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Transfer of electronic commerce trust between physical and virtual environments: experimental effects of structural assurance and situational normality

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Abstract Although there is a considerable body of empirical evidence on the subject of electronic commerce trust, most of it is correlational evidence based on field surveys, and very little attention has been given to causal effects of how participants in electronic markets transfer their trust beliefs between physical and virtual environments. Research has previously established that structural assurance and situational normality have differential effects on vendor and technology-based trust. Generalized expectancies are used as a theory for understanding how people trust and transfer trust in the context of electronic commerce technologies. In theory, there should be differential cause-and-effect relationships between trust antecedents and transfer of trust between physical and virtual environments. This study reports the results of a randomized experiment on the effects of structural assurance and situational normality on the transfer of electronic commerce trust between physical and virtual environments. A pretest-treatment-posttest design using MANOVA revealed that structural assurance, situational normality, and direction of transfer have differential effects on vendor-based trust and technology-based trust. Structural assurance prevents loss of trust in physical-to-virtual transfers, and both situational normality

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and structural assurance cause increases in trust for virtual-to-physical transfers for technology-based trust, but not necessarily for vendor-based trust. The results indicate significant differences between how trust operates in physical-to-virtual transfers versus virtual-to-physical transfers.

Keywords Trust transfer · Structural assurance · Situational normality · Vendor-based trust · Technology-based trust · Generalized expectancies · E-commerce trust · Initial trust

1 Introduction

The advent of e-commerce in the early Internet era triggered sweeping transformations across the modern business landscape. More than 20 years later, the landscape is still undergoing earth-moving shifts. The media portrays the illusion that retail has already changed: stores have closed and malls have emptied, although the numbers tell a different story. E-commerce represents only 8.9% of total sales, but it is growing at a rate of 16.2% which is almost four times greater than the average growth of total retail sales of 4.1% [76]. Change continues to occur because of the growth of Internet-connected tools which facilitate our ability buy online [26]. The biggest change in recent years may be the development of smartphones and the apps they can host. A merger of digital and offline is occurring, and businesses are learning to take advantage of this foreign, new world [66]. For example, Starbucks' mobile app now accounts for 30% of its sales, which offers customers convenience and discount coupons; it also stores a plethora of data and transactions for the benefit big data analytics [66]. In other words, e-commerce is still very much an evolving and developing aspect of business that has yet to reach maturity.

Many organizations are now adopting "click and brick" distribution paths. Both paths require different strategies to effectively support this business model, and these could also differ according the organization's primary distribution path [49]. Online "click" business models offer lower inventory costs but longer delivery times and organizations must find balance between these costs. By comparison, brick-and-mortar business models must balance the risks and costs of stock and stockouts in order to offer instantaneous on-the-spot purchases. Amazon, the online behemoth and e-commerce king, is one example of an organization looking to enter this new digital and offline frontier. They are slowly building physical retail outlets and have purchased 460 Whole Foods stores as they redefine their business model and leverage their online strengths and success for the offline commerce world [80].

Commerce can only occur because of trust. Trading partners must rely on each other to complete their side of the bargain, and risk losing their side of the bargain if their counter party fails to act appropriately. Traditionally, traders will look for evidence which signals the trustworthiness of potential trade partners, such as visibility of trade products, personal interactions which demonstrate their integrity and reliability, and mechanisms which will assist the completion of an instant sale, such as cash tills or EFPTOS. These trust signals are visible in the brick and mortar environment.

E-commerce trade fosters less trust and greater uncertainty as it increases the risk of trading partners being opportunistic and failing to deliver their side of the trade. This risk increases from traditional brick and mortar trades because there is no physical location for individuals to visit to ensure a potential trader and their merchandise exists, no products to touch or test, and no salespersons to interact with and question. The online environment of e-commerce also means transactions generally occur between strangers who have little or no knowledge or experience of each other and who may be located anywhere in the world [4, 17, 20, 32–34, 55]. Consequently, e-commerce is blind, borderless, ever present, non-instantaneous, with delivery often arriving after purchase, and entrance and exit barriers significantly less than the traditional brick-and-mortar commerce environment [1]. E-commerce is similar to the purchase of services, because consumers are unable to objectively evaluate a virtual vendors' trustworthiness and must rely on cues, which in the case of e-commerce are based on technical functionality and design [8].

Though there is theoretical justification and observational evidence of how people transfer trust between physical and virtual environments, research about virtual-to-physical transfers is rare [48], and there has not been much research that compares the two directly, especially with regard to experimentally-controlled effects. Research suggests trust is formed differently in physical spaces than it is in virtual spaces [75]. This is reflected by the distinction made between vendor-based and technology-based trust in the research literature [61], and the differential effects structural assurance and situational normality have on vendor- and technology-based trust [81]. Structural assurance (i.e., features in a virtual marketplace to minimize concerns over safety and security) and situational normality (perceptions that a transaction appears normal) are of particular interest, since they are associated with strong differential effects between physical and virtual markets; structural assurance is theorized to be more important in virtual markets, while situational normality is theorized to be more important for physical markets [81], though this has not yet been tested in a controlled experimental setting between physical and virtual environments.

For the same reasons that structural assurance and situational normality are of interest as causes, so vendor-based trust and technology-based trust are of interest as effects [32, 36, 61, 81]. Specifically, vendor-based trust (i.e., benevolence, integrity, and ability) is theorized to operate more strongly in physical environments where person-to-person contact between buyers and sellers cultivates trust [32, 36], and technology-based trust (i.e., functionality, reliability, and effectiveness) is theorized to operate more strongly in virtual environments, where interaction is primarily between the buyer and the vendor's virtual storefront, rather than the vendor's people [61].

Social cognitive theory also proposes the concept of "generalized expectancies," which is about how people in unfamiliar situations generalize expectancies from previously-encountered familiar situations and modify their behavior accordingly [6, 7, 56, 70]. Although generalized expectancies might seem to be a prime candidate for how people form trust in virtual spaces, non-personal contexts, and inanimate technologies, it has been largely overlooked by the trust literature until recently [56].

