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Fuzzy-Trace Theory and Risky Decisions in The Setting of The Digital Economy

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Abstract

The purpose of this study was to test the ability of fuzzy-trace theory in explaining the influence of framing; and provide empirical evidence on the influence of framing and assurance structure in online consumer decision making with the setting of the digital economy in Indonesia. A total of 226 students participated in the experiment, using between-subjects design with a factorial of 2x2x2. This type of research is experimental research on students at the Muhammadiyah University of Makassar. The results of this study prove the accuracy of the predictions of fuzzy-trace theory in explaining framing, and also prove that assurance structure provides confidence to overcome the doubts and reluctance of online consumers in Indonesia to make online transactions. The implications of this research will be very beneficial for producers who will consider the consumer market in Indonesia as one of the countries with a potential population with growing online transaction growth.

Keywords: *framing; assurance structure; fuzzy-trace theory; digital economy*

Introduction

In the last three years there has been a significant increase in the number of online shoppers in Indonesia. Bain & Company and Facebook research predicts that online shopping in Indonesia will grow 3.7-fold to $48.3 billion by 2025 versus $13.1 billion in 2017. The research also found that digital consumers in Indonesia grew rapidly from 64 million or 34% of the population in 2017 to 102 million or 53% of the population in 2018. Some online shopping sites in Indonesia such as Bukalapak, Tokopedia, Lazada, and Shopee compete to be the best and most trusted online shopping sites, which makes the growth of the digital economy in Indonesia the highest in Southeast Asia (Katadata, 2020).

On the other hand, some complaints about online pending, making consumers cautious or even then traumatized over the privacy and security and use of their personal information. This is an obstacle to the growth of the digital economy in Indonesia. Creating a "trust building model" for the sake of customer trust through a structured security policy (assurance structure) will overcome doubts or conditions of uncertainty over the reputation of vendors as well as the quality of online shopping sites (Gillison et al., 2021, Karani & Mary, 2022). Consumer-specific in online shopping, namely transaction security, information privacy, vendor legitimacy, product/service quality, documentation adequacy, fair prices, and availability of customer service have been discussed in several studies (Goswami et al., 2019; Guo et al., 2021; Karimov et al., 2021). Online vendors must address this issue to increase their current market share with the explosive growth of today's digital economy.

In the context of online shopping decision making is seen as often in a state of uncertainty, decision makers face the domains and frame problems described in behavioral decision theory, which reveals that consumers can become irrational in decision making (Zeng et al., 2021; Zhu et al., 2022). Prospect theory (Kahneman & Tversky, 2013; Rossiter, 2019; Zeng et al., 2021) and Fuzzy-Trace Theory (C J Brainerd & Reyna, 2019; Charles J Brainerd & Reyna, 2001, 2002) discuss how decision makers formulate domains and frame problems. This theory has been tested in a variety of contexts and its findings are strong in support of the framing effect (Levy et al., 2020; Wenger et al., 2021). In further research fuzzy-trace theory has a more powerful predictive ability in explaining the framing effect (Claus, 2019; Fisher, 2020, 2021). Fuzzy-Trace theory (Charles J Brainerd & Reyna, 2002) became the basis of the theory in this study, using experimental method to explain differences in consumer behavior in conditions of uncertainty with decision-making in the domain and frame problems in the context of the digital economy.

In addition to testing fuzzy-trace theory's ability to explain the influence of framing, the study also examined whether assurance structures on websites/apps can reduce the risks associated with framing's influence on decision-making in digital economy settings; and can further test how framing and assurance structure influences decision-making in digital economy setting in Indonesia.

Literature Review And Hypothesis Development

Framing and Fuzzy-Trace Theory

Framing is a phenomenon that shows decision makers responding differently to the same decision problem if the problem is presented in a different format (Gäher & Kunze, 2021; Levin, 2018). (Al-Shareef, n.d.) used the problem of Asian diseases in explaining the influence of framing. On issues that

use positive wording (will be saved), note that the majority of subjects (72%) prefer the risk-averse option, which definitely saves 200 people. This option is within the advantage area (gain domain) that will be saved, their subjects prefer this program (program without risk) rather than choosing a risk program that offers a probability of 1/3, to save 600 people (28%). According to the expected utility theory of other programs with problems that use negative word arrangements (will die) is the same as programs with problems that use positive word arrangements (will be saved). However, most subjects preferred risky programs (78%) to risk-averse programs (22%). This is called framing influence, which is when a problem of the same with different frames can result in the reversal of different choices or choices. (Kahneman & Tversky, 1979) used prospect theory as a framework to explain this phenomenon.

(Wakker, 2022) invented Fuzzy-Trace Theory (FTT) as an alternative in explaining the influence of framing. This theory is different from prospect theory, FTT assumes individuals prefer to use reasons that simplify the presentation of information (essence). According to the FTT, when decision makers are encoding information word for word, they intercept the global pattern of the information presented and then mentally present the decision at a different level. Vagueness to this series of word for word, allows decision makers to generate reversals of options.

(Rossiter, 2019) describe the classical framing effect (Asian disease), which is that when quantitative information is available, decision makers initiate choices to be "more" or "less" than other options to distinguish them. When an option enters a result of zero (no one is saved), the essence of the option then becomes "multiple" with "nothing" or "there" with "none". Therefore, according to ftt, the unclear distinction of choice in asian disease problems is stated as follows:(1) program A: some people will be saved; (2) program B: some people will be saved or no one will be saved; program C: some people will die; and program D: No one will die or some people will die.

