Trust and e-commerce: a study of consumer perceptions

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Abstract

Increasing use of the World Wide Web as a B2C commercial tool raises interest in understanding the key issues in building relationships with customers on the Internet. Trust is believed to be the key to these relationships. Given the differences between a virtual and a conventional marketplace, antecedents and consequences of trust merit re-examination. This research identifies a number of key factors related to trust in the B2C context and proposes a framework based on a series of underpinning relationships among these factors. The findings in this research suggest that people are more likely to purchase from the web if they perceive a higher degree of trust in e-commerce and have more experience in using the web. Customer's trust levels are likely to be influenced by the level of perceived market orientation, site quality, technical trustworthiness, and user's web experience. People with a higher level of perceived site quality seem to have a higher level of perceived market orientation and trustworthiness towards e-commerce. Furthermore, people with a higher level of trust in e-commerce are more likely to participate in e-commerce. Positive 'word of mouth', money back warranty and partnerships with well-known business partners, rank as the top three effective risk reduction tactics. These findings complement the previous findings on e-commerce and shed light on how to establish a trust relationship on the World Wide Web.
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1. Introduction

The Internet has become an essential business platform for trading, distributing and selling products between organisations, among organisations and consumers, and even between consumers. This has brought e-commerce to an entirely new level [1,2],

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building on the role of EFT and EDI in the past [3–5]. One important concept in the relationship-marketing paradigm related to the development of this B2C e-commerce is trust. Trust is a fundamental principle of every business relationship [6]. As Quelch and Klein [7] noted, ''trust is a critical factor in stimulating purchases over the Internet.'' Keen [8] argues that the most significant long-term barrier for realising the potential of Internet marketing to consumers was the lack of consumer trust, both in the merchant's honesty and in the merchant's competence to fill Internet orders. This paper reports a study which addresses one question related to trust:

what are the key variables that affect the perception of trust and risk for consumers engaged in business to consumer e-commerce?

Trust has a vital influence on consumer activities and thereby on e-commerce success. Ganesan [9] builds the notion of trust leading to a causal function: trust is responsible for creating consumer activity. Jarvenpaa et al. [10] argue that online retailers might increase consumer trust and thereby increase the willingness of prospective customers to shop on the Internet. CommerceNet's report [41] suggests that trust is the third of the 10 top barriers and inhibitors to e-commerce. Hart and Saunders [6] argue that trust has a changing and evolving dynamic. The introduction of technology challenges the current trust relationship, thus causing it to be redefined or renegotiated.

The advent of the Internet and electronic commerce, however, changed the pace and scale of commercial evolution so radically that existing processes for building new trust models for new markets have been unable to keep pace and in many cases are inappropriate for new e-commerce markets. To date, considerable effort has been invested in examining the trust issue in e-commerce, primarily on privacy and security [11], site attributes and trust [10,12], and trust and e-commerce participation and adoption [13,14]. This paper is complementary to these existing perspectives and explores the trust relationship in the online B2C retail context. Trust is the centre of online customer relationships. To address the role of trust in e-commerce, this study has tried to answer two key questions: What factors influence the level of trust in the Internet? And how does trust influence participation in e-commerce? To address the role of trust in e-commerce, this study has tried to answer two key questions:

● What factors influence the level of trust in the Internet?
● How does trust influence participation in e-commerce?

2. Modelling trust in B2C e-commerce

In the relationship marketing paradigm, trust is generally viewed as an essential ingredient for a successful relationship [15–18]. Moorman et al. [17] (p. 82) define trust as a willingness to rely on an exchange partner in whom one has confidence. Morgan and Hunt [18] define trust as the perception of ''confidence in the exchange partner's reliability and integrity''. Both definitions highlight the importance of confidence and reliability in the concept of trust. In the context of studying consumer trust on the Internet, Jarvenpaa et al. [10] note that trust is a critical factor in any relationship in which the trustor does not have direct control over the actions of a trustee (e.g., merchant or store). The decision is important and the environment is uncertain. The most complete definition so far is given by Hosmer [19], who defines trust as the expectation that the other parties will behave in accordance with commitments, negotiate honestly, and not take advantage, even when opportunity arises. This definition is more appropriate due to its applicability to virtual transaction based e-commerce.

Trust is characterised by uncertainty, vulnerability, and dependence [40]. These characteristics are reflected in an online transaction, where customers cannot see the seller face to face, physically examine the merchandise, or collect the merchandise upon payment. The expectation of getting the right delivery is based on belief in the merchant's technical competence, goodwill and past experience with the merchant due to the fact that both regulatory and technical systems of B2C e-commerce are far from perfect.

According to social exchange theory [20], people form exchange relationships on the basis of trust. Exchange relationships that are likely to cost more than the potential reward will be avoided. On the Internet, customers typically perceive higher risk compared to a conventional shopping environment [12], as a result of distance, virtual identity, and lack of regulation. Therefore trust is the preliminary condition to consumers' e-commerce participation.

