Article

Benefits First: Consumer Trust Repair in Mobile Commerce

He-Da Zhang [1], Shih-Chih Chen [2,*] and Athapol Ruangkanjanases [3,*]

[1] Department of Business Administration, Beijing University of Chemical Technology, Beijing 100029, China; zhanghd@mail.buct.edu.cn

[2] Department of Information Management, National Kaohsiung University of Science and Technology, Kaohsiung 82445, Taiwan

[3] Chulalongkorn Business School, Chulalongkorn University, Bangkok 10330, Thailand

* Correspondence: scchen@nkust.edu.tw (S.-C.C.); athapol@cbs.chula.ac.th (A.R.)

Abstract: The purpose of this study is to explore trust repair strategies and the outcomes in mobile (m-)commerce. Consumer trust in m-commerce is a calculus-based form of trust; service failures, "inaction" and "excessive actions" are the typical trust decline situations. Three strategies of the fulfillment of consumers' psychological contract for compensation, arousal, and regulation are proposed as trust-repaired solutions regarding the abovementioned three situations. The experimental results demonstrate that trust cannot be repaired by a single relational psychological contract strategy and that it can be repaired by both a single transactional and interactive strategy; the interactive strategy is more effective in competence-based decline. Second, in integrity-based decline, both the single and interactive strategy negatively influence trust repair; the relational strategy has the strongest effect. The "boomerang effect" shows that the more m-vendors repair, the more the trust decreases. Third, trust can be repaired, respectively by arousal and regulation strategy regarding corresponding situations of inaction and excessive actions. Finally, the trust repair paradox (TRP) has not been verified in m-commerce.

Keywords: consumer trust; calculus-based trust (CBT); trust repair; consumer psychological reactance; mobile commerce (m-commerce)

1. Introduction

Over the past decade, the rapid pervasiveness of wireless networks and mobile devices (such as smartphones, tablets, or laptops) has made m-commerce an important business model [1,2]. This trend is expected to accelerate in the coming years due to a number of m-commerce advantages: continuous connection, increased speed of service, simplicity and convenience, added value (e.g., tracking delivery of orders or searching for reviews), and cost reduction. As everything has two sides, in an "always-on" virtual environment, m-commerce activities contain significant risks due to their characteristics of ubiquitous connectivity, localization, and personal identity attachment [3]. However, these are typical occasions in which trust has a function, because trust reduces uncertainty and insecurity which are key factors in the facilitation of purchases and prevention of altering intentions.

Given mobile technology's intrinsic attributes of instantaneity and ubiquity [4], m-commerce's basic characteristic of being able to access the internet anywhere at any time makes consumers' trust differentiate from that of both traditional face-to-face commerce and traditional e-commerce confined to a wireline environment [3,5]. Consumers' expectations, vulnerabilities, and proximities to trustees; the causes of trust decline; and ways of trustworthiness judgement vary considerably. For instance, compared with making purchases in a real shop, consumers in m-commerce lack commitment because they are able to conveniently switch between alternative vendors by a single click [4]. Therefore, each business model raises different trust issues for researchers and practitioners. Moreover, in recent years, some studies have begun to focus on consumers' trust issues in the

m-commerce environment [1,2,4], but surprisingly, the issue of how trust might be repaired in m-commerce has not yet received theoretical attention. Therefore, consumer trust repair in m-commerce merits research in its own right as an important theme in this emerging business model.

Hariguna et al. [6] identified economic trust in the context of mobile banking, where it represented users' perceptions regarding the benefits in saving time and costs, as well as the economical use of mobile services. In a business relationship, there are three sequential levels or types of trust: calculus-based trust (CBT: economic calculation of rewards and punishment), knowledge-based trust (KBT: full information and understanding), and identity-based trust (IBT: full internalization or collective identity) [7]. In m-commerce transactions, consumers buy products without really seeing, touching, or experiencing them, and there is a lack of face-to-face communication. To complicate matters, the impact of online reviews of conflicting or mixed information leads to consumers to approach purchase decisions with an ambivalent attitude [8]. Several studies related to recommender systems in online shopping endeavor to solve the issues related to the substitution of human vendors [9–11]; for example, Sulikowski et al. [9] found links between user behavior on certain product pages and preferences towards those products, which was useful for recommender systems design. However, consumers' knowledge of the m-marketers and products remains insufficient. Furthermore, the emotional elements of trust in online consumers are also different from traditional face-to-face commerce (such as the sense of being certain and secure)—at best, the feelings of comfort and dependency in the transaction are present [11], which is far from the full internal identity. These two points illustrate that KBT and IBT cannot be developed in m-commerce. Significantly, consumers' actual benefits derived from remaining in the relationships culminate in the judgement of credibility of m-vendors. Therefore, consumer trust in m-commerce for transactional relationships is a typical calculus-based trust that begins and ends at this minimal level.

The specific type and its nature of trust influence its repairing emphasis. In buyer–seller relationships, current trust repair studies rarely consider the nature of a calculus-based trust by regarding that the single relational or affective strategy (such as apologies, denials or excuses) is effective [12,13], or that the affective and tangible strategy (such as financial compensation) are equally effective in trust repairing [14,15]. Our work bridges the existing research gap by identifying the nature of trust in m-commerce buyer–seller relationship and answers the following research questions are: Do consumers re-trust in benefits, emotions or both? Which strategy is essential for trust repairing—the tangible or affective strategy? What is the appropriate strategy for repairing trust in a certain situation in m-commerce? Will the repaired trust be higher than the pre-existing trust after successful trust repair efforts (the trust repair paradox issue)? By tackling the questions above, this study seeks to contribute to how trust in m-commerce is appropriately repaired after its decline, and ultimately, to advance the understanding of trust theory and provide useful guidelines for m-vendors.

2. Literature Review

Trust includes a minimum of three stages: formation, decline and repair [16]. In this research, we examined the trust trajectory in the third phase of repair after its decline. Trust repair is when the trust level stops decreasing, starts to improve, and then reaches relative stabilization after trust decline [17]. Trust declines in many different ways, thus impacting how trust can be repaired [18]. Hence, first, the literature review focuses on what leads to trust decline. Following a logical path of "decline and then repair", trust repair is then discussed in the literature review.

