Product information
		Security certificates 1
		Third party certification
		Users' testimonials
Security and Information Privacy	14	Information privacy
		Internet security
		Paying online
		Security certificates 2
		Third party auditors
Functionality Design	9	Ease of use
		Search functionality
		User interaction
		User experience
		On-going trust
Vendor Attributes	41	Branding
		Delivery cost
		Established brand partnership
		Marketing and advertising
		Payment options 2
		Services provided
		Vendor's capital and size
		Vendor's physical identity
Development Process	31	Cultural barriers
		Designer skills and expertise
		Development methods
		Industry standards
		Pre-built technology
		Users involvement
		Using analytics

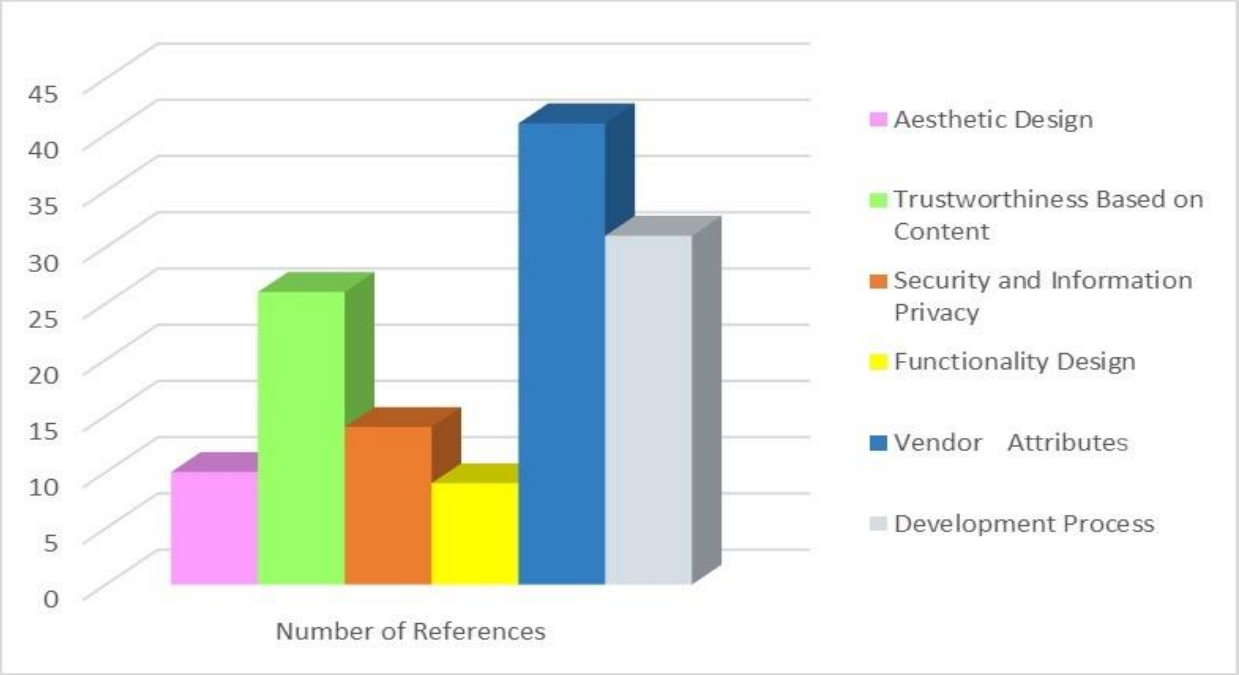

Figure 4.4: Graphical representation of the interview themes

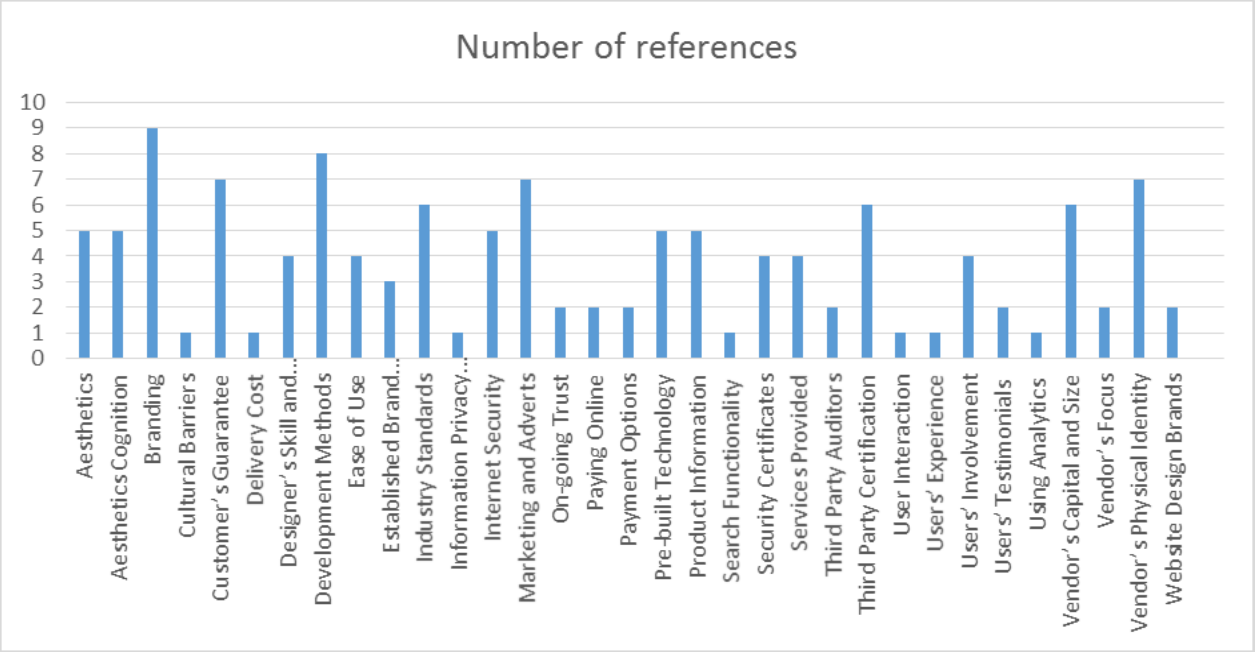

Figure 4.5: Graphical representation of the interview sub-themes

4.3.2.1 Theme 1: Vendor Attributes

Vendor attributes include any features, traits or characteristics attributed to an e-commerce vendor (online and/or offline). Vendor attributes are regarded as very important to engender trust and for e-commerce websites to thrive. The responses reveal that vendors' characteristics, quality, traits or anything relating to the vendor

as shown from the websites, are major keys to users' trust or distrust. Out of the 131 references across all 35 sub-categories, the theme Vendor Attributes attracted 41 references—the highest of all six major themes. This number of references—almost a third of the interview findings—illustrates the web developers' view on engendering user trust. The data reveals branding, delivery cost, established brand partnership, marketing and advertising, payment options, services provided, vendor's capital and size, vendor's focus, and vendor's physical identity as the sub-themes that comprise the theme Vendor Attributes. These sub-themes are presented below.

Branding

The sub-theme branding, according to all the respondents, is a major factor to engender trust and also create an on-going trust between e-commerce vendors and their customers. The sub-theme had nine references, the highest number of the sub-themes. The concept of branding means to create a unique sign, name, symbol or term in the mind of customers to identify and associate with goods and services of a vendor. This brand is presented and marketed to the customer to differentiate the vendor from others and establish its significance compared to other vendors.

The data revealed the respondents believe that, even if you have a good price and product, without an established brand you cannot gain trust from the customers.

> "Even from my own opinion, there is always this feeling of mistrust or fear when for instance it's a local, unestablished brand. Somebody selling something for a good price, but you have never heard of them" (Appendix F, Respondent WD1).

The respondents assume that people trust brands they know; that it is the responsibility of the vendor to establish this, and the web developer to represent it in the best way online so that customers can trust them: "People trust brands. It really becomes a point where you need to establish your brand" (Appendix F, Respondent WD2). Respondent WD1 stressed the need to establishing the e-commerce website as brand citing established brands as having trust by stating the following: "I mean with established brands there's trust obviously" (Appendix F, Respondent WD1). Respondent WD2 continued by stating that "I believe that design does play a role in it but it's about brand".

To build the brand, the data revealed that through marketing and advertising, which is the next sub-theme, e-commerce websites can become established brands.

Marketing and advertising

Marketing and advertising are ways through which an e-commerce website can establish itself as a brand, and that will further build the initial trust. This is what makes this sub-theme attract such a high number of references in the interview data. According to Respondent WD2, an e-commerce website needs to be brought "… in front of your clients, many, many, many times, over and over and over". WD2 also stated that:

> "…there are seven touch points which a person can use to recognise a brand and start trusting it. It is more of a standard marketing strategy… Like if you have an e-commerce site but you advertise a prominent Facebook page with a thousand followers. You know that's trust. If you [are] on price check, that's trust. If you have some other mediums that you market on—print media or billboards—and you take that and put that onto the site, I think that's trust".

Vendor's physical identity

The vendor's physical identity is seen as another of the major factors that can engender trust. Respondent WD2 noted that, for e-commerce vendors to build trust with their customers, there should be "…information about yourself" for customers to see the person "who's the holder in the company"; also "things like address verification" (Appendix F, Respondent WD4), and that an e-commerce vendor has "…a telephone number a person can call" (Appendix F, Respondent WD2) could motivate consumers to trust the site. Respondent WD3 also stated in support that "we have a company registration number. So if we are fraudulent, you will have ways in tracking us and we have a physical address".

Vendor's capital and size

The vendor's capital and how well-known the vendor (or company) is plays a role in the way a user will perceive an e-commerce website. The respondents assume the users can distinguish a fraudulent from a non-fraudulent website by what size budget was used on it. Respondent WD3 noted:

> "I mean you can easily see if it's a misleading or fraudulent site because 99% of the time it would be designed poorly with low budget… Would we spend all this money just to steal your money?"

The budget used to develop an e-commerce website can affect small vendors or businesses in having a competitive or equally good e-commerce website to get the same advantage as the big vendors or businesses. Respondent WD1 stated that

“this thing cost a lot of money. A lot of people charge a lot of money to build these things. So for small businesses or individuals to take advantage of having an e-commerce solution is not always as easy as possible”. The size of a vendor’s capital to invest in building a trustworthy site “…probably will be the biggest challenge for start-up e-commerce sites” (Respondent WD2). Respondent WD1 also noted that “the smaller vendors, they tend to focus a lot more on the current market—the working clients that they have… But with more established brands, they have money to throw in marketing”.

Services provided

The data revealed services provided by the vendor with regard to support to the customers could also improve the trust of users. Some of the responses include:

> “But the selling point is always what kind of support and what kind of merchants they support (the amount of card-merchants)? What is their fail-self mechanism? Because things always go wrong” (Respondent WD1).

> “And then the customers’ service...” (Respondent WD4).

> “…But the bigger solid giants where the focus is solely where their business is living, they put a lot of focus on service agreements that their service have” (Respondent WD1).

Established brand partnership

The respondents view e-commerce vendors partnering with established brands as a way that can further build a strong relationship between the vendor and their customers who can be guaranteed that the vendor is backed by well-known established brands. Respondent WD1 stated: “And you partner with the big brands like MasterCard and Visa, they actually insure you for an amount… For me it’s just all about the brands you tie to, that can be a major plus for you”. Respondent WD3 also stressed the importance of partnering with established brands through an illustration: *“*But I told him listen, I can get Samsung’s guy with a Samsung email (a Samsung.com email) to send you a mail stating that we are an accredited Samsung products seller...”

Payment options

The attribute of a vendor being able to provide customers with payment options (offline and online) can be a way to inspire trust. Respondent WD4 stated that:

> "The idea to kind of inspire trust is to give them more options so they feel that they can, if they don't trust the credit card then maybe they can just try the EFT. Because that's login into their bank and doing it separately outside the system or even cash on collection. So you try and give them as many options as possible".

Respondent WD4 also noted that the inability of a vendor "not to pay with more than one method like credit card or EFT or even cash on collection" can lead to mistrust.

Delivery cost

Although not linked to trust, Respondent WD4 made reference with emphasis to this sub-theme as an obvious part of vendor attributes. Respondent WD4 stressed that extra cost of delivery added by the vendor can be a barrier for customers to make a purchase:

> "The others is [sic] not necessarily trust but engagement such as what cost to deliver. They go through the whole process and they'll get to the end of the kind of check out process and they'll be hit with a R100, R50, whatever it might be for the delivery cost. That's kind of a barrier to entry for a lot of clients but it should be free".

4.3.2.2 Theme 2: Development Process

The significance of the development process to the respondents was stressed, with nearly a quarter (31 out of 131) of the findings emerging under this theme. The development process must play an integral part in designing and building any e-commerce website if the site is to succeed and thrive. The responses from the data revealed that some research on the technology to use is done before an e-commerce website can be developed successfully. The sub-themes are development methods, pre-built technology, the developer's skill and expertise, industry standards, users' involvement, and using analytics.

Development methods

The responses revealed that various methods are being used for the development of e-commerce websites. Development methods are the steps taken by the developers in developing the websites. The respondents see a need for some research on technologies to use before the development of websites to prevent creating fraudulent sites: "It doesn't help you if you design something that you know its fraud. So research I think is quite important" (Respondent WD2).

There is not a standard method to use in the development of these websites—it depends on the method the developer or company deems best, such as Respondent WD4's response: "But we use SCRUM methodology".

Respondents WD4 and WD2 noted that they used tools such as wireframes and got the clients involved in developing the 'look' of the websites, but this did not include any input from the users on 'trust':

> "But before we start any of the development, we put our clients into this mix in flat designs—what we think the website should like. And then the clients usually give input on that too" (Respondent WD2).

> "Once the analysis phase is done we go into the design phase [in] which we call the designers to come and draw up a template of the back of the wireframe… We're less concerned about use case diagrams, more concerned about data modelling and wireframing, and detailing on wireframes" (Respondent WD4).

Only Respondent WD4 noted some form of indirect user testing in recent e-commerce projects being done using A/B split testing—to test an e-commerce project with two websites to see which site performs better—during their development phase before going live: "We [are] actually undergoing now; there's a new project that we're developing in e-commerce project where we doing what's called A/B split testing… and we kind of deliver small modules during the course of the project. And once it's developed we test and go live".

Apart from the methods being used, the sub-themes outlined below also provide more insights into the development process theme.

Pre-built technologies

Pre-built technologies are used by developers while others build from scratch. These pre-built technologies are sometimes modified by the developers and designers to suit the needs of the e-commerce website: "The tools already exist that everybody use, so it's not really a re-inventory from the design point of view… It's almost like nobody usually in today's age is going to build an e-commerce site from scratch" (Respondent WD1).

Regarding pre-built technologies, developers either use a template or design from scratch on how the website should look: "There are a couple of pre-built themes but

usually people just take skin templates and maybe get a designer in for the logo" (Respondent WD1). "No, it's never by template" (Respondent WD2).

The development and modification of these e-commerce sites are also affected by the next sub-theme, developer's skill and expertise.

Developer's skill and expertise

In the development process, the developer's level of skill and expertise plays a critical role in the development of e-commerce websites. For developers to use pre-built technologies to build a strong e-commerce website that can compete in the market, the developer involved must be able to show a high level of skills and expertise. Respondent WD2 noted that "there's a level of skill and expertise when it comes to the designers or developers", and respondent WD1 indicated that some technical work is to be done by an expert developer: *"*A local payment vendor that isn't aligned with the software merchant that you went to, that is where some technical bit will come from a senior developer".

The developer's skill and expertise is also needed as vendors come to developers for advice and adding any extra technical features or requirements needed for the e-commerce site to thrive. Respondents WD4 and WD2 noted that the vendors (their clients) "…don't know and that's the reason they come to a company like us because we have a great deal of experience in that realm. So we give them a lot of advice" (Respondent WD4); and "…we involve our clients and our clients usually come to the agencies—not being the experts" (Respondent WD2).

Industry standards

The respondents revealed that they follow some process in the development of e-commerce websites, and that these remain similar for all e-commerce websites. Respondent WD4 stated:

> "And you deliver something similar. So the process is that you want to have similar types of card[s] check out, similar product distinct, similar product view, and just keep that process as structured and as similar to the rest… I think the methodologies that have been in place in what we studied are still impeccable. So the process is still very similar… it's helpful to look at the industry's standards just to see what does work and what doesn't work".

The main challenge as shown from the data is that there are no distinct local industry standards or methodologies in South Africa; those developed by Western

and European countries are followed. The response from respondent WD4 summarises this:

> "So locally we haven't really organised our own structure, we [are] kind of following the trends of the West and European countries. So they probably are certain things that we need to push more but we haven't done the research on them. And I am not sure exactly what they might be".

User involvement

On involving users in the development process, the responses showed that the developers do not see the importance and need. When asked if users were involved during the development of the e-commerce websites, the respondents treated it as a difficult question. It seems that it is not so popular among developers here in South Africa:

> "It is a difficult question to answer just like that. Let me think about it (Laughs). I think up till now obviously way too little has been done to consider the user and I think that not a lot of efforts go into that at all…There was no feedback or anything from users" (Respondent WD1).

> "It's a great question and it's a difficult one especially in South Africa because the market hasn't really been established. People are new to e-commerce" (Respondent WD4).

> "We don't take it out to our customer's customers to see what they specifically want because that process becomes so expensive. The benefits that you are going to get by doing that is not, we believe, is not going to be that vital" (Respondent WD2).

One of the respondents acknowledged only indirectly involving users in testing two websites to see which one works better for the website traffic: "So we will have two interfaces that essentially do the same thing but they communicate different message[s]. So we [are] trying to see what the traffic is on each one of those and figure out which works better" (Respondent WD4).

Using analytics

The use of analytics to analyse the user's experience of a website similar to the one being developed, or of already developed websites, appear from the data to have been advantageous:

> "If I must think about the last successful site that I worked on, the guy's approach was basically to build a catalogue site. And based on the attraction that that site got, he actually took the whole concept and he made an e-commerce site out of it. He is making very good money out of it. But there was very little, even none – no interaction with the people he was judging analytics of. It was purely from analytics point of view, seeing what people are interested in" (Respondent WD1).

In essence, the process of developing e-commerce websites follows different methods depending on company or developer preferences. Presently there do not appear to be existing industry standards in the country (South Africa) for developers on how e-commerce sites should be developed to engender user trust.

4.3.2.3 Theme 3: Trustworthiness Based on Content

According to the data, respondents view trustworthiness based on the content of the e-commerce website as a means of improving or engendering trust. This involves a number of sub-themes that they believe will make the users trust the e-commerce websites through the contents of the information on the sites. The theme was mentioned in almost 20% of the responses (26 out of 131). The following sub-themes comprise this major theme: customer's guarantee, product information, payment options, security certificates, third party certification, and users' testimonials.

Customer's guarantee

The respondents revealed that if e-commerce website vendors can provide guarantees to customers through the website's contents, the customers are likely to trust it. One such guarantee is the refund of the buyer's money (a returns policy) when a transaction fails, which can motivate trust: "Maybe you want something else saying if anything goes wrong, you'll be guaranteed your money back" (Respondent WD4). "We have a returns policy, we have an authorised credit card payment system, we are VAT registered" (Respondent WD3). "It is never really your responsibility if you are using an established brand like MasterCard. They will just refund your money immediately and they sort it out" (Respondent WD1). Also, the guarantee that they have a mechanism to detect fraud *"…*like the more prominent ones have like fraud detection, immediate reversal of transactions" (Respondent WD1), are just some of the guarantees a vendor can communicate to its customers through the contents of the websites.

Third party certification

Another means of showing trustworthiness through the contents of the website is by being certified and supported by a well-known established third party. The responses showed that if a vendor can be supported and backed up by third parties (such as the vendor's suppliers) it can make customers trust the website. They say that vendors should have a very close working relationship with their suppliers and should readily make contact details of the suppliers available to customers when needed. Some of the responses from the interviewees include the following:

> "In cases like that I always look for, if I see you are supported by a MasterCard or whatever, I can use it. People don't really understand the value of going through a channel like that" (Respondent WD1).