According to the FTT, to make a choice between programmes A and B, "some people will be saved" is the same for both alternatives, and the difference centers on "no one will be saved." Therefore, decision makers prefer program A. In comparing program C with program D, "some people will die" is the same for both alternatives, therefore, individuals focus on a different part, namely "no one will die," and prefers program D. Clear evidence in (Kahneman & Tversky, 1979), He found that removing all the numbers from the Asian disease problem and replacing them with vague expressions did not eliminate the framingeffect. In further testing fuzzy-trace theory has successfully demonstrated more accurate and powerful predictions in explaining framing on risky options (C J Brainerd & Reyna, 2019; Kahneman & Tversky, 2013; Rossiter, 2019; Zeng et al., 2021).

Assurance Structures and Fuzzy-Trace Theory

In some previous studies it has been shown that trust in online vendors is influenced by brands (Grewal et al., 2011; Li & Ling, 2016). New-V endorse who do not yet have a well-known name or brand must look for creative ways to increase and capture the trust of online consumers (Corley et al., 2013; Nuseir, 2016) define that online consumer trust in unknown vendors requires a process that will change consumers' perceptions. The efforts of online vendors to communicate and ensure the security of transactions, will have an effect on increasing consumer confidence and the intention to do online shopping.

Assurance structure will refer to statements, promises, warranties, logos, symbols and other structural components on websites / apps, which is an effort by online vendors to reduce the perception of risk in transacting on their websites / apps. The effort to establish the initial beliefs outlined in (N. Lankton et al., 2014; N. K. Lankton et al., 2015) comes from institutional-based trust theory, which explains that assurance structures become a means for new consumers to recognize online vendors they did not know before, either through information or previous experience. The study of assurance structure is especially important when online vendors are unknown, or when consumers have no experience with online vendors; they can predict the possible outcomes of the transactions they will make.

Online vendors can influence frames by using certain words and marketing techniques. When websites/apps market products with limited inventory or state that not buying these products will be a loss and regret, they use negative messages. Negative-frame/loss-domain is intended to influence consumers so that consumers will feel that they will experience losses at some point of reference if they do not purchase this product. Messages on websites/apps emphasizing positive-frame/gain-domain of products such as attractive prices and other positives of transactions are intended to influence consumers so that consumers will feel that not buying will release potential profits (Johnson & Puto, 1987; Tafesse & Wien, 2018). Puto also found that when a sales message contains only the keywords "profit" or "loss" it results in a change in the decision maker's reference point so that the shift in choice associated with framing influence will occur.

The risk of uncertainty arising in online shopping transactions makes testing behavioral theories such as fuzzy-trace theory interesting, so as to understand how aspects of behavior, framing, and assurance structure occur in the online shopping decision-making process. This will be a lesson for online vendors to understand the importance of presenting information on websites/ apps, as well as the impact of changing the presentation of information on the risks felt by consumers, the intention to buy, and ultimately the buying behavior of consumers online.
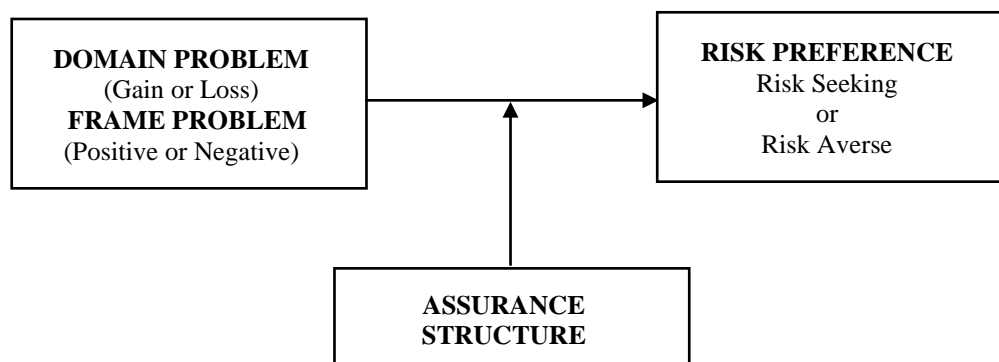
Figure 1. Research Model

Research Construct

Through the testing of fuzzy-trace theory, independent variable in this study separates domain and frame problems, further explanation is in the Kahneman &Tversky lottery experiment (1979) which showed the influence of domains:

Problem Domain: Gain

A: Win $4,000 with a .80 probability, and $0 with a .20 probability

B: Won $3,000

Problem Domain: Loss

Lose $4,000 with a probability of .80, and $0 with a probability of .20

B: Loss of $3,000

(Kahneman & Tversky, 2013) cite the reflection events of risk-averse options for domain gain and risk-seeking options for loss-domains as reflection effects. Compared to the reflection effect, the framing effect involves only one problem (Asian disease problem) with two frames (positive and negative). The effect of framing refers to othere are changes in different descriptions of the same problem, while the effect of reflection refers to different responses because there are two problems.