2.1. Trust Decline: Sharp Violation and Gradual Erosion

The multiple studies on trust repair have attracted considerable attention regarding competence or integrity-based trust violations, including public–organization or stakeholder–company relationships [19,20], interpersonal or organizational relationships [21,22],

contractors–subcontractors relationships [17], citizen–government relationships [23], and buyer–vendor relationships in traditional or online environment [13,24]. Indeed, trust decline encompasses both a single violation event with a sharp destruction of trust and gradual trust erosion with time [25]. The former has received extensive attention in the literature (see the literature above); however, relatively few studies have been devoted to gradual trust erosion, and, to date, this question has not been addressed in the literature regarding consumers' trust in the m-commerce environment.

Halinen and Tahtinen [26] proposed a natural termination of buyer–vendor relationships, which means that the relationship gradually becomes obsolete as the need for business exchange with the vendor diminishes. In fact, consumers' trust memory dissolves over time [16,25]. It is more difficult to maintain the original trust in m-commerce because consumers usually face over-rich product choices and may instantly seek other vendors to gain benefits. Therefore, businesses should take measures to maintain the trusting relationship with consumers instead of doing nothing. In this regard, "inaction" is defined here as m-vendors' lack of actions toward the natural decline in consumers' trust—for example, failing to provide consumers with promotional information or some special discounts. However, excessive or insufficient amounts of actions are both dangerous for trust [27]. With the characteristic of "anytime, anywhere access" of m-commerce [3], many apps for mobile devices facilitate shopping as well as advertising; thus, over-marketing has become a common phenomenon leading to damage to consumers' benefits, followed by trust. Contrary to inaction, "excessive actions" are defined here as m-vendors' over-marketing actions aimed at consumers for the purpose of maintaining the trusting relationship— for example, sending promotion information or advertising to consumers frequently via mobile communication (phones, text messaging or instant messaging services).

2.2. Trust Repair in Buyer–Seller Relationships

Trust, as suggested by many theories, is a multiplex concept; nonetheless, multiple previous studies simply differentiate trust depending on the different relationships (romantic, parent–child, institutional, or buyer–seller). Instead, even within the same relationship, trust changes character and texture as the relationship develops [7]. Exploring trust repair is an important concern in the trust literature, and it has resulted in a few achievements in buyer–seller relationships (see Table 1 for more details); however, the basic nature of a calculus-based trust in this given relationship has not received its deserved attention (for an exception, see Ref. [24]). These studies in various transactional contexts either tend to implicitly equate a tangible strategy (such as financial compensation) to an affective or relational strategy (such as apologies, denials or excuses) for trust repair [14,15], or focus more on the affective or other factors while losing sight of the calculative nature of trust [12,13,28].

Trust has a cognitive and emotional component [7], but trust decisions cannot be influenced by emotions alone in economic relations. The study by Astasiei and Dospinescu [29] showed that consumers trusted the rational messages of Facebook advertising posts more than the emotional ones; the rational messages generated more credibility while the perceived purchase risk was higher for the emotional messages. The cognitive dimensions are most responsible for maintaining the "balance" in CBT and KBT, while the emotional dimension is most critical in IBT [25]. Emotions are intense feelings that are very brief in duration (seconds or minutes); moods are feelings that are less intense than emotions and last longer than emotions (hours or days); affect is a generic term that includes both emotions and moods [30]. It is undeniable that the victim will generate a stable negative affect (e.g., general dislike, feelings of injustice) towards the offending party due to violations [31], which belongs to the field of moods instead of emotions. It is also noteworthy that moods are cognitive in nature while emotions are action oriented in nature [30]. Hence, the victim's cognition, including both assignments of responsibility and responses of violators, as well as degree of negative effects, primarily determines the outcome of trust repair (relationship rupture, recalibration or restoration). Based on this reasoning, as a typical CBT

in m-commerce, the victim tends to be more rational when the repair begins and develops and, thus, the cognition prevails over emotions, which is important in determining how trust in m-commerce is appropriately repaired after its decline.

Table 1. Literature on the trust repair in buyer–seller relationships.

Source	Method	Context	Key Findings
Bozic et al. [28]	Grounded Theory	Food retail market	Four factors (absence of further violations, prior positive experience, normal functioning, and normal behavior of other consumers) and three contextual conditions (time passage, institutional context, and immediate strategies) influence trust recovery.
Chen et al. [14]	Survey	E-commerce	The combination of affective, functional, and informational strategies is effective in the rebuilding of consumer trust. Positive moods serve as a mediator.
Cui et al. [24]	Experiment	E-commerce	Under equal compensation, apology with internal attribution is more effective than with external attribution for integrity violations. The opposite is the case for competence violations. Overcompensation is not necessarily optimal.
Friend et al. [13]	Storytelling	Clothing retail market	For explicit trust violations, service recovery actions (responsibility acceptance and apology) are required for trust repair; for implicit trust violations, such actions do not work.
La and Choi [12]	Survey	Service failures with a service firm	The key determinant of trust recovery is consumer affection.
Liao et al. [32]	Survey	E-commerce	Perceived trustworthiness is a significant factor affecting continuance trust intention. Confirmation has significant impact on perceived trustworthiness.
Utz et al. [33]	Experiment	On-line auctions	Plain apologies are more successful than denials independent of trust violation type. Perceived believability of the comments serve as a mediator.
Yu et al. [15]	Survey	Service failures with a telecom operator	The combination of affective, functional, and informational strategies is effective in the repairing of trust. Positive emotions serve as a mediator.