> "If you can ask, let's say Samsung suppliers, you can get Samsung's Managing Director to sign on a Samsung letter head stating that you are accredited and you put on there… And without your suppliers you are not going to sell anything. Except if you make it yourself" (Respondent WD3).

> "So part of that is to make sure that your suppliers back you. That's a very, very important thing… The backing of your suppliers can aid building the trust" (Respondent WD2).

Product information

The respondents assumed that the more relevant information the vendor supplies on products and services, the more the users might trust. From the data it is suggested that having the right messages on products and services are important to the success of e-commerce websites: "We traditionally make sure that the e-commerce websites showcase products firstly and foremost. Making sure that the necessary information about the products is highlighted" (Respondent WD2).

Respondent WD4 stressed that these messages or information should be properly designed into e-commerce websites to ensure the right messages are passed on to the customers: "…and if you can do that then you can kind of give them the right messages… but in terms of design, you just have to ensure the right messages are there". Respondent WD2 also noted: "You need to have all that messages designed into your site. If it does, then the messages is [sic] more important than the design, but if it's nicely designed (aesthetically), it's just a benefit".

Security certificates

To ensure that customers' information and privacy are secured, the security messages must show from the website's contents, logos and seals that it indeed is secured. As the technology cannot be viewed, the respondents noted that such security messages must be contained on the website to engender trust: "I think that the fact that this is on all the logos that they already have trust in like MasterCard and all those things" (Respondent WD1). "I am not really interested if it says https, and it has a secured certificate I'm happy. For me that's fine" (Respondent WD4). "On top of that you also give them the right icons of certificates that kind of show that it's a trusted site… Security messages are there" (Respondent WD4).

This sub-theme also appears in the theme Security and Information Privacy.

Payment options

The data revealed that if customers are given payment options they can trust, they may believe the vendor is not a fraud. Respondent WD4 stated that not including payment options such as EFT, pay at delivery, and credit cards on the website can affect customers' trust:

> "The idea is to kind of inspire; trust is to give them more options so they feel that they can, if they don't trust the credit card, then maybe they can just try the EFT. Because that's a login into their bank and doing it separately outside the system or even cash on collection. So you try and give them as many options as possible." (Respondent WD4).

Users' testimonials

Users' testimonials can also be used to engender trust. The respondents noted that vendors can create a place on the websites where users who have used the websites can review or testify to the services. The data also shows that testimonials by word of mouth from a user to a potential user can help build trust. "What better way to generate trust than to take people that already bought from you, had a nice experience, and write a phrase stating how spectacular the service was—and having about two hundred of those" (Respondent WD3). "They maybe know their friend that bought through it and they kind of trust that one—like well nothing happened with their friend" (Respondent WD4).

4.3.2.4 Theme 4: Security and Information Privacy

Security and information privacy was mentioned in just over 10% (14 of 131) of the responses. The theme involves measures to provide security on the e-commerce

websites to prevent third parties from gaining access to customer details, and also measures taken in handling customer information. Some mistrust also surrounds the technology behind e-commerce, and how well the use of these technologies can protect against third parties and provide users with information privacy. The following sub-themes give more insights into the theme: internet security, paying online, security certificates, information privacy, and third party auditors.

Internet security

The respondents stated that technical measures need to be put in place for fraud detection and for the website to be secured: “Well there’s always you know, that is why fraud detection... But I mean, most of the systems they have immediate fraud detection; they can spot suspicious transactions a mile away” (Respondent WD1). Apart from the fraud detection mechanism, the sites need to “meet all the security requirements” (Respondent WD1), have https: “It’s got https, it’s secured” (Respondent WD4), and avoid other mistrust of e-commerce surrounding Internet security and the use of cards as noted by respondents WD4 and WD1: “We found that a lot of the mistrust on e-commerce is around the security, around the credit card” (Respondent WD4). “Well, if you’re going to process any payments there are a lot of legalities around things. Like you can’t store credit card details on servers and you have to have basically forensic, IP export orders sign off” (Respondent WD1).

Paying online

Respondent WD4 believed that the readiness to transact online using credit/debit cards depends on the economic standing of the users in South Africa. Those at a higher LSM (living standard measure) do not have trust issues regarding the use of their electronic cards: “The upper LSM [living standard measure], we kind of seen they don’t have trust issues. They have credit cards, they are very comfortable paying”. People from the lower LSMs are the ones afraid to use their electronic cards: “It’s the new kind of lower LSM guys that are worried about someone stealing their credit cards and they are not used to paying online and it’s a new experience”.

Security certificates

Internet security certificates (public key certificates or digital certificates) are small electronic data documents that carry information about the cryptography key, details of the organisation, and digital signature of the verifier. They are a component of Secure Socket Layer (SSL) or Transport Socket Layer. The responses revealed that vendors can engender trust if they show proof of having security certificates. Respondent WD4 stressed the need for security certificates: “On top of that you also

give them the right icons of certificates that kind of show that it's a trusted site", and "…am not really interested if it says https, and it has a secured certificate am happy. For me that's fine".

Information privacy

As revealed from the findings, respondent WD1 noted that consumer information is kept within the country (South Africa) and that it is illegal for such information to go overseas. This is to ensure the information privacy of customers: "In South Africa it's becoming illegal for consumer data to go overseas. So if you got a cheaper rate and the people are not in the boundary of the country, it will be assumed illegal" (Respondent WD1).

Third party data auditors

The use of a third party data auditor can help vendors investigate transactions if needed. The company helps in setting up the data network and control over the use of the customer information. Respondent WD1 emphasised this sub-theme by stating: "They sort of get an external merchant to set [up] along [with] them the data network… the vendor that you partner with will basically store everything in an auditing form".

In developing an e-commerce website—from the findings shown above—developers could reduce the users' mistrust by ensuring the security of their website to safe guard the information privacy of users.

4.3.2.5 Theme 5: Aesthetics Design

The aesthetics design of the e-commerce website is its look, its creative beauty. It is among the features that users use, consciously or subconsciously, in judging the credibility or trustworthiness of a site. The responses showed that the respondents view aesthetics design of e-commerce websites as somewhat important, but not nearly as much as other factors such as vendor attributes (section 4.3.2.1). Its lesser significance is shown by the fact that only 10 of the 131 responses referred to the theme. The sub-themes, aesthetics and aesthetics cognition, give more insight into aesthetics design.

Aesthetics

Aesthetics is the philosophy relating to the study of beauty. The respondents agreed that an e-commerce website should present itself aesthetically and should portray what the e-commerce vendor is selling in an attractive way. The respondents also

stated that an aesthetically pleasing website can make people see the website as trustworthy:

> "So if your design is really high and it's beautifully put together, people will see it to be trustworthy" (Respondent WD4).

> "Obviously design is important because if you don't have a site that looks aesthetically nice, you are not going to feel comfortable in buying… Having a big rotational advice is helpful for special information and it draws the eye of the potential customer to the items that you actually want to sell" (Respondent WD2).

Respondent WD2 further stated that the aesthetics of the website is also dependent on what is being sold on the e-commerce site: "You know if you are selling flowers online, you probably don't want your website to look like a text site. If you are selling cars, you don't want it to look like a flower shop. So it [is] really product specific, I would say".

Aesthetics cognition

Aesthetics cognition is that which comes to be known through mental knowledge, intuition, reasoning or perception of a customer as communicated through the aesthetics of the e-commerce website. The respondents stated that customers could easily know (or perceive) websites as being trustworthy by their cognition if only e-commerce vendors would go out of their way to make the websites seem trustworthy: "…and there are a lot of fraudsters out there; that also makes it a bit more challenging for your e-commerce sites to go extra out of their way to make the site seem more trustworthy" (Respondent WD3), such as adding an eye-catching Bible verse: "... might also be an interesting way to earn trust in putting Bible verses on your site because that is why it's done here… because he (the customer) feels, if he uses Bible verses, he's (the owner of the website) not going to steal their money" (Respondent WD2).

4.3.2.6 Theme 6: Functionality Design

The responses showed this theme as one of the means of engendering trust but with less emphasis on the findings related to it; in total it rated only 9 mentions out of 131. Functionality is the design efforts the developers put in the design of e-commerce websites for the users to be able to navigate through the websites with ease. The following sub-themes give more insights.

Ease of use

In an online transaction, it should be easy for a customer to navigate through the e-commerce website to obtain information of the desired product and purchase the product quickly. Respondent WD2 noted this by saying: "…and also removing all other obstacles for transactions, making sure that if a guy wants a product, he can actually buy it from it quite quickly… and then having some sort of navigation for the user". Respondent WD2 further explained that it is important to have an 'ease-of-use' perception when a user navigates through an e-commerce website: "From [a] usability perspective, we always believe that there need to be a clear navigation links, of course the brand must be there, but we always believe in having a call-to-action for a quick content mechanism on the home-based system, and it's quite important".

On-going trust

The responses revealed that if a customer has used an e-commerce website before and found it user-friendly, this might prompt re-use which eventually results in an on-going trust: "We believe that the obstacles to transact must be gone; it must be easy for the person to go through information and buy, and re-buy. We put quite an emphasis around that" (Respondent WD2). "If they've paid before they don't worry about it… But once they've kind of gone through the process a couple of times, they'll trust" (Respondent WD4).

Search functionality

Response from respondent WD2 showed that adding search functionality can also add to the usability of any e-commerce website. Respondent WD2 stated that search functionality should be made available on all sections of an e-commerce website to aid users in searching for products or information: "You never know what they want. They are going to search for it. So it is also important to have your search functionality readily available on all sections".

User interaction

Respondent WD2 stated that "…adding a couple [of] interactions for the potential client to engage with you [a vendor]" in words or images can help engage users through the entire process on an e-commerce website.

User experience

According to respondent WD4, feedback from user experience can help developers improve on the use of e-commerce websites: *"…* think ideally what we do with a lot

of our bigger clients is we kind of build the system, then we let it run for a bit and then we get feedback from our clients".

4.4 Consolidation of the interviews and UCD activity

To find further meaning from the UCD activity and the interview data, the researcher looked for resonance and discordance among the findings from the UCD activity and interviews. This section highlights the findings, discussing the themes in alphabetical order.

4.4.1 Theme 1: Aesthetics Design

Aesthetics design of an e-commerce website includes both its creative beauty and the 'look-and-feel' of the site. Users and web developers have contrasting views on the importance of aesthetics design. Although both groups agree on the need to have high aesthetic quality in e-commerce websites, the developers see it as less significant in engendering trust. This is in substantial contrast with what the users say of aesthetics design; the website features considered by users in judging the credibility or trustworthiness is not only aesthetically important to them, but also what gives them the first impression of trustworthiness.

The findings show that developers do agree with the users' claim that a beautiful, eye-catching design on an e-commerce website can make people "see it to be trustworthy". The aesthetics of a website plays a big role in the cognition of the users. Their perception, intuition and judgement of trust start with the look of the website. The developers contributed the following additional features to the list of ideas from the users (Table 4.1): i) having big rotational product display for product information, which draws the eyes of the users to the product that the vendor wants to sell; and ii) the look of the website should speak of the product(s) the vendor is selling.

4.4.2 Theme 2: Development Process

The development process is what the developers follow and execute to develop and produce an e-commerce website. The findings show that developers must do some research before such a site can be developed successfully. A variety of methods are used in development. Examples include using SCRUM methodology, wireframes, A/B split testing, and using pre-built technology. Also mentioned are the importance of the developer's skill and expertise, industry standards, involving users in the development, and using analytics. According to the findings, there are no known South African industry standards for e-commerce website developers to follow for engendering trust—they follow the standards from the West and European

countries. This absence of local, South African standards could be seen as a gap in the development process.

There is little known involvement of users in the development process, making it difficult for developers to know how users perceive or judge trustworthiness. The users stressed the importance of involving potential users in the development process, particularly for their insight on issues of trust. They further suggested allowing users of different ages to test the website's functionality, and using creative input from other, separate developers and designers. The need to have a 'home' developer that will check and handle issues when websites break down or buttons do not work was also stressed.

The challenge with involving users in the development process is the high cost of it, but there is acknowledgement that 'user testing' of pre-developed e-commerce websites has merit.

4.4.3 Theme 3: Functionality Design

Functionality design was found to be important for user trust. It is one of the main reasons for user to return (thus showing on-going trust) for subsequent shopping with an e-commerce website. It was found that if a user can easily use the e-commerce website, they do not only get to trust the website, but also develop an on-going trust relationship with the site. It increases the users' 'love' for the technology, which in turn makes them domesticate the technology as part of their life. This finding came through very clearly from the viewpoints of both the developers and users. The developers also noted the need (albeit less strongly) for improved functionality in the design of an e-commerce website.

Users noted more examples of functionality that can make e-commerce websites easy to use. These include features such as minimising page scrolling, optimised search functionality, and navigation assistance to guide users through what to do to perform a transaction.

4.4.4 Theme 4: Security and Information Privacy

The internet security and information privacy theme was acknowledged, both by the users and the developers, to be one of the major factors that bring trust issues to the users. Both groups stressed the need for e-commerce websites to ensure internet security. These include having https and security certificates that can be authenticated by the users themselves and which should be displayed very prominently at the top of e-commerce website pages.

The developers were largely concerned with the need to have the right technology for internet security, including the ability to detect fraudulent activities from third parties. From the users' perspective, however, their major concern was the amount of their private information being collected, and how it is used. Users believe that if e-commerce vendors demand less information concerning them, they can worry less about their information being hacked by a third party. They feel that if there is less information concerning them out there, they are less likely to be defrauded. From the findings it is known that the information demanded from the users is what leads to internet security concerns. Users in South Africa are still very sceptical about using or providing their credit/debit card details online. This is one of the reasons why guest accounts and payment options (including EFT and payment at receiving products) were given high ratings for e-commerce websites to be perceived as trustworthy.

It was established from the developers that it is illegal for vendors to store credit card details on a server. This information, if made known to users, and monitored by an authority or auditor, can help improve trust, and users can then use their cards for payment with fewer concerns about security and information privacy.

4.4.5 Theme 5: Trustworthiness Based on Content

There was some overlap in the opinions of the users and developers on what leads to trustworthiness based on the content of an e-commerce website. The developers believed that user testimonials on websites can improve trust. The users concurred, but noted that it could also lead to distrust—the vendor might just be making it up. The users added that a dialog box for user feedback will make it easier for users to communicate with the site's vendors.

Other Information contained on the websites—such as a money-back guarantee, information on payment options, displaying up-to-date security certificates and seals, and clear information on products and services—can all improve user trust in an e-commerce website. The interviews with the developers revealed that the right messages should be displayed for services, products, and terms and conditions. The users agreed, but stressed the need to make it 'straight-to-the-point-information' which would be quick to read. The developers also mentioned support and certification by well-known third parties (such as popular brands) which may be the vendor's suppliers, as drivers to engender trust. In similar vein the users noted that a brand ambassador who endorses the website could further improve trust, while

both agreed on the value of word-of-mouth recommendation from friends and relations.

4.4.6 Theme 6: Vendor Attributes

According to the interview findings, the developers rated vendor attributes as most important. Although the theme did not come out so significantly from the user findings, the users did note some of the attributes. The developers consider vendor attributes as the major driver to engender trust, in contrast with the users who rate the aesthetics, security and information privacy, and functionality design more highly. The developers consider turning an e-commerce website into a brand as more important than the website itself. In making the site a brand, it will require marketing and advertising. Other vendor characteristics emerging from the interview data—such as vendor's capital and size, services provided by the vendor, the vendor's physical identity, ability to provide a platform for payment options, and delivery cost—can help to engender trust. The users acknowledged the need for branding, but they saw it as less important than aesthetics, security and information privacy, and functionality design of the website. They also noted the need for a vendor to have a physical identity with verifiable physical contact information.

4.5 Summary

This chapter outlined the data analysis and findings. The data analysis and findings from the UCD activity present five major themes: Aesthetics Design, Functionality Design, Development Process, Security and Information Privacy, and Trustworthiness Based on Content. The interviews with the developers were also analysed, identifying the six major themes: Aesthetics Design, Functionality Design, Development Process, Security and Information Privacy, Trustworthiness Based on Content, and Vendor Attributes. Step three, in triangulating the findings from the users and developers, led to a further discussion using the overall six major themes found. The next chapter discusses the major themes.

CHAPTER FIVE: DISCUSSION ON FINDINGS

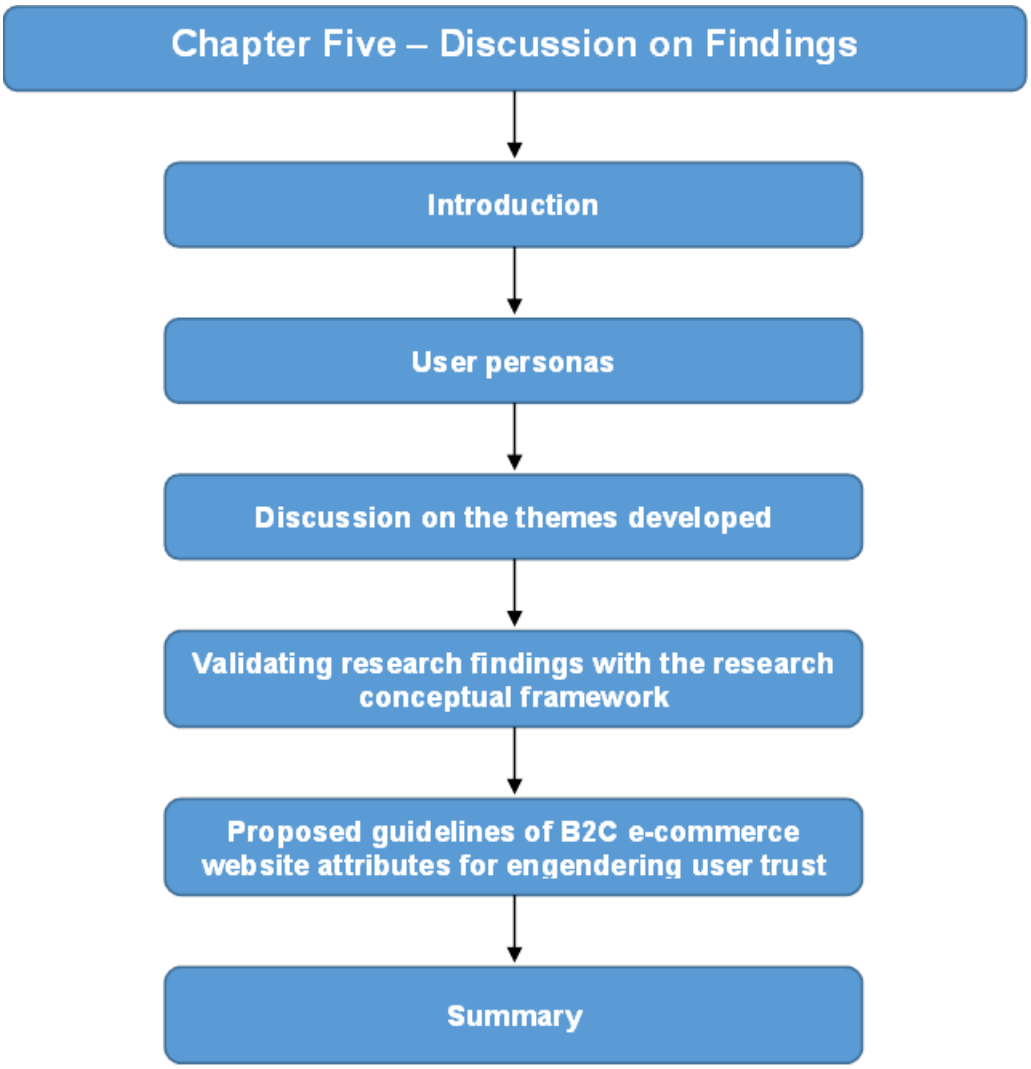

Figure 5.1: Graphical representation of Chapter Five

5.1 Introduction

In this chapter, the findings from Chapter Four are discussed. The discussion on findings is presented in four main parts. The first part discusses the findings from the data collected and the literature using two personas to make the findings more practical and approachable. The discussion of the findings addresses two sub-research questions. The second part presents the themes that emerged from the data answering the remaining sub-questions, and the third part presents the validation of the findings using the study's conceptual framework adapted from the Domestication of Technology Theory. Lastly, the guidelines using the findings from the study are also presented.