(Chang, 2008) has clearly separated the difference in reflection effect and framing effect on the combination of problem domain and frame problem, which was previously gain-domain/ positive frame and loss-domain / negative-frame, by creating a new combination to separate the two effects namely gain-domain / negative-frame and loss-domain / positive-frame. In this study, the domain problem will be determined by whether the subject has the ability to win additional raffle tickets or will lose the lottery ticket. In the frame problems with the positive frame (i.e., the use of the words "ticket saved" or "ticket not lost") or to negative (i.e., the use of the words "ticket not saved" or "ticket lost").

The moderation variable in the study is the Assurance structure, defined as statements, promises, warranties, logos, symbols, and other structural components of websites/apps, which vendors intended to reduce the perception of risk in transacting on their websites/apps. In this study, the assurance structure consisted of: security policies, privacy policies, use of cookies, shipping information, money back guarantees, toll-free customer service numbers, as well as any statements or warranties from online vendors intended to reduce the risk perception of prospective online consumers so as to increase initial trust and intent to buy. Assurance structure is considered a moderation variable because it only predicts influencing behavior in perceived domain gain. In a loss domain, there is no perceived influence with the existence of an assurance structure.

The dependent variable in the study was risky decision-making from online consumers. The study will ask participants who act as online consumers to make actual decisions about making online purchases where gains or losses are at stake.

Fuzzy-Trace Theory

Fuzzy-trace theory assumes individuals prefer to use excuses that simplify the presentation of information (essence), if the risky options are outlined using gain-domain/positive-frame or loss-domain/negative-frame, FTT predicts that the individual will make a decision at the essence level, thus the framing effect will exist. Domain and frame problems will affect consumer decision making.

Testing fuzzy-trace theory in the case of the digital economy, which shows that there are risks in online spending, so domain and frame problems will have a significant effect on the choices made by consumers. kthe ethics of choice is in the gain domain / positive frame consumers prefer the program without risk, conversely when the choice is in the loss domain/negative frame consumers will choose a risky program, this choice will be presented when consumers face new vendors who are not yet known, and become an option on online spending through websites / apps, so the hypotheses expressed according to Fuzzy-Trace Theory is:

H1a: According to Fuzzy-Trace theory, when a website is presented in a gain-domain/positive-frame, online consumers will choose a particular option (No buying) over a risky option (buy). When a website is presented in a loss-domain/negative-frame, online consumers will choose a risky option over a specific option.

The separation of framing and reflection effects by creating other combinations (i.e. gain-domain/negative-frame and loss-domain/positive-frame) makes consumers unable to simplify decision choices to the core level, and requires additional information for decision making. For more complicated decision-making in consumers must think at a quantitative level when choices are different and cannot be simplified at the core level. If the choice provides the same expected value at the quantitative level, then the consumer's difference in risk choice or confidence level can soften the impact of the framing effect, so the proposed hypothesis is:

H1b: According to Fuzzy-Trace theory, when a website is presented in gain-domain/negative-frame or in loss-domain/positive-frame, framing effects will be absent.

Moderation Assurance Structure

The influence of assurance structure tested in the context of e-commerce (Bahmanziari et al., 2009; E. Mauldin & Arunachalam, 2002; E. G. Mauldin et al., 2006; Pennington et al., 2003), in general the results of the study showed that assurance structure helps increase the trust and intention to buy from prospective consumers online. Assurance structure will overcome the risks associated with online transactions, with the process of frame problems and domain problems who felt, will affect the consideration of risk.

The simplification of the presentation of information in the editing phase can lead individuals to forget about events with very low probability and make them events with very high probability and make them confident. With an assurance structure, it will simplify the choice in such a way that the probability weight of Program B (the probability that some people will be saved or no one will be saved) becomes an impossible choice. The probability of another part (some people will be saved) becomes more likely, so the decision maker treats the event very likely to be something. Thus, the decision maker has only one rational choice, which is not released from the problem domain, the risky option is the most likely option chosen.

This means that the assurance structure will lead to a reversal of options in domain gain but not in domain loss because risky options become more desirable in loss scenarios.

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The following hypothesis attempts to test this proposition about the moderating effect of the assurance structure.

H2a: When the perceived domain problem of the decision maker is the gain-domain/positive-frame, the existence of the assurance structure will lead to a reversal of the option so that the perceived risk of the risky option (to buy) is eliminated and the decision maker will choose the risky option (to multiply) over a particular option (not buy).

H2b: When the perceived domain problem of the decision maker is a loss-domain/negative-frame, the existence of an assurance structure will not significantly affect the decision maker's choice between the set of options.

H2c: According to Fuzzy-Trace theory, when the perceived domain problem of the decision maker is gain-domain/negative-frame, or in loss-domain/positive-frame, the existence of an assurance structure will not significantly affect the decision maker's choice between the set of options and the framing effect will be absent.

Method

This research uses a 2x2x2 experiment design, which consists of framing with problem domain, frame problem and assurance structure. Framing with domains and frame problems consists of: gain-domain/positive-frame, loss-domain/negative-frame, gain-domain/ negative-frame, loss-domain/ positive-frame; while assurance structure It consists of the presence or absence of an assurance structure.

Research Subjects

This study involved 274 students from the Department of Accounting and Management at the University of Muhammadiyah Makassar with between-subjects design. Those involved in this participant are students who have an understanding of online spending and have done online spending at least once per semester. This requirement becomes the basis for students who will participate and apply online voluntarily. Forty-eight participants' answers could not be analyzed, because they were incorrect in answering the question and did not fill out the answer in full, so the remaining 226 participants' answers were further analyzed.