Balance theory [21] posits that people tend to develop a positive attitude toward those with whom they have some prior association. The more experienced the Internet user, the greater the opportunity they have had to prior association with e-commerce web sites, then the more positive attitude they will develop towards e-commerce. Therefore, user's web experience can be argued to be positively related to trust.

The theory of reasoned action [22] and theory of planed behaviour [23,24] assert that behaviour is influenced by behavioural intention and that intention is determined by attitude. Attitude mediates between belief and intention, although belief can also have a direct effect on intention. Perceived site quality, technical trustworthiness and marketing orientation can be considered as attitude and therefore will have a positive effect on customer's trust intention. Conversely, negative attitudes towards perceived risk can have a negative effect on customer's trust intention, and trust intention may positively influence participation behaviour.

Trust is a critical factor for consumers' patronage behaviour. Successful e-commerce web sites are those which could invoke consumers' trust and lower consumers' risk perception through marketing activities and technology improvements. Compared with its function in the conventional market, technology is much more important for the online market, for it is the vehicle for marketing concept with the absence of a salesperson. The appearances, the functionality and the service quality performed by an electronic storefront are a direct result of the technical design, which is backed up by marketing and business strategies. Therefore, the importance of both marketing orientation and technical trustworthiness in relation to trust on the web is vital.

Market orientation is essentially a managerial philosophy, which takes the customer as a focal point for business activities and considers profit as a consequence of customer orientation [25–28]. Information collection and usage started to be considered as governing determinants to the organisations' market orientation in the 1980s [29]. Using this definition in the B2C e-commerce context, market orientation is likely to increase the level of trust since the e-commerce web sites will: (1) collect the customer's information dynamically to follow customer's preference from time to time; (2) use the information to customise product/services to cater to the individual customer's taste on a one-to-one basis rather than mass marketing; (3) maintain close contact with customers and respond to customer's problems in real time; and (4) allow customers to contribute to the site development. Carnevale and Wechsler [30] found that open communication and the opportunity to participate are necessary conditions for a market orientation. Therefore, a positive relationship between market orientation and trust is proposed.

H1: Perceived market orientation is positively related to the level of customer's trust perception; and

H2. Perceived market orientation is positively related to the level of customer's e-commerce participation.

Trustworthiness of the technology supporting the e-commerce transaction is of vital importance to consumers' trust. The more customers count on the online services, that is, the more they view it as a trusted relationship, the greater the trusted premium that best practice companies will command and the greater the corresponding erosion of trust for those with poor IT operations. A cognitive state of trust can be viewed as a composite of benevolence (belief in the intentional goodwill of another person) and credibility (disbelief in the unintentional ill-well of another person) [31]. An interactive communication technology demonstrates benevolence by enforcing the trust perception about partners' dependability with actual evidence from their partner's behaviour [32]. Apposite to trust acceptance by consumers is their willingness to engage decisions about risk. Risk about the technology being used becomes integral to the consumer decision when engaged in e-commerce and since technology risk is itself perceived negatively, propositions about risk are necessarily related to technology in a negative manner. Hence, it is posited that:

H.3. Perceived technology trustworthiness is positively related to level of perceived trust, and

H.4 Perceived technology trustworthiness is negatively related to the level of perceived risk

Hoffman et al. [33] suggest that the negative perception of security and privacy increases with increasing level of online proficiency. However, the level of factors of not shopping online also decreases as online skill increases. In essence, the more experiences one acquires on the web, the less important the functional barriers to online shopping, and the more concerns over security and privacy issues. Dutton [11] posits that factors such as no perceived need, no interest, and no knowledge of how to shop online, contribute to the reasons of choosing to shop in a store rather than online. Therefore, more web experience will likely bring more reasons for customers to shop online. Since

privacy and security are also frequently discussed on the Internet, on-line surfers are also exposed more to such issues; therefore they form a higher risk perception of Internet commerce than those who are seldom on-line. It is of interest here to investigate how such a contradiction may affect customer's participation in e-commerce. It is proposed that:

H5. User's web experience is positively related to e-commerce participation,

H6. User's web experience is positively related to the degree of perceived trust, and

H7 User's web experience is negatively related to the degree of perceived risk.

Web site quality is important for web sites to gain competitive advantages over other web sites and attract more customers [1]. While a salesperson is generally absent or peripheral to the settings of the e-commerce web site, the primary object of trust becomes the organisation itself [10]. The organisation's image reflected by its site is hence critical to customer's perceived level of trust. Quality perception has proven to be associated with risk perception (e.g., [34,35]). Jarvenpaa et al. [10] argue that a larger site may be perceived to be more reputable, for the larger stores might have been around longer and that might increase the chance that a consumer has had prior experience with the merchant in other channels or has heard of the merchant in that context.