Therefore, our paper expands prior theories and tests a causal theory about how trust and its antecedents transfer from the virtual to the physical environment, and vice versa. We propose the research questions:

RQ1: How do people transfer trust from physical to virtual environments and vice versa?
RQ2: What are the causal mechanisms for transfer of trust between physical and virtual environments?

We anticipate both theoretical and practical contributions for this research. Theoretical contributions are anticipated both concerning the causal mappings of how trust transfers between physical and virtual environments, and insight into the mechanism for its transfer. Practical contributions are anticipated concerning the design of virtual marketplaces so as to facilitate the transfer of trust between the more familiar, high-contact consumer-vendor experience of people and the low-contact virtual environment.

2 Literature review

2.1 Trust

Trust is the belief that another individual or entity will not behave opportunistically in an uncertain situation [16, 18, 55]. Trusting relationships assume some level of risk and dependence on another party [79]. Therefore, for individuals to be trusting they need to be vulnerable and accept the risk that comes from an inability to control the trustee or situation [55].

The role of trust has greater significance and bearing in the ethereal virtual environment than in the physical environment [5]. This is due to of the lack of physical cues that people often rely on for trust formation which 'reduces uncertainty or expectations of opportunistic behavior' [45, 65: p. 45]. Therefore, buyers in the virtual environment may be less trusting and more sensitive to other potential indicators of trust, such as photos, buyer reviews, seller communications, guarantees, accurate product information, and ability to complete transactions [21, 24, 46].

Trust directly increases purchase intentions in buyer–seller relationships [31, 32] through reduced perceived risk [39, 41, 42]. A lack of trust heralds market failure for sellers [37]. As said by Reichheld and Schefter [68: p. 107], 'Price does not rule the Web; trust does.' When trust exists, long term relationships form between buyers and sellers and both parties are able to take mutual advantage of the virtual e-commerce environment. Or, in the words of Lee, Kang and McKnight [48: p. 729], '[Trust] allows partners to transcend short-run inequities or risks to concentrate on long-term profits or gains.'

2.1.1 Vendor-based trust

Vendor-based trust refers to the trust beliefs consumers have in vendors. Vendor-based trust beliefs are comprised of benevolence, integrity and ability [11, 20, 32,

86]. Benevolence is the belief that a vendor has a customer's best interest in mind as part of their business practice; integrity is the belief that a vendor is ethical and honest in their business conduct, and; ability is the belief that a vendor has the necessary skills and competence to act in a trustworthy manner [32]. The strength of these trust beliefs often forms over time as familiarity and experience increase [57, 70].

In e-commerce, customer trust beliefs form in the context of the virtual environment, within the bounds of the person's tendencies and perceptions of the environment [59]. For example, customers' purchase intentions are affected by the amount of information in the marketplace, which is reinforced by previous Internet experience [74]. Individuals are also limited by the absence of physical evidence and vendor interactions which could otherwise support trust beliefs and encourage a transaction to take place. With such a high degree of uncertainty, vendor-based trust in the virtual environment may be dependent upon an individual's characteristics and propensity to trust [55, 58] as well as their prior internet experiences and the use of endorsements from third parties [59]. Similarly, the marketing literature argues that there are two distinct types of trust: benevolence and credibility [25, 31].

Following Bhattacharya et al. [13], Gambetta [30], McKnight et al. [17] and McKnight et al. [60], we define vendor-based trust as the subjective assessment of a buyer that a seller will perform a particular transaction according to the buyer's confident expectations in an environment characterized by uncertainty. It indicates that a potential buyer believes a seller will be dependable, ethical and socially appropriate [32, 39, 44, 88].

2.1.2 Technology-based trust

There is a growing body of literature that suggests people have trust issues with new and emerging technologies which would seem to predict that technology-based trust might not transfer well, not at all, or negatively from the physical to virtual environments. In the e-commerce literature, technology trust refers to the trust beliefs in the website of a virtual vendor, in the information technology system as a conduit to the vendor, and in any other marketplace technology the vendor uses such as payment systems, encryption methods or endorsement systems [36, 81].

Technology-based trust beliefs consist of functionality, reliability, and effectiveness, which are the technology-based counterparts of benevolence, integrity, and ability. According to McKnight et al. [61], functionality is the belief that the technology has the capabilities to complete its intended tasks; reliability refers to the belief that the technology will not fail, and effectiveness refers to the belief that the technology will operate when needed. Consumers in the e-commerce marketplace must trust that the marketplace technologies will accurately and successfully process their orders and payments so that the correct goods will be delivered and the transaction completed while protecting their personal and financial information. They must also trust that the mechanisms managing the vendor's third-party endorsements and feedback system are designed to serve their best interests, and that they are honest and free from manipulation.

In this research, we adopt the theoretical definition established by previous research [36, 81], that technology-based trust is defined as a buyer's perception that

conditions are in place to ensure appropriate technologies exist to facilitate a successful transaction [81], and that technology-based trust "is tied to the existence of third-party structures that are independent of dyadic actions" [65].

One of the problems related to technology-based trust is about how do people "trust" technology when trust is inherently a belief that we reserve for other people and their intentions. Do people trust the intentions of the technology's creators and managers, or do they trust the technology itself, or is there something else at work, such as anthropomorphism? There is some evidence that people exhibit trusting behavior with humanoid robots and AI systems that are designed to have a "personality," however, the existing theories of trust lack in their ability to explain how people trust inanimate technologies. Although previous research has defined functionality, reliability, and effectiveness as the virtual counterparts of benevolence, integrity, and ability, it does not provide an explanation for why this should be so.