Forty-three percent of respondents use 6-10 hours per day to go online and use the internet, with the average in total being 10 hours per day. Sixty-two percent of respondents have spent online or at least once per semester. Participants consisted of 60 men and 166 women, with an average age of 21.2years. The average allowance of the participants either received from parents or with additional part-time work income was Rp. 817,478, -, (see table 1). For students who voluntarily register and participate in this research in addition to getting meal vouchers, also receive lottery tickets and have the opportunity to get 20 door prizes worth Rp. 200,000, - and grand prize 1 unit hand phone worth Rp. 2,000,000, -.

CHOICE	FREQUENCY	PERCENTAGE
AGE: 21,2 (Avg.)		
18-19	17	7,5%
20-21	115	50,9%
22-23	78	34,5%
24-25	14	6,2%
26-27	2	0,9%
Total	226	100,0%
GENDER		
Man	60	26,5%
Woman	166	73,5%
Total	226	100,0%
HOURS PER DAY ON INTERNET: 10,4 (Avg.)		
1-5	41	18,1%
6-10	99	43,8%
11-15	60	26,5%
16-20	26	11,5%
Total	226	100,0%
ONLINE PURCHASE FREQUENCY		
Once (Once Per Semester)	142	62,8%
Often (Once Per Two Month)	69	30,5%
Routine (Once Per Month)	15	6,6%
Total	226	100,0%
MONTHLY EXPENDITURE: Rp. 817.478,- (Avg.)		
250.000 up to 1.000.000	195	86,3%
1.000.001 up to 2.000.000	23	10,2%
2.000.001 up to 3.000.000	6	2,7%
3.000.001 up to 4.000.000	2	0,9%
Total	226	100,0%

Table 1. Demographic Data

Research Instruments

The research instruments used in the study developed an

instrument model in (Bahmanziari et al., 2009) study that used the storyline of buying an exclusive package of Beatles concert tickets from an online retailer, the difference in this study was using a mobile phone purchase storyline. Researcher's design

and prepare Maribel websites / apps with different treatments in the presence or absence of assurance structure, Maribel Website / apps are online shopping applications such as Bukalapak, Tokopedia, Lazada, and Shopee which are very popular in Indonesia, which were accessed by participants at the time of this study. The storyline developed is that researchers have just purchased one OPPO A35 gadget from an online vendor on Maribel Website/Apps. The purchase was just made five minutes ago so the outcome of the purchase is not yet known. To answer the questions asked by the participant researchers will be asked to look at the online vendor's site/website and then determine whether the purchase will run smoothly according to the expected quality or disappointing because it does not match the offer on the online vendor's website/website. Participants will get lottery tickets that depend on their evaluation of the results of the online purchase decision.

Experimental Procedure

The experiment was conducted in the campus laboratory of the Faculty of Economics, University of Muhammadiyah Makassar, on the day and time that has been determined by the participants invited through the WhatsApp group and get reminders twice, namely 1 day before the experiment and 3 hours before the experiment began. In this study, researchers were assisted by 5 research assistants who were tasked with ensuring all experimental activities ran smoothly, ranging from directing participants into the room, distributing experiment sheets, making sure computers/laptops were connected to the available WIFI network, distributing lottery coupons and observing and being alert to the needs or questions of participants until the experiment was completed. and finally direct the participants into the room to enjoy the snacks that have been prepared.

When the participant is ready, researchers can determine whether all participants have connected to the available WIFI network, this is important because Maribel websites/apps can only be accessed on local servers, with the help of static micro tic every time participants access Maribel.com on existing browsers, it will automatically be directed to local sites, namely websites / apps Maribel.com, but when participants access other applications it is automatically directly connected to the internet, so the participants do not know that Maribel websites/apps only exist on local servers.

Researcher provides information about how this experiment is conducted, the prizes to be given, as well as the opportunity to obtain mobile phone prizes through the number of sheets and blocks of raffle coupon. The sequence of experiments is starting from watching videos, observing Maribel's website / apps, observing the given case, making decisions, and filling in demographic questions. The video contains the experience of researchers who have done online spending of 1 unit of mobile phones on Maribel websites/apps the day before, and are waiting to see if the ordered phone will arrive on time and in accordance with the specifications of the order.

After watching the video participants were asked to observe Maribel websites / apps, this was intended so that participants could make an evaluation of the spending that had been done by researchers. There are two identical types of Maribel websites/apps, except for differences in the guarantee structure and office address and consumer services. Participants can use the time they consider sufficient, until then open the experimental sheet, read the given case and then make a decision on the fulfillment of specifications on spending that has been done by the researcher.

The experiment sheet contains participants' decision-making, which is to evaluate whether the purchase from Maribel's website/apps is a good or bad decision. A good decision means that the purchases the researcher has made will meet the specifications on order. A bad decision means that purchases made by researchers do not match the specifications of the goods ordered. The decision of participants in assessing these purchases, will measure the desire or intention of participants in making spending or purchasing on Maribel websites / apps. After choosing the option given, participants were also asked to determine the level of confidence in decisions taken on a scale of 1 to 6, which is very unsure until very confident.