A lack of technology reliability can cause customer's to lose trust in e-commerce, and technology quality is also a reflection of the web sites' substantiality as most advanced e-commerce solutions do not come cheaply and can be easily affordable by small sites. Therefore technology can be used as a hint for customers who seek support for their trust or distrust perception of e-commerce web sites. Hence, it is hypothesised that:

H8 Perceived site quality is positively related to trust, and

H9. Perceived site quality is positively related to marketing orientation.

H10. Perceived site quality is positively related to technology trustworthiness.

Tan [12] suggests that consumers perceive Internet shopping to be of higher risk than in-store shopping. Risk perception is interwoven with trust [36]. As trust in a store has been found to positively impact on consumers' behaviour, Jarvenpaa and Todd [37] argue that because trust reduces the perceived risk of being mistreated by the store, a low perception of risk negatively influences the attitudinal orientation of consumers toward the store. Consumers may be concerned about the image projected by their on-line purchase behaviour. Whereas on-line shopping is not as common as in-store shopping, on-line purchase behaviour may be perceived as a deviation from social norms. It can be posited that: *H11. Risk perception is negatively associated with trust perception.*

The theory of reasoned action and theory of planned behaviour posit that behaviour is influenced by intention to behave and intention is determined by the actor's attitude towards the behaviour [14,38]. Active trust will influence intentions to shop on-line and eventually will lead to on-line purchase behaviour. Thus: *H12. Trust is positively associated with e-commerce participation.*

The interrelationships of these propositions when built into the research framework suggest a research model which focuses of the relationships between variables (Fig. 1).

3. Research method

To assess the research model in Fig. 1, a self-administered survey approach was used to collect data from Internet users in New Zealand. A survey questionnaire was put up to collect the information via the Internet. The participants were recruited through email invitations, which are embedded with the survey web site URL. The School of Information Management at Victoria University of Wellington in New Zealand hosted the survey web site.

The survey web site was made up of web pages. The actual questionnaire consisted of 74 questions in three sections covering the variables proposed in the model (Fig. 1). The questions related to each variable and their operationalisation are provided in detail in Appendix A. A home page served as an information sheet to inform the participants about the survey purpose and questionnaire length. No incentive was offered to induce survey response. As noted by Best et al. [39] in their research on
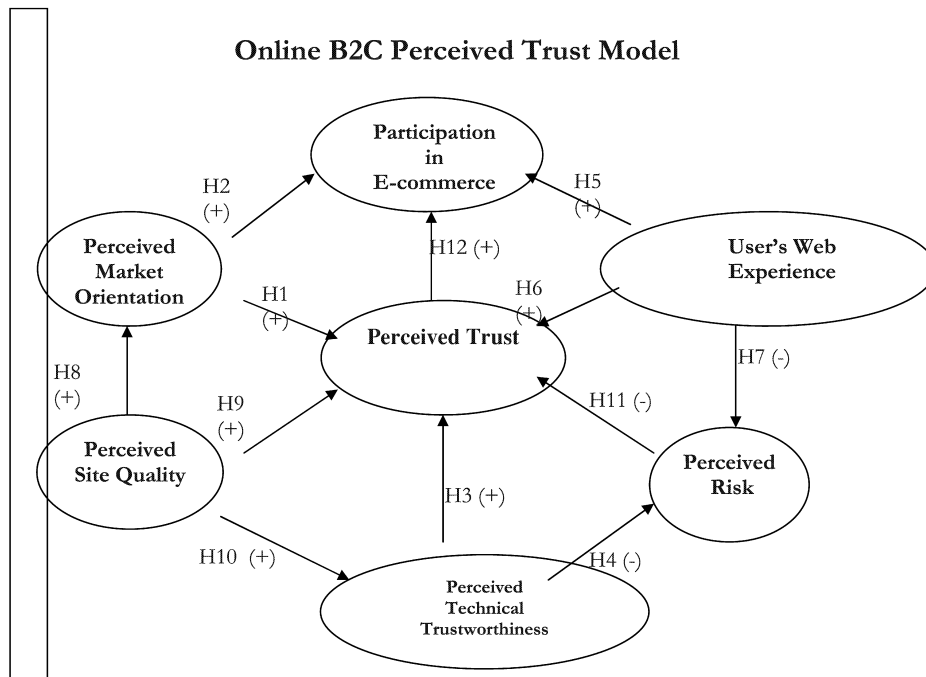
Online B2C Perceived Trust Model

Fig. 1. Research Model with hypothesis indicators.

generalisability of Internet surveys, current Internet sampling techniques only permit the generation of diverse, not representative samples. A diversified sample was adopted in this research to mitigate the potential sample bias. Survey invitations were sent out to students at Victoria University of Wellington by email and also used a snow-ball sampling method.