3. Development of Research Hypotheses

In the marketing relationship, a psychological contract consists of a consumer's perceptions about the promises made by a brand, and it is emphasized that it is simply the perceptions of the consumer [34]. Disconfirmation has been developed as a model for understanding customers' satisfaction/dissatisfaction regarding the service provider's recovery actions after a service failure [35]. As a typical CBT, when a service failure of an m-vendor occurs, the consumer' benefits are damaged. Consumers cognitively determine the causes of this negative outcome, and an implicit psychological contract for compensation (such as substantial actions, favorable attitudes, or apologies) generates concurrently. They compare the repair strategies that the m-vendor provides with their psychological contracts, and the discrepancy determines the consumers' general judgment of trust or lack thereof. Thus, trust repair in service failures needs to be studied from the perspective of the fulfillment of consumers' psychological contract for compensation.

A psychological contract includes two types: transactional and relational, where the former emphasizes tangible content and explains "what to exchange", while the latter explains "how to exchange" and does not involve a tangible element [36]. In repairing trust of m-commerce consumers, the transactional psychological contract embodies a collection of tangible economic compensation for consumers, for example, free exchange, refund,

price discount, and gifts. In contrast, the relational psychological contract emphasizes process quality and involves intangible exchange, for example, face, identity and respect. Specific behaviors of the relational psychological contract in trust repair of m-commerce include acknowledgement, apologies, and solving problems in a proactive and timely manner. Following the above discussion, the hypotheses are formally presented below.

Hypothesis 1 (H1a,b). *Following a competence-based trust decline caused by a service failure, the fulfillment of the (a) transactional and (b) relational psychological contract for compensation positively influences trust repair.*

Hypothesis 2 (H2a,b). *Following an integrity-based trust decline caused by a service failure, the fulfillment of the (a) transactional and (b) relational psychological contract for compensation positively influences trust repair.*

Several studies have concluded that simultaneous tangible and relational strategy are effective in trust repair in buyer–seller relationships [14,15,24]. Alternatively, Haesevoets et al. [37] demonstrated that even in economic settings, relational strategies enhanced the effects of tangible compensation in situations where the tangible compensation alone was insufficient. From the perspective of the relationships between two distinct types of psychological contract, Rousseau pointed out that the transactional and relational psychological contract could promote each other thus forming an interaction pattern [36]. This perspective suggests that in m-commerce, the fulfillment of the transactional psychological contract indicates that the vendors are concerned with not only self-interest but also with the consumers' losses, which facilitates the implementation of the relational strategy. Meanwhile, the fulfillment of the relational psychological contract confirms the vendors' goodwill, which may, in turn, raise the "values" of tangible compensation by adding emotional content. Thus, as the combination of both strategies also positively influences trust repair, the following hypotheses are presented:

Hypothesis 1 (H1c). *Following a competence-based trust decline caused by a service failure, the fulfillment of the transactional × relational psychological contract for compensation positively influences trust repair.*

Hypothesis 2 (H2c). *Following an integrity-based trust decline caused by a service failure, the fulfillment of the transactional × relational psychological contract for compensation positively influences trust repair.*

In organizational settings, violations reduce the benefits that an employee receives and make him or her feel a sense of injustice or betrayal; thus, that employee offers an increase in the transactional psychological contract and a decrease in the relational psychological contract in return [38]. De Cremer [39] found tangible compensation was more important than apologies when the victim suffered direct financial losses. In m-commerce buyer–seller relationships, as a typical form of calculus-based trust, any relational strategy is no more than emotional reparation; thus, the relational strategy is clearly less effective than tangible compensation. As mentioned above, there is likely an interaction effect in which the transactional and relational contract strategies are complements in trust repair. Accordingly, the impact on trust repair of the respective psychological contract strategies and the interactive strategy may differ considerably. Thus, the following hypotheses are presented:

Hypothesis 1 (H1d). *Following a competence-based trust decline caused by a service failure, the fulfillment of the transactional, relational, and interactive psychological contract has significant differences in terms of the effects of trust repair.*

Hypothesis 2 (H2d). *Following an integrity-based trust decline caused by a service failure, the fulfillment of the transactional, relational, and interactive psychological contract has significant differences in terms of the effects of trust repair.*

In economic exchange relations, m-vendors' inaction may lead to a natural reduction in business exchange for benefits, and, correspondingly, the consumers' trust declines based on the gradual dissolution with time. Arousal is the basis of motivation, information processing, emotions, and behavioral reactions [40], which can reconnect the benefits of both m-vendors and the "sleeping consumers", thus evoking consumers' prior trust memories and repairing trust. Therefore, our third hypothesis is as follows:

Hypothesis 3 (H3). *Following trust decline caused by m-vendors' inaction, arousal positively influences trust repair.*

M-vendors' excessive actions may damage consumers' benefits and, thus, lead to trust decline. To repair trust, consumers need to believe that in the future, the m-vendors' untrustworthy behavior will be constrained. Lewicki and Brinsfield [18] propose that the longer-term repair strategies for broken trust include actions to provide more permanent "structural" changes or boundaries in the relationship. Dirks et al. [41] define regulation as setting up a system to ensure future trustworthy behaviors and limit future trust violations, and they show that regulation can promote trust following a violation. In a situation of excessive actions, m-vendors need to regulate such actions in relatively permanent "structural" arrangements and make consumers perceive the preventive activities in order to improve trust. Therefore, the fourth hypothesis is presented in order to verify the outcomes of regulation on the repair of trust:

Hypothesis 4 (H4). *Following trust decline caused by m-vendors' excessive actions, regulation positively influences trust repair.*

The service recovery paradox, that is, after a service failure, businesses take appropriate remedial measures which can bring more satisfaction to customers than before [35]. Echoing similar sentiments of the service recovery paradox, the trust repair paradox (TRP) is defined as after trust decline, vendors take the appropriate repair strategies to allow them to be trusted more so than before. The trust repair paradox appears as an important phenomenon to both academics and practitioners because it may be seen as an opportunity to gain a higher degree of customer trust through successful trust repair. Tax et al. [42] used trust and commitment as the dependent variables in consumer-facing industries and confirmed the existence of the service recovery paradox again. Soars et al. [43] validated the influence of quick resolution and compensation on the service recovery paradox in a call center setting of mobile telecommunications. In line with these studies, the trust repair paradox is expected to exist in the new context of m-commerce. Following the above discussion, the hypotheses are formally presented below.