"Generalized expectancies" refers to how patterns of behavior in unfamiliar situations are patterned after successful behavior that is generalized from previous familiar situations [6, 7, 56, 69, 70]. In this research, we theorize that generalized expectancies are the basis for the formation of technology-based trust. Generalized expectancies are expectations formed on the basis of previous similar experiences, which in the case of this research are the expectations formed in the initial market condition: physically-based expectations for physical-to-virtual transfers, and virtually-based expectations for virtual-to-physical transfers. As such, generalized expectancies provide an explanation for why people are able to trust an inanimate technology, specifically that people trust technology based on their previous similar experiences with other *people*, and especially people who are associated with the technology.

2.2 Trust transfer

Trust transfer may be generally defined as the extent to which trust in one context influences trust in another context [48], in our case the extent to which trust in a physical context affects trust in a virtual context, and vice versa. The transfer of trust from a known to an unknown entity is based on "relatedness," that is, their similarity, proximity, and common fate, and where the degree to which they form as a related group is defined as "entitativity" [19]. Entitativity explains how trust transfers to unknown members of a group because of the trust in the group and the members' common degree of relatedness [75, 84]. By definition, entitativity depends on group relationships and associations. Therefore, entitativity applies only to transfers of trust between two entities that share a common group membership or a similar association.

2.2.1 Deficiencies of previous trust transfer research

Although there has been much written about multichannel trust and transfer of trust between channels, there are some major deficiencies of previous trust transfer research. First of all, if the concept of transfer is to be defined in a meaningful

way, the definition of "transfer" must account for a sequence of events or contexts to represent the transfer of trust between them. The sequence of events or contexts must also be perceived as connected, not random or unrelated, as is required by the definition of entitativity. Surprisingly, there is much previous research that does not explicitly define "transfer" in this manner [e.g. 10, 43, 15], if it provides an explicit theoretical definition of transfer at all, but rather defines transfer more loosely as a relationship between events or contexts. Secondly, the vast majority of research that makes claims to investigate the transfer of trust either does not operationally control for the sequential connection between events or contexts, or gathers all the data from both events or contexts at the same point in time, for example in a cross-sectional field study design [e.g. 10, 48, 50, 52, 78]. These kinds of studies may demonstrate that trust in one context is related to trust in another context, but no conclusions may be made that the trust in one context influences or is transferred to another context. Thirdly, most previous research about trust transfer either takes place in only one context, or operationalizes transfer within a single context, thus obviating the possibility of making any meaningful conclusions about whether trust was indeed transferred between contexts [e.g. 10, 50, 52, 78]. Fourthly, although three types of e-trust transfer (and one type of offline-to-offline trust) have been identified based on whether trust is transferred within or between online and offline contexts [48], research has focused almost exclusively on the within-online [10, 50, 52] or offline-to-online contexts [48, 81]. Studies that investigate online-to-offline trust transfer are both rare and necessary in order to establish the relative effect size of the offline-to-online transfer effect. In other words, it is not very meaningful to say that trust transfer occurs from offline-to-online environments if the effect size is insignificant by comparison to that for online-to-offline trust, since trust would then be transferring without respect for context. This is also an obvious and critical omission from the research, since in the twenty first century marketplace the customer's experience often begins with a vendor's virtual presence first and then with the vendor's physical store, and there are also vendors whose first presence in the marketplace begins through its virtual store, which is then followed by the construction of physical stores, for instance, Amazon. Therefore, one of the contributions of this study will be to operationalize transfer in a manner that is consistent with its theoretical definition under controlled experimental conditions, and that will allow direct controlled comparisons of effect sizes to be made.

2.2.2 Trust transfer and generalized expectancies

Generalized expectancy theory does not require entitativity, although entitativity is a special case of generalized expectancy where the previous familiar situation is an instance of group membership or association. Generalized expectancies account for a broader range of contexts than entitativity, as we are likely to find in the context of e-commerce, and are therefore more substantive. As such, generalized expectancies may be used as a mechanism for explaining how trust is formed in novel or unfamiliar situations, as is often the case with the web, as long as behavior in the current context may be generalized from previously similar contexts [56]. Generalized expectancies and entitativity are not competing theories; rather, generalized

expectancies are a larger category of phenomena that includes entitativity. Consequently, generalized expectancies may be a theoretical vehicle to explain trust transfer between physical and virtual locations, where there is no perceived connection between the locations. For example, an online shopper might form trust in a completely new website, unassociated with any websites previously encountered, simply because the context in which the website is viewed is familiar, or seems similar to other contexts the shopper trusts [e.g., 50, 81], such as the context of a physical store with real people, or because of the shopper's previous Internet experiences [e.g., 74]. For another example, initial trust in mobile channels is transferred from trust in other previous online channels [50, 52, 78]. At face value, this transfer appears to occur on account of generalized expectancies rather than entitativity, which supports the theory that generalized expectancies are an appropriate theoretical vehicle to explain how people "trust" inanimate technologies by generalizing their previous similar experiences with humans. Therefore, in the context of e-commerce, we believe the formation and transfer of trust from a previous familiar context to a current context is an instance of generalized expectancy. With this in mind, the conceptualization of generalized expectancies as a more general category of phenomena that includes entitativity is a secondary contribution of our research.

A variety of other information plays a role in the development and transfer of trust which may also be relevant for generalized expectancies. For example, physical, brick-and-mortar sellers are perceived as more credible than virtual sellers when providing information [40, 51]. Signals used by physical retailers to infer product quality have greater credibility than signals used by virtual retailers because of their physical investments, which buyers consider more trustworthy [14]. Websites that show pictures of physical stores and list associated geographic addresses have been found to increase buying intentions [75], thus demonstrating the importance of physical cues, even in the virtual environment, in the transfer of trust.

Store location is also known to affect trust beliefs [28]. Individuals will transfer trust to an unknown store because of its association with another group of trusted stores [75]. This illustrates that greater perceived similarity and interaction between a trusted entity and an unknown entity can increase initial trusting beliefs in the unknown entity.