Due to the low cost associated with conducting a survey on the web, invitations were able to be sent to all email addresses (saturated sampling) that could be collected without any restrictions to maximally target the whole interested population, therefore reducing the risk of sampling bias. Another advantage experienced by doing the survey on the Web was that an Internet shopper must be an Internet user to start with. The Web survey method is a natural filter to exclude responses from ineligible respondents, people who do not have access to the Internet. Further, the survey also benefited from automatic data transfer from the web to the database without bothering with data entry and check. One predominant problem with such a sampling method is that there is no known sample frame and thus the response rate

could not be calculated to provide a clue on how representative the sample is of the whole population. Also, since no personal information is collected, non-respondents were not traceable. Given the exploratory nature of this study, such a sampling method suits the research purpose. The web site data collection mechanism identifies the email address of the respondent identifying them as students within the university.

Altogether, the on-line survey generated 80 valid responses. The overall user's Internet experience is rather high compared with the general on-line population due to the characteristics of the university student sample. Nearly all the respondents have more than one year's Internet experience with over half of them having used the Internet for more than 3 years. A great majority (87.5%) use the Internet for more than 3 h per week. Slightly over half of the respondents perceive themselves more experienced with the Internet and less than 70% mainly access the Internet from home. Interestingly, the main purposes for using the Internet are dominated by two: searching information (63.8%) and communication (27.5%). Only 5% of respondents report that they use the

Internet mainly for shopping and 2% for entertainment.

Experience with Internet purchasing is fairly low in the sample, however it is consistent with most Internet commerce literature. About half rarely purchase from the Internet ($n <= 1$). Over half have not spent more than US$500 and more than 5% of their total purchase from the Internet. Over half of the respondents estimate that their Internet purchase will increase over the next 2 years. About half of the respondents' household income exceeds US$20 000 and 65% have educational qualifications equivalent to bachelor degrees or higher. Credit card is the major Internet payment method.

4. Data analysis

Altogether seven factors were proposed, namely user's web experience, market orientation, technology trustworthiness, trust, perceived risk, participation in e-commerce and perceived site quality. Given the exploratory nature of the research, 0.6 was chosen as cut point for the reliability test. All seven factors' α are higher than 0.6. Given the exploratory nature of the research, the scales are considered reliable (see Table 1).

Initially 12 hypotheses have been proposed about trust. Correlation tests were used to find out the relationships among the variables in the model. These are shown in Table 2.

The first hypothesis proposed a positive relationship between market orientation and trust. The correlation test did return a significant correlation

coefficient of 0.25 ($P \le 0.05$), suggesting that a higher level of market orientation is actually related to a higher level of trust, therefore H1 is supported by the data.

The second hypothesis proposed that market orientation should be positively associated with e-commerce participation. However, the correlation test did not support this hypothesis by returning a statistically significant test result. Therefore, H2 was not supported. It seems that a higher perceived market orientation is not necessarily linked with customer's patronage behaviour. While many explanations could explain this result, the one proposed is that due to the early stage of e-commerce development, a majority of customers are still getting used to the idea of shopping on-line. The effect of perceived market orientation on e-commerce may be further complicated by some other reasons, such as trust in e-commerce and perceived risk.

The third hypothesis suggested a positive relationship between trust and technical trustworthiness. This hypothesis is strongly supported by a Pearson correlation coefficient 0.51 ($P < 0.01$). However, the fourth hypothesis was rejected by a non-significant P value. It can be explained that perceived risk, although partly related to the technology, is also closely related to other aspects like the financial cost, performance of the product and delivery time, which are not so much affected by the technology itself. Therefore a higher level of trust in technology will not necessarily correlate to a reduced level of risk perception.

The fifth, sixth and seventh hypothesis were concerned with the user's web experience. The fifth hypothesis is supported by the data ($B = 0.42$, $P < 0.01$), indicating that, as predicted, there is a strong positive correlation between user's web experience and e-commerce participation. The more experienced Internet users tend to purchase more from the Web. Data analysis also indicates that more experienced Internet users tend to have a higher level of trust in e-commerce ($B = 0.24$, $P < 0.05$), therefore H6 is also supported.

H7 was not statistically supported. It appears that although user's web experience may lead to a higher level of trust, it may not lead to a lower level of perceived risk. This finding suggests that somehow, user's web experience may not have a great impact

Table 1
Reliability test result of model variables

	No. of cases	α Std.	Item α
User's web experience (UWE)	76	0.6107	0.6067
Perceived market orientation (MO)	71	0.6514	0.6599
Perceived technology trust Worthiness (TTW)	75	0.6395	0.6473
Perceived trust (TRUST)	73	0.7484	0.7560
Perceived risk (PR)	70	0.7942	0.7972
Participation in e-commerce (PE)	59	0.7965	0.7992
Perceived site quality (PSQ)	73	0.6581	0.6637