Hypothesis 5 (H5a). *In the case of a competence-based trust violation caused by a service failure, consumers' repaired trust will be higher than the prior trust followed by the fulfillment of the (1) transactional, (2) relational, and (3) interactive psychological contract for compensation.*

Hypothesis 5 (H5b). *In the case of an integrity-based trust violation caused by a service failure, consumers' repaired trust will be higher than the prior trust followed by the fulfillment of the (1) transactional, (2) relational, and (3) interactive psychological contract for compensation.*

Hypothesis 5 (H5c). *In the case of trust decline caused by m-vendors' inaction, consumers' repaired trust will be higher than the prior trust followed by arousal.*

Hypothesis 5 (H5d). *In the case of trust decline caused by m-vendors' excessive actions, consumers' repaired trust will be higher than the prior trust followed by regulation.*

Figure 1 displays the model of consumer trust repair in the m-commerce environment of the study.
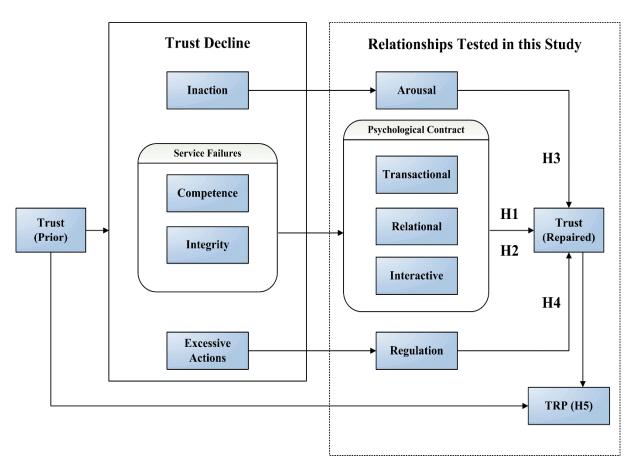

Figure 1. Consumer Trust Repair Model.

4. Method

4.1. Experiment Design

The research method for this study was a scenario-based controlled experiment. Service failures, inaction and excessive actions are the three typical scenarios when consumer trust declines in m-commerce. In the scenarios of trust decline caused by service failures, the design was full factorial (2×3), leading to six scenarios: two violation types (competence- and integrity-based trust decline) time three repair strategies (the fulfillment of the transactional/relational/interactive psychological contract for compensation). As well as the arousal and regulation regarding trust-repaired strategies towards inaction and excessive actions, a total of eight scenarios were given in this study.

4.1.1. Material and Samples

Data were collected from college students, most of whom are experienced in using m-commerce and relatively insufficient purchasing power. In m-commerce consumption, they are easily attracted by cheap counterfeit and inferior goods and can better understand the scenario of integrity-based trust violation. Two hundred and fifty-six undergraduate and graduate students enrolled in an organizational behavior course participated in this study for course credit. Responses of 18 participants were excluded due to incompleteness, leaving a total of 238 valid questionnaires with an effective rate of 92.9%. All the participants

were of Chinese nationality; 56.2% of the final sample was female, and the vast majority of the participants (78.9%) used m-commerce for at least five years.

This study focused on the service failures that cause actual loss but not significant harm to consumers, which is a common phenomenon in m-commerce. Nike sports shoes were chosen to represent the prototypical product of service failures in the trust violation scenarios because of the following two considerations: first, well-known and durable goods should be used so that participants have a fair degree of involvement in decision making; second, the goods should have more competence- and integrity-based services failures in the mobile shopping experience, thus making the experimental scenarios plausible. According to the monitoring of data of China's online retail big data by China e-Business Research Center, in the first quarter of 2019, Nike ranked first in China's sports shoes industry with sales exceeding RMB 800 million/USD 123 million (sales volume of 1.41 million pieces and unit price of RMB 579/USD 89) [44]. This shows that Nike is a sports brand familiar among and liked by Chinese people; moreover, it is still a relatively high-end product in China. There is a huge profitable space for fake goods, which leads to a large number of pirated Nike shoes in the non-physical m-commerce. Hence, designed competence-based (wrong color dispatches in the scenario) and integrity-based (fake and inferior Nike shoes in the scenario) services failures would arouse the participants' empathy. In addition, in order to enhance the experiments' credibility, all the text materials were equipped with corresponding pictures, including the following: the compared pictures of the ordered Nike shoes and Nike shoes with obvious color errors (a competence-based trust decline), the authentic and fake and inferior Nike shoes (an integrity-based trust decline), expression pictures with a sentence describing both consumers' trust loss (an inaction-based trust decline) and consumers harassment caused by over-marketing information (excessive actions-based trust decline).

4.1.2. Procedures

The survey was administered to the participants in a quiet room at the appointed time. The participants were informed that the questionnaire was anonymous, and they provided consent for their data to be used for the purposes of the study. The experiment had three phases: in the first phase, the participants' prior trust was measured (the materials note that the m-vendor was once-trusted and trustworthy at this phase); in the second phase, the participants were shown the specific scenarios, and the violated trust was measured, respectively (note that it was the first trust decline perceived by participants); in the third phase, the repair strategy was shown, and the participants' recognition degree of the repair strategies and the repaired trust were measured, respectively. To encourage and reward participation, the respondents were offered a dining coupon that could be exchanged for both a meal and a soft drink at the university canteen.

4.1.3. Manipulations

The experiment was designed to manipulate participants' reaction to the stimulus materials of competence-, integrity-, inaction- and excessive actions-based trust decline. The manipulation check was carried out to test whether experimental stimuli successfully reduced the trust. A pairwise t-test of prior trust and declined trust showed that the average trust was significantly reduced as a result of exposure to competence-, integrity-, inaction- and excessive actions-based trust decline with $p < 0.001$. Regarding the mean values, prior trust (4.897) was greater than declined trust (1.217–3.888), indicating that the manipulation was successful. Furthermore, the results of one-way ANOVA analysis showed that the F value was 494.911 ($p < 0.001$), indicating that at least one of the four trust declines was significantly different to the other three. Through the Bonferroni method, it was observed that the differences between the mean declined trust scores for competence, integrity, inaction and excessive actions were −2.670, −1.178 and −1.536 ($p < 0.001$), which indicates that the type of degree of trust decline in descending order is as follows: integrity-, inaction-, excessive actions- and competence-based trust decline.