Summary of research problem

The research problem statement of the study is: e-commerce websites are known to have features such as security certificates and encryption methods to ensure trust, but this requires technical knowhow to understand. E-commerce users do not realise these features are put in place for the trustworthiness of websites, which contributes to their reluctance to conduct business transactions online and thereby reducing their buying intentions.

The research aimed to explore e-commerce attributes that can communicate and engender trust from the users' perspective using user-centred design. The study was done to answer the research question: **What e-commerce website design attributes can engender trust from a user point of view***?*

To answer the main research question, four sub-questions were outlined (section 1.5). By answering these sub-questions, this in turn answered the main research question.

The data analysis and findings discussed in the previous chapters revealed six themes: Aesthetics Design, Functionality Design, Development Process, Security and Information Privacy, Trustworthiness Based on Content, and Vendor Attributes, which are further discussed in this chapter.

5.2 User personas

The user personas created in section 4.2.2.2 is used to make the e-commerce users more practical and approachable. The personas describe two B2C e-commerce users as found from the UCD workshop: Letsego, a tech-savvy student in Information Technology, and Mafune, an administrator at a private company. The researcher acknowledges the two personas are "extremes" and that most people probably fall somewhere in between. The use of the user personas is intended to answer the sub-questions:

- W*hat trust issues are related to the design of an e-commerce website?*
- *How does the user perceive e-commerce trustworthiness?*

The personas, which depict findings from the data collected on the users' perception of e-commerce (section 4.2.1), revealed that being 'tech-savvy' may make people more cautious to use technology. In addition, the findings support the literature in terms of the gender differences in the value and trust placed on the e-commerce technology. This is in agreement with Garbarino and Strahilevitz (2004) who state that women perceive a higher degree of risk in e-commerce than men. The

perceived risk by women is reduced when friends recommend to women to buy from a recommended site. Midha (2012) states that women show more concern than men when reading privacy policies and in support of enacting laws that protect confidentiality. This supports the findings that women are more concerned with the use and security of their private information which includes their credit/debit card details. By having these in mind, the themes developed below are discussed.

5.3 Discussion on the themes developed

The discussion on the themes follows the structure of the importance from the users' perspective as this is the direction the study places its focus on. Extensive studies on e-commerce trust have been done as described in Chapter Two (sections 2.5.1, 2.4.2 and 2.4.3). These studies developed user trust frameworks and models for e-commerce. Despite the published research and studies conducted, it is interesting to note that very little research covers the detailed characteristics (or attributes) needed to bring about trust in the design and development of e-commerce websites from the users' perspective.

There is also a knowledge gap on users' trust in e-commerce in South Africa. Most studies and their methodologies used in the e-commerce industry are those employed by the Asian, European and Western World. This study attempts to fill that void by adding to the body of knowledge. Not only has the study examined the characteristics and attributes of e-commerce design that can engender trust, but also other factors that can influence trust from the users' perspective. The discussions below address the following sub-questions:

- W*hat design attributes can be identified for a trustworthy e-commerce website?*
- *How can user-centred design contribute to the trustworthiness of websites?*

5.3.1 Aesthetics Design

The characteristics of a website are what users mostly use in judging the credibility or trustworthiness of e-commerce websites. One of these characteristics includes the aesthetic quality of websites. The aesthetics design of an e-commerce website is the 'look' of the website. From the developers' interview responses, the aesthetics design of an e-commerce website is considered to be important, but not as important as other factors such as vendor attributes and trustworthiness based on content. The findings from the UCD workshop participants (referred hereon simply as participants) indicate a contrasting view point with the findings from the interviews of the web developers regarding the importance of aesthetics design. The

participants see aesthetics design as one of the most important criteria for creating trust in e-commerce. The user experience (UX) of a customer *begins* with the aesthetics of the e-commerce website.

According to Chen and Rodgers (2006), websites have “personalities” that both attract and deter Internet users, which can be compared to human and brand characteristics. However, characteristics unique to web technology (information characteristics) can also be found. Interestingly, from the findings, the users stressed that it is how well designed a website looks that first attracts them to it and creates the first impression of perceived trustworthiness. This is in addition to the findings of Chen and Barnes (2007) who state that perceived usefulness, security, privacy, good reputation and willingness to customise are important antecedents of initial trust. However, Chang (2012) states that in as much as the personality of the websites is derived from visual design, it can only influence a consumer if there is an agreement between the depicted personalities and the consumer’s own self-concept. This self-concept is the consumer’s trust propensity—a person’s inherent (inborn) character to trust—which could be natural, nurtured or both (Wade & Robison, 2012; Chen *et al*., 2015).

Hasan (2010) as well as Meyers-Levy and Loken (2014) indicate in their findings that the attractiveness of an e-commerce website plays a significant role in the value users place on e-commerce. The value of attractiveness is more prevalent in women than men. Women value the use of e-commerce less than men because women find online shopping less attractive or appealing (Hasan, 2010; Meyers-Levy & Loken, 2014). In essence, in as much as aesthetics design plays a significant role with men, women valuing the use of e-commerce can increase if the e-commerce website is found more attractive. Meyers-Levy and Loken (2014) explain that although females appreciate the financial control offered through online shopping, they view shopping online as being impersonal, less involving, and lacking in social sensory experience. The findings from the data collected reveal that effort in aesthetics design of an e-commerce website equates to improved trustworthiness in the eyes of users. Making e-commerce more interactive and products shown on the website to look as real as the products itself through the use of appropriate colours, are just some of the attributes the participants listed in aesthetics design. These findings are in agreement with Cyr *et al*. (2010) who state that effective colour appeal of an e-commerce website can be a significant determinant for user trust and satisfaction, but with differences across cultures.

From the information revealed by the data, the participants place most of their judgement on what they see regarding the visual attractiveness of websites as the interface is their first point of contact with the website. The visual attractiveness of an e-commerce website can make a user perceive a business/vendor as being of high quality and standard (Bai *et al*., 2008). Participants share the view that since they cannot see the technology behind the website, the degree of how aesthetically pleasing the website looks can make them feel or perceive that effort has been put in designing the website. As such, the aesthetics of the design can communicate trustworthiness to consumers.

For users, especially women, the visual attractiveness of a first time visit to an e-commerce website can play a huge role in creating a good first impression. This, as revealed from the findings, shows that the aesthetics of an e-commerce website has much to play in the cognition—mental knowledge, intuition, reasoning or perception—of the users. Their perception, intuition and judgement of trust start at the visual attractiveness of the website. An e-commerce website should present itself aesthetically and portray what the e-commerce vendor is selling in a visually compelling way.

5.3.2 Security and Information Privacy

The findings from the UCD workshop show that information security and information privacy of consumers are as important to the users as the aesthetics of the website. These findings support Chellappa (2002) who indicate perceived privacy and perceived security as two distinct constructs, but the effect of perceived privacy on trust in EC transactions is strongly mediated by perceived security. The participants stressed the need for vendors to guarantee internet security with corresponding security certificates which can be authenticated by the users themselves when clicked on. As such, users' expectation of making security information/awareness obvious and easily accessible can be achieved. This also should be obvious and visible at the top of e-commerce website pages.

The participants noted that the collection and use of their information, which include card details and personal information, is the main issue they want to be dealt with. Participants feel that if there is less information 'out there' concerning them, there would not be any worry of them being defrauded. Having an option to sign-up or transact as a guest without entering any personal information would make them feel secure and less hesitant to trust the e-commerce website. This will help address users' concern about the amount of their personal information being exposed online.

Findings from the interviews show that the developers ensure measures are taken to provide security on the e-commerce websites to prevent third parties from having access to customers' details. Measures are also taken in the handling of customer information. Yasin *et al*. (2012) highlight that as consumers, information sharing with vendors is on the increase; there is a growing concern on how to transact securely and conveniently. Kraft and Kakar (2009) indicate that the purpose of internet security is to ensure and safeguard users' information privacy. Vendors and developers should ensure they know the most recent techniques used in securing websites because there is a greater risk of mistrust as technologies tend to become more complex and circulated, with a possibility of having an unintended increase of security challenges (Hall & McQuay, 2010).

While the developers concentrated more on the need to have the right technology for internet security so that fraudulent activities from third parties can be detected, a means should be found to address the issue of lesser information being collected from users to be stored on databases. The participants believe that less personal information on e-commerce websites will lead to less concerns that their information might be hacked by a third party. The findings indicate that private information being requested from users leads to internet security concerns. The participants stated that they are still very sceptical about using or providing their credit/debit card details online. This is one of the reasons guest accounts and payment options, including EFT payments, receive so much attention for an e-commerce website to be perceived trustworthy.

For an e-commerce website to be trustworthy there should be an assurance that the technology will perform as expected—safe, secure and reliable with ensured privacy (Hall & McQuay, 2010). The developers reported that measures have been put in place in South Africa to protect personal information through the Protection of Personal Information Act (PoPI) (The Presidency, 2013). The PoPI Act empowers entities in controlling their personal information that is collected, processed, stored, and/or shared by South African Institutions (Workpool, 2015). This information is made known to users and monitored by an authority or auditors to improve trust, thereby allowing users to use their cards for payment with less security and information privacy concerns.

5.3.3 Functionality Design

Functionality is the design efforts put into the design of e-commerce websites for users to be able to navigate through the websites with ease. This attribute of e-

commerce is considered important for user trust and is one of the main reasons for a user to establish on-going trust with an e-commerce website. Findings from the users and developers show that while aesthetics design attracts users and provides the first impression of trust, functionality design gives the users reasons to return and contribute to building an on-going customer trust relationship with the website. An e-commerce website which is simple to use and navigate helps engender trust in e-commerce. Easy and effective navigation can help a user complete a transaction easily and prompt a recall (Tan & Wei, 2006).

Simplicity in design can make a design more user-friendly (Jenson, 2002). Jenson (2002:3) notes that "simple designs have a tendency to make product managers nervous because they view the design as not having enough features to be competitive". Jenson (2002:3) however argues this to be a complete fallacy as designs can hide powerful features under the surface and still have simplicity on the surface. An e-commerce website can be designed to be simple to use for users and yet have complex technology to ensure everyone wins. Functionality design plays a major role in user experience (UX) of e-commerce websites. It is important that the design of e-commerce websites contain detailed but simple cues that can trigger and bring about trust in users of these websites (Lumsden & MacKay, 2006). For example, functionality is one key factor of the Google search engine's early success among its competitors—having a page that communicates a clear function (Bradley, 2010) and shows how functionality design can play a huge role in the success of an e-commerce website.

Preece *et al.* (2015) point out that one cannot "design" a user experience, but one can "design for" user experience. This means that one cannot design a sensory experience but one can design a technology able to evoke it. The user experience of an e-commerce website is influenced by the users' assessment of the website characteristics (Perdue, 2001) with only the users' common sense and experience to guide them (Garrett, 2010). The user experience is less pleasurable if the user finds it difficult to interact with the website. The users and developers from the findings all acknowledged that the functionality and the ability to use a website plays a major part in ensuring user trust with a firm assertion from a participant saying: "if I can't use it, I can't trust it". Designing for user experience can easily facilitate trustworthiness for e-commerce users. The developers from the findings also in agreement made it clear that it should be easy for a customer to navigate through the e-commerce website to obtain information of the product they are looking for and

actually purchase the product quickly. There should be an ease of use when a user navigates through an e-commerce website.

As noted from the participants, an e-commerce website should be easy to use without having a hard time figuring out what to do. Findings from the participants revealed that if the e-commerce website is easy to use and is navigation friendly for even novice users, then they are more likely to trust it. These findings corresponds to Jenson (2002) stating that the role of designers is to ease the task for the user by making sure the user is able to utilise the product as intended and with little effort to learn how to use it. Garrett (2010), in elaborating what user experience is, says it is not how a product works on the inside although it sometimes has a large amount of influence. Garrett stresses that user experience is how a product works on the outside where a user comes into contact with the product and has to work with it.

Nielsen and Norman (2015) note that UX should encompass all aspects of the end-user's interaction with the company, its services, and its products. This means that vendors should design products that are simple and elegant, and are a joy to own and use. To make an e-commerce website a joy to use, the findings from both the users and developers revealed the addition of user interaction in words and images. Providing guidance to (mostly new) users through images and short videos or animations can help guide and engage users through the entire process on an e-commerce website.

To attract consumers to purchase online products, making them stay or return to repurchase, and in driving traffic, website functionality is critical (Bai *et al*., 2008). The results of Bai *et al*. (2008) indicate that website functionality has a direct and positive impact on customer satisfaction, and that customer satisfaction has a direct and positive impact on purchase intentions. Chen *et al*. (2015) argue that one of the intentions of consumers to re-purchase is determined by the overall satisfaction derived from the use of the e-commerce website. A well designed e-commerce website, according to Liu *et al*. (2000), would lead to an improved consumer recall and acknowledgement with a positive attitude towards the website and its products.

Developers and e-commerce vendors could ensure that they consider functionality design as an integral part of their e-commerce website to build trust as this feature meets the expectations of users. Other concepts such as keeping page scrolling to a strict minimum, use short descriptive text for products, ensure there are on-point information on every product displayed, visible icon to easily cancel a transaction, and optimised search functionality with minimum clicks to reach product(s) of

interest are also attributes of an ideal e-commerce website that can help engender and domesticate the e-commerce technology.

5.3.4 Trustworthiness Based on Content

Trustworthiness based on content is that which will make users trust e-commerce websites through the information contained on the websites. The information contained on e-commerce websites is also one of the aspects that encompass the user experience, which includes aesthetics design and functionality design as discussed above. Precise and clear information on the contents of an e-commerce website can improve its trustworthiness.

Findings from the data reveal some similarities from the users and developers on the trustworthiness based on the content of an e-commerce website. With the information contained on the websites, consumers can judge if a website is trustworthy or not by what is communicated to them. Tan and Wei (2006) note that contents on e-commerce websites help consumers to make well-informed decisions when purchasing a product. Tan and Wei (2006) discuss content of websites to fulfil four categories of information quality, namely intrinsic (accuracy and reliability), contextual (information is relevant to the task at hand and provided in a timely manner), representational (concise representation, interpretable, easy to understand), and accessible. Correspondingly, Fang *et al*. (2011) state that for an e-commerce website to be successful it has to have good content; the information provided must be easy to read, accurate, complete, timely, and relevant to customers' purchase decisions. The findings from the data collected from the users and developers were observed to fulfil these categories.

From the findings it is clear that for an e-commerce website to be deemed trustworthy the contents should have intrinsic information quality such as communicated up-to-date third party certifications, service and product guarantees to customers, and up-to-date user ratings, comments, testimonials and reviews. To ensure that customers' information and privacy are secured, the security messages are to show this from the logos and seals on the website. As the technology cannot be viewed, security messages should be contained and communicated on the website to stimulate trust. E-commerce websites should show certification and support from a well-known established third party. The findings indicate that if a vendor can be supported and backed up by third parties which are the vendor's suppliers, it can make customers trust the website. Vendors should have a very close working relationship with their suppliers and make available contact details of

the suppliers to the customers when needed. Communication on user guarantees to refund their money when a transaction fails, guarantees that they are insured and that vendors can detect fraud. These are just some of the guarantees a vendor can communicate to its customers through the contents of the websites to encourage a trusting relation with users.

The contextual and representational information quality revealed by the findings are that the contents should promote advertisements only related to the items or categories being searched by users; promote on-point information in terms and conditions, giving the customers payment options; having a brand ambassador (a popular star who endorses the website) and clear product information; and limit (annoying) popup adverts on websites. Displaying accurate messages on products and services are of a great importance to the e-commerce websites. A user will become more trusting and let go of some of his annoyances regarding e-commerce websites if these features are included.

The contents should have accessible information quality such as optimised search boxes to help customers find what information they are looking for quickly, keep security information/awareness obvious and easily accessible, and having a dialogue box for customers to comment. Lee and Kozar (2009) argue that relevant content which invokes positive appraisals should be provided on e-commerce websites. The findings from the data support Lee and Kozar's (2009) suggestion to vendors and web developers that the only thing users desire is a straight forward way of finding what they want, click on it to obtain a brief, precise description, confirm payment, and leave. As summarised by a participant: “We don’t care about much stuff, we just want to get there and complete our transaction as soon as possible”. This detailed, precise simplicity of information is argued to not just build trust by users perceiving the information to be of high quality (Kim & Niehm, 2009), but also give customers the satisfaction that will in turn help domesticating the technology.

One uncertainty was noted by the participants in the use of ratings, comments, testimonials and reviews. Although participants found such information important for making decisions, they shared the fear that vendors or developers might want to manipulate this information for personal gain. This would suggest the addition of an integrated social network feature (with real user profiles e.g. from Facebook) that would encourage users to discuss, obtain product reviews, create a trusting network among themselves, and having fun while shopping online.

A vendor of an e-commerce website can build a trusted brand with quality information based on the contents of the website as revealed by the data collected from the users. As a brand known by the B2C e-commerce website users, this will encourage users to 'try it out and keep using it'.

5.3.5 Development Process

The development process is the process developers undergo to build an e-commerce website. It is the process and steps taken by developers during and after the development of e-commerce websites to ensure trust. The development process is not directly an e-commerce website attribute/characteristic for trust, but it is an attribute that indirectly affects the website as the attribute/characteristic is constructed during this process. The findings reveal that the developers acknowledge the development process as an integral part of any e-commerce website if the website is to succeed and thrive. The development process has a direct or indirect impact on the trustworthiness of the implemented e-commerce website. The development methods and technologies combined with the developer's skill and expertise play a critical role in the development of a trustworthy e-commerce website.

Also noted from the findings is that the developers carry out research before developing a successful e-commerce website in order to prevent building a website that looks fraudulent. Various techniques and industry standards from the Western and European countries are used for engendering trust as there are little or no known industry standards in South Africa for e-commerce websites which the developers can follow in engendering trust.

As respondent WD4 noted:

> "So locally we haven't really organised our own structure, we kind of following the trends of the West and European countries. So they probably are certain things that we need to push more but we haven't done the research on them. And I am not sure exactly what they might be".

Since there are no distinct industry standards or methodologies locally in South Africa, the developers are made to judge South African e-commerce users using methodologies from Western and European countries. Users should become involved in e-commerce to enable developers to localise the technology to achieve a fit between the user, the e-commerce website, and the task to be performed (Te'eni *et al*., 2007).

Although not directly affecting them, the users also gave suggestions on the development process and the need to involve users in this process. They argued that developers do not truly know how they (the users) will view or use the websites. The developers in turn acknowledged that involving potential users in the development process will be good, but argued that it will be expensive. The developers' argument is supported by Abras *et al*. (2004) and Mao *et al*. (2005), but the authors further state that involving users in a user-centric methodology such as user-centred design might initially seem expensive and time consuming, but on the long run it saves development time and money through a reduction of the amount of rework and redesign needed. Involving users in the development process will ensure that the website developed will offer and maintain a great user experience (Lowdermilk, 2013). Jiang *et al*. (2010) suggest that researchers and developers should be concerned with how the users view communicated messages through the interfaces as the users' perspective plays a huge role in designing for trust.

The users stressed that developers should allow users of different ages to 'test drive' the website and also obtain another separate developer/designer's creative input. The need for a home developer that will check and handle issues when websites break down or buttons do not work was also stressed. Vendors and developers should encourage the development of e-commerce websites in collaboration with users. Vendors should endeavour to find developers with a high level of skill and expertise who can design attributes that communicate trust on e-commerce websites.

5.3.6 Vendor Attributes

As revealed by the findings of the interviews conducted with the developers, vendor attributes are regarded as very important to engender trust in e-commerce websites. These attributes are regarded by the developers as the major key solution to trust although it received a less significant rating from the users. The vendor's characteristics, quality, traits, or anything relating to the vendor should portray elements for triggering user trust. The findings revealed that the vendor's attributes are of two types: the vendor's physical (offline) attributes and online attributes which are inter-dependent. The physical (offline) image of the vendor can also be a determinant of the vendor's online image (Verhagen & Van Dolen, 2009).