Table 2
Correlations between model variables

Variable no.:		UWE 1	MO 2	TTW 3	TRUST 4	PR 5	PE 6
UWE	Pearson correlation	0.12					
	Sig. (two-tailed)	0.06					
	n	70.00					
MO	Pearson correlation	**0.25***					
	Sig. (two-tailed)	0.04					
	n	67.00					
TTW	Pearson correlation	**0.28***	**0.46****				
	Sig. (two-tailed)	0.02	0.00				
	n	72.00	69.00				
TRUST	Pearson correlation	**0.24***	**0.25***	**0.51****			
	Sig. (two-tailed)	0.05	0.05	0.00			
	n	71.00	67.00	72.00			
PR	Pearson correlation	− 0.07	− 0.11	− 0.15	− 0.08		
	Sig. (two-tailed)	0.59	0.37	0.20	0.50		
	n	66.00	64.00	69.00	68.00		
PE	Pearson correlation	**0.42****	0.09	0.13	**0.26***	− 0.05	
	Sig. (two-tailed)	0.00	0.51	0.33	0.05	0.74	
	n	57.00	57.00	59.00	58.00	55.00	
PSQ	Pearson correlation	**0.26***	**0.30****	**0.37****	**0.46****	− 0.06	**0.22**
	Sig. (two-tailed)	0.03	0.01	0.00	0.00	0.62	0.09
	n	69.00	66.00	71.00	69.00	68.00	58.00

Bold letter: correlation significant at 0.01 level.
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).
n, numbers vary because of responses that were complete for each item being included.

on user's risk perception on e-commerce. Although some users may be more exposed to the positive side more than the negative side of e-commerce, it is highly suspected there is equal chance to see it go the other way around. Therefore the user's web experience may not make much difference on the user's perceived risk level.

Perceived site quality is proposed to be positively related to the level of perceived market orientation (H8), trust (H9) and technical trustworthiness (H10). All three hypotheses are strongly supported by the data, suggesting that web site quality is a very important factor, which helps to enhance customer's favourable attitude to e-commerce web sites in terms of perceived customer orientation ($B = 0.31$, $P < 0.05$), trust ($B = 0.46$, $P < 0.01$) and technical trustworthiness ($B = 0.37$, $P < 0.01$). Therefore, web site quality may actually be very closely related to the marketing purposes and, as expected, have a big impact on marketing objectives.

Finally, H11 proposes that there is a positive relationship between perceived risk and trust. However, this is not supported as the correlation was very low and insignificant. So it virtually contradicts the idea that risk is the natural opposite of trust. What this seems to suggest is that risk and trust are not necessarily linked at least in the context of B2C commerce. Therefore, H11 is not supported.

H12 proposes that there is a positive relationship between trust and e-commerce. H12 is supported by the data ($B = 0.26$, $P < 0.05$). It can be assumed that a higher level of trust will lead to a higher level of e-commerce participation. Therefore, trust is considered an important factor in e-commerce participation.

A further examination using linear regression on the predictable factors and dependent variable trust was performed. Marketing orientation, perceived site quality, technical trustworthiness, perceived risk, and user experience are used as predictors of trust. The regression model was statistically significant (df = 5, $F = 7.943$, $P < 0.01$) and could explain 43% of the variance of trust ($R^2 = 0.43$). Among the five predic-

tors, technical trustworthiness and perceived site quality are found to be strong predictors of trust. Coefficient of technical trustworthiness was 0.343 ($P < 0.01$), and coefficient of perceived site quality was 0.301 ($P < 0.01$). Model constant was 1.514 ($P < 0.01$). There was no strong support for other predictors. It seems that technical trustworthiness and site quality are the most important predictors of trust.

On the other hand, it was predicted that trust, along with user's web experience and market orientation, is a predictor of participation in e-commerce. The regression model again is supported by the data (the model was significant at 0.01 level). User's web experience was found to be the strongest predictor of the three with coefficient of 0.441 ($P < 0.01$). However, although trust has a high co-efficient of 0.341, it is not supported by the P value (0.236). Market orientation was found to be of little predictable value to e-commerce participation. After market orientation was removed from predictor list, it was found R^2 increased slightly to 0.218 and predictable power of both user's web experience and trust increased slightly. Coefficient of user's web experience increased to 0.46 ($P < 0.01$) and coefficient of trust increased to 0.37, however it still not statistically supported by the returned P value. Hence it appears that the user's web experience is the strongest predictor of e-commerce participation in this model.

5. Discussion

The results of this study provide support for a majority of the hypotheses proposed at the beginning of this research. Although some relationships did not receive significant support from the data, the model seems to hold fairly well with the need for some moderate revision, thus this model is a reasonable starting point for developing a framework for trust in B2C e-commerce.