4.2. Measures

To ensure construct validity, we used items from existing scales wherever possible (see Appendix A for more details). Consumers' trust in m-commerce was measured using several multi-item scales adapted from previous studies on consumer trust [1,45]. Crucially, two core components of this construct were measured: cognition and emotions. The cognitive dimensions of three items encompassed perceived ability, integrity, and benevolence. Emotional trust in m-commerce was measured using one item regarding the feeling of comfort in relation to transactions with m-vendors. The scale items of the transactional and relational psychological contract were adapted from Rousseau and Schalk [46], and the background was transferred from the organizational domain into the mobile commerce setting. The transactional psychological contract strategy encompassed three concrete actions for compensation: free replacement/refund service, price discount/gifts, and substantial economic compensation. The relational psychological contract strategy was measured using three items: admission, apology and immediate responses. Arousal was measured using three items (arousal behaviors, emotional response and purchase intentions) adapted from the research of Groeppel-Klein [40]. In the reference of the regulation scale of Dirks et al. [41] and Gillespie and Dietz [47], the latter emphasized the underlying mechanism for trust repair of both distrust regulation and trustworthiness demonstration, the regulation scale encompassed three items, control distrust (the vendor asked if I would accept the marketing information), display credibility (the vendor provided more accurate marketing information), and consumers' regulation perception (the vendor reduced over-marketing actions effectively). Participants answered on a five-point Likert scale ranging from strongly disagree (1) through neutral (3) to strongly agree (5). Since the participants were Chinese, the questionnaire was translated into Chinese to produce reliable answers. Two marketing professors and two m-commerce professionals, who are proficient in English and familiar with m-commerce, were asked to offer suggestions in examining the appropriateness of the Chinese-version scale. Finally, the re-examination for the measurements was repeated throughout the pre-test process. The above steps ensured that the questionnaire satisfied the content validity.

5. Analysis

5.1. Reliability and Validity

As shown in Table 2, composite reliability (CR) values were above the acceptable threshold of 0.70, indicating very good reliability. Loadings in excess of 0.71 are considered excellent, 0.55 good, and 0.45 fair [48]. In this study, all items but the minimum factor loadings (0.533) of the constructs loaded well. The square root of the AVE of all constructs was larger than all other correlations, suggesting that all constructs are distinct from each other (Table 3). In order to embody the specific experiment procedures and for brevity, the fit indices were displayed in Table 4, and they were all within a reasonable range, indicating the appropriateness of the research model.

Data were collected in three phases (before the trust decline, after the decline, and after the repair scenarios), which reduced the threat of CMB regarding process control to some extent [49]. To check for CMB after data collection, we added a general factor to the estimations [50]. Respectively, we took the trust decline triggered by service failures, inaction, and excessive actions; then, trust was repaired through the corresponding strategies to show the testing process of CMB. Two structural equation models were constructed, and the fitting results of the single-factor model encompassed the corresponding strategy and repaired trust were all clearly better than those of the two-factor model, indicating that CMB was not a serious concern in this study.

Table 2. Confirmatory factor analysis.

Variables	Competence		Integrity	
	Loadings	**t-Value**	**Loadings**	**t-Value**
Trust (CR = 0.798/0.884)			**Trust (CR = 0.912/0.920)**	
Item1	0.652/0.862	-	0.846/0.862	-
Item2	0.780/0.904	8.162/17.976	0.872/0.893	17.054/18.599
Item3	0.782/0.830	8.865/15.651	0.895/0.895	17.131/18.223
Item4	0.596/0.624	7.560/10.384	0.779/0.790	13.898/14.800
Transactional Strategy (CR = 0.734)			**Transactional Strategy (CR = 0.789)**	
Item1	0.533	-	0.669	-
Item2	0.819	6.412	0.762	8.932
Item3	0.709	6.757	0.780	8.549
Relational Strategy (CR = 0.796)			**Relational Strategy (CR = 0.814)**	
Item1	0.848	-	0.774	-
Item2	0.788	9.331	0.769	10.843
Item3	0.609	8.358	0.779	10.298
Variables	Inaction		Excessive actions	
	Loadings	**t-Value**	**Loadings**	**t-Value**
Trust (CR = 0.875)			**Trust (CR = 0.924)**	
Item1	0.801	-	0.870	-
Item2	0.846	14.141	0.894	19.110
Item3	0.850	13.885	0.888	18.122
Item4	0.688	10.640	0.816	15.871
Arousal (CR = 0.786)			**Regulation (CR = 0.803)**	
Item1	0.629	-	0.744	-
Item2	0.753	8.603	0.872	9.850
Item3	0.836	8.291	0.652	9.166

Note. The value after the slash represents the corresponding values when trust was repaired by the relational strategy.

Table 3. Construct correlations and comparison with the square root of AVE.

Variables	Competence				Integrity			
	Mean	**S.D.**	**1**	**2**	**Mean**	**S.D.**	**1**	**2**
1. Transactional Strategy	4.333	0.519	(0.697)		4.437	0.418	(0.849)	
2. Trust	3.975	0.442	0.181 **	(0.729)	1.464	0.452	−0.353 **	(0.746)
1. Relational Strategy	4.239	0.644	(0.755)		4.434	0.444	(0.861)	
2. Trust	1.946	0.631	−0.068	(0.812)	1.287	0.406	−0.395 **	(0.771)
Variables	Inaction				Excessive Actions			
	Mean	**S.D.**	**1**	**2**	**Mean**	**S.D.**	**1**	**2**
1. Arousal	3.874	0.628	(0.744)					
2. Trust	4.243	0.464	0.239 **	(0.832)				
1. Regulation					4.179	0.469	(0.762)	
2. Trust					4.170	0.569	0.286 **	(0.868)

Note. The value in parentheses represents the square root of AVE. ** $p < 0.01$.