The findings suggest that the vendor's physically known reputation, presence and/or identity (through methods such as advertising, marketing or word of mouth from friends and family) can encourage trust and the use of e-commerce websites. This

include the vendor's capital and size—the vendor's financial capital and how big the vendor (or company) is—which play a vital role in the way a user perceives an e-commerce website. Jarvenpaa *et al*. (2000) argue that although the user interface plays a huge role in trust, customers (mostly older customers) of e-commerce who do not have daily internet experience may use perceived store size and reputation of the vendor—including familiarity with the vendor—as determinants of trust. The data reveals that if the consumer can identify and relate the e-commerce website to a physical structure (building), company, person or entity, trust can be built. In other words, if a consumer can call a vendor and also have the knowledge of the availability of a physical address of the vendor, it can improve the trust the consumer has for the vendor of the users. For a vendor to build this reputation of trust, the findings suggest that vendors also need to have attributes that will build a brand.

The concept of branding is to create a unique sign, name, symbol or term in the mind of customers to identify goods and services of a vendor, which is then conveyed to the customer via the website to differentiate its presence and significance from other vendors. It is the responsibility of the vendor to establish a brand in order to gain the trust of customers. Responses from the findings emphasise the importance of branding: "People trust brands. It really becomes a point where you need to establish your brand" (Respondent WD2), "If you look at some more established e-commerce websites like Amazon, trust is already there" (Respondent WD2) and "...with established brands there's trust obviously" (Respondent WD1). The findings revealed that even if an e-commerce website has a good price and product but the brand is unestablished, it will most probably not gain much trust from the customers.

To build the brand, the data revealed that through marketing and advertising, e-commerce websites can become an established brand will build initial trust. Respondent WD2 stated: "You need to bring your brand in front of your clients, many, many, many times, over and over and over". The downside of branding through marketing and advertising is that it can be expensive for start-ups or small vendors. This can be augmented if the start-ups (or small) vendors form a partnership with established brands (including bigger e-commerce brands).

Manjunatha (2013) proposes that as online shopping is largely increasing, there should be joint ventures where various players (brands) in the industry work together to build a larger network of trust. The findings from the study similarly show

an established brand partnership as a way to further build a strong relationship between the vendor and its consumers. This offers a guarantee to the consumers that the vendor, especially start-ups, is backed by well-known established brands.

Even with the physical (offline) attributes a vendor should possess, the lack of good online vendor attributes can decrease consumers' trust (Poddar, Donthu & Wei, 2009). Poddar *et al*. (2009) argue that there should be congruence between the offline and online attributes of vendors. The findings show in support that the vendor's online attributes should contain the vendor's physical identity (such as address, e-mail and phone number), the brand representation, and established brand partner logos which should be engraved/inscribed on the website to encourage consumers' trust. Other attributes a vendor should possess to inspire or improve trust include: i) the ability to provide the customers with payment options offline and online (the inability of a vendor to provide these options can lead to mistrust); ii) services provided by the vendor with regard to customer support; and iii) extra cost to deliver (can lead to a barrier in creating trust to the customers).

5.3.7 Summary of attributes in a graphical representation

The purpose of the graphical representation (Figure 5.2) of the discussion is to show a pictorial summary of the emergent themes. Using UCD (combined with interviews), contributed to having a clear understanding of the attributes of trustworthiness that can be infused into B2C e-commerce websites.

The diagram (Figure 5.2) below shows from the findings that the attributes/characteristics for engendering trust in e-commerce are of two types: E-commerce visible Attributes (EVA) which can be seen in an online e-commerce website and E-commerce invisible Attributes (EIA) which are the e-commerce offline attributes as discussed in sections 5.3.1 to 5.3.6. Aesthetics design, functionality design, security and information privacy, and trustworthiness based on content are online visible e-commerce attributes for engendering trust while development process is an invisible e-commerce attribute for engendering trust. Vendor attributes can be viewed either online or offline.

To further buttress the significance of the research, the findings are validated in the next section using the research conceptual framework.

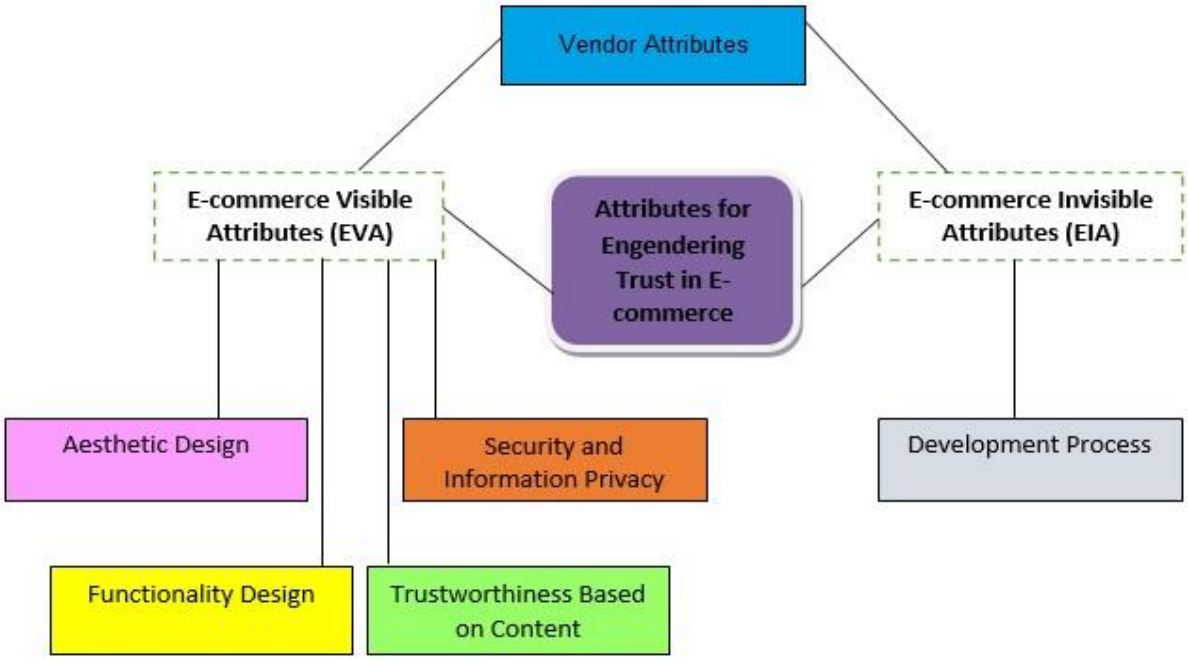

Figure 5.2: Graphical representation of the discussed attributes

5.4 Validating the research findings with the research conceptual framework

In Chapter Two (section 2.6) theoretical frameworks such as Theory of Reasoned Action, Theory of Planned Behaviour, Technology Acceptance Model, Expectation-Confirmation Theory and Egger's MoTEC Model are discussed with the adopted theory (Domestication of Technology Theory) for the conceptual framework underpinning this study in section 2.6.6. In this section, the adopted conceptual framework is used to validate the findings of the study as shown in Chapter Four and further discussed with prior literature in this chapter. An inductive approach has been followed in this study; therefore, the findings are inferred with existing theories for validation. Saldaña (2009:11-12) states that the outcome of qualitative research is not always necessarily the development of an original theory but an acknowledgement that "pre-existing theories drive the entire research enterprise" with or without our awareness.

Monette *et al*. (2014) indicate that in conducting qualitative research, researchers should not only draw conclusions, but also make an effort to validate their research findings through existing theories to justify the conclusion of their findings. Monette *et al*. (2014:443) argue that without validation, the researcher's findings are simply his or her personal account, hence the need to convince self (the researcher) and the relevant audiences that the findings "are both reasonable and justified". This,

Monette *et al.* say, will help create a "greater theoretical sensitivity" and help conceptualise the research findings (Monette *et al*., 2014:450).

5.4.1 The research conceptual framework

This research used the Domestication of Technology Theory as an adaptation to the research conceptual framework. This section presents the validation of the research findings using the dimensions of the Domestication of Technology Theory. As discussed in section 2.6.6, domestication of technology has six dimensions: commodification, imagination, appropriation, objectification, incorporation and conversion. These dimensions are known as moments of domestication. This study used these moments of domestication to conceptualise a framework or model that can engender a user's trust in B2C e-commerce websites.

Key characteristics of the domestication theory led to its adoption for this study when compared to other theories and models (discussed in section 2.6). These characteristics include but are not limited to the following:

i) It helps describe and analyse the social and cultural processes of the e-commerce technology acceptance, rejection and use in users' everyday lives (Silverstone & Haddon, 1996; Haddon, 2006; Hynes & Richardson, 2009; Harwood, 2011).

ii) The theory underlines that the consumer is perceived to influence the functions, nature and scope of the technology which is known as the social construction of technology (Tobbin, 2013).

iii) The theory accommodates the fact that the needs of e-commerce users may change, creating an emergence of new technological needs and thereby soliciting the need for a user-centred design development process (Ward, 2006).

iv) The domestication theory suggests that taming of technology acquired from the public space (formal economy) which is integrated into a private space (moral economy), is not a once-off process as the role of e-commerce technology may be re-assessed by the user (Haddon, 2003). A user may discard an e-commerce website if the user deems it untrustworthy at any stage of the process.

v) It also supports the research findings of viewing engendered trust in a three-way interaction: the end-user, the e-commerce technology, and the interaction from other individuals (i.e. the vendors and the developers) (Haddon, 2003). For instance, the use and continuous use of e-commerce websites by consumers may also depend on the customer service.

vi) The theory also supports the iterative and cyclical approach of the research methodology (user-centred design) used as it considers the further developments of future versions of the e-commerce website from the users' feedback (Silverstone, 1994; Tobbin, 2013). In addition, it also assumes the use of a technology as cyclical rather than having a linear trajectory which ends at conversion (Silverstone, 1994).

vii) The Process of Domestication Theory is not necessarily a sequential approach to adoption and consumption of technology (Silverstone 1994; Ling, 2004). For instance, a person can start mentally at the incorporation phase before the appropriation phase.

With these understandings, the dimensions of the research conceptual framework are discussed with the model as shown in Figure 5.2.

5.4.1.1 Commodification

Commodification is the moments of a technology consumption process which begins from the invention or development of a product in the public sphere (formal economy) to the private (sphere) life (moral economy) of an individual and *vice versa* (Silverstone, 2006). These moments of domestication is cyclical rather than having a linear trajectory which ends at conversion (Silverstone, 1994). This study acknowledges the two spheres: the public sphere and the private sphere.

Public sphere (formal economy)

The findings of this study support the notion that the e-commerce development environment is the starting point at which trust begins as this is the stage when the developers, during the development process, shape the e-commerce website's features to include attributes that can engender trust (section 5.3.5). This is referred to as the public sphere. The e-commerce website is given its aesthetics, functionality, security, and other symbolic meanings at a developer's workshop and moves from the workshop to the marketplace. These meanings are the embodiment of the e-commerce website design which also defines how the user perceives the website (Silverstone & Haddon, 1996; Tobbin, 2013).

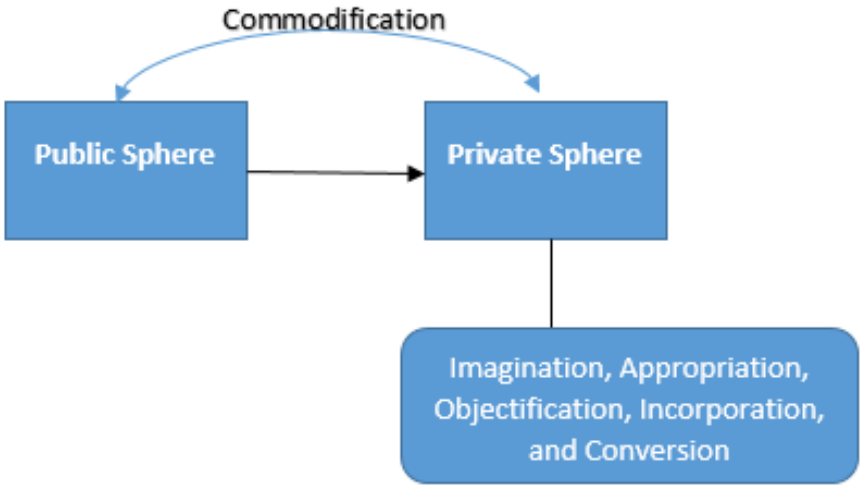

Figure 5.3: Commodification from the public sphere to the private sphere and *vice versa*

Private sphere (moral economy)

The e-commerce website moves from the public sphere into the private sphere which has five moments of consumption, namely imagination, appropriation, objectification, incorporation and conversion. During these moments, the adjustments and negotiations of a user with the e-commerce website result in the shaping, creation or translation of new meanings. These new meanings are then expressed in the public sphere in the developer's workshop and in the marketing of the e-commerce website using UCD methods and processes. Thus, this concept exhibits the cyclical approach of consumption in domestication from the formal economies to the moral economies and *vice versa* (Tobbin, 2013); hence the inference that commodification is the axis for technology consumption in domestication (Silverstone, 2006).

5.4.1.2 Imagination

As previously noted, the private sphere has five moments of consumption beginning with imagination. Imagination is the stage at which a technology or any product enters into our minds and consciousness (Ling, 2004). To be more explicit, this is the stage an e-commerce user become aware of the e-commerce website, who the vendor is, the services or products they sell, and in general the vendor's physical attributes as shown from the findings. This awareness is created in the user's mind through advertising, marketing, word of mouth from friends and family, and branding. Others include vendor's reputation (for already established brands) and vendor's partnership with already established brands. Findings from the study further show that it is at this stage that new e-commerce websites get into the minds of people, which advocates for a good marketing and branding strategy so that

these websites can be appropriated. Silverstone (1994) and Haddon (2003) also build their arguments in support by acknowledging that these imaginations (or awareness) are entered into our minds through the 'cultural system' created by the advertising of the products or media discourse (including word of mouth).

To further buttress the role which this stage (or moments) of imagination plays in engendering consumer e-commerce trust, Haddon (2003) states that technologies such as e-commerce websites come pre-formed with social meanings and referred to as a pre-adoption process whereby the consumer imagines the potential role (or lack of it) of the technology in their lives and the negotiations around it. That is to say, the awareness created by the vendor can even be used by the user to judge if the e-commerce website is worth using. These social meanings create the desire or dreams for the use of the technology in the consumer (Silverstone, 1994).

The awareness created in the minds of the users helps the user in understanding the need(s) for the e-commerce website which is the next moment—the appropriation.

5.4.1.3 Appropriation

Appropriation is the moment in which a consumer desires and acquires a technology (Silverstone & Haddon, 1996; Harwood, 2011). In the context of this study, appropriation is firstly the e-commerce user's desire and intent to use the e-commerce website. At this stage, the belief is that the user has the knowledge of the e-commerce website and also knowledge that the website could somehow fit into their lives (Ling, 2004). This fit includes the need(s) and motives of the user to use the e-commerce websites such as convenience, time saving, lower prices, choice, access to products at any time, etc.

Secondly, appropriation is seen as the moment whereby a technology crosses the threshold between the public (formal economies) and the private (moral economies) (Silverstone, 1994; Hynes & Richardson, 2009). In the context of e-commerce websites as an online environment, this stage can be seen as when an e-commerce user after identifying his or her needs or motives, visits the e-commerce website (Harwood, 2011).

5.4.1.4 Objectification

Objectification can be referred to as when a consumer' tastes, values and styles are expressed through the display of the new technology (Hynes & Richardson, 2009). The display of an e-commerce website comes from its interface, and e-commerce

users express their tastes and values through its aesthetics. Silverstone (1994:127-128) opines that the display of objects actualises the "values, the aesthetic and the cognitive universe" of a user. Ling (2004) argues in support of Silverstone (1994) that objectification describes how a product comes to play out in a consumer's values and sense of aesthetics. Ling (2004) further stresses that objectification to a certain degree focuses on aesthetics. In essence, from the findings of this study, the e-commerce attribute of aesthetics design (discussed in section 5.3.1) relates strongly to this moment of domestication. It is from this moment that users' initial online trust begins using aesthetics and cognitive values as shown from the research findings.

The visual attractiveness of the e-commerce website helps build the first impression (initial trust) the user will have of the website. The aesthetics design is the personality of the website the user comes across first and can influence (positively) a user only if there is an agreement between the depicted personalities on the website and the consumer's own self-concepts (Chang, 2012). An e-commerce website that has less effort put in place to make it attractive to a visiting user might end up deterring their supposed consumers with the look of the website. To encourage e-commerce users to initiate trust and be encouraged to take a step further to use the website, developers should make efforts in making their e-commerce websites visually appealing.

5.4.1.5 Incorporation

Ling (2004) states that while objectification focuses more on aesthetics values, incorporation focuses more on functionality but argues that these two go hand-in-hand as they are two sides of the same coin. Incorporation is the actual use of the technology through its functions. At this stage of incorporating the e-commerce website, the study considers the e-commerce attributes used by users in judging the trustworthiness of the website. From the research findings these attributes are functionality design, security and information privacy, trustworthiness based on content, and the vendors online attributes and contact details such as physical address, email and phone numbers (sections 5.3.2, 5.3.3 and 5.3.4).

It is at this moment of the domestication process that an e-commerce website begins to integrate into a user's life if it fits the intention, however, if it does not, could lead to the user discarding it (Haddon, 2006; Lee *et al*., 2009). In essence, for an e-commerce user to revisit a website, the developers (and vendors) must take incorporation into serious consideration.

5.4.1.6 Conversion

In the conversion moment, the e-commerce website becomes part of the user life and forms the user experience (UX) (Lee *et al*., 2009). The user experience then transits from the private sphere (moral economy) to the public sphere (formal economy) (Silverstone, 1994). The overall UX is measured by the overall e-commerce attributes of the e-commerce online presence—aesthetics design, functionality design, security and information privacy, trustworthiness based on content, and the vendors' online attributes.

At this stage there is a conversion of the experience from the appropriation of meanings derived from the e-commerce website to the users' expressed meanings derived from their experience. This user's expressed meanings become part of the public meaning of the future appropriations and future versions of the e-commerce websites (Tobbin, 2013). This final point brings us back to full circle of domestication (Silverstone, 1994:130) and supports the cyclical and iterative process of UCD.

The full process of engendering user trust using Domestication of Technology Theory as the study's conceptual framework is shown in Figure 5.4.