Trust, as a critical factor in e-commerce, is influenced predominately by three sources: e-commerce reputation in general, the consumers, and the specific e-commerce web site. The impression of e-commerce as a whole has a strong impact on willingness to trust on-line shopping. The general credibility of e-commerce strongly influences the decision of whether or not to adopt on-line shopping at all; however, individual web sites influence the decision on which web site to purchase from. Customer's own experiences and attitudes also influence their decision making process. E-commerce reputation is mainly reflected in the factors of technology trustworthiness and perceived risk, individual e-commerce web site quality is reflected in the factor of perceived site quality, and customer's experience with the internet reflect the third source of influences. To enhance the trust level in B2C e-commerce, those factors need to be taken care of.

The research results also provide some evidence for the impact of income, education and native country on trust and its related factors. It is hardly surprising that those people with higher incomes are more likely to have greater web experience and participate in e-commerce, people with higher education are more likely to worry about e-commerce technology, and New Zealanders generally perceive less risk towards e-commerce. Therefore it is worthwhile to further look into how exactly customer's demographic characteristics influence their on-line purchasing behaviours and perceptions.

The relationship between market orientation and e-commerce participation failed to get any support from the data. Market orientation is a well-tried and tested factor which is closely related to business performance. In this research, outsiders were asked to judge market orientation reflected on e-commerce web sites as a whole and customer's actual e-commerce participation is used as a performance measure. However, it seems the linkage between the perceived market orientation and e-commerce participation is very weak. Several explanations can contribute to this apparent contradiction.

First, market orientation is closely related to corporate culture and has been traditionally measured within the organisation rather than outside the organisation. Consumers may not have adequate knowledge to judge market orientation level purely by observing from the outside. Therefore customer's perception may not be an appropriate way to measure market orientation. Second, since the idea of B2C e-commerce is still quite new, people may still be on the verge of deciding whether or not to have a try, therefore the most influencing factors are still

trust and user's web experience. However, with the development of such e-commerce, the decision-making task will gradually shift from whether to try to where to buy and what to buy on-line, then at that stage, probably market orientation may become a key factor influencing e-commerce participation. Therefore, the weight of market orientation decisions in e-commerce participation may grow with its popularisation.

Another interesting phenomenon is that perceived risk and trust are not so obviously closely related, and neither is perceived risk and e-commerce participation. It seems that people can have a certain level of trust in e-commerce even if they perceive considerable risk and people can participate in e-commerce even if they think it is risky. This contradiction is also evident in Hoffman et al. [33]. It seems that the higher the user's Internet experience, the more they are likely to trust the technology, thus it may help to improve their trust in e-commerce. However, the more people use the Internet, the higher their concern over security and privacy, and thus it may reduce levels of trust. Therefore, on-line trust may not be a simple opposition to perceived risk. Participation in e-commerce may be influenced more by motivations such as curiosity, fun and convenience and less by perceived risk.

The findings of the risk relieving tactics were somewhat consistent with the findings by other researchers. For example, this research finds that positive word of mouth is the most effective in relieving customer's anxiety in purchasing on-line, while Jarvenpaa et al. [10] found that store reputation is very strong predictor of trust in-store. Similarly, money back warranty, word of mouth and brand image have been found effective by Tan [12] in reducing risk aversion. It seems that most people do take advice from people around them on Internet purchase decisions, and they do care if their risk can be best avoided and adequately compensated in case.

Therefore, partnership with a well-known company may enhance the perception of trustworthiness, therefore making the customer worry less about their potential risk, and money back warranty is a reliever that make customers feel less worried about the risk since they can get fully covered for financial loss. Detailed analysis on risk type suggests that people worry more about performance risk, financial risk

and time risk when buying from the Internet and less about social risk and physiological risk.

This study has suggested an integrated trust model in the new B2C context, and the model was a fair starting point for further exploration of the B2C trust model. Market orientation, perceived site quality, technical trustworthiness, and user's web experience were found to strongly correlate with trust. Further, perceived site quality and user's web experience were found strong predictors of e-commerce trust. Trust and user's web experience together explain a significant variance of e-commerce participation.

Based on this study, a more complete set of trust antecedents and consequences could be identified and underlying relationships need to be further looked into. For example, institutional characteristics could be a factor influencing trust. Jarvenpaa et al. [10] found perceived web site size a factor influencing consumer trust in Internet shopping. Off-line marketing activities can also have an impact on consumer trust, such as promoting e-commerce web sites through newspapers, radio stations or TV programmes. Therefore, a wider scope of trust factors could be investigated.

A theoretical paradox was observed in this study, which needs to be investigated: there is no direct negative relationship between perceived risk and trust and between perceived risk and e-commerce participation. Although a possible explanation has been proposed in this research, further investigation needs to be carried out in order to give a convincing explanation. Marketing orientation failed to account for e-commerce participation, it seems to be related to trust which is related to e-commerce participation. The role that market orientation plays in this model is not very clear and needs to be further investigated.