Table 4. Results of regression analysis.

Hypothesized Path		Standardized Path Coefficient	t Value	*p*	Results
Competence	**Transactional Strategy→Trust**	0.220	2.272	0.023	H1a supported
	χ^2/df = 2.450, GFI = 0.970, CFI = 0.958, TFI = 0.933, RMSEA = 0.078, SRMR = 0.048				
	Relational Strategy→Trust	−0.087	−1.159	0.256	H1b not supported
	χ^2/df = 1.367, GFI = 0.979, CFI = 0.994, TFI = 0.990, RMSEA = 0.039, SRMR = 0.030				
	Transactional × Relational Strategy→Trust	0.039	5.181	***	H1c supported
	χ^2/df = 1.426, GFI = 0.978, CFI = 0.991, TFI = 0.986, RMSEA = 0.042, SRMR = 0.041				
Integrity	**Transactional Strategy→Trust**	−0.531	−5.103	***	H2a not supported
	χ^2/df = 1.865, GFI = 0.962, CFI = 0.987, TFI = 0.979, RMSEA = 0.060, SRMR = 0.035				
	Relational Strategy→Trust	−0.438	−5.972	***	H2b not supported
	χ^2/df = 1.726, GFI = 0.975, CFI = 0.990, TFI = 0.985, RMSEA = 0.072, SRMR = 0.055				
	Transactional × Relational Strategy→Trust	−0.082	−6.279	***	H2c not supported
	$\chi2/\text{df}$ = 1.552, GFI = 0.976, CFI = 0.994, TFI = 0.991, RMSEA = 0.048, SRMR = 0.029				
Inaction	**Arousal→Trust**	0.233	3.447	0.003	H3 supported
	χ^2/df = 2.124, GFI = 0.968, CFI = 0.979, TFI = 0.967, RMSEA = 0.069, SRMR = 0.058				
Excessive actions	**Regulation→Trust**	0.457	4.369	***	H4 supported
	χ^2/df = 2.344, GFI = 0.964, CFI = 0.982, TFI = 0.971, RMSEA = 0.075, SRMR = 0.035				

Note: *** *p*-value < 0.001.

5.2. Hypothesis Testing

Regression analysis was used in order to test the hypotheses of H1a–H1c, H2a–H2c, H3, and H4. Following the guideline of estimating the interactive effect of two independent variables on an outcome variable as recommended by Marsh et al. [51], we used the matched-pair method, thus forming the new indicator by multiplying according to the permutations of the matched factor loading values of the transactional and relational strategy. The complete results of the regression analyses are presented in Table 4, and these findings support H1a, H1c, H3, and H4, respectively; but for H2a, H2b, and H2c, the results show the negative significant effects of the transactional, relational and transactional × relational psychological contract on trust repairing.

In competence-based trust decline, the mean of three trust repair strategies, namely, the transactional, relational and transactional × relational psychological contract, were 3.975, 1.946 and 4.608, respectively. The results of one-way ANOVA analysis showed that the F value was 1756.558 (*p* < 0.001), indicating that at least one of the three strategies was significantly different to the other two. With the Bonferroni method, the difference between the mean post trust scores for the transactional and relational psychological contract strategies was 2.028 (*p* < 0.001), which indicated that the transactional strategy was more effective than the relational strategy in repairing trust. The mean value difference of post trust repaired by the transactional and transactional × relational psychological contract strategies was −0.633 (*p* < 0.001), which indicated that the transactional × relational strategy was more effective than the transactional strategy, thereby supporting H1d. The order of the positive effects of trust repair in a competence-based trust decline was as follows: the transactional × relational, transactional and relational psychological contract strategy. The results of the similar regression analyses in an integrity-based trust decline showed that H2d was supported, and the order of the negative effects of trust repair in the integrity-based trust decline was as follows: the relational, transactional and transactional × relational psychological contract strategy.

A pairwise *t*-test was used to examine the hypotheses of the paradoxical effect of consumers' trust repair in m-commerce. Table 5 shows that following competence-, inaction- and excessive actions-based trust decline, the prior and repaired trust are all significantly differed with *p* < 0.001. However, the mean values differences between repaired trust and prior trust were −0.9122, −0.288, −0.654 and −0.727, respectively, indicating that the mean values of the repaired trust were significantly lower than the prior trust. Combining with H1b and H2 were not validated in the previous content, therefore, H5a, H5b, H5c, and H5d were all not supported.

Table 5. Results of the pairwise *t*-test.

Repairing Strategy	Mean Difference	Standard Deviation	Standard Error	T	df	Significance (Double Tails)
Transactional Strategy	−0.922	0.484	0.031	−29.418	237	0.000
Transactional × Relational Strategy	−0.288	0.505	0.033	−8.833	237	0.000
Arousal	−0.654	0.526	0.034	−19.184	237	0.000
Regulation	−0.727	0.587	0.038	−19.094	237	0.000

6. Discussion

6.1. Trust Repair in Competence vs. Integrity Trust Violation

The results of H1 and H2 indicate that, in m-commerce, the fulfillment of the psychological contract for compensation has a significantly positive impact on trust repair following a competence violation; contrary to our initial hypothesis, following an integrity violation, the fulfillment of the psychological contract has a significantly not positive but negative effect. Since consumers identify the strategies of the fulfillment of both the transactional and relational psychological contract for compensation (the mean of these two strategies following a competence violation was 4.333 and 4.239, and that of an integrity violation was 4.437 and 4.434, respectively); however, the identification of repair strategies does not always change into re-trust towards m-vendors, and, as such, the question arises as to why trust can be repaired following a competence violation but cannot be repaired following an integrity violation. As many studies have discussed [41,52,53], when trust violation is due to a lapse of integrity rather than due to a lapse of competence, trust is hardly repaired because the violation causes are stable, and the violation will occur again. Hence, it is logical that we can obtain the same conclusions in m-commerce. Interestingly, it is most perplexing that the results of H2 indicated that after integrity violations in m-commerce, trust and the strategy of fulfillment of psychological contracts for compensation are linked with a negative relationship, thus revealing the "boomerang effect" in which the more the m-vendors repair, the more the trust decreases.