Each participant has the opportunity to win or lose a lottery ticket. Two conditions gain and loss domain as well as positive and negative frames are given on the chance of getting or losing a lottery ticket, with a choice of negative or positive frames. Participants in the gain /positive frame condition are given1 raffle ticket, and then choose a risky or definite option, namely:

If the Seller sends goods in accordance with the specifications of the order, then participants will get additional blocks of lottery coupons; or

If the seller sends goods that do not comply with the specifications of the order, then participants will not get additional lottery coupons.

Or if the participant chooses and believes that the purchase decision is bad, thus predicting that the purchase will not fit the order criteria, then automatically the participant will get half a block of lottery coupons.

This option refers to the possible consequences of purchasing on the internet. When making a purchase through a website / app, it will certainly produce good or bad consequences for buyers. This option also refers to the use of fuzzy-trace theory which assumes that individuals prefer to use excuses that simplify the presentation of information or digests, so choose the option of eliminating quantification with a lottery coupon block which means 10 sheets of raffle coupons; or half a block of raffle coupons which means 5 sheets of raffle coupons. In this gain condition the expected profit is 5 pieces of lottery tickets, regardless of the option chosen. If you choose the option at risk of profit is 10 x 0.5 + 0 x 0.5 or equal to 5 raffle tickets, the same thing with the second option that guarantees a profit of 5 tickets.

Participants in the loss / negative frame condition are also arranged in the same way, i.e., given 1 block containing 10 sheets of raffle coupons, if choosing the risk option, they cannot lose the lottery coupon if the purchase matches the order specification, or lose half the block of the lottery coupon if the purchase does not match the order specifications. For certain options automatically lose half a block of lottery coupons. These two gain and loss scenarios are crossed with the or absence of structured guarantees and two fuzzy-trace theory tests on gain/loss and positive/negative frame conditions. In total there are 8 test groups with different options on the experiment sheet (see table 2).

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FRAMING	GAIN		LOSS	
	Assurance	No Assurance	Assurance	No Assurance
POSITIVE	Cell 1: H2a	Cell 5: H1a/H2a	Cell 4: H2c	Cell 8: H1b/H2c
NEGATIVE	Cell 3: H2c	Cell 7: H1b/H2c	Cell 2: H2b	Cell 6: H1a/H2b

Table 2. Factorial Design 2X2X2

The experiment sheet at the end by answering 9 demographic questions related to age, gender, allocation of internet browsing time in each day, courses that have been taken, experience in doing online shopping, the amount of pocket money/income in a month, and manipulation check questions that test participants' understanding of the experiment provided, participants are also asked to assess how interesting this experiment is and are welcome to write any comments related to A series of experiments that have been conducted. Each lottery coupon received is entered into the box, and at the end of the experiment the draw is carried out and simultaneously handed the prize to the winners, with 1 mobile phone unit as the main prize.

Results And Discussion

Hypothesis Testing

H1a testing is conducted to find out if there are differences in decisions in online consumers if information is presented in gain-domain/positive-frame and when information is presented in loss-domain/negative-frame. Results in table 3 – statistical test 1 indicate on gain-domain/positive-frame of the 34 participants, 20 chose option A (at risk) and 14 participants chose option B (certain). On the other hand, loss-domain/negative-frame from 29 participants, 28 participants chose option A (risk) and 1 participant chose option B (certain). Using SPSS 13.0 for Windows, Chi-Square=12,281, p=0.000 on table 3 – statistical test 1 shows that there are differences in decision-making by online consumers, when decision choices are presented in gain-domain/positive-frame and loss-domain/negative-frame, these findings supportH1a.

H1b testing provides a treatment that revises domain problems and problem frames that distinguish descriptive abilities from fuzzy-trace theories in explaining framing. As seen in table 3 – statistical test 2, when the option is expressed in the gain-domain /negative-frame of 30 participants, 26 choose option A (risk) and the remaining 4 choose option B (certain); when the option is expressed in loss-domain /positive-frame of the 28 participants, 19 chose option A (risk) and 9 chose option B (certain). Chi-Square=2,947, p=0.086 results show that no difference in decisions in online consumers when website/apps information is presented in gain-domain/negative-frame and loss-domain/positive-frame or framing effect will be absent, this finding supports H1b which is about generalization of the predictive ability of fuzzy-trace teory in explaining the effect Framing.

	GAIN			LOSS		STATISTICAL TES 1&2	
	Option			Option		CROSS TABULATIONS	
	Risky	Certain		Risky	Certain	Chi-Square	P
POSITIVE	20 (58,8%)	14 (41,2%)	POSITIVE	28 (96,6%)	1 (3,4%)	12.281	0.000
NEGATIVE	26 (86,7%)	4 (13,3%)	NEGATIVE	19 (67,9%	9 (32,1%)	2.947	0.086

Table 3. Chi-Square Test (No Structural Assurance)

The Impact of Assurance Structure

H2a, H2b and H2c testing tests the existence of assurance structures in the context of online shopping, assurance structure will cause a reversal of options in gain-domain/positive-frame but not in loss-domain/negative-frame because risky options become more desirable in loss scenarios; Further testing of fuzzy-trace theory predictions was also tested with variations in domains and frames that led to loss of framing effects. The H2a test that tests when the option presented to participants as an online consumer is gain-domain / positive frame, with the existence of assurance structure showing that the results of the chi-square test involving a total of 66 participants (table 4 - statistical test 1) namely in assurance condition 26 participants choose option A (risk) and 6 choose option B (certain); but in conditions without assurance 20 participants chose option A (risk) and 14 participants chose option B (certain). The chi-square=3,926, p=0.048 test in favor of H2a proves that there is a difference caused by a reversal of options when structural assurance is available, as online consumer choice would be foolish by preferring option A over option B with structural assurance.