Interactivity is the frequency of interaction between retailer and customer and also impacts trust transfers. Greater levels of interactivity are correlated with greater levels of trust in both physical and virtual retailers [22]. There may also be carry-over effects for multi-channel retailers. For example, trust in physical environments may extend to virtual environments and vice versa [22]. Trust which is established in physical environments increased the likelihood of buyers dealing with the same retailers in a virtual environment [29]. This is likely attributable to the sense of permanence and security induced by the retailers' dual physical presence and possible human interaction available through their physical stores [73].This may make buyers feel more confident that retailers may be held accountable if issues occur [67].

Prior research on trust transfer from physical to virtual spaces shows that physical trust is positively related to flow because of the perceived sense of control and less uncertainty about the organization [48]. Physical trust is positively related to structural assurance online and indicates trust in the organization's ability to have

adequate safeguards in the virtual realm, since the organization is perceived to support its goods or services equally regardless of channel. (Note: Although expectation confirmation theory (ECT) has been proposed for websites [77], we did not include ECT because we are allowing consumption of the product in our study, and interaction with a physical store.)

Because virtual retailers' trust signals are less credible than physical retailers, they must supplement with other signals to improve vendor trust beliefs (e.g., reputation, customer testimonials, warranty, guarantees, return policy). Investing heavily in these signals may also lead to the perception of market leadership which could boost buyer trust and purchasing intentions.

Whether buyers have a positive or negative experience with a retailer (i.e. consensus information) affects both retail hybrids (firms having a physical and virtual presence) and virtual retailers. Physical retailers are less sensitive to negative buyer experiences, although this benefit becomes redundant when high consensus exists. For unknown retailers, a hybrid strategy is considered most beneficial to hedge against the consensus of buyer experience [12].

These are all various phenomena that are related to the transfer of trust. However, generalized expectancies have not been investigated in connection with trust transfer or its associated phenomena. Theoretically speaking, the object of trust has usually been considered to be a person or group of people in exclusivity, rather than a technology. Generalized expectancy theory provides a stable theoretical framework from which to theorize how trust may form and transfer to and from virtual environments based on peoples' prior experiences in similar situations, with people across different contexts.

Based on these considerations, we theorize vendor-based trust will transfer positively from the virtual store to the physical store because of the physical store's greater perceived permanence as result of its physical store locations, and it's tangible, living employees who can better foster interactivity. This will lead to the formation of generalized expectancies which will support stronger levels of trust. The reverse also will hold for technology-based trust. Specifically that technology-based trust will negatively transfer from the physical store to the virtual store because the virtual store's dependence on reliable infrastructure is perceived to be tied to a vendor's physical presence. Therefore, we hypothesize:

Hypothesis 1a Transfer of vendor-based trust will be more effective than the transfer of technology-based trust in transfers from the virtual to the physical environment.

Hypothesis 1b Transfer of technology-based trust will be less effective than the transfer of vendor-based trust in transfers from the physical to virtual environment.

2.3 Structural assurance and situational normality

Previous research has demonstrated that structural assurance and situational normality are dimensions of institution-based trust which are related to trust

in vendors who have a web-based presence [57]. Structural assurance refers to the features that exist in a virtual marketplace to minimize anxieties over safety and security, such as contracts, guarantees, buyer feedback or seals of approval [57, 72, 81]. It is the consumer's belief that the infrastructure will protect the integrity of their transaction. Situational normality is the extent to which a consumer perceives a transaction to appear "normal" [57, 81]. It includes the extent to which a consumer believes they are in an organized, properly ordered environment which appears likely to ensure a successful interaction [58]. Previous research has identified that structural assurance and situational normality cause differential effects on both vendor-based and technology-based trust [81]. However, the effects of structural assurance and situational normality are not well understood in the context of transfer of trust between physical and virtual environments.

2.3.1 Structural assurance

Structural assurances help reduce uncertainty in trusting situations [58] and have a positive effect on vendor-based trust and technology-based trust in the context of e-commerce [81]. Structural assurance has been shown to influence trust in fashion clothing and jewelry [82], banking [63], mobile commerce [2, 83], mobile banking [53, 85, 87], and online banking where paper statements were treated as a structural assurance [62]. Feedback from other buyers has also been found to have a positive effect on trust [3]. Flow, the optimal experience with a task, and structural assurance may also result from trust transfer in a physical retailer [48], which implies that previous similar experiences which form the basis of generalized expectancies may also affect the formation of structural assurances.

In physical environment transfers, structural assurances may be gleaned from consumer protections, and grounded in statute or company policy. Products are available for inspection, vendors are available for discernment, questioning and bargaining, and a name, brand and shopfront can be found physically rooted in the earth, whom unhappy buyers could petition and caution others against if need be–unlike the faceless, virtual vendors who have the power to disappear and reemerge under new aliases. In virtual transfers, consumers have less power. This characteristic of the Internet and virtual environment is ubiquitous; it lacks some of the legal enforceability and accountability that is present in physical environments. Structural assurances are fewer, and those that do exist are subject to customer scrutiny and, ironically, customers' evaluations of trust and reliability. In theory, structural assurance will enhance trust in, and the transfer of trust to the virtual or online environment more than situational normality. Therefore, we hypothesize:

Hypothesis 2 Structural assurance will be more effective than situational normality in physical to virtual transfers on vendor-based and technology-based trust.

2.3.2 Situational normality

In physical environments, situational normality refers to how trust beliefs can be based on a wide range of evidence: observations, perceptions, human interactions, and familiarity. Hence, consumers may be less likely to engage transactions in more unconventional or unusual environments as trust beliefs are affected by the uncertainty associated with the lack of situational normality. The virtual marketplace is an already uncertain environment, where evidence to support trusting beliefs is scarce by comparison to the physical marketplace. In such a context, familiarity and previous experience bear significant weight [32, 74] and suggest that consumers will be more sensitive to perceptions of situational normality to reproduce successful transactions. Recommendations of trusted people and third parties are also related to trust formation and continued usage in a virtual environment [10, 78]. In the physical world, we rely on our senses, more especially our visual acuity, which can aid in determining trust in a brick-and-mortar location. In theory, situational normality will be more effective in the formation of trust in, and the transfer of trust to the physical environment. Therefore, we hypothesize:

Hypothesis 3 Situational normality will be more effective than structural assurance for virtual to physical transfers on vendor-based and technology-based trust.