By returning the survey to the participants after the experiment, a considerable number of them said that the mobile trust breakers were supposed to provide the transactional or relational compensation, which was manifested in the form of the psychological contract. Moreover, they used the words of "tricks", "swindle", or "gimmicks" to describe the trust breakers' repair behaviors. More specifically, they used the phases of "afraid of communication, an unsought confession" to describe what they perceived only when the transactional strategy was used, and they used "cheater, big fake or want to deceive again" only when the relational strategy was used. Additionally, they used the sentence "my judgment will not change" when both the transactional and relational strategy were used. Clearly, the lower level of trust cognition was motivated together with the repair strategies towards an integrity trust violation.

An explanation for this may be attributed to consumer psychological reactance evoked by trust repair strategies. Consumers psychological reactance means that consumers perceive the externally imposed influence and regard it as a threat to freedom, thus entailing overreaction, or moving in the direction opposite to the influence efforts [54]. Koslow [55] has shown that consumer skepticism may evolve as a defensive coping and reactance

response to pervasive advertising attempts, even if they do not have the rational reasons for doing so. Analogous to consumer psychological reactance caused by advertising, as an integrity trust violation occurs, the stereotyping of the violators' deliberate acts of wrongdoing obviously makes consumers perceive more manipulative intentions (for the purpose of repurchase and profits) behind the trust repair. Thus, psychological reactance occurs in this situation, which further deteriorates the low trust level.

This novel finding has important theoretical implications that sheds some light on how consumers' subtle psychological state operates in relation to integrity-type trust repair, hence contributing new knowledge in the trust repair literature. Moreover, this study provides an empirical evidence to reinforce the meaning of the ethics of businessmen—not knowingly to do harm [56]. For practical implications, this finding suggests that mobile marketers must understand that the best thing for them is to avoid opportunistic actions of integrity-based trust violations rather than to respond to the failure with repair strategies, which not only fails to elicit more trust but may also even decreases trust.

Regarding reparative power, our findings show that following a competence trust violation, the sequence of the positive effects of the repair strategies of psychological contracts on trust is as follows: transactional × relational, transactional, and relational (supporting H1a, H1c and H1d; rejecting H1b). In contrast, following an integrity violation, the sequence of the negative effects is as follows: relational, transactional, and transactional × relational (supporting H2a, H2b and H2c oppositely; supporting H2d). The results demonstrate that in the calculus-based trust repair of m-commerce, the strategy of fulfillment of the transactional psychological contract for compensation exerts the most critical and universally useful effects on the trustworthiness judgment, because the transactional strategy provides a basis for benefits for rebuilding trust. Moreover, there is a significant transactional-by-relational strategy interaction effect, such that the relational strategy magnifies the repair effect of the transactional strategy.

In contrast to prior research that only regards the single affective strategy or the simultaneous tangible and affective strategy for repairing trust in buyer–seller relationships [12–14], our findings further expand on these insights by revealing the sequence of the tangible and affective strategy by focusing on the transactional psychological contract for compensation. In addition, several studies reveal that the single affective strategy is the appropriate trust-repaired strategy for competence or integrity trust violations [12,13]. Nevertheless, the present study reached different conclusions: the fulfillment of the transactional psychological contract for compensation (tangible strategy) must be warranted, and then the relational psychological contract (affective strategy) has a function. The reason for this lies in the cognitive benefits that play a critical role in trust repair due to the calculative nature of trust in the purely economic environment of m-commerce. These findings enhance our understanding that each stage's nature of trust clarifies its repairing emphasis, thus enriching trust theory.

A practical implication for m-vendors is that the central role of the fulfillment of the transactional contract, rather than of the relational psychological contract, for compensation should be underlined, and a substantial offer of compensation rather than "sweet talk" alone should be provided in order to repair trust. We also propose that on the basis of the transactional strategy, it can be even more powerful when combined with relational strategies, such as "icing the cake".

6.2. Trust Repair in Inaction and Excessive Actions Trust Decline

Our study also focuses on trust repair after a gradual trust decline with time: inaction and excessive actions, which the existing trust repair literature regarding buyer–vendor relationships has ignored. H3 was verified, as arousal had significant effects on repaired trust triggered by inaction. This finding suggests that regarding the natural dissolution of trust decline caused by inaction, m-vendors should not let it be, just "give up", and not think any act of repair would be effective. In this sense, m-vendors may arouse consumers' benefit requirements by distributing promotional information, special discounts, or electronic

coupons through appropriate instant messages or calls, thereby rebuilding trust with "rewards" that meet the requirements of the consumers' benefits.

In CBT, this form of trust is grounded not only in the rewards to be derived from preserving it but also in the fear of punishment for violation [7]. H4 was verified, as regulation had significant effects on repaired trust triggered by excessive actions. The result also has implications for the operating platform of m-commerce. Gillespie and Dietz [47] identified two complementary mechanisms that underlie trust repair: distrust regulation and trustworthiness demonstration, the former acting by punishing the faults that lead to the failure, and the latter representing attainment of a sense of hope, faith, and assurance through improved desirable actions. In m-commerce, as consumer trust decline is triggered by excessive actions, the regulation strategy is conducted for the purpose of applying these two complementary mechanisms in order to protect and increase consumers' benefits. It is recommended that rules be established on the platform for distrust regulation, for example, not sending marketing information without consumers' consent and appropriate punishment. Furthermore, consumers should be encouraged to perceive the platform's regulation actions aims of trust demonstration, for example, shielding spam information or providing useful marketing information in a precise (rather than bombarding) manner.