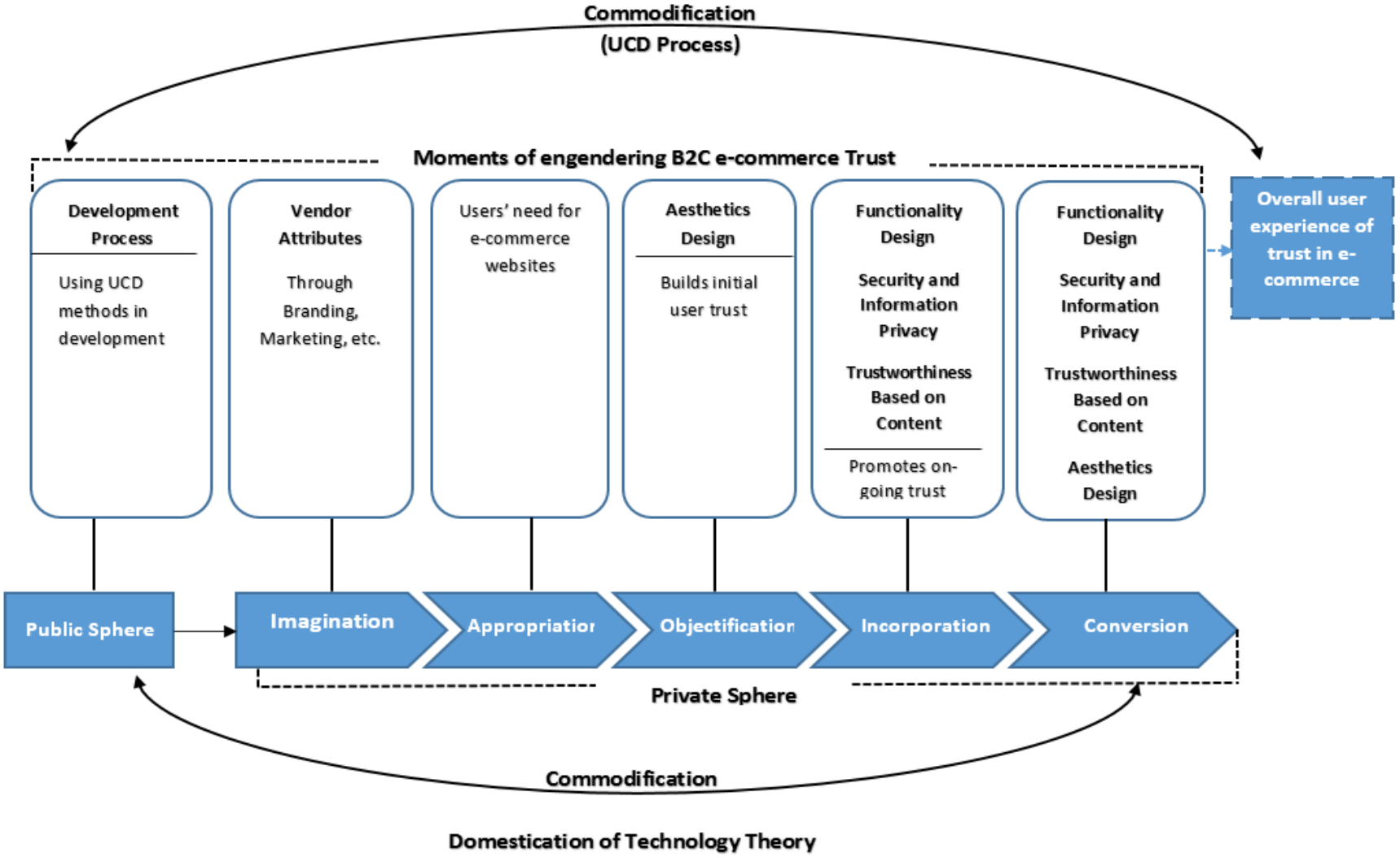

Figure 5.4: Research conceptual framework adapted from the Domestication of Technology Theory

To develop and design a B2C e-commerce website that builds user trust, the moments as shown by the conceptual framework are to be considered. The framework underscores a rich description of the process of engendering user trust and considers all possible entities (the developer, the vendor, the user, and the e-commerce website) in the e-commerce environment. It shows the movement from the public sphere to the private sphere and the actions carried out at each stage using the findings from the study.

At the private sphere, the user undergoes the five moments from the imagination stage through to the conversion stage where the whole user experience can transit to the public sphere. For this transition of the user experience to take place from the private to the public sphere, the framework further shows that the use of UCD methods, processes and tools can help developers gather the right information (knowledge of the user they do not know). Using UCD could also assist developers to design and develop e-commerce websites that ensure the user's online e-commerce experience is satisfactory and pleasurable. This stage of conversion adds to answering the research sub-question: *how can user-centred design contribute to the trustworthiness of websites?*

From the findings of the study as shown in Chapter Four and further discussed in this chapter, the proposed guidelines to consider in engendering B2C e-commerce trust are presented below. These guidelines could be considered by developers and vendors as detailed features for each moment of domestication as discussed above.

5.5 Proposed guidelines of B2C e-commerce website attributes for engendering user trust

To build trust in e-commerce, key attributes could be considered by web developers and vendors so as to increase traffic to their websites and the customers' buying intentions. Vendors have to create a strong relationship in others for their e-commerce websites to thrive, especially in developing countries such as South Africa (and Africa as a whole). There is no or little online buying culture in South Africa compared to the Western and European countries, hence the need for these proposed guidelines using the attributes developed from the findings to assist vendors and developers.

The following attributes could be considered to engender trust in e-commerce. Under each attribute, detailed guidelines are proposed to bring about trust in e-commerce.

5.5.1 Aesthetics Design

i) Ensure e-commerce websites are attractive and appealing to increase the value consumers, especially women, place on the websites. This includes making e-commerce more appealing with many eye-catching, lively colours, product displays and symbols (or signs), having creative graphics and colour blocking.

ii) E-commerce websites should be made more engaging to make it less impersonal and more involving, thereby giving users a social sensory experience comparable to a brick-and-mortar store.

iii) Products displayed on websites should look as real as the products itself in real life with elaboration on the quality of the pictures of the products displayed.

iv) Having a big (rotational) product display that can allow potential consumers to view all sides of a product with detailed information that draws the eye of the consumer to the products on display.

v) Use of appropriate colours that is related to the e-commerce brand.

vi) The most essential pages such as *Home page* and *About us* should not be hard to locate with emboldened symbols and text.

vii) Design the homepage properly with not too much text.

viii) The company's name and logo should be very obvious on the e-commerce website.

ix) Manage websites to ensure all products have the proper images relating to the product description.

x) Any button not working or not in use should be greyed out (leaving it of the same colour causes confusion to users).

xi) Put in more effort when designing websites to avoid easy manipulation of phishing.

xii) There has to be a reflection of professionalism and consistency in the design and colours used on all web pages.

xiii) An e-commerce website should be presented aesthetically pleasant and should portray what the e-commerce vendor is selling in a beautiful way.

5.5.2 Functionality Design

i) Ease the task for the user by making sure the user is able to utilise the e-commerce website as intended and with little effort to learn how to use it.

ii) Add features to give users' direction in words or images for easy navigation through the website. Providing guidance to (mostly new) users in the form

of short videos or animations can help guide and engage users through the whole process on an e-commerce website.

iii) Visible buttons to easily retract and cancel a transaction.

iv) Keep page scrolling to a minimum and categorise products and group related information.

v) Ensure all products displayed on the website have short descriptive text by the side of the products.

vi) Optimised search functionality with minimum clicks to reach product(s) of interest and to the actual purchase of the product.

vii) Allow users to return to the home page anywhere on the site (with 'Home' written as text, not only as an image).

5.5.3 Security and Information Privacy

i) Ensure internet security with security certificates are genuine and can be verified by the users themselves when clicked. The security certificates also should be placed at a prominent position at the top of the e-commerce website pages.

ii) Demand and collect minimum information from users as the collection and use of user information—including card details and personal information—is a significant trust issue that should be dealt with. If there is less information out there (online) concerning the users then there would not be too much concern of them being defrauded.

iii) Have an option for users to either sign-up with their information stored on the vendor's database or transact as a guest without storing any personal information to ease the fear of their information being hacked by a third party.

iv) Give users an option for place of delivery which should include their homes, place of work and post offices.

v) Vendors and developers should ensure they are up to date with recent security threats and the most recent techniques used in securing websites as there is a greater risk of trust as technologies tend to become more complex and circulated with the possibility of having unintended increase of security challenges. In addition, have the right technology which can detect fraudulent activities from third parties.

vi) Users are still very sceptical about using or giving their credit/debit card details online. The reason being that guest accounts and payment options (including EFT and payment at receipt of products) were given a lot of attention for an e-commerce website to be perceived trustworthy.

vii) Ensure that the credit/debit card details are not stored on vendors' servers, and this should be made known to users. To ensure compliance, this should be monitored by an authority or auditors.

viii) Ensure one-to-one verification for users (via email and/or SMS).

ix) Give users control of their personal data and informed consent when their data is to be used as well as enabling them to retract their personal information/data anytime they want to.

x) Avoid security misinformation (do not market security they do not have) as well as making sure the URL has visible https or padlock to indicate it is a secured link.

5.5.4 Trustworthiness Based on Content

i) Web developers and vendors should ensure that the contents of the information provided must be easy to read, accurate, complete, timely and relevant to customers' purchase decisions.

ii) Ensure that the e-commerce website contains security messages through logos, seals and short descriptive words to convince customers that their information and privacy are secured. These security messages should be obvious and easily accessible (more visible). As the technology cannot be viewed, such security messages should be contained on the website to engender trust.

iii) Ensure that information of a well-known third party (a house-hold brand) backing and supporting the e-commerce websites is contained. Vendors should establish a very close working relationship with their suppliers and provide contact details of the suppliers to the customers for authentication.

iv) Messages of guarantee to refund their money when a transaction fails, guarantees that they are insured, and guarantees that they (vendors) can detect fraud, are messages that should be engraved/ inscribed on the websites.

v) Have the right description on products (or services) with clear product information that is not misleading.

vi) Give on-point information in terms and conditions, not making it too wordy for customers to read.

vii) Ensure the payment options are shown clearly, which should include an option of paying by EFT and at point of collection.

viii) The contents should have intrinsic information quality such as up-to-date security certificates, third party certifications, customer's guarantee, and up-to-date user ratings, comments, testimonials and reviews.

ix) The contents should have accessible information quality such as optimised search boxes to help customers find what information they are looking for quickly as well as having a dialogue box for customers to interact directly with the vendors (customers' feedback).

x) Limit (annoying) popup adverts on websites and have a brand ambassador (a popular a star who endorses the website).

5.5.5 Vendor Attributes

i) Vendors should ensure they have a physical identity which customers can trace the e-commerce websites to such as a physical structure (building), company, person or entity. Customers (mostly older customers) of e-commerce who do not have daily internet experience use perceived store size and reputation of the vendor—including familiarity with the vendor—as determinants of trust.

ii) Make contact details such as the physical address, e-mail and phone number clearly visible on the website so a consumer can call a vendor and have the knowledge of the availability of a physical address of the vendor.

iii) Establish the e-commerce website as a brand by creating a unique sign, name, symbol or term in the mind of customers to identify their goods and services.

iv) Invest in marketing and advertisements to establish the e-commerce website as a brand. The e-commerce website should be repeatedly shown to the (potential) customers to establish its presence and significance.

v) Create a good relationship and partnership with established brands (in particular small and medium vendors). This can also help in building a brand especially for vendors who have little resources for marketing and advertising.

vi) Excellent customer support should be encouraged by vendors.

vii) The brand representation (symbol, sign or name), and established brand partners' logos should be engraved/inscribed on the website to encourage consumers' trust.

viii) Vendors should have the capability of providing to the customers' various payment options (offline and online).

ix) Vendors should give a reasonable cost to deliver goods, as a large amount can discourage a customer.

5.5.6 Development Process

i) General industry standards could be set for developers and vendors to follow to ensure e-commerce websites meet the standards required for users in specific regions.
ii) Involving users during the development process is strongly advised for a more positive impact of trust to users of e-commerce. This will encourage localisation of the technology to achieve a fit between the user, the e-commerce website, and the task to be performed.
iii) Allow potential users to provide input on the ease of use of the websites.
iv) More attention should be given to how the users view the communicated messages through the interfaces.
v) Vendors should endeavour to look for (and/or employ) the services of developers with a high level of skill and expertise. The developer(s) will check and handle issues (debugging) when websites break down or buttons do not work.
vi) Allow users of different ages to 'test drive' the website and get children to play with the website to obtain insight into its functionality and usability.
vii) Developers could also create a network with other developers to obtain creative input.

It is necessary for developers and vendors to have a way of verifying whether the B2C e-commerce website being developed would build user trust. These proposed guidelines can serve as a checklist for ensuring the development of a trustworthy user-centred e-commerce website.

The guidelines proposed here can also serve as the detailed features to be considered at each domestication moment shown in the conceptual model in Figure 5.4 (especially for start-ups). The guidelines will give the developers and vendors, especially in developing countries such as South Africa, a clearer understanding of developing a trustworthy e-commerce website.

5.6 Summary

The chapter discussed the findings from the data collected which, after analysis, answered the research question. An introduction outlining the research problem statement, the aim of the research with its objectives, and the main research question with sub-questions, were provided. Using the user personas developed from the findings of the data collected and discussed in prior literature, two sub-questions were answered:

- *What trust issues are related to the design of an e-commerce website?*
- *How does the user perceive e-commerce trustworthiness?*

The chapter further discussed the emergent themes identified from the findings in relation with prior literature and also answered the other two sub-questions which subsequently answered the research question. The emergent themes discussed are identified as Aesthetics Design, Security and Information Privacy, Functionality Design, Trustworthiness Based on Content, Development Process, and Vendor Attributes. The findings revealed the following themes as contributing more to the online user experience: Aesthetics Design, Security and Information Privacy, Functionality Design, and Trustworthiness Based on Content.

Aesthetics design was found to be the attribute that first attracts (or detracts) a user to an e-commerce website and creates the first impression of perceived trustworthiness. The security and information privacy attribute is found to be as important to the users as the aesthetics of the website. The findings from this study revealed that the uncertainty of internet security discourages the users from giving out their private information. Lesser information from users can increase trust. The functionality design attribute revealed that this is the one attribute able to build on-going trust and give the users reasons to return to the website. Consumers can judge the trustworthiness of a website using the trustworthiness based on content attribute by checking how precise and up-to-date the information contained is. The vendor attributes revealed both online and offline attributes which a vendor should seriously consider in order to build trust. These attributes (online and offline) should complement each other. Development process is an attribute that indirectly affects the website as the attribute/characteristic is constructed during this process. The process of development can affect the overall outcome of the implemented (online) e-commerce website.

Also from the findings, as summarised and shown graphically, it can be deduced that e-commerce attributes are of two categories: e-commerce online attributes and e-commerce physical attributes.

Lastly, in this chapter the conceptual framework underpinning this study was used in validating the research findings using the Domestication of Technology Theory, and a set of guidelines was proposed to engender trust in e-commerce.

The next chapter presents the conclusion of the study and recommendations for future research.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

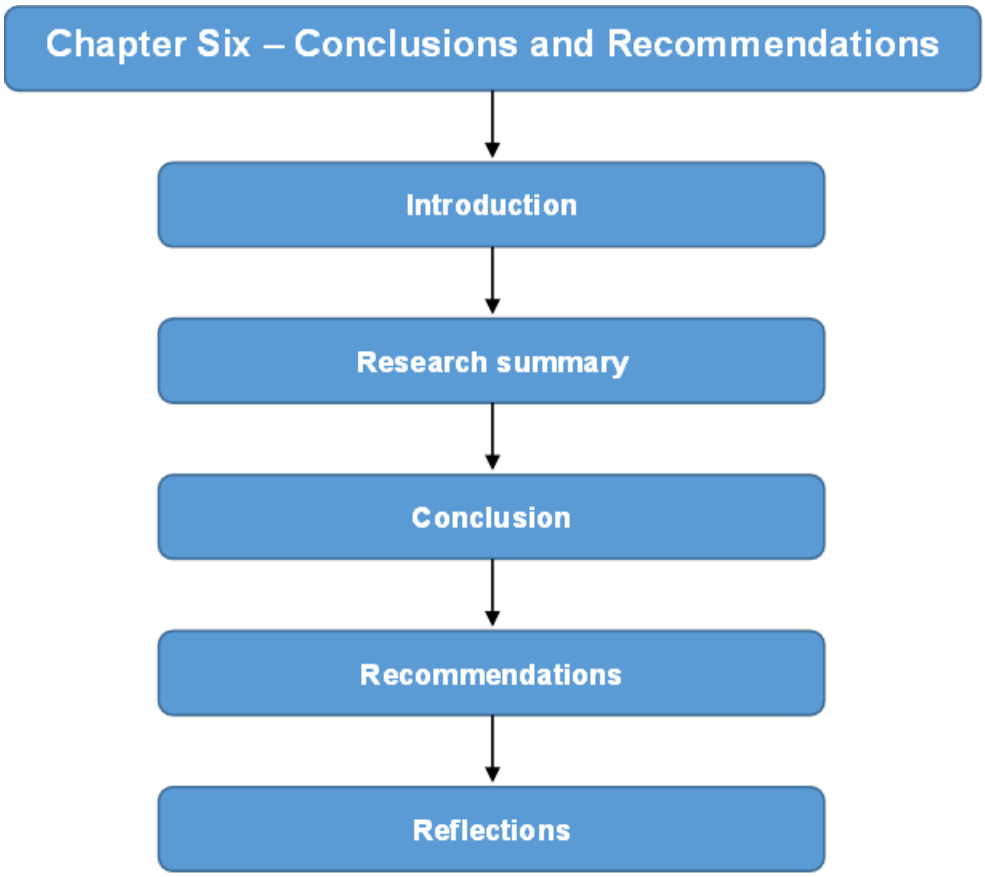

Figure 6.1: Graphical representation of Chapter Six

6.1 Introduction

Chapter Six presents the conclusion of the study and recommendations for further research. The chapter begins with the research summary which includes research problem statement, aim of the research, and the research questions. A guideline of attributes to assist vendors and developers in engendering user trust in e-commerce websites is also presented. This is followed by the conclusion, recommendations, limitations and reflection of the study.

6.2 Research summary

6.2.1 Research problem statement

E-commerce websites are known to have features such as security certificates and encryption methods to ensure trust, but this requires technical knowhow to understand. E-commerce users do not realise these features are put in place for the trustworthiness of these websites, which contributes to their reluctance to conduct business transactions online, thus reducing their buying intentions. Hence, there is a

need to explore e-commerce attributes that can communicate and engender trust from the users' perspective.

6.2.2 Aim of the research

The research aimed to explore e-commerce attributes that can communicate and engender trust from the users' perspective using user-centred design with the following objectives:

- Identify the trust issues and challenges of users in e-commerce websites
- Identify users' perception of the trustworthiness of e-commerce websites
- Identify techniques that can be used to engender trust in e-commerce
- Identify design attributes that can be used to engender trust in e-commerce
- Create guidelines for e-commerce website developers to help them engender trustworthiness in their products

The aim of this exploratory study is to gain more insight into e-commerce trust from the users' perspective. The findings from the study were used to propose a set of guidelines for web developers and vendors of the attributes of B2C e-commerce websites that can improve and engender users' trust. This was achieved by using user-centred design methods, with interviews (of developers) and a literature review to gain a clearer understanding of the phenomenon studied.

The findings were also conceptualised with an existing theory to explain the moments involved in the building of e-commerce websites. These moments, in addition to the guidelines for each moment, can engender trust and help in domesticating the e-commerce technology.

6.2.3 Research question

What e-commerce website design attributes can engender trust from a user point of view?

In answering the research question, four sub-questions were asked:

1. What trust issues are related to the design of an e-commerce website?
2. How does the user perceive e-commerce trustworthiness?
3. What design attributes can be identified for a trustworthy e-commerce website?
4. How can user-centred design contribute to the trustworthiness of websites?

6.3 Conclusion

The research aimed at exploring how user-centred design (UCD) can contribute to improve (thereby engendering) users' trust in B2C e-commerce websites. Using the UCD methods, trust issues were identified from the users' perspective, and attributes of e-commerce websites which not only engender trust but also help domesticate the e-commerce technology, have been categorised. To achieve the research objectives with a clearer understanding without bias by gathering information only from the users, the study also sought the view of professionals in web development of e-commerce through interviews. The findings from the research afforded the researcher the opportunity to understand the trust issues and challenges B2C e-commerce users are facing and attributes B2C e-commerce websites should have in order to engender trust, especially in developing countries such as South Africa.

The study achieved to a substantial extent the objectives of the research set to answer the research sub-questions which in turn answer the main research question. Revealed and discussed in this study are users' perceptions of the trustworthiness of e-commerce websites, trust related issues and challenges of users in e-commerce websites, techniques and design attributes used to engender trust in e-commerce, and user-centred design methods to create potential design principles for e-commerce websites.

The answers to the sub-questions which fulfil the objectives of the study are summarised below.

6.3.1 Answering the research sub-questions with corresponding objectives

Four research sub-questions were asked with each having an objective to achieve. The study fulfilled the objectives set out which in turn fulfilled the aim of the research and further clearly answered the main research question. The answers to the sub-questions are summarised below:

6.3.1.1 How does the user perceive e-commerce trustworthiness?

To answer the research sub-question, the objective to identify users' perception of the trustworthiness of e-commerce websites was set.