2.4 Research model

Accordingly, the research model adopted is represented in Fig. 1. The research model depicts main effects for both the direction of transfer (H1a and H1b) and the institutional trust variables structural assurance and situational normality (H2 and H3). We found no theoretical evidence to suggest an interaction between the direction of transfer and the institutional trust variables. Therefore, no interaction is hypothesized. Such an interaction, if it exists, would result in differing effect sizes of mean differences between physical-to-virtual and virtual-to-physical

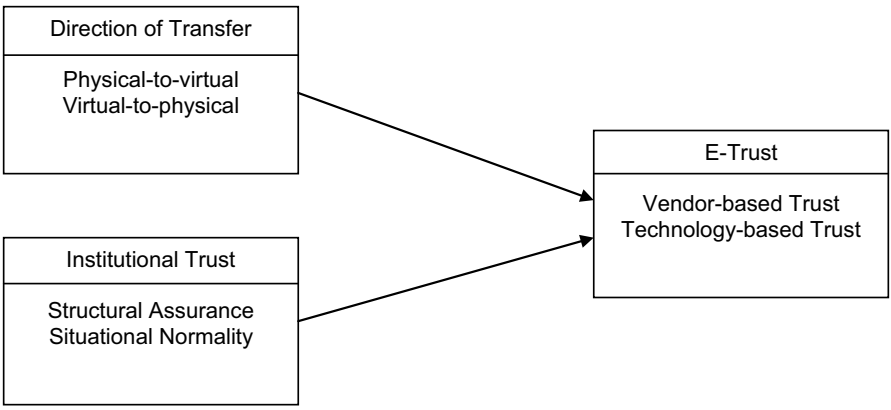

Fig. 1 Research model

transfers. However, the lack of theoretical evidence may be on account of the general lack of theory concerning trust transfer effects between physical and virtual environments, and therefore we will explore the possibility by conducting a test for interaction.

3 Methodology

3.1 Experimental design

A fully randomized, two-factor, paired difference experimental design with controls was employed (Table 1) to test both directions of transfer (virtual-to-physical and physical-to-virtual transfer) and measure the transaction context (structural assurance and situational normality). Subjects (students) were presented with scenarios about buying textbooks in either a physical bookstore or a virtual bookstore associated with the physical bookstore ("Appendix A"). The bookstore scenario was chosen because many students purchase textbooks online, and are familiar with the contexts of interaction.

Physical-to-virtual transfer was operationalized by first instructing subjects to read a scenario relating to a physical store before testing them with the vendor and technology-based trust instruments to measure their trust levels as a pre-test. They were then instructed to read a second [treatment] scenario describing the physical store's (virtual) website and testing them with the same instrumentation for vendor and technology-based trust. Similarly, the virtual-to-physical transfer was operationalized by asking subjects to read the virtual store scenario first, followed by the scenario for the physical store ("Appendix A"). Subjects were randomly treated for either the virtual to physical treatment or the physical to virtual treatment, but not both. Structural assurance and situational normality were operationalized in the scenarios as descriptions regarding the scenarios' context of relating to either a virtual or a physical store, for each direction of transfer that was tested. The control condition contained only a basic description of the store with no information about either structural assurance or situational normality.

Table 1 Experimental design, with treatments

	Physical to virtual	Virtual to physical
Control	Physical pretest No treatment (store description) Virtual posttest	Virtual pretest No treatment (store description) Physical posttest
Structural assurance	Physical pretest Structural assurance treatment Virtual posttest	Virtual pretest Structural assurance treatment Physical posttest
Situational normality	Physical pretest Situational normality treatment Virtual posttest	Virtual pretest Situational normality treatment Physical posttest

3.2 Subjects

A total of n = 263 experimental subjects were included in this study. Subjects were undergraduate students at two universities in the south-east U.S with all subjects indicating prior experience in the campus textbook market. 67% of subjects had purchased a textbook over the Internet and 96% of subjects have a history of Internet purchasing experiences.

Although the use of students in experimental designs is often criticized for being unrealistic and producing ungeneralizable results, there are several considerations that argue against those critiques. First of all, experiments make no claims to be generalizable or realistic, since their primary purpose is to test causality, to examine whether or not relationships exist between variables, and to measure with precision the relative effect sizes of relationships between variables [64]. In other words, experiments are concerned with the effects of treatments, not characteristics of people or populations; experiments excel at establishing *internal* validity, whereas studies of a population excel at establishing *external* validity. Secondly, even if generalizability were a concern in an experiment, previous research has demonstrated that the use of students in trust-related research yields results similar to research conducted with more representative samples of people [70]. Furthermore, previous research has shown that students are in fact relatively representative of the population of internet consumers with regard to trust beliefs, and are credible users of internet marketplaces [81], which is also confirmed by the 96% rate of subjects in this research who have prior internet purchasing experience. Finally, the use of students in experiments establishes de-facto controls for the effects of a wide variety of demographic and socio-economic variables that may interfere with the effects of the experimental treatments, and pose threats to the internal validity of the experimental findings. For these reasons, we chose to use students as an appropriate pool of test subjects for experimentation on internet trust.

3.3 Instrumentation

Vendor-based and technology-based trust were used as the study's dependent variables ("Appendix A") and measured with instrumentation validated in previous research, and which has consistently shown adequate reliability by Cronbach's Alpha ($\alpha > 0.70$) and discriminant validity as demonstrated by factor analysis [32, 33, 57, 81]. Summated rating scales were chosen because they are a better fit for the MANOVA procedure than the scales that were developed for latent variable models in other e-trust research. Instruments were measured using a seven-point Likert scale, anchored by strongly disagree (one) and strongly agree (seven). Vendor-based trust was measured with eight items and technology-based trust was measured with four items. The instrumentation for vendor-based trust used a knowledge-based trust scale which included benevolence, integrity and ability trust beliefs [34, 81]. Technology-based trust was measured using a general institution-based trust subscale that included information about functionality, reliability, and effectiveness [57] that

was subsequently modified to include statements about website security, encryption and related technological 'safety' features [81]. All instrumentation was adapted to fit the overall context of the experiment and the specifics of the treatments.