The H2b test that tested when the option presented to participants as an online consumer was a loss-domain/negative-frame with the existence of an assurance structure indicating that in assurance condition 22 participants chose option A (risky) and 2 chose option B (certain); in conditions without assurance 28 participants chose option A (risky) and 1 participant chose option B (Certain). The chi-square=0.587, p=0.444 test on table 4 – statistical test 2 supports H2b which shows no difference, so the existence of the Assurance Structure does not significantly affect the decision maker's choice. The results of the H2a and H2b tests demonstrate the important role of assurance structure in providing trust to consumers, particularly in online spending that is associated with the presence of risks felt by online consumers.

H2c testing that tests-fuzzy-trace theory explanation capabilities with domain separation and frame problems shows conflicting results. P there gain-domain/negative-frame indicates in assurance condition 24 participants choose option A (risk) and 2 choose option B (certain); in conditions without assurance 26 participants choose option A (risk) 4 participants choose option B (certain). Chi-square testing=0. 463, p=0.496 (table 4 – statistical test 3) proves that there is no difference when the options presented to participants as online consumers are gain-domain/negative-frame, the existence of an assurance structure does not significantly affect the decision maker's choice. Different results were shown in loss-domain/positive-frame, in assurance condition 22 participants chose option A

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(risk) and 1 chose option B (certain); under no assurance conditions 19 participants chose option A (risky) and 9 participants chose option B (certain). The chi-square=6,189, p=0.013 (table 4 – statistical test 4) tests show that there is a difference when participants or online consumers are presented

in a loss-domain/positive-frame, the existence of a significant assurance structure affecting online consumer choice. These results cause H2c to be partially supported and at the same time also require further analysis of this phenomenon.

	GAIN/POSITIVE		LOSS/NEGATIVE		GAIN/NEGATIVE		LOSS/POSITIVE	
	Option		Option		Option		Option	
	Risky	Certain	Risky	Certain	Risky	Certain	Risky	Certain
No Structural Assurance	20 (58,8%	14 (41,2%)	28 (96,6%)	1 (3,4%)	26 (86,7%)	4 (13,3%)	19 (67,9%)	9 (32,1%)
Structural Assurance	26 (81,3%)	6 (18,8%)	22 (91,7%)	2 (8,3%)	24 (92,3%)	2 (7,7%)	22 (95,7%)	1 (4,3%)
Cross tabulation	STATISTICA TEST 1		STATISTICA TEST 2		STATISTICA TEST 3		STATISTICA TEST 4	
Chi Square	3.926		0.587		0.483		6.189	
P	0.048		0.444		0.496		0.013	

Table 4. Chi Square Test (No Structural Assurance – Assurance Structure)

Additional Analysis

This research conducted a separation of domain effects and frame effects that led to the loss of framing effects, and it is very likely that there were other variables that influenced the participants in decision making. As (Zeng et al., 2021) revealed, fuzzy-trace theory shows that if choices cannot be simplified at the essence level, then decision makers will consider them at a quantitative level. If the outcome of the choice is the same, it is predicted that the decision will be influenced by decision makers who tend to take risks. This was also stated by (Wang et al., 2021) who found that risk selection or confidence levels, as well as framing,were also influential factors indecision-making. To prove the prediction of this fuzzy-trace theory, additional analysis was carried out using ANCOVA.

The results in table 5 (panel A and panel C) on both the NSA and NSA-SA tests show the existence of framing influence when options are on gain-domain/positive-frame and loss-domain/negative-frame or when options can be simplified. In table 5 (panel A), framing is significantly influential in decision making (values p=0.000 for Framing, and p=0. 526 for

confidence level). These results showed that participants were affected by framing decision-making without the influence of risk selection or confidence levels. Table 5 (panel C) also refers to the same thing, namely the framing influence (value p = 0.001 for Framing, and value p = 0. 400 for the level of confidence) without any influence of risk selection or confidence level.

The results in table 5 (panels B and D) are very different from the results in panels A and C,i.e. when the options are in gain-domain/negative-frame and loss-domain/positive-frame or when the options cannot be simplified. The results of this test showed that framing in no way affected the choice of the participants (pthereis panel B, the value p= 0. 246 for Framing, and p=0. 001 for the confidence level; and in panel D, the value p= 0. 386 for Framing, and p=0. 002 for confidence level. Once again this result further reinforces the predictive accuracy of the fuzzy-trace theory, which says that the influence of framing will be absent when decision information is presented in gain-domain/negative-frame and loss-domain/positive-frame,and kthe ethics of choice cannot be simplified risk selection becomes an influential factor in decision making (Chang, 2008; E. Mauldin & Arunachalam, 2002; Wang et al., 2021).