The six trust-related factors provide a framework that e-commerce managers could use to evaluate how well their web sites could convey trust to on-line customers. To improve the trust level among consumers, this paper strongly recommends that on-line businesses should keep a customer focused business orientation, actively generate customer information and provide value-added service on customer information. It is essential that web sites be most responsive to customer requirements and allow customers to contribute their ideas to the business operation. More importantly, this must be well

communicated to customers to let them know that their participation is appreciated and could make a difference. Site quality is a vague concept; however, clearly it contains both marketing effort and technical effort. Flashy is not enough. Every design idea should be backed up with a real consideration for customer's needs.

Customer's judgement could be a good source and gathering customer feedback on web design helps to ensure a web site is constructed the way it was designed to be. Technical trustworthiness is most essential to trust. When adopting e-commerce technology, in addition to performance consideration, such as reliability and scalability, it pays to ensure customer's privacy and data security are well protected as well as communicated. Although perceived risk is not found directly linked to trust, every

possible effort needs to be made to reduce the risk perception to smooth customer's anxiety over on-line purchases. Moreover, it pays to understand the current customer and try to attract more experienced Internet users to the site. As a result, trust will strengthen the customer relationship in the virtual marketplace and bring in business revenue as it is positively related to e-commerce participation.

Finally, building trust in e-commerce cannot be fulfilled by any individual web site. Rather, it can be fulfilled at group level. Facing the new way of shopping, consumers first have to decide whether or not to purchase on-line before deciding which web site to purchase from. That is, they will have to evaluate the trustworthiness of B2C e-commerce as a whole, before they come to the stage of evaluating the possibility of any individual web site.

Appendix A

Items and scales the model variables and control variables

Constructs	Sub concepts dimensions	Measures
Trust	Competence	I believe that most commercial web sites have the necessary skills and ability to carry out the on-line transaction. (strongly disagree/strongly agree)
		I believe that most commercial web sites have the necessary technology knowledge to carry out the on-line transaction. (strongly disagree/strongly agree)
		Technology obstacles should not be a major concern when conducting on-line transactions. (strongly disagree/strongly agree)
		The chance of having a technical failure in an on-line transaction is quite small. (strongly disagree/strongly agree)
	Predictability	Customers can always predict performance of most e-commerce web sites from their past experience with the web sites. (strongly disagree/strongly agree)
		Past and future behaviours are positively related on most e-commerce web sites. (strongly disagree/strongly agree)
		I tend to relax when I am dealing with the e-commerce web sites that I have had a pleasant experience with. (strongly disagree/strongly agree)
	Goodwill	Most commercial web sites exhibit care, concern, honesty and goodwill to their customers, thus providing a basis to advance the customer relationship. (strongly disagree/strongly agree)
		I believe most e-commerce web sites will perform to the outmost of the customers' benefit. (strongly disagree/strongly agree)
		Most e-commerce web sites do demonstrate their belief in "the Customer is always right." (strongly disagree/strongly agree)
Risk perception	Performance risk	I believe that on-line purchases are risky because the products/services delivered may fail to meet my expectations.
		I believe that on-line purchases are risky because the products/ services delivered may be of inferior quality. (strongly disagree/strongly agree)
		I believe that on-line purchases are risky because the products/services delivered may be dangerous to use. (strongly disagree/strongly agree)