Consumers' initial level of trust and familiarity with the Internet were measured and controlled for as covariates. Prior research has demonstrated that some consumers may be naturally more inclined to trust than others. That is, consumers may approach situations with varying levels of initial trust [57, 58, 81]. In this context, initial trust is defined as the trust a consumer has in an unfamiliar stimulus [81]; it is one's general propensity to trust [47] and is affected by store location [28, 81]. Initial trust was operationalized using a four item instrument using a general-trust scale. All instruments were measured using a seven point Likert scale, anchored by strongly disagree (one) and strongly agree (seven) [23, 47, 81]. Familiarity with the Internet was also operationalized using instrumentation validated in prior research [81]. Familiarity or comfort with Internet shopping is a four-item six-point summed Likert-type scale anchored with not at all familiar (one) and very familiar (seven). The familiarity and previous experience instruments also operationalize the concept of generalized expectancies, and will serve as covariates for uncontrollable sources of generalized expectancies.

3.4 Experimental procedure

A pretest-treatment-posttest design was employed. Subjects were provided the instructions for the experiment with the treatment and questionnaire for the first scenario before the treatment and questionnaire for the second scenario. The questionnaire included the instruments to measure vendor and technology-based trust, and the covariates.

Subjects were encouraged to carefully read and consider the questionnaire instructions and scenarios before recording their responses to promote strong manipulation validity. They were also instructed not to discuss the contents of the questionnaire, or look at anyone else's while the experiment was in session. Subjects were monitored to ensure this. After the initial instruction, the treatments were randomly assigned and administered to the subjects. Once subjects completed the questionnaires, they were immediately returned to control for any threats to internal validity that might result from subjects' sharing information about the experiment.

3.5 Treatments

Treatments consisted of written scenarios relating to the physical and virtual electronic marketplaces and developed so as to operationalize control, structural assurance, and situational normality conditions ("Appendix B"). Scenarios are a common form of experimental treatment where peoples' beliefs are of interest as dependent variables. The direction of transfer was operationalized with a pretest-postest, paired-difference design by requiring subjects to be treated for one scenario relating to either physical or virtual environments and measuring their trust beliefs (pretest)

before testing them with the alternate store environment and measuring their trust beliefs (posttest).

The context type was operationalized as a description of a textbook-buying scenario with either structural assurances or situational normality conditions, or no context description to act as a control condition. Generalized expectancy was operationalized by holding the vendor constant between treatments, while varying only the direction of transfer for each subject, thus allowing subjects to generalize from the initial information provided in a familiar situation about the vendor to the technology and vice versa. As mentioned previously, uncontrolled sources of generalized expectancies will be accounted for by using the familiarity and previous experience measures as covariates.

3.6 Pilot test

Before the primary data collection, the instrumentation and experimental procedure was pilot tested on a small group ($n = 12$) of graduate students. During the pilot phase, a panel of domain experts examined the treatments and agreed (inter-rater reliability = 100%) that the treatments adequately operationalized the treatment variables. The goals of the pilot test were to refine the treatments so as to represent valid instances of structural assurance and situational normality, and to adapt the instrumentation to fit both the physical and the virtual contexts of trust transfer. Specifically, participants in the pilot test provided both test data and focus group feedback about how well the treatments and measured scales fit the theoretical definitions of the constructs of interest, and their application in both the physical and virtual contexts of trust transfer. Feedback from the pilot test was used to make minor modifications to the instrumentation and procedure. Initial data supported the validity and reliability of the resulting instrumentation and its continued usage in the primary experimental procedure. The properties of the final instrumentation are reported subsequently in Sect. 4.

3.7 Manipulation validity

Tests were conducted for manipulation validity in accordance with best practice for experimental research designs. A manipulation check and a test for manipulation validity was administered after each test, i.e. the pretest and the posttest. Specifically, subjects were asked to report their belief about the extent to which each treatment matched a theoretical definition of either situational normality or structural assurance, as appropriate, and a follow-up at the end of the form which asked whether they understood that there were two treatments, one for a physical store, followed by the physical store's virtual storefront (or vice versa for virtual-to-physical). Approximately 76% of the subjects were found to be aware that the questionnaire instructions included the information provided in the treatments. This exceeds the rule of thumb that at least 50% of experiment subjects should be aware a treatment was administered [35].Tests of significance confirmed (with $\alpha < 0.05$) subjects believed the treatment scenarios represented instances of the independent variables,

indicating the experiment population believed the treatments represented relevant constructs of interest. These results are consistent with the outcomes of the pilot test, which also supported the validity of the treatments and contrasts represented by the measured scales. Based on these results, appropriate manipulation validity appears to exist and the treatments were effective at communicating two different retail scenarios for the physical and virtual environments.

4 Analysis

4.1 Descriptive statistics

Descriptive statistics for n, mean difference, and standard deviation across all groups of the independent variables can be found in Table 2. A Levene's Test of Equality of Error Variances was not significant for vendor or technology-based trust ($p < 0.09$ and $p < 0.74$ respectively). This indicates equal variance of the dependent variable for all groups in each scenario. Across all groups, vendor-based trust had $n = 263$ with a grand mean of $\mu = 0.25$ and a standard deviation of $s = 7.46$. For technology-based trust $n = 263$ with a grand mean of $\mu = 0.06$ and a standard deviation of $s = 5.83$. There were $n = 15$ observations invalidated on account of excessive missing values, > 3 s outliers, or failed manipulation check. This left a total of $n = 248$ subjects included in the primary data analysis.