Users' perception of e-commerce still connotes much untrustworthiness and mistrust. E-commerce websites are still perceived as less attractive and engaging, difficult and frustrating to use and understand, and showing less of a reflection of high levels of expertise. Users are also sceptical to use the technology as they still

consider e-commerce websites as a platform which hackers can use to steal their private information. This perception stems from the belief that the vendors and developers are not doing enough to improve the aesthetic and functional design of e-commerce websites and ensuring the security of users' private information. Section 4.2.1 shows the users' perceptions of e-commerce from the research findings.

6.3.1.2 What trust issues are related to the design of an e-commerce website?

To answer the research sub-question, the objective to identify trust related issues and challenges of users in e-commerce websites, was set.

E-commerce users identified factors such as difficulty in the use of the technology (un-friendly navigation), internet security and use of their private information, less guidance on the use of the websites mostly for novice users, non-optimised search functionality, too lengthy (and wordy) information, lack of clear product description, less attractiveness and e-commerce impersonal traits, and lack of social sensory experience. Factors including lack of professionalism in the design of the website, 'annoying' pop-ups, lack of a visible option to cancel a transaction, home page not clearly defined which makes it difficult to access the home page, non-relevant adverts, and scrolling down pages with a lot of unnecessary clustered information on one page are just some of the trust related issues and challenges users face with e-commerce websites.

6.3.1.3 What design attributes can be identified for a trustworthy e-commerce website?

To answer this research sub-question, the objective to identify techniques that can be used to engender trust in e-commerce and identify design attributes that can be used to engender trust in e-commerce, was set.

Techniques used to engender trust by the developers vary. Techniques identified include the use of analytics to determine how users use the website, A/B split testing of e-commerce websites to determine which will produce a positive impact on users, and most importantly, the use of potential users in user experience (UX) design workshops during the development phases.

Attributes found from the study for engendering trust are aesthetics design, functionality design, security and information privacy, trustworthiness based on content, vendor attributes, and development process. These attributes with their detailed features are discussed in Chapters Four and Five.

6.3.1.4 How can user-centred design contribute to the trustworthiness of websites?

To answer this research sub-question, the objective to create guidelines for e-commerce website developers to help them engender trustworthiness in their products, was set.

The exploration of user-centred design methods contributed to having a better insight and understanding of users' trust issues and challenges and a clearer view of potential design and development guidelines to follow in order to engender trust. These guidelines for e-commerce websites were outlined in section 5.5.

Furthermore, the use of the UCD methodology contributed greatly in finding trust issues from the perception of the users and attributes for trust to include in the e-commerce websites. The use of UCD can close the gap in using traditional methods of development as shown in this study. UCD brings extra value to the development of a trustworthy e-commerce website. As developers cannot easily understand what satisfies a user in e-commerce websites, adopting the use of UCD methods and tools for development as shown from the study can help in understanding the user experience to enhance user satisfaction and a pleasurable e-commerce online experience. The conceptual framework (and the model) of the study also clearly shows the advantages UCD (section 5.4) can bring in the development of any software or web development.

Thus, in concluding, the answer to the research question is summarised below.

6.3.2 Answering the research question

In summary, to answer the research question: **What e-commerce website design attributes can engender trust from a user point of view?**

Six attributes were found, namely aesthetics design, functionality design, security and information privacy, trustworthiness based on content, vendor attributes, and development process. Aesthetics design gives the users their first impression of the trustworthiness of a website. Functionality design, security and information privacy, and trustworthiness based on content can trigger on-going trust. Security and information privacy have as much importance as aesthetics design to the users as the safety and use of their private information is vital to them. The vendor's online and offline attributes that promote the vendor as being trustworthy as well as the development process encouraging the use of potential users (using UCD methods), were also found as critical attributes to be considered to engender trust. The study

also revealed that the users mainly judge the trustworthiness of a website by what they see.

6.4 Recommendations

Improving and building trust in e-commerce websites is important for businesses to succeed. Recommendations for policy and practice are made for vendors, web developers and the e-commerce industry based on the findings. In addition, recommendations for future research are also provided.

Design policy and practice

This study proposes guidelines to engender trust in e-commerce as shown in section 5.5. Recommendations are also presented to vendors and developers to consider for engendering trust. Establishing a strong relationship with the potential users of their e-commerce website is essential for the business to thrive and this is achieved mainly through the attributes and personality of the e-commerce website interface.

The design of e-commerce websites should show enough professionalism to create a positive impression on visitors and users of the website. Developers and vendors should consider improving the attractiveness and engaging nature of e-commerce websites. There should be great importance placed on the social, emotional and interactive nature of the website, similar to the experience a customer will experience in a brick-and-mortar store. Website design should include an integrated platform of social media where users can interact (and socialise) easily among themselves and with the vendors, and develop a trust network. The integration of a social media platform will reduce (if not eliminate) the mistrust users have of the reviews and comments on the websites, add a fun experience as users can engage with each other and exchange information, and have on-the-go feedback from the vendors.

Attractiveness of websites can be achieved through the optimum use of colours that are eye-catching. Important symbols (e.g. company logo), buttons, the website name, products on display, and similar important signs are recommended to be emboldened to draw the attention of the users and create an image in the user's mind.

Visitors (especially first timers) of the website should be provided with guidance through media such as short animations, videos or pictorial representations to make it easier for users to understand the impending process on the website. This

includes a step-by-step guide and interaction for users to know what action to take at each stage of the process. These recommendations will reduce or minimise the confusion and difficulty facing the users when using the website. Buttons and symbols used for navigation, especially to essential pages, should have images with text to enable users to clearly understand the meaning of these images. These recommendations are critical, especially for developing countries such as South Africa as many still do not clearly understand the meanings of images used on websites.

As revealed by the study, the users emphasised the need to complete a transaction fast and swiftly. Vendors and developers should ensure that the steps a user needs to follow in order to complete a transaction should not exceed five steps from the starting point to the end. Simplicity in design and use, optimised search functionality, and good ease of use will increase the on-going trust of users.

E-commerce websites should have security certificates and seals at the top of the page(s) as proof that the users' personal information and privacy are secured. Vendors should ensure these certificates shown are verifiable by the users when clicked on to confirm authenticity. The collection and use of the users' information should be clearly and briefly stated in the terms and conditions. Rather than enforcing a single option for users, it is recommended that users be given various options such as payments options (which should include EFT and cash on delivery), sign-up or transact as a guest option, and options for delivery (home, office or post office).

Development policy and practice

The outcome of a product, website or software application depends on the approach and methods of development. In the past few years technology development has started seeing a wind of change in the development of innovative products, websites, software applications (on phones and computers), including services. This change is as a result of a user-centric approach being used by developers and companies although some developers still have a cynical approach and misconception towards using a user-centred approach and practice in development. Possible reasons for this include the fact that the approach is viewed as being expensive, and (or) developers do not see a need for such an approach. These are misconceptions as a user-centred approach ultimately reduces the time and cost of redevelopment, redesign or rework, as seen from the study. In addition, it promotes

the critical understanding of the user experience in engendering and the domestication of technologies.

It is recommended that more user-focused, user-centred approaches should be used in the development of web and software applications as it results in many benefits for the users, developers and vendors. In a faculty (Informatics and Design) and department that adopted design thinking in solving real-world problems and the development of innovative technologies, methodologies such as user-centred design or interaction design, service design, and product design are emphasised. The use of these methodologies have seen research studies conducted and delivered rich, innovative, localised software, products and services that fit the everyday life of users. The need to encourage development practices that are user-centred will help developers and vendors gain more insight into and understanding of their users, and subsequently develop e-commerce websites that are trustworthy and offer a pleasurable user experience.

The researcher acknowledges that much research still needs to be conducted in the development of web and software applications. There is a need for companies, developers and e-commerce vendors to have a working partnership with research institutions equipped with technology hubs and incubators. Through these hubs and incubators as living laboratories, developers and vendors can research and develop e-commerce websites that meet business and customer needs. The Kujali Innovation hub at the Cape Peninsula University of Technology (CPUT) is an example of this. The Kujali hub as a living laboratory follows a multi-disciplinary approach that involves co-developing and co-designing with users using methods from methodologies such as user-centred design or service design, to the research, design and development of products, services and applications.

Industry standards and policy

The emphasis is on the need to establish standards for the e-commerce industry and a body to ensure these standards are adhered to as presently there are no specific standards, policies or guidelines used to engender trust in South Africa. The standards used are still mainly from the western and European countries. The guidelines proposed in section 5.5 can be used as a starting point to understand and build B2C e-commerce website standards. The need for standards is to ensure that e-commerce websites are localised for the people of the region rather than developers judging South Africans by standards developed in another country.

The body formed should serve as auditor to ensure e-commerce vendor websites are on par with standards that can be recognised globally. This body should monitor and audit e-commerce websites on the collection and use of customers' private information, website security (if it is up-to-date), storage of customers' credit or debit card details, and quality of service rendered by the e-commerce websites. There should also be policies that will help sensitise consumers on the need for e-commerce website use, how to identify trustworthy websites, list approved secured e-commerce websites, and information that should not be displayed on an e-commerce website for security reasons.

In addition, there should be an established standard (security) signature certificate for all e-commerce websites in a country (e.g. South Africa) or in a particular region, issued by the formed body and made known to users. This can serve as a platform where users can identify approved websites which can be trusted and transacted on.

6.4.1 Research limitations

The study is limited to business-to-consumer (B2C) e-commerce websites. The attributes from the findings are constrained to B2C websites, thereby excluding other types of e-commerce websites such as business-to-business (B2B) and consumer-to-consumer (C2C). The sample size of users and respondents (developers) were drawn from Cape Town, Western Cape Province, South Africa and therefore cannot allow for the generalisation of the findings.

The availability of the developers for interviews limited the number of respondents as they were not willing to conduct the interview due to time constraints, workloads, and meeting deadlines of projects they were handling. During the UCD activities the developers were expected to be part of the activity for the technical contributions with the users but could not make it because of the challenges mentioned; they were replaced by users who were technically inclined.

The research does not attempt to design any mock-up screens, develop any prototypes, or test and implement any designed solution for public use from the proposed guidelines. Furthermore, financial constraints also prolonged the study as the researcher and the supervisor had to use their own resources. The absence of resources needed for easier transcribing and coding of the interviews conducted also contributed to making the study tedious.

6.4.2 Further research

The research creates a foundation to accommodate further research and investigation into e-commerce trust from the users' perspective, especially within the context of the e-commerce technology still being relatively new as seen in South Africa. Future research could expand using a bigger user sample size (with possibly developers and vendors) to ensure generalisability of findings.

Studies on attributes that can build trust on other types of e-commerce websites such as B2B and C2C can also be carried out to address trust issues on these websites. This will ensure a safer and more pleasurable transactional experience on any e-commerce platform on the Internet. These studies can be beneficial and advantageous to having industry standards that can ensure trustworthiness across all e-commerce websites.

Future studies are recommended to put to test the proposed attributes and guidelines to determine the level of impact it will have on users' trust in B2C e-commerce. This would include using the proposed attributes and guidelines to complete the UCD lifecycle as shown in Chapter Two (section 2.4, Figure 2.9) by designing mock-up screens, developing prototypes, and testing and implementing a solution. Furthermore, the conceptual model developed in this study can be tested to identify its impact on the engendering and domestication of the e-commerce technology.

More research could be done to ascertain the level of impact adding social media can contribute in improving trust. Additionally, studies on how to localise e-commerce websites for specific regions can be conducted for effective and easy use by the people of certain localities.

6.5 Reflection

This study theoretically establishes a better understanding of e-commerce, trust, e-commerce trust issues, user-centred e-commerce trust, and the user-centred design body of knowledge. The study also contributes practically with design characteristics, attributes and guidelines of B2C e-commerce websites that will engender trust in e-commerce users (consumers). The study stresses the need for user input in the development of web/software applications in understanding the users and developing a user-friendly application. Furthermore, this study could be beneficial to e-commerce vendors, web developers, e-commerce users and future researchers at large.

Using the user-centred design methodology reveals the relevance of a user-centred approach in software and website development to gain more insight into users' perceptions of artefacts, products and services developed for their use. Users showed enthusiasm in their contribution towards the research as it directly affects them and provided an opportunity to disclose the trust issues they have with e-commerce websites. The use of UCD (or interaction design) and other similar design methodologies helps develop products that are simple and easy for users to use and at the same time adopts a sophisticated technology.

The developers of B2C e-commerce websites are seen to be somewhat defensive of the methodologies they use and seem to be indifferent to the significance of the need to involve users in development.

The research also shows that while aesthetics, functionality and trustworthy contents can be designed into websites, security, information privacy, and vendor attributes can also be included in e-commerce websites. Users mostly make use of their aesthetic and cognitive value in their judgement for trust, which is mainly connected to what they see. Another means to engender trust is through 'word-of-mouth' by friends and family. The findings of the study from the exploration of the users' perspective provide better understanding and insight into how to improve, engender and domesticate e-commerce technology.

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APPENDIX A: Sample of individual consent for research participation

FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Individual Consent for Research Participation

Title of the study: **User-centred design to engender trust in e-commerce websites**

Name of researcher: Mr. Chinonye Leuna Obioha

Contact details: email: obiohaleuna@gmail.com Phone: 0736535276

Name of supervisor: Mr. Jay Barnes

Contact details: email: BarnesJ@cput.ac.za Phone: 0214647210

Purpose of the study: The aim of the research is to explore attributes for engendering users' trust of B2C e-commerce websites using user-centred design.

Participation: My participation will consist essentially of interviewee.

Confidentiality: I have received assurance from the researcher that the information I will share will remain strictly confidential unless noted below. I understand that the contents will be used only for a MTech Thesis, research conferences, and research publications, and that my confidentiality will be protected by the use of personas and pseudonyms.

Anonymity will be protected in the following manner: coded names of interviewee will be taken or used.

Conservation of data: The data collected will be kept in a secure manner.

Voluntary participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If I choose to withdraw, all data gathered until the time of withdrawal will destroyed.

Additional consent: I make the following stipulations (please tick as appropriate):

	In thesis	In research publications	Both	Neither
My image may be used:				
My name may be used:				
My exact words may be used:				
Any other (stipulate):				

Acceptance: I, (print name) _____ agree to participate in the above research study conducted by Mr. Chinonye Leuna Obioha of the Faculty of Informatics and Design, Department of Information Technology, at the Cape Peninsula University of Technology, which research is under the supervision of Mr. Jay Barnes.

If I have any questions about the study, I may contact the researcher or the supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

Participant's signature: _____ **Date:** _____

Researcher's signature: _____ **Date:** _____

APPENDIX B: Invitation to participate in the UCD activity

Cape Peninsula University of Technology

An Invitation to participate

User-centred Design to Engender Trust in E-commerce

Date: 17 May 2014

Venue: BTech Lab, IT department, FID

CPUT, Cape Town Campus

Time: 11am (Duration – 3h30)

To RSVP and for more information please contact

Chinonye Leuna Obioha

obiohac@cput.ac.za

This serves as an invitation to participate in a user-centred design workshop activity. This workshop aims to explore how e-commerce users experience issues of trust when interacting with e-commerce websites, and how they would change such websites to improve their perception of trust.

Trust is been said to be one of the main issues hampering the growth of e-commerce (please see attached document). This research intends to explore ways to improve users' trust by engaging the users in this user-centred workshop activity.

During this exciting but intensive workshop, participants will focus on their experience, point of view, belief, needs and concerns on trust issues, and will participate in creating new ways of engendering trust in e-commerce.

APPENDIX C: UCD Workshop Activity Guide

UCD Workshop Activity Guide

Part A: Workshop introduction

1. Arrivals and registration
2. Ice-breaker (creating rapport with and among participants)
3. Introduction (why are we here?)

Part B: To the main business of the day

1. Exploring three e-commerce websites on users' trust perceptions
    i. Identify trust issues related to security and privacy
    ii. Identify website's trustworthiness (what they see in websites that communicated trust)
    iii. Identify trust issues related to design (the overall look and feel of the websites)
    iv. Identify trust issues related to functionality (challenges of users in the use of the websites to complete a transaction)
2. A short break
3. Idea generation (brainwriting)
4. Selecting and evaluating ideas
5. Forming concepts candidates
6. A big thank you!!!

APPENDIX D: Interview Guide

INTERVIEW GUIDE

About the person

Main Questions	Additional Questions	Clarifying Questions
Can you tell me briefly about yourself?	What is your job title? And responsibilities? How many years' experience do you have and what kinds of projects have you handled?	• Can you give me some examples?

General design and technology

Main Questions	Additional Questions	Clarifying Questions
• In your experience, how would you describe the development process of an e-commerce website?	• What technology parameters do you use when building a B2C e-commerce website? • To what extent is your design/technology dictated by the owners of the websites? • What dictates the actual purchasing process? Owner-specified, template driven, best practices, host, etc.?	• Can you expand a little on this? • Can you tell me anything else? • Can you give me some examples?

User trust issues

Main Questions	Additional Questions	Clarifying Questions
• How do you design to communicate/convey trust to the users?	• Do you judge/measure and design for issues such as aesthetics, cognitive value, and usability? • To what extent and how do you involve end-users in your design? • Have you ever specifically addressed the issue of user trust in your design process? If yes, how did you address it? • Have there been issues of trust reported about websites you've designed?	• Can you expand a little on this? • Can you tell me anything else? • Can you give me some examples?
Conclusion of interview		
• Is there anything else you would like to add?		