PANEL A: NSA Gain/Positive-Loss/Negative (H1a)				
Source	Mean Square	df	F	p
Risk Preference	0.062	1	0.407	0.526
Framing	2.111	1	13.861	0.000
PANEL B: NSA Gain/Negative-Loss/Positive (H1b)				
Source	Mean Square	df	F	p
Risk Preference	1.637	1	11.347	0.001
Framing	0.198	1	1.373	0.246
PANEL C: NSA-SA Gain/Positive-Loss/Negative (H2a-H2b)				
Source	Mean Square	df	F	p
Risk Preference	0.103	1	0.714	0.400
Framing	0.198	1	12.503	0.001
PANEL D: NSA-SA Gain/Negative-Loss/Positive (H2c-H2d)				
Source	Mean Square	df	F	p
Risk Preference	1.216	1	10.380	0.002
Framing	0.096	1	0.816	0.386

Table 5. ANCOVA

Conclusion

This study proves the predictive accuracy of fuzzy-trace theory in explaining framing. When decision information cannot be simplified, decision makers tend to process information at a quantitative level, and because that information cannot be simplified makes a loss of framing influence. The absence of significant differences in additional testing when information presented in gain-domain/negative-frame and loss-domain/positive-frame indicates a loss of framing influence, proving the accuracy of fuzzy-trace theory predictions better than with other theories that explain the influence of framing.

The existence of assurance structure is also proven to give confidence to online consumers to overcome the doubts and reluctance of online consumers when trying to transact with unknown online vendors. In this study proves aandya reversal of options when structural assurance is available, so that online consumer choices will be reversed by preferring option A over option B with structural assurance.

This research provides evidence that in the context of the digital economy in Indonesia, in particular on the influence of framing and assurance structure, as well as the interaction of the two that can change consumer choice in the online shopping process. The implications of this research are certainly very useful for websites or apps that will consider the consumer market in Indonesia as one of the countries with a large population with an increasing growth in online transactions. More details for the finance and accounting profession to compile and consider how the best model on the financial guarantee structure favors consumers, so that it can be used by marketing in online marketing and sales activities. For the marketing profession, of course, you can also use structural assurance with various alternatives so that it will improve the ability and fulfillment of online sales targets.

There are differences in results in fuzzy-trace theory testing and assurance structure when information is presented on loss-domain/positive-frame, which suggests that the existence of a significant assurance structure influences online consumer choice is an important note in this research, but this is explained in additional testing using ANCOVA that is when the framing influence is lost, then the level of confidence or risk selection becomes important in this research, but this is explained in additional testing using ANCOVA that is when the framing influence is lost, then the level of confidence or risk selection becomes The dominant factor in decision making, it could be with the average age of participants at a young age, so that their risk selection rate is greater than the average of other age groups, but of course this is also an opportunity in further research in the future, be it focus on the level of confidence or risk selection, or maybe even other factors that can be tested in the future.

The limitation in this study is the use of student subjects which of course will be different if using online consumers who automatically conduct online spending transactions at the time the experiment is carried out. Another limitation is that scenario is made in the form of simulations of online transactions that have been done by researchers, it will be different if done directly by participants who act as online consumers, especially if studied in terms of the level of risk they feel is different between online shopping done by researchers and online shopping that they carry out themselves. Future research may also focus more on the use of fuzzy-trace theory in various case studies, so that it will find generalizations about the accuracy of fuzzy-trace theory predictions that are better at explaining the influence of framing.

References

[1] Al-Shareef, A. (n.d.). Investigating the effects of initial anchors on decision making: Tversky and Kahneman Replication Study.

[2] Bahmanziari, T., Odom, M. D., & Ugrin, J. C. (2009). An experimental evaluation of the effects of internal and external e-Assurance on initial trust formation in B2C e-commerce. International Journal of Accounting Information Systems, 10(3), 152–170. https://doi.org/10.1016/j.accinf.2008.11.001.

[3] Brainerd, C. J., & Reyna, V. F. (2019). Fuzzy-Trace Theory, False Memory, and the Law. Policy Insights from the Behavioral and Brain Sciences, 6(1), 79–86. https://doi.org/10.1177/2372732218797143.

[4] Brainerd, C. J., & Reyna, V. F. (2002). Fuzzy-Trace Theory: Dual Processes in Memory, Reasoning, and Cognitive Neuroscience. Advances in Child Development and Behavior, 41–100. https://doi.org/10.1016/s0065-2407(02)80062-3.

[5] Brainerd, C. J., & Reyna, V. F. (2002). Fuzzy-Trace Theory and False Memory. Current Directions in Psychological Science, 11(5), 164–169. https://doi.org/10.1111/1467-8721.00192.

[6] Chang, C. (2007). Ad framing effects for consumption products: An affect priming process. Psychology and Marketing, 25(1), 24–46. https://doi.org/10.1002/mar.20199.

[7] Claus, B. (2019). Framing effects as a semantic puzzle: Putting the alignment-assumption account to a test. Proceedings of Sinn Und Bedeutung, 23(1), 249–266.

[8] Corley, J. K., Jourdan, Z., & Ingram, W. R. (2013). Internet marketing: a content analysis of the research. Electronic Markets, 23(3), 177–204. https://doi.org/10.1007/s12525-012-0118-y.

[9] Fisher, S. A. (2020). Meaning and framing: the semantic implications of psychological framing effects. Inquiry, 1–24.

[10] Fisher, S. A. (2021). Framing Effects and Fuzzy Traces: 'Some' Observations. Review of Philosophy and Psychology. https://doi.org/10.1007/s13164-021-00556-3.