6.3. Trust Repair Paradox

The present results show that repairing strategies pertaining benefits can prove to be a critical factor that determines whether consumer trust may be effectively repaired, with the except of an integrity violation. However, the results of H5 show that the trust repair paradox has not been verified in m-commerce. Eventually, when trusting again, the repaired trust is below the prior trust level, and a complete recovery of trust to its former state may not be possible. This finding suggests that in m-commerce, consumers may rebuild destroyed trust after appropriate repairing, but not all is forgotten.

Our work is an initial study about the trust repair paradox in m-commerce. As Lewicki and Brinsfield [18] note, the repaired trust may include elements of distrust and hence may be "healthier" than pristine trust because the victim may be more cautious in future interactions. On the one hand, the repaired trust of a healthier level provides personal assurance for consumers with a more rational and beneficial relationship with m-vendors, while, on the other hand, for m-vendors, consumers' repaired trust is less beneficial in comparison with the unbroken trust for promoting transactions. Therefore, m-vendors should try to take measures to prevent any actions which may cause trust decline.

7. Conclusions, Limitations and Future Research

The existing literature lacks analyses of trust repair specifically for m-commerce. This study can fill the research gap and develops a trust repair model in m-commerce. The nature of trust in each stage helps to clarify its appropriate repairing emphasis. In conclusion, we return to our basic premise with a significantly enhanced perspective: in exchange relations of m-commerce, consumer trust is a calculus-based trust; thus, the trust-repairing belief of "benefits first", in which cognitive benefits play a critical role in trust recalibration, is established. "Benefits first" determines the corresponding trust repair strategies and can explain why these reparative strategies work in three typical m-commerce situations of service failure, inaction, and excessive actions-based trust decline. Specifically, this study supplements previous research by proposing and verifying that the fulfillment of psychological contract for compensation (basic transactional type and supplementary relational type), arousal, and regulation are the three appropriate repair strategies for trust declines of competence, inaction, and excessive actions, respectively. Combined, these repairing strategies constitute fundamental guidelines for how vendors should handle consumer trust repair in m-commerce. As some past work has shown that trust cannot be repaired in an integrity-based trust decline, this study also supports this result but further revealed the "boomerang effects" in m-commerce trust repair caused by integrity violations, in which the more m-vendors try to repair, the more the trust decreases.

Furthermore, in m-commerce, the trust repair paradox is not verified, and consumers' trust can never fully recover.

In view of the attribution of consumers' trust decline in m-commerce, four typical situations are examined in this study: competence, integrity, inaction, and excessive actions-based trust decline. However, there may be some other causes of trust decline, such as service failure concerning matters of the third party (i.e., express companies), or privacy breaches (i.e., unauthorized personal information disclosure). Hence, it is necessary to explore the repair strategies and effects in additional scenarios involving different types of trust decline. The magnitude of harm of trust violation has important implications for how trust can be repaired [18]. To test the research hypotheses concerning service failures, this study conducted an experiment only using Nike sport shoes, which represented a product that caused actual loss but no significant harm to consumers. This, in turn, provides a starting point for future studies, in which products with value variation according to the severity of service failures can be used to investigate and compare consumers' responses.

In addition, future work may refine trust repair at different levels of relationship decline. As a minimal level of typical CBT, consumers' trust towards m-vendors is a fragile type of trust, and it can quickly plunge to zero if there is a violation [7,25]. Rather, in m-commerce, consumers usually face the choices of over-rich products and have different "zero level" trust relationship with vendors, meaning that the ending point of trust decline or the starting point of trust repair has its own nature in relation to the different degree of trust or distrust. Accordingly, future studies on trust repair can be undertaken from the perspective of different trust decline levels of total distrust (confident negative expectation), a no-trust and no-distrust condition (a neutral expectation condition), and ambivalence (simultaneous presence of trust and distrust). Additionally, trust is a dynamic construct, and longitudinal studies play an important role in trust research. CBT embodies the relatively short term or long duration based on the rational calculation of benefits and costs [7]; indeed, full trust repair is likely to be a complex process, and the repair effects may involve time, even in professional other than personal relationships. The present study focuses solely on verifying the short-term effects of the repair strategies in the CBT relationship of m-commerce, and, therefore, a longitudinal study of the long-term effectiveness and viability of these strategies should be conducted.

Perhaps the most interesting finding of the study is the "boomerang effect", in which trust repair leads to a further deteriorated level of trust perception; however, the "boomerang effect" in regard to the specific type of integrity failure is probably related to the low social trust in China. As noted above, the sample used was restricted to university students enrolled in one course, all of which were of Chinese nationality. Fukuyama [57] has described China as a low-trust society. Su et al. [58] found that economic development in China has provoked a state of generalized social anomy, thus leading to a serious crisis of decline in social trust. The low social trust of Chinese society may have significantly influenced the participants' over-responses in the case of integrity trust violation. As previously discussed, psychological reactance theory provided an explanation for the "boomerang effect" in trust repair. The importance of a threatened freedom, costs of resistance, and the influence of threat altogether determine the magnitude of reactance [59]. In this research, the participants were freedom-preferring university students that were in a safe m-commerce environment without facial interactions, and, hence, the participants may have experienced relatively more reactance. Thus, for future research, it may be interesting to use samples including individuals from different countries or with different ages to test the effects of these socio-demographic variables.

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Appendix A. The Instrument

Construct	Items
Trust	1. The m-vendor can meet my needs. 2. I feel comfort to transact with the m-vendor. 3. The m-vendor is of integrity. 4. The m-vendor concerns about consumers' benefits.
Transactional psychological contract	1. The m-vendor provides free exchange or a refund service. 2. The m-vendor provides price discount or gifts. 3. The m-vendor provides tangible economic compensation.
Relational psychological contract	1. The m-vendor admits his/her service failure. 2. The m-vendor makes an obvious apology. 3. The m-vendor responds with timeliness.
Arousal	1. The m-vendor offers special discounts to old consumers. 2. I feel familiar to purchase from the m-vendor. 3. I pay attention to the transaction with the m-vendor when needed.
Regulation	1. The m-vendor asks if I would like to receive marketing information. 2. The m-vendor effectively reduces over-marketing behavior. 3. The m-vendor provides accurate marketing information.

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