4.2 Reliability and discriminant validity

Reliability and discriminant validity were re-examined and compared to the findings of previous research, and the instrumentation was subsequently re-validated for this study. Cronbach's alpha confirmed the reliability of the vendor and technology-based trust instruments were adequate, with $\alpha = 0.84$ and 0.92 respectively, and factor loadings demonstrated strong evidence of discriminant validity ("Appendix C"),

Table 2 Descriptive statistics by dependent variable

	Physical to virtual transfer			Virtual to physical transfer		
	Control	Structural assurance	Situational normality	Control	Structural assurance	Situational normality
Vendor-based trust						
N	46	39	45	45	41	42
Mean diff.	−0.89	0.28	−2.51	2.22	3.17	3.04
SD	5.99	7.70	6.03	5.22	4.95	4.65
Technology-based trust						
N	45	40	45	44	41	42
Mean diff.	−1.78	−0.80	−2.47	0.77	2.00	2.26
SD	4.60	5.45	5.34	3.85	4.10	5.18

given that all within-factor loadings significantly exceed the between-factor loadings. These results indicate both instrument scales are consistent with their properties as reported in previous research, and are adequate for experimental modeling as dependent variables.

4.3 Results

First, a test for interaction between institutional trust (control, situational normality, and structural assurance) and direction of transfer (physical-to-virtual and virtual-to-physical) was conducted. Although we did not theorize an interaction, this test was conducted to rule out the possibility. The model, trust = treatment + transfer + treatment x transfer, was tested for each dependent variable. The *p*-values for vendor and technology-based trust were insignificant ($\alpha = 0.05$). Since both interaction terms were insignificant, the interaction between the institutional trust treatments (i.e., control, structural assurance, and situational normality) and direction of transfer treatments was ruled out, and the analysis proceeded to an examination of the theorized main effects; physical-to-virtual and virtual-to-physical transfers will be evaluated separately, following the hypotheses. Although our theory did not anticipate that our covariates familiarity with the Internet, previous experience, and initial trust would have moderating effects, we nonetheless tested them all for moderation, and all tests were insignificant ($\alpha = 0.05$). Next, initial trust, previous experience, and familiarity with the Internet were tested as covariates, as planned. The *p*-values for initial trust, previous experience, and familiarity were insignificant ($\alpha = 0.05$), and therefore they were eliminated from further consideration.

To test the hypotheses, MANOVA will indicate whether there is a significant difference between the effect sizes of the control (Δ_c), structural assurance (Δ_{sa}), and situational normality (Δ_{sn}) treatments (H_0: $\Delta_c = \Delta_{sa} = \Delta_{sn}$; H_α: $\Delta_c \neq \Delta_{sa}$ or $\Delta_{sa} \neq \Delta_{sn}$ or $\Delta_{sn} \neq \Delta_c$), and paired-difference t-tests will indicate whether the treatments have an effect that is significantly different from zero (H_0: $\mu_\Delta = 0$; H_α: $\mu_\Delta \neq 0$).

4.3.1 Hypothesis 1a and 1b: trust transfer directions

The hypotheses proposed that the virtual-to-physical transfer of vendor trust is positive (hypothesis 1a) and physical-to-virtual transfer of technology trust is negative (hypothesis 1b). These hypotheses were tested using MANOVA procedures to compare the direction of trust transfers against each retail scenario and across both dependent variables simultaneously. T-tests were also used to individually test each direction of transfer for each dependent variable. The mean differences for each control group were then compared to t-tests against a null hypothesis (H_0: $\mu_\Delta = 0$; H_α: $\mu_\Delta \neq 0$) to test whether no difference is attributable to the direction of the trust transfer. These results are reported in Table 3 and illustrated in Figs. 2 and 3.

Wilks' Lambda, Pillai's Trace and the Hotelling-Lawley Trace were all significant ($p = 0.0067$). This indicates the combined dependent variables were significantly affected by the treatments and subjects were effectively treated. Both MANOVA

Table 3 Hypothesis 1: MANOVA and t-tests for direction of transfer results

Vendor-based trust			R^2	F	*p* value
MANOVA			0.15	14.03	**<0.0001**
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	n	SD	μ_Δ	T	*p* value
Physical to virtual	44	5.67	−1.27	1.49	0.144
Virtual to physical	44	5.27	2.27	2.86	**0.007**
Technology-based trust			R^2	F	*p* value
MANOVA			0.15	13.93	**<0.0001**
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	n	SD	μ_Δ	T	*p* value
Physical to virtual	44	4.63	−1.70	2.44	**0.019**
Virtual to physical	44	4.48	1.13	1.68	0.100

Bold values are significant at $p < 0.05$

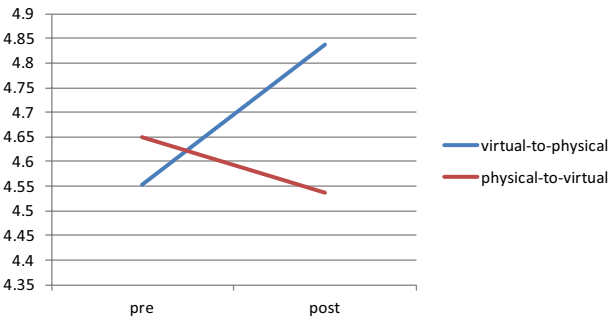

Fig. 2 H1a: transfer of vendor trust

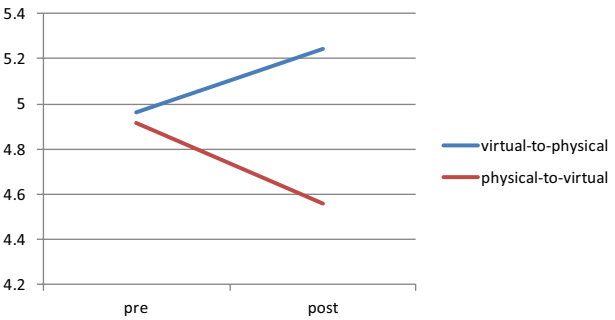

Fig. 3 HIb: transfer of technology trust

tests are significant, and the mean differences are in the hypothesized directions, providing support for hypotheses 1a and 1b.