[11] Gäher, L., & Kunze, F. (2021). Mechanising complexity theory: the cook-Levin theorem in Coq. 12th International Conference on Interactive Theorem Proving (ITP 2021).

[12] Gillison, S. T., Beatty, S. E., & Northington, W. M. (2021). Shoppers' digital deal seeking: Charting new territory. Journal of Marketing Theory and Practice, 1–21.

[13] Goswami, S., Nandi, S., & Chatterjee, S. (2019). Sentiment analysis based potential customer base identification in social media. In Contemporary Advances in Innovative and Applicable Information Technology (pp. 237–243). Springer.

[14] Grewal, D., Ailawadi, K. L., Gauri, D., Hall, K., Kopalle, P., & Robertson, J. R. (2011). Innovations in Retail Pricing and Promotions. Journal of Retailing, 87, S43–S52. https://doi.org/10.1016/j.jretai.2011.04.008.

[15] Guo, L., Hu, X., Lu, J., & Ma, L. (2021). Effects of customer trust on engagement in live streaming commerce: mediating role of swift guanxi. Internet Research, 31(5), 1718–1744. https://doi.org/10.1108/intr-02-2020-0078.

[16] Johnson, M. D., & Puto, C. P. (1987). A review of consumer judgment and choice.

[17] Kahneman, D., & Tversky, A. (1979). On the interpretation of intuitive probability: A reply to Jonathan Cohen.

[18] Kahneman, D., & Tversky, A. (2013). Prospect theory: An analysis of decision under risk. In Handbook of the fundamentals of financial decision making: Part I (pp. 99–127). World Scientific.

[19] Karani, A. & Mary, W. M. (2022). Challenges and prospects of online instruction of vocational subjects by tvet institutions in Kenya due to Covid-19. International Journal of Education, Technology and Science, 2(2), 108–118.

[20] Karimov, J., Ozbayoglu, M., Tavli, B., & Dogdu, E. (2021). Menu Optimization for Multi-Profile Customer Systems on Large Scale Data. Computational Economics, 1–22.

[21] Katadata. (2020). Riset Belanja Online di Indonesia. https://katadata.co.id/ekarina/digital/5e9a495b679e8/riset-belanja-online-indonesia-tumbuh-37-kali-lipat-di-2025

[22] Lankton, N. K., McKnight, D. H., & Tripp, J. (2015). Technology, humanness, and trust: Rethinking trust in technology. Journal

of the Association for Information Systems, 16(10), 1.

[23] Lankton, N., McKnight, D. H., & Thatcher, J. B. (2014). Incorporating trust-in-technology into Expectation Disconfirmation Theory. The Journal of Strategic Information Systems, 23(2), 128–145.

[24] Levin, S. (2018). Framing the concepts that underpin discontinuous technological change, technological capability and absorptive capacity.

[25] Levy, D. S., Frethey-Bentham, C., & Cheung, W. K. S. (2020). Asymmetric framing effects and market familiarity: experimental evidence from the real estate market. Journal of Property Research, 37(1), 85–104.

[26] Li, C. J., & Ling, H. (2016). An investigation on the radar signatures of small consumer drones. IEEE Antennas and Wireless Propagation Letters, 16, 649–652.

[27] Mauldin, E., & Arunachalam, V. (2002). An experimental examination of alternative forms of web assurance for business-to-consumer e-commerce. Journal of Information Systems, 16(s-1), 33–54.

[28] Mauldin, E. G., Nicolaou, A. I., & Kovar, S. E. (2006). The influence of scope and timing of reliability assurance in B2B e-commerce. International Journal of Accounting Information Systems, 7(2), 115–129.

[29] Nuseir, M. T. (2016). Exploring the use of online marketing strategies and digital media to improve the brand loyalty and customer retention. International Journal of Business and Management, 11(4), 228–238.

[30] Pennington, R., Wilcox, H. D., & Grover, V. (2003). The role of system trust in business-to-consumer transactions. Journal of Management Information Systems, 20(3), 197–226.

[31] Rossiter, J. R. (2019). A critique of prospect theory and framing with particular reference to consumer decisions. Journal of Consumer Behaviour, 18(5), 399–405.

[32] Tafesse, W., & Wien, A. (2018). Using message strategy to drive consumer behavioral engagement on social media. Journal of Consumer Marketing.

[33] Wakker, P. P. (2022). The correct formula of 1979 prospect theory for multiple outcomes. Theory and Decision, 1–5.

[34] Wang, P., Sun, L., Zhang, L., & Niraj, R. (2021). Reference points in consumer choice models: A review and future research agenda. International Journal of Consumer Studies, 45(5), 985–1006.

[35] Wenger, A., Stauffacher, M., & Dallo, I. (2021). Public perception and acceptance of negative emission technologies–framing effects in Switzerland. Climatic Change, 167(3), 1–20.

[36] Zeng, S., Hu, Y., & Xie, X. (2021). Q-rung orthopair fuzzy weighted induced logarithmic distance measures and their application in multiple attribute decision making. Engineering Applications of Artificial Intelligence, 100, 104167.

[37] Zhu, B., Guo, D., & Ren, L. (2022). Consumer preference analysis based on text comments and ratings: A multi-attribute decision-making perspective. Information & Management, 59(3), 103626.