APPENDIX E: Findings from UCD with top rating (3)

Categories	Group	Rating	Idea
Aesthetics design	GP2	3	More elaboration on pictures of products
Aesthetics design	GP1	3	Provide visible option to cancel transaction
Aesthetics design	GP1	3	Allow users to return to home page from anywhere on the site (with 'Home' written as text not only as an image)
Aesthetics design	GP1	3	Professional and consistent design on all web pages
Aesthetics design	GP1	3	Maintain website by including proper images related to the product description
Aesthetics design	GP1	3	Design homepage properly (not too much text)
Aesthetics design	GP1	3	Very prominent company name and logo
Aesthetics design	GP1	3	Any button not working or in use should be greyed out (it causes confusion)
Aesthetics design	GP2	3	Develop a website in such a way that it attracts customers to the site
Aesthetics design	GP2	3	Use appropriate colours – consistency on website
Aesthetics design	GP2	3	Put in more effort when designing websites to avoid easy manipulation or phishing
Aesthetics design	GP2	3	Design websites to reflect some level of professionalism
Aesthetics design	GP2	3	The most essential pages should not be hard to locate e.g. Home Page, About us
Aesthetics design	GP2	3	High-quality graphics (such as colour blocking)
Aesthetics design	GP2	3	Items being advertised should be obvious as real product
Development Process	GP2	3	Adhere to e-commerce best practice
Development Process	GP1	3	Allow users to provide input on ease of use
Development Process	GP1	3	Get children to play with website (development process)
Development Process	GP1	3	Get a new web designer's different creative input
Development Process	GP1	3	Design with potential users
Development Process	GP1	3	Have home developers that will check and handle issues when website breaks or buttons do not work
Development Process	GP1	3	Allow users of different ages to test drive website (different levels of techie)
Security and Information Privacy	GP1	3	Security certificates should be genuine
Security and Information Privacy	GP1	3	Ensure one-to-one connections (via email and/or SMS confirmations)
Security and Information Privacy	GP1	3	Certificate should ensure customer info privacy

Categories	Group	Rating	Idea
Security and Information Privacy	GP1	3	There should be standard signature (security) certificates for all e-commerce websites
Security and Information Privacy	GP1	3	Request less personal information
Security and Information Privacy	GP1	3	Visible security certificates (top of page)
Security and Information Privacy	GP1	3	Websites should ensure privacy of customer data
Security and Information Privacy	GP2	3	Control of personal data and informed consent
Security and Information Privacy	GP2	3	Retraction of personal information/data
Security and Information Privacy	GP2	3	Avoid misinformation (do not market security you do not have)
Security and Information Privacy	GP2	3	Security certificates or signatures verification of originality
Security and Information Privacy	GP2	3	Provide medium of secure information storage/usage
Security and Information Privacy	GP1	3	Give an option to deliver to post office
Security and Information Privacy	GP1	3	Having sign-up/guest accounts to give users the option to have an account or not
Security and Information Privacy	GP2	3	URL with visible https or padlock as an indication of it being secured
Trustworthiness Based on Content	GP1	3	Up-to-date certificates should be displayed on website
Trustworthiness Based on Content	GP1	3	Keep security info/awareness obvious and easily accessible (more visible)
Trustworthiness Based on Content	GP1	3	Limit annoying popup adverts on website
Trustworthiness Based on Content	GP1	3	Promote ads that are only related to the item or category searched
Trustworthiness Based on Content	GP2	3	Dialogue box for customer to comment (customers' feedback)
Trustworthiness Based on Content	GP2	3	Provide different modes of payments
Trustworthiness Based on Content	GP2	3	Have a brand ambassador (a popular star who endorses the website)
Trustworthiness Based on Content	GP2	3	On-point information in terms and conditions
Trustworthiness Based on Content	GP2	3	Ratings, comments and reviews
Trustworthiness Based on Content/Functionality Design	GP2	3	Retraction of transaction

Categories	Group	Rating	Idea
Functionality Design	GP1	3	Provide good ease of use of websites (if I can use it, I can trust it)
Functionality Design	GP2	3	Make website navigation friendly, mostly for novice users (telling users what to do next)
Functionality Design	GP1	3	Provide guidance to navigate website for new users (telling the user what to do before they start any process)
Functionality Design	GP1	3	Keep page scrolling to a strict minimum
Functionality Design	GP1	3	Easy to use and understand
Functionality Design	GP1	3	Categorise and group related information (products)
Functionality Design	GP2	3	Use short descriptive text (do not like too much of text; get tired of reading)
Functionality Design	GP2	3	Obvious location of information needed by customers
Functionality Design	GP2	3	Availability and on-point information on each product or item displayed
Functionality Design	GP2	3	Icon to easily cancel transaction as and when needed
Trustworthiness Based on Content/Functionality Design	GP2	3	The use of optimised search box to help customers find what they are looking for quickly
Functionality Design	GP1	3	Minimum clicks to reach the item(s) of interest
Trustworthiness Based on Content	GP2	3	Branding of the websites
Functionality Design	GP2	3	Make website's physical contacts available and verifiable

APPENDIX F: Sample of interview transcript—questions, responses, code

Questions	Response	Code/ Comments
Q1: In your experience, how would you describe the development process of an e-commerce website?	I think, [1]depending on the size and what people are trying to achieve it's very different. I would say for [2]the smaller vendors, they tend to focus a lot more on the current market—the working clients that they have. They take a lot of feedback from them. But with more established brands, they have money to throw in marketing and it's usually most of the concepts come from the content of the people the market is focused on. [3]So very little focus is put on the technology side of things because they usually go for pre-built options. Whatever has been around and has good reputation is what middle established brands go for. [4]But the bigger solid giants where the focus is solely where their business is living, they put a lot of focus on service agreements that their service has... [5]It's almost like nobody usually in today's age is going to build an e-commerce site from scratch. There's just too many good solutions out there. [6]But the selling point is always: what kind of support and what kind of merchants they support (the amount of merchants)? What is their fail-safe mechanism? Because things always go wrong. So those people make a lot of money and time on focusing on who's the biggest player in terms of those things.	1. Vendor's capital and Size 2. Vendor's Focus 3. Pre-built Technology 4. Vendor's Focus 5. Pre-built Technology/ Development Methods 6. Services Provided
	It's a close conjunction with our clients; [7]we traditionally make sure that the e-commerce websites showcase products firstly and foremost. [8]Making sure that the necessary information about the products is highlighted and they are [9]also adding a couple interactions for the potential client to engage with you. [10]And also removing all other obstacles for transactions, making sure that if a guy wants a product, he can actually buy it from it quite quickly. Once he's decided to buy it from you, he can actually purchase it—pay for it without too much of a hustle. That is in a nutshell the important base.	7. Product Display 8. Content Information 9. User Interaction 10. Ease of Use
	Development process? [11]I think the methodologies that have been in place in what we studied are still impeccable. So the process is still very similar. The analysis phase when you look at kind of doing a user requirement specification document is very much as we kind of learnt it except they have been some adaptation to what that document looks like. [12]We're less concerned about use case diagrams, more concerned about data modelling and wireframing, and detailing on wireframes. Some other things once covered are not relevant anymore. So from there, [13]once the analysis phase is done we go into the design phase which we call the designers to come and draw up a template of the back of the wireframe. Once that has been signed off by the clients, then we start development and we use, potentially depending on the account, [14]but we use SCRUM methodology where we have weekly reviews and sprints on the project. [15]And we kind of deliver small modules during the course of the project. And once it's developed we test and go live. So that's the procedure and it hasn't changed much since we started, it just got better.	11. Industry Standards 12. Development Methods 13. Development Methods 14. Development Methods 15. Development Methods
Q2: What technology parameters do you use when building a B2C	[1]Well, if you're going to process any payments there are a lot of legalities around things. Like you can't store credit card details on servers and you have to have basically forensic, IP export orders sign off. Also[2], your ability to guarantee that the amount of money coming in and out is insured or refundable becomes	1. Internet Security 2. Customer's Guarantee (Money

Questions	Response	Code/ Comments
e-commerce website?	an issue. That's why what most people do is [3]they sort of get an external merchant to set along them the data network. It is quite a lengthy process. You can have a normal site basically and for you to just have the e-commerce bit; all you do is manage the data—the information system data. [4]The vendor that you partner with will basically store everything in an auditing form.	Refund) 3. Third Party Auditors 4. Third Party Auditors
	You are talking about specifically for e-commerce... The parameters, there is quite a standardised methodology that we adopt for e-commerce. The biggest thing is that you have to keep the user experience consistent. That consistency comes through basically every other website that is out there and essentially bench marking against websites that their expected market is going to be engaged. For example, if they go to YuppieChef a lot and their market is also kitchen ware. You look at the kind of website or the e-commerce site that their clients will be accessing. And you deliver something similar. So the process is that you want to have similar type of card check out, similar product distinct, similar product view, and just keep that process as structured and as similar to the rest.	5. Industry Standards 6. Industry Standards
Q3: To what extent is your design/ technology dictated by the owners of the websites?	[1]Well you go with the more established brands. I actually, just before meeting you check out the latest more trending ones in 2014. [2]They usually partner with established design brands. [3]There are a couple of pre-built themes but usually people just take skin templates and maybe get a designer in for the logo.	1. Website Design Brands 2. Website Design Brands 3. Development Methods/Pre-built Technology
	[4]We involve our clients and our clients usually come to the agencies—not been the experts. The agencies need to stand up and say we suggest the following. [5]But before we start any of the development, we put our clients into this mix in flat designs—what we think the website should like. And then the clients usually give input on that too.	4. Designer's Skills and Expertise 5. Development Methods
	They do but we give them a fair amount of guidance. They don't actually..... They don't know and that's the reason they come to a company like us because we have a great deal of experience in that realm. So we give them a lot of advice.	6. Designers Skills and Expertise
Q4: What dictates the actual purchasing process? Owner-specified, template driven, best practices, host, etc.?	[1]The tools already exist that everybody use, so it's not really a re-inventory from the design point of view. But if you are [2]talking about sort of technically laid things, then it's completely up to what the extra things— like most of the enterprise solutions they support a lot of things. [3]The only real reason you need an external development is if you want to integrate unsupported things. So if there's [4]a local payment vendor that isn't aligned with the software merchant that you went to, that is where some technical bit will come from a senior developer.	1. Pre-built Technology 2. Development Methods 3. Services Provided 4. Designer's Skills and Expertise
	[5]No, it's never by template. [6]It's helpful to look at the industry's standards just to see what does work and what does not work. [7]It does not help you if you design something that you know its fraud. So research I think is quite important. And then it's really overly rated based on the products. [8]You know if you are selling	5. Pre-built Technology 6. Industry Standards

Questions	Response	Code/ Comments
	flowers online, you probably don't want your website to look like a text site. If you are selling cars, you don't want it to look like a flower shop. So it really product specific, I would say.	7. Development Methods 8. Aesthetics
	Absolutely, for all e-commerce we try to keep them as consistent as possible.	9. Industry Standards
Q5: How do you design to communicate /convey trust to the users?	[1]I think that the fact that this is on - all this logos that they already have trust in like MasterCard and all those things. [2]When people see that you affiliate yourself with all those vendors you'll automatically gain somebody's respect for that brand. That and the fact that [3]a lot of people like the more prominent ones have like fraud detection, immediate reversal of transactions. Those are like big value added services. [4]Also things like address verification. If you support those little things in the system, you leverage on your competition and significances. Somebody might not think its valuable but like [5]in South Africa its becoming illegal for consumer data to go overseas. So if you got a cheaper rate and the people are not in the boundary of the country, it will be assumed illegal. Just having all that extra things like – we are local, we do this and that, that's just our leverage on building the trust on the customers. A lot of them start by been either a supplier. [6]I don't think the leap just happens like that because it's very hard to convince somebody that they actually have enough value into a store. Because people always see stores as a collective, big compartment of things of value. For instance, the scenario you are explaining (Start-up Vendor's e-commerce), I think the natural order of things would be to have a website which is like a portfolio of what they are doing. [7]But if they want to sell, go through the people that sort of group those people together and they have sort of just an e-commerce thing. They are the merchants for those people. So that's the national order of things. And obviously once you are doing well, you can actually have your own e-commerce website. There are a lot of ways to do it. [8]Like e-commerce does not need to be a site, they can just be an electronic way to pay. I have used that part as an e-commerce solution. I think its small steps for small people. [9]This things cost a lot of money. A lot of people charge a lot of money to build these things. So for small businesses or individuals to take advantage of having an e-commerce solution is not always as easy as possible.	1. Security Certificates 2. Branding 3. Customer's Guarantee 4. Vendor's Physical Identity 5. Information Privacy 6. Branding 7. Brand Partnership 8. Services Provided 9. Vendor's Capital and Size
	WD2: I think if we come back to trust, where I was disagreeing with your study is that [10]I believe that design does play a role in it but it's about brand. [11]People trust brands. It really becomes a point where you need to establish your brand. [12]You need to bring your brand in front of your clients, many, many, many times, over and over and over. You can always emphasise the same message. It might be that you give good service, or that you are cheap or that you are reliable or whatever that message is. [13]And that probably will be the biggest challenge for start-up e-commerce sites in design. [14]If you look at some more established e-commerce websites like Amazon, trust is already there. I think it's a difficult question. **WD3** what's your opinion about trust and design and brand?	10. Branding 11. Branding 12. Marketing and Advertising 13. Vendor's Capital and Size 14. Branding 15. Aesthetics 16. Aesthetics Cognition

Questions	Response	Code/ Comments
	WD3: I think I agree with **WD2**. [15]Obviously design is important because if you don't have a site that looks aesthetically nice, you are not going to feel comfortable in buying (look at eHome's competitor). [16]There might also be an interesting way to earn trust in putting Bible verses on your site because that is why it's done here. I promise you that's the reason. [17]Because he (the customer) feels, if he uses Bible verses he's (the owner of the website) not going to steal their money. But apart from that I agree with **WD2**. [18]I think it's the brand and the market, and final things you do away from your websites. [19]Like if you have an e-commerce site but you advertise a prominent Facebook page with a thousand followers. You know that's trust. If you're on price check, that's trust. If you have some other mediums that you market on print media or billboards and you take that and put that onto the site, I think that's trust. I mean [20]why would you advertise to steal money? Why would you take Google Ads to steal money? Or do any other fraudulent activity? [21]And also pictures of you, information about yourself. If you are on the about us page and [22] you can see a guy who's the holder in the company. That about us is very crucial. [23]The more information you put there the more trust you would earn. You are going to make people more comfortable to buy on your site.	17. Aesthetics Cognition 18. Branding 19. Marketing and Advertising 20. Marketing and Advertising 21. Vendor's Physical Identity 22. Vendor's Physical Identity 23. Vendor's Physical Identity
	[24]It's a great question and it's a difficult one, especially in South Africa because the market hasn't really been established. People are new to e-commerce. [25]We found that a lot of the mistrust on e-commerce is around the security, around the credit card, [26]the ability to not pay with more than one method like credit card or EFT or even cash on collection. [27]The idea to kind of inspire trust is to give them more options so they feel that they can, if they don't trust the credit card then maybe they can just try the EFT. Because that's log in into their bank and doing it separately outside the system or even cash on collection. So you try and give them as many options as possible. [28]On top of that you also give them the right icons of certificates that kind of show that it's a trusted site. [29]It's got https, it's secured. A lot of it is around the kind of security issue. [30]The others are not necessary trust but engagement such as what cost to deliver. They go through the whole process and they'll get to the end of the kind of check out process and they'll be hit with a R100, R50, whatever it might be for the delivery cost. That's kind of a barrier to entry for a lot of clients but it should be free. So doing it in a design, doing it in a development, it's critical that you ensure that all of those things are well communicated to the clients. [31]It's not an exact science and I think ideally what we do with a lot of our bigger clients is we kind of build the system, then we let it run for a bit and then we get feedback from our clients...	24. Cultural Limitations 25. Internet Security 26. Payment Options 27. Payment Options 28. Security Certificates 29. Internet Security 30. Delivery Cost 31. Users' Experience
Q6: Do you judge/ measure and design for issues such as aesthetics, cognitive value, and usability?	In the area of trust? I think that (pauses)... [1]It is a difficult question to answer just like that. Let me think about it (Laughs). I think up till now obviously way too little has been done to consider the user and I think that not a lot of efforts go into that at all. If I must think about the last successful site that I worked on, the guy's approach was basically to build a catalogue site. And based on the attraction that that site got, he actually took the whole concept and he made an e-commerce site out of it. He is making very good money out of it. But there was very little, even none – no interaction with the people he was judging analytics of. So, [2]it was purely from analytics point of view,	1. Users Involvement 2. Using Analytics 3. Vendor's Capital and Size 4. User Involvement

Questions	Response	Code/ Comments
	seeing what people are interested in. [3]I know Amazon has those where you can actually pay for human testers. [4]There was no feedback or anything from users and [5]he was not an established business brand. Because I have worked on some sites that are not around anymore because of the same mistakes.	5. Branding
	WD2 [6]There's a level of skill and expertise when it comes to the designers or developers. The designers that one use need to have the insights to understand the brief and to come up with right design. In design there's two parts: there's usability design and there' aesthetics design – the way that it looks. [7]When you look at the aesthetics, you are probably looking at the client's branding, and you need to comply with that. In this case (ehomes.co.za) it's got a green logo, shady green would be a useful colour in the design itself. And if we brought into this design, maybe blue it just wouldn't have worked. [8]From usability perspective, we always believe that there need to be a clear, of course the brand must be there, but we always believe in having a call-to-action for a quick content mechanism on the home-based system and it's quite important. One thing also is you can look at your audience and ask 'what will they be looking for?' [9]You never know what they want. They are going to search for it. So it is also important to have your search functionality readily available on all sections. [10]And then having some sort of navigation for the user. If he's looking for a bit that he actually goes and he starts mining for the available information. [11]Having a big rotational advice is helpful for special information and it draws the eye of the potential customer to the items that you actually want to sell. **WD2:** [12]We believe that the obstacles to transact must be gone; it must be easy for the person to go through information and buy, and re-buy. We put quite an emphasis around that. It is really important that process runs smooth. We had a discussion about that a bit earlier. We want to rebuild another website too—it's two sites that belong to the same business. How to make sure that they don't compete with each other too much? And those are typical questions that one goes through these. Every site and every business got its own challenges. Some specific questions come up. We have another client and they wanted to expand internationally—that was their next big step. And a big discussion was on how do you make that site internationalised with trust? **WD3:** [13]And also, maybe it will be farfetched, but you also get these cultural things as well. Because it's South Africans (maybe one thing you can bring in), you will have trust issues here than you would have in a first world country. In Sweden you will just buy online because there is no fraud, but here there is fraud so it is an issue. And there are a lot of fraudsters out there. That also makes it a bit more challenging for your e-commerce sites to go extra out of their way to make the site seem more trustworthy. **WD2:** And I think design does play a role in it. [14]You need to have all that messages designed into your site. If it does then the messages is more important than the design, but if it's nicely designed it's just a benefit. **WD3:** [15]I mean you can easily see if it's a misleading or fraudulent site because 99% of the time it would be designed poorly with low budget. The whole aim is not to have a	6. Designers Skills and Expertise 7. Aesthetics 8. Ease of Use 9. Search Functionality 10. Ease of Use 11. Aesthetics/Content Information 12. Ease of Use 13. Cultural Limitations 14. Content Information 15. Vendor's capital and size 16. Vendor's capital and size 17. Users' Testimonials 18. Marketing and Advertising 19. Customer's Guarantee 20. Vendor's Physical Identity 21. Vendor's Physical Identity

Questions	Response	Code/ Comments
	sustainable thing for the long run but to hit and run. So design is important, it's one of the things I tell the guys when they ask—how can I trust you? I tell them look at the site, look at the zoom function, and look at all the stuff there. [16]Would we spend all these money just to steal your money? **WD2:** But criminals will, they will spend more efforts. **WD2:** What about testimonials? **WD3:** That's another thing we didn't touch on. We implemented testimonials just now because you know its trust. [17]What better way to generate trust than to take people that already bought from you, had a nice experience, and write a phrase stating how spectacular the service was. And having about two hundred of those. **WD2:** Well, we haven't done any usability testing on this specific website. And usability testing is taking it out to the market and you see how they engage with the site. **WD3:** And I mean how to get people's trust is definitely an issue. We have gotten numerous clients that want to buy, the price is good, everything is good but the one question they ask is—because in e-commerce they pay up front, they will ask you how can we trust you? How do I know this product will reach me after I've paid you 50000 Rand? That's why I say from personal experience, [18]you going to move away from the design and you going to more emphasise—we have price check, we have a Facebook page over a thousand people, [19]we have a returns policy, we have an authorised credit card payment system, we are VAT registered ... **WD2** [20]And the fact that you have a telephone number, a person can call. **WD3** ...[21]we have a company registration number. So if we are fraudulent, you will have ways in tracking us and we have a physical address.	
	Absolutely. It almost goes about saying if you go into a car that is rackety and beaten up. And it's got a perfect engine and it's not going to give you a problem but you get out of that and get into a nice, luxurious Mercedes Benz. The outside looks fantastic. You are just going to trust that car more. Its human nature—we [22]visually judge things before we engage with them. Is it food, cars, whatever it might be? It's like that with websites. So if your design is really high and it's [23]beautifully put together, people will see it to be trustworthy.	22. Aesthetics Cognition 23. Aesthetics
Q7: To what extent and how do you involve end-users in your design?	No. [1]I mean with established brands there's obviously... when there is a physical medium like for instance, we did a promotion with Savanna Dry; obviously they have a market. So they have like pre-conceptualised campaigns already. By the time it comes to the developing, there's no real – like the film is set basically already.	1. Vendor's Capital and Size
	[2]We don't take it out to our customer's customers to see what they specifically want because that process becomes so expensive. The benefits that you are going to get by doing that is not, we believe, is not going to be that vital.	2. User Involvement
	Correct. [3]We're actually undergoing now – there's a new project that we're developing in e-commerce project where we doing what's called A/B split testing. [4]So we will have two interfaces that essentially do the same thing but they communicate a	3. Development Methods