Appendix A. Continued

Constructs	Sub concepts dimensions	Measures
	Financial risk	I believe that on-line purchases are risky because the products/services may be available at a lower price somewhere else. (strongly disagree/strongly agree)
	Social risk	I believe that on-line purchases are risky because it may cause others to think less highly of me. (strongly disagree/strongly agree)
	Psychological risk	I believe that on-line purchases are risky because the products/services delivered may fail to fit well with my personal image or self-concept. (strongly disagree/strongly agree)
	Time risk	I believe that on-line purchases are risky in terms of time because the products/services delivered may fail to be delivered within the expected time frame. (strongly disagree/strongly agree)
Market orientation	Information generation	The e-commerce web sites that I have visited are generally good at collecting customers' information. (strongly disagree/strongly agree) Most e-commerce web sites encourage customers to send their feedback. (strongly disagree/strongly agree) I do not feel embarrassed to send negative feedback to e-commerce web sites as it is generally quite convenient to contact web masters with any enquiry. (strongly disagree/strongly agree)
	Information dissemination	Customers' opinions can be reviewed and exchanged effectively through e-commerce web sites. (strongly disagree/strongly agree) Customers' opinions can reach the relevant department and people immediately once sent on-line. (strongly disagree/strongly agree) Customers' opinions can be easily lost in the communication chain. (strongly disagree/strongly agree). (R*)
	Responsiveness	Customers' opinion can influence the way e-commerce web sites serve the customers. (strongly disagree/strongly agree) Usually I can receive a timely response from the e-commerce web sites that I deal with. (strongly disagree/strongly agree) Usually any issues relating to on-line purchases can be solved effectively and satisfactorily once I have contacted the web sites with my problems. (strongly disagree/strongly agree) E-commerce web sites value customers' opinions. (strongly disagree/strongly agree) Most e-commerce web sites allow customers to make their contribution to the web sites. (strongly disagree/strongly agree)
	Coordination mechanism	On-line transactions and deliveries work out quite smoothly by the joint effort of different functional departments. (strongly disagree/strongly agree) It is often easy to find out mistakes during transactions or deliveries. (strongly disagree/strongly agree). (R*) Conflicting information often appears between different web pages. (strongly disagree/strongly agree) (R*)
Technology trustworthiness	Reliability	Most e-commerce systems are capable of processing a large number of transactions, connections, or large orders efficiently. (strongly disagree/strongly agree) E-commerce technologies are effective in keeping the accurate value of data. (strongly disagree/strongly agree)
	Security	No one can get access to the data without permission (strongly disagree/strongly agree) E-commerce technologies are effective in checking out whether a particular user is authorised to take a certain action (for example, logon) or not. (strongly disagree/strongly agree) Original content of messages will remain unchanged during or after the on-line transaction. (strongly disagree/strongly agree) An individual cannot reasonably claim not to have taken an action on-line while they actually have. For example, once an order is placed, the buyer/seller cannot deny placing such an order. (strongly disagree/strongly agree)

Appendix A. Continued

Constructs	Sub concepts dimensions	Measures
	Privacy	Allowing customers to use a false name or no name at all can ensure the customers' personal record left on e-commerce web sites will not be used for finding out customers' real identity. (strongly disagree/strongly agree) Technology mechanism can effectively prevent a third party from stealing on-line customers' information. (strongly disagree/strongly agree)
Customers' web experience	Length	I have been using the Internet for: (less than 1 year/between 1 and 2 years/between 2 and 3 years/between 3 and 5 years /5 years or more).
	Frequency	I use the Internet approximately: (less than 1 h per week/between 1 and 3 h per week/between 3 and 10 h per week/between 10 and 20 h per week/more than 20 h per week).
	Self-perceived level of Internet experience	I perceive myself pretty experienced at using the Internet. (strongly disagree/strongly agree)
Participation in e-commerce		I have purchased from the Internet: (once or less/two to three times/four to five times/more than five times). The value of my total on-line purchase is approximately: (less than US$10/between US$10 and US$100/between US$100 and US$500/between US$500 and US$1000/more than US$1000). The ratio of on-line purchase to total purchase in value is approximately: (less than 1%/between 1% and 5%/between 5% and 10%/between 10% and 20%/more than 20%). I anticipate that my on-line purchasing within the next 2 years will be most likely to (decrease sharply/increase sharply).
Perceive site quality	Usefulness	E-commerce web sites usually provide sufficient useful information to fulfil the on-line transaction. (strongly disagree/strongly agree) E-commerce web sites usually provide sufficient information to evaluate the product. (strongly disagree/strongly agree) E-commerce web sites usually provide sufficient information to search for the relevant products/services. (strongly disagree/strongly agree) E-commerce web sites are good places to surf not only for trading purposes, but for fun, information or something else. (strongly disagree/strongly agree)
	Timeliness	E-commerce web sites always provide timely information regarding their own products/services. (strongly disagree/strongly agree) Most e-commerce web sites update their information quite often. (strongly disagree/strongly agree)
	Advance	E-commerce web sites are always quick to adopt advanced technologies to obtain the largest marketing opportunity. (strongly disagree/strongly agree) E-commerce web sites are always quick to adopt advanced marketing techniques to obtain the largest marketing opportunity. (strongly disagree/strongly agree)
Control variables	Income	My yearly household income is: (less than US$5,000/between US$5000 and US$10 000/between US$10 000 and US$15 000/between US$15 000 and US$20 000/above US$20 000)
	Education	My highest level of educational qualification is: (high school graduate/diploma/bachelor degree/masters degree/PhD or above)
Risk reduction tactics		The use of a third party icon may relieve my anxiety in conducting on-line purchases. (strongly disagree/strongly agree) The use of open security and privacy policy may relieve my anxiety in conducting on-line purchases. Open addressing of complaint procedures and policy may relieve my anxiety in conducting on-line purchases. Partnering with a well-known company will relieve my anxiety in conducting on-line purchases. Using a customer bulletin board will relieve my anxiety in conducting on-line purchases. Celebrity referrals will relieve my anxiety in conducting on-line purchases. Positive referrals from friends or relatives will relieve my anxiety in conducting on-line purchases. Selling highly regarded brand products may relieve my anxiety in conducting on-line purchases. A money back warranty may relieve my anxiety in conducting on-line purchases.

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