Questions	Response	Code/ Comments
	different message. So we're trying to see what the traffic is on each one of those and figure out which works better. But it's not an exact site and it pretty much depends on your market. [5]The upper LSM (living standard measure), we kind of seen they don't have trust issues. They have credit cards, they are very comfortable paying. [6]If they've paid before they don't worry about it. [7]It's the new kind of lower LSM guys that we are worried about, someone stealing their credit cards and they are not used to paying online and it's a new experience. [8]But once they've kind of gone through the process a couple of times, they'll trust.	4. Users' Involvement 5. Standard of Living 6. On-going Trust 7. Standard of Living 8. On-going Trust
Q8: Have there been trust issues reported about websites you've designed? **Q9:** Have you ever specifically addressed the issue of user trust in your design process? If yes, how did you address it?	[1]Well there's always you know, that is why fraud detection... and what a lot of people do is, if you me*et* all the security requirements [2]and you partner with the big brands like MasterCard and Visa, they actually insure you for an amount. I think the minimum is like 10000 USD, which is a few years ago. This is probably much more now. [3]So it means they insure you for 100000 Rand worth of fraudulent transactions which is more than enough if you are capable, you know. [4]But I mean most of the systems they have immediate fraud detection; they can spot suspicious transactions a mile away. Yes they have been a few but thankfully the solutions we were using, it was just me basically passing things off saying—this has been flagged by the system can you just please resolve this. [5]It is never really your responsibility if you are using an established brand like MasterCard. They will just refund your money immediately and they sort it out. Obviously with that said, if I keep the clients and the customers in mind, there is, [6]even from my own opinion, there is always this feeling of mistrust or fear when for instance it's a local, un-established brand. Somebody selling something for a good price, but you have never heard of them. [7]In cases like that I always look for, if I see you are supported by a MasterCard or whatever, I can use it. People don't really understand the value of going through a channel like that. They can actually dispute the claim. [8]For me it's just all about the brands you tie to, that can be a major plus for you.	1. Internet security 2. Established Brand Partnership 3. Customer's Insurance 4. Internet Security 5. Customer's Guarantee 6. Branding 7. Third Party Certification 8. Third Party Certification
	WD2: Can you tell him quickly about the case study of the Samsung transaction with the guy where he got some trust questions where you got Samsung involved? **WD3:** Yeah. I got a lead from a cutting edge TV of about 65000 Rands and the guy wanted to buy the product because my price was the best one in the country. But he had some questions, which is fair. I wouldn't do what he's done. [9]But I told him, listen I can get Samsung's guy with a Samsung email (a Samsung.com email) to send you a mail stating that we are an accredited Samsung products seller but apart from that that's the most I can do. **WD2:** But that solved the problem. He just wanted to make sure that eHome is a Samsung dealer. That was the trust he needed. [10]So part of that is to make sure that your suppliers back you. That's a very, very important thing. **WD3:** [11]And without your suppliers you are not going to sell anything. Except if you make it yourself. **WD2:** [12]The backing of your suppliers can aid building the trust.	9. Established Brand Partnership 10. Third Party Certification 11. Third Party Certification 12. Third Party Certification 13. Third Party Certification 14. Marketing and Advertising 15. Marketing and Advertising 16. Marketing and Advertising

Questions	Response	Code/ Comments
	WD3: Yes, for sure. **WD2:** So the question is on eHome, are we making that message clear that you guys are totally backed by your suppliers? Maybe one can do bit more in there. **WD3:** Yea that is a valid point. [13]If you can ask, let's say Samsung suppliers – you can get Samsung's Managing Director to sign on a Samsung letter head stating that you are accredited and you put on there. You know you can't do much more than that. I think the point is clear, design is important but there's a lot of other stuff behind design... **WD2:** It's a bit broad as we have seen. Some of our clients that have beautiful brands, it's much easier. EHome is a brand new brand and actually on our website there's a case study of the eHome establishment and its first year of trade. You can have a look at that. And the graph base we literally needed to overcome. [14]We do believe that Google SEO and Google Ads do help a lot with establishments of a brand. I don't know about trust specifically. **WD3:** I think in a way I have used that argument for the question – how can we trust you? I have stated that we use Google Ads, not that you can't use it if you are fraudulent. But at least... **WD2:** [15]It's about we've placed your brand on different touch points, everywhere. It does not matter where you go. If you are looking for a bed, e-home will surface somewhere and if you do that enough, people will start trusting your brand. I think the touch point is seven. [16]There are seven touch points which a person can use to recognise a brand and start trusting it. It's more of a standard marketing strategy.	
	I do not know if it is so much with the design, I think a well-designed site; there are a lot of elements that you need to put into the site to put that trust. Those elements are standardised. We see from the US, the UK, the European market what that is what people need to see. [17]So locally we haven't really organised our own structure, we kind of following the trends of the West and European countries. So they probably are certain things that we need to push more but we haven't done the research on them. And I am not sure exactly what they might be. We do know that it's a time based thing. [18]They maybe know their friend that bought through it and they kind of trust that one – like well nothing happened with their friend. [19]With the design, obviously you got to put all the right things in place but it's incredibly difficult to know what's going to impact you and what's going to impact me. [20]Am not really interested if it says https, and it has a secured certificate am happy. For me that's fine. Maybe for you it's not fine. [21]Maybe you want something else saying if anything goes wrong, you'll be guaranteed your money back. So it depends, but we are learning slowly through our bigger clients what that is. [22]But in terms of design, you just have to ensure the right messages are there, [23]security messages are there, [24]guarantees are there, [25]and then the customers' service. [26]So if you have a problem with process, give us a call and that helps. Those things help. The design is important—it has to look good, it has to present well. [27]And if you can do that then you can kind of give them the right messages. It's as much as we know we should be doing.	17. Industry Standards 18. Users' Testimonials (Word of Mouth) 19. Aesthetics Cognition 20. Security Certificates 21. Customer's Guarantee 22. Content Information 23. Security Certificates 24. Customer's Guarantee 25. Vendors' Services 26. Vendors' Physical Identity 27. Content Information

APPENDIX G: Interview responses with codes

Ref.	Responses	Code
28	You know if you are selling flowers online, you probably don't want your website to look like a text site. If you are selling cars, you don't want it to look like a flower shop. So it really product specific I would say.	Aesthetics
37	Obviously design is important because if you don't have a site that looks aesthetically nice, you are not going to feel comfortable in buying.	Aesthetics
68	So if your design is really high and it's beautifully put together, people will see it to be trustworthy.	Aesthetics
69	When you look at the aesthetics, you are probably looking at the client's branding, and you need to comply with that.	Aesthetics
70	Having a big rotational advice is helpful for special information and it draws the eye of the potential customer to the items that you actually want to sell.	Aesthetics
38	There might also be an interesting way to earn trust in putting Bible verses on your site because that is why it's done here.	Aesthetics Cognition
39	Because he (the customer) feels, if he uses Bible verses he's (the owner of the website) not going to steal their money.	Aesthetics Cognition
71	And there are a lot of fraudsters out there. That also makes it a bit more challenging for your e-commerce sites to go extra out of their way to make the site seem more trustworthy.	Aesthetics Cognition
99	With the design, obviously you got to put all the right things in place but it's incredibly difficult to know what's going to impact you and what's going to impact me.	Aesthetics Cognition
72	Its human nature – we visually judge things before we engage with them.	Aesthetics Cognition
41	I believe that design does play a role in it but it's about brand.	Branding
42	People trust brands. It really becomes a point where you need to establish your brand.	Branding
43	If you look at some more established e-commerce websites like Amazon, trust is already there.	Branding
44	I think it's the brand and the market, and final things you do away from your websites.	Branding
73	He was not an established business brand.	Branding
100	Even from my own opinion, there is always this feeling of mistrust or fear when for instance it's a local, un-established brand. Somebody selling something for a good price, but you have never heard of them.	Branding
98	I mean with established brands there's obviously.	Branding
45	I don't think the leap just happens like that because it's very hard to convince somebody that they actually have enough value into a store. Because people always see stores as a collective, big compartment of things of value.	Branding
46	When people see that you affiliate yourself with all those vendors, you'll automatically gain somebody's respect for that brand.	Branding
8	Making sure that the necessary information about the products is highlighted.	Product Information
74	You need to have all that messages designed into your site. If it does then the messages is more important than the design, but if it's nicely designed it's just a benefit.	Product Information

Ref.	Responses	Code
101	But in terms of design, you just have to ensure the right messages are there.	Product Information
102	And if you can do that then you can kind of give them the right messages.	Content Information
7	We traditionally make sure that the e-commerce websites showcase products firstly and foremost.	Product Information
47	It's a great question and it's a difficult one especially in South Africa because the market hasn't really been established. People are new to e-commerce.	Cultural Barriers
75	We have a returns policy, we have an authorised credit card payment system, we are VAT registered.	Customer's Guarantee
103	It is never really your responsibility if you are using an established brand like MasterCard. They will just refund your money immediately and they sort it out.	Customer's Guarantee
104	Maybe you want something else saying if anything goes wrong, you'll be guaranteed your money back.	Customer's Guarantee
105	Guarantees are there.	Customer's Guarantee
106	So it means they insure you for 100000 Rands worth of fraudulent transactions which is more than enough if you are capable, you know.	Customer's Guarantee
16	Your ability to guarantee that the amount of money coming in and out is insured or refundable becomes an issue.	Customer's Guarantee
48	A lot of people like the more prominent ones have like fraud detection, immediate reversal of transactions.	Customer's Guarantee
49	The others is not necessary trust but engagement such as what cost to deliver. They go through the whole process and they'll get to the end of the kind of check out process and they'll be hit with a R100, R50, whatever it might be for the delivery cost. That's kind of a barrier to entry for a lot of clients but it should be free.	Delivery Cost
29	A local payment vendor that isn't aligned with the software merchant that you went to, that is where some technical bit will come from a senior developer.	Designer's Skills and Expertise
22	We involve our clients and our clients usually come to the agencies – not been the experts.	Designers Skills and Expertise
23	They don't know and that's the reason they come to a company like us because we have a great deal of experience in that realm. So we give them a lot of advice.	Designers Skills and Expertise
76	There's a level of skill and expertise when it comes to the designers or developers.	Designers Skills and Expertise
12	We're less concerned about used case diagrams, more concerned about data modelling and wireframing, and detailing on wireframes.	Development Methods
13	Once the analysis phase is done we go into the design phase which we call the designers to come and draw up a template of the back of the wireframe.	Development Methods
14	But we use SCRUM methodology.	Development Methods
15	And we kind of deliver small modules during the course of the project. And once it's developed we test and go live.	Development Methods
24	But before we start any of the development, we put our clients into this mix in flat designs – what we think the website should like. And then the clients usually give input on that too.	Development Methods

Ref.	Responses	Code
30	Talking about sort of technically laid things, then it's completely up to what the extra things.	Development Methods
31	It does not help you if you design something that you know its fraud. So research I think is quite important.	Development Methods
91	We actually undergoing now – there's a new project that we're developing in e-commerce project where we doing what's called A/B split testing.	Development Methods
10	And also removing all other obstacles for transactions, making sure that if a guy wants a product, he can actually buy it from it quite quickly.	Ease of Use
77	And then having some sort of navigation for the user.	Ease of Use
78	We believe that the obstacles to transact must be gone; it must be easy for the person to go through information and buy, and re-buy. We put quite an emphasis around that.	Ease of Use
79	From usability perspective, we always believe that there need to be a clear, of course the brand must be there, but we always believe in having a call-to-action for a quick content mechanism on the home-based system and it's quite important.	Ease of Use
107	And you partner with the big brands like MasterCard and Visa; they actually insure you for an amount.	Established Brand Partnership
108	But I told him listen I can get Samsung's guy with a Samsung email (a Samsung.com email) to send you a mail stating that we are an accredited Samsung products seller but apart from that that's the most I can do.	Established Brand Partnership
40	But if they want to sell, go through the people that sort of group those people together and they have sort of just an e-commerce thing. They are the merchants for those people.	Established Brand Partnership
11	I think the methodologies that have been in place in what we studied are still impeccable. So the process is still very similar.	Industry Standards
17	The biggest thing is that you have to keep the user experience consistent. That consistency comes through basically every other website that is out there and essentially bench marking against websites that their expected market is going to be engaged.	Industry Standards
18	And you deliver something similar. So the process is that you want to have similar type of card check out, similar product distinct, similar product view, and just keep that process as structured and as similar to the rest.	Industry Standards
32	It's helpful to look at the industry's standards just to see what does work and what does not work.	Industry Standards
33	Absolutely, for all e-commerce we try to keep them as consistent as possible.	Industry Standards
109	So locally we haven't really organised our own structure, we kind of following the trends of the West and European countries. So they probably are certain things that we need to push more but we haven't done the research on them. And I am not sure exactly what they might be.	Industry Standards
50	In South Africa its becoming illegal for consumer data to go overseas. So if you got a cheaper rate and the people are not in the boundary of the country, it will be assumed illegal.	Information Privacy
19	Well, if you're going to process any payments there are a lot of legalities around things. Like you can't store credit card details on servers and you have to have basically forensic, IP export orders sign off.	Internet Security
51	We found that a lot of the mistrust on e-commerce is around the security, around the credit card.	Internet Security
52	It's got https, it's secured.	Internet Security

Ref.	Responses	Code
110	But I mean most of the systems they have immediate fraud detection; they can spot suspicious transactions a mile away.	Internet Security
111	Well there's always you know, that is why fraud detection... and what a lot of people do is, if you me*et al*l the security requirements	Internet security
53	You need to bring your brand in front of your clients, many, many, many times, over and over and over.	Marketing and Advertising
54	Like if you have an e-commerce site but you advertise a prominent Facebook page with a thousand followers. You know that's trust. If you on price check, that's trust. If you have some other mediums that you market on print media or billboards and you take that and put that onto the site, I think that's trust.	Marketing and Advertising
55	Why would you advertise to steal money? Why would you take Google Ads to steal money?	Marketing and Advertising
80	You going to move away from the design and you going to more emphasise – we have price check, we have a Facebook page over a thousand people.	Marketing and Advertising
112	We do believe that Google SEO and Google Ads do help a lot with establishments of a brand. I don't know about trust specifically.	Marketing and Advertising
113	It's about we've placed your brand on different touch points, everywhere.	Marketing and Advertising
114	There are seven touch points in which a person can use to recognise a brand and start trusting it. It more of a standard marketing strategy.	Marketing and Advertising
92	If they've paid before they don't worry about it.	On-going Trust
93	But once they've kind of gone through the process a couple of times, they'll trust.	On-going Trust
94	The upper LSM (living standard measure), we kind of seen they don't have trust issues. They have credit cards, they are very comfortable paying.	Paying Online
95	It's the new kind of lower LSM guys that are worried about someone stealing their credit cards and they are not used to paying online and it's a new experience.	Paying Online
56	The ability to not pay with more than one method like credit card or EFT or even cash on collection.	Payment Options
57	The idea to kind of inspire trust is to give them more options so they feel that they can, if they don't trust the credit card then maybe they can just try the EFT. Because that's log in into their bank and doing it separately outside the system or even cash on collection. So you try and give them as many options as possible.	Payment Options
3	So very little focus is put on the technology side of things because they usually go for pre-built options.	Pre-built Technology
5	It's almost like nobody usually in today's age is going to build an e-commerce site from scratch.	Pre-built Technology
25	There are a couple of pre-built themes but usually people just take skin templates and maybe get a designer in for the logo.	Pre-built Technology
34	The tools already exist that everybody use, so it's not really a re-inventory from the design point of view.	Pre-built Technology
35	No, it's never by template.	Pre-built Technology
81	You never know they what they want. They are going to search for it. So it is also important to have your search functionality readily available on all sections.	Search Functionality

Ref.	Responses	Code
58	On top of that you also give them the right icons of certificates that kind of show that it's a trusted site.	Security Certificates
115	Am not really interested if it says https, and it has a secured certificate am happy. For me that's fine.	Security Certificates
116	Security messages are there.	Security Certificates
59	I think that the fact that this is on- all this logos that they already have trust in like MasterCard and all those things.	Security Certificates
6	But the selling point is always; what kind of support and what kind of merchants they support (the amount of merchants)? What is their fail-self mechanism? Because things always go wrong.	Services Provided
36	The only real reason you need an external development is if you want to integrate unsupported things.	Services Provided
125	And then the customers' service.	Services Provided
60	Like e-commerce does not need to be a site, they can just be an electronic way to pay.	Services Provided
20	They sort of get an external merchant to s*et al*ong them the data network.	Third Party Auditors
21	The vendor that you partner with will basically store everything in an auditing form.	Third Party Auditors
117	In cases like that I always look for, if I see you are supported by a MasterCard or whatever, I can use it. People don't really understand the value of going through a channel like that.	Third Party Certification
118	For me it's just all about the brands you tie to, that can be a major plus for you.	Third Party Certification
119	So part of that is to make sure that your suppliers backs you. That's a very, very important thing.	Third Party Certification
120	The backing of your suppliers can aid building the trust.	Third Party Certification
121	If you can ask, let's say Samsung suppliers – you can get Samsung's Managing Director to sign on a Samsung letter head stating that you are accredited and you put on there.	Third Party Certification
122	And without your suppliers you are not going to sell anything. Except if you make it yourself.	Third Party Certification
9	Also adding a couple interactions for the potential client to engage with you.	User Interaction
61	It's not an exact science and I think ideally what we do with a lot of our bigger clients is we kind of build the system, then we let it run for a bit and then we get feedback from our clients.	Users' Experience
82	There was no feedback or anything from users.	Users' Involvement
96	We don't take it out to our customer's customers to see what they specifically want because that process becomes so expensive. The benefits that you are going to get by doing that is not, we believe, is not going to be that vital.	Users' Involvement
97	So we will have two interfaces that essentially do the same thing but they communicate different message. So we trying to see what the traffic is on each one of those and figure out which works better.	Users' Involvement
83	It is a difficult question to answer just like that. Let me think about it (Laughs). I think up till now obviously way too little has been done to consider the user and I think that not a lot of efforts go into that at all.	Users' Involvement

Ref.	Responses	Code
123	They maybe know their friend that bought through it and they kind of trust that one – like well nothing happened with their friend.	Users' Testimonials
84	What better way to generate trust than to take people that already bought from you, had a nice experience, and write a phrase stating how spectacular the service was. And having about two hundred of those.	Users' Testimonials
85	It was purely from analytics point of view, seeing what people are interested in.	Using Analytics
1	Depending on the size and what people are trying to achieve it's very different.	Vendor's capital and Size
62	This things cost a lot of money. A lot of people charge a lot of money to build these things. So for small business or individuals to take advantage of having an e-commerce solution is not always as easy as possible.	Vendor's capital and Size
63	And that probably will be the biggest challenge for start-up e-commerce sites in design.	Vendor's capital and Size
86	I know Amazon has those where you can actually pay for human testers.	Vendor's capital and Size
87	I mean you can easily see if it's a misleading or fraudulent site because 99% of the time it would be designed poorly with low budget.	Vendor's capital and Size
88	Would we spend all these money just to steal your money?	Vendor's capital and Size
2	The smaller vendors, they tend to focus a lot more on the current market – the working clients that they have. They take a lot of feedback from them. But with more established brands, they have money to throw in marketing and it's usually most of the concepts comes from the content of the people the market is focused on.	Vendor's Focus
4	But the bigger solid giants where the focus is solely where their business is living, they put a lot of focus on service agreements that their service have.	Vendor's Focus
64	Also things like address verification.	Vendor's Physical Identity
65	And also pictures of you, information about yourself.	Vendor's Physical Identity
66	You can see a guy who's the holder in the company.	Vendor's Physical Identity
67	The more information you put there the more trust you would earn.	Vendor's Physical Identity
89	And the fact that you have a telephone number, a person can call.	Vendor's Physical Identity
90	We have a company registration number. So if we are fraudulent, you will have ways in tracking us and we have a physical address.	Vendor's Physical Identity
124	So if you have a problem with process, give us a call and that helps.	Vendors' Physical Identity
26	Well you go with the more established brands.	Website Design Brands
27	They usually partner with established design brands.	Website Design Brands

APPENDIX H: Interview codes, references and number of references

Code	References	Number of references
Aesthetics	28, 37, 68, 69, 70	5
Aesthetics Cognition	38, 39, 71, 99, 72	5
Branding	41, 42, 43, 44, 73, 100, 98, 45, 46	9
Cultural Barriers	47	1
Customer's Guarantee	75, 103, 104, 105, 106, 16, 48	7
Delivery Cost	49	1
Designer's Skills and Expertise	29, 22, 23, 76	4
Development Methods	12, 13, 14, 15, 24, 30, 31, 91	8
Ease of Use	10, 77, 78, 79	4
Established Brand Partnership	107, 108, 40	3
Industry Standards	11, 17, 18, 32, 33, 109	6
Information Privacy	50	1
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