4.3.2 Hypothesis 2: structural assurance in physical to virtual transfer

Hypothesis 2 proposes that structural assurance will be more effective than situational normality for physical-to-virtual transfers. This was tested using MANOVA procedures to compare the difference in effects between structural assurance and situational normality across both dependent variables. Individual t-tests for each separate effect and each dependent variable were also measured to compare the mean differences for both structural assurance and situational normality against a null hypothesis (H_0: $\mu_\Delta = 0$; H_α: $\mu_\Delta \neq 0$), to test whether no significant difference in transfer is attributable to the treatments. The results indicate significant declines in both vendor-based and technology-based trust for the situational normality treatment, while there was no significant decline in either vendor-based or technology-based trust for the structural assurance treatment. Furthermore, the MANOVA affirms a statistical difference between the effects of structural assurance and situational normality, and in the hypothesized direction, therefore supporting hypothesis 2. These results are reported in Table 4 and Figs. 4 and 5.

4.3.3 Hypothesis 3: situational normality in virtual to physical transfer

Hypothesis 3 proposed that situational normality will be more effective for virtual to physical transfers than structural assurances. This was tested using MANOVA procedures to compare the effects of structural assurance and situational normality across both dependent variables simultaneously. Individual t-tests for each separate effect and each dependent variable were also measured. The t-tests

Table 4 Hypothesis 2: MANOVA and t-tests for treatments, physical-to-virtual transfer

Vendor-based trust			R^2	F	*p* value
MANOVA			0.06	**3.73**	**0.013**
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	N	SD	μ_Δ	T	*p* value
Control	44	5.67	− 1.27	1.49	0.143
Structural assurance	37	6.32	− 0.08	0.08	0.938
Situational normality	43	6.83	− 3.72	3.57	**0.001**
Technology-based trust			R^2	F	*p* value
MANOVA			0.04	**2.63**	**0.05**
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	N	SD	μ_Δ	T	*p* value
Control	44	4.63	− 1.70	2.44	**0.019**
Structural assurance	37	4.38	− 0.68	0.94	0.355
Situational normality	43	6.16	− 2.74	2.92	**0.006**

Bold values are significant at $p < 0.05$

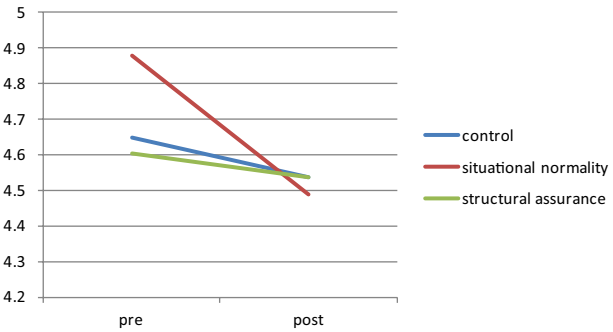

Fig. 4 H2a: structural assurance and vendor trust for physical-to-virtual

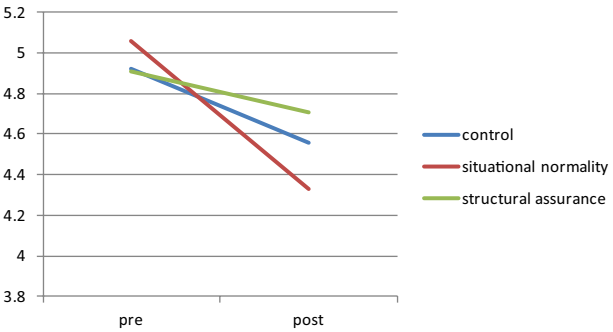

Fig. 5 H2b: structural assurance and Technology trust for physical-to-virtual

compared the mean differences for both structural assurance and situational normality against a null hypothesis ($\mu = 0$), to test whether no significant difference in transfer is attributable to the treatments. The results indicate significant increases in both vendor-based and technology-based trust for both the structural assurance and situational normality treatments; however the MANOVA indicates there is no significant difference between the effects of structural assurance and situational normality. In other words, the point estimates for situational normality mean differences are larger than the means for structural assurance, as hypothesized, but the experiment cannot affirm this with statistical significance and therefore fails to support hypothesis 3. In spite of this, both treatments indicated significant increases in both vendor-based and technology-based trust, as represented by the significant t-tests, which test whether the mean difference is equal to zero (H_0: $\mu_\Delta = 0$; H_α: $\mu_\Delta \neq 0$). These results are reported in Table 5, and Figs. 6 and 7.

Figures 8 and 9 summarize the results graphically, by direction of transfer. Physical-to-virtual transfers have a negative effect ($\beta = -1.27$) on technology-based trust, and no effect on vendor-based trust. Virtual-to-physical transfers have a positive effect on vendor-based trust ($\beta = 2.27$), and no effect on technology-based trust. In

Table 5 Hypothesis 3, MANOVA and t-tests for treatments, virtual to physical transfer

Vendor-based trust			R^2	F	*p* value
MANOVA			0.004	0.24	0.789
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	N	SD	μ_Δ	T	*p* value
Control	44	5.27	2.27	2.86	**0.007**
Structural assurance	41	5.63	2.80	3.19	**0.003**
Situational normality	41	4.57	2.88	4.03	**0.0002**
Technology-based trust			R^2	F	*p* value
MANOVA			0.018	1.12	0.329
Pairwise t-tests (H_0: $\mu_\Delta = 0$)	N	SD	μ_Δ	t	*p* value
Control	44	4.48	1.14	1.68	0.100
Structural assurance	41	4.66	2.24	3.08	**0.004**
Situational normality	41	4.65	2.63	3.63	**0.001**

Bold values are significant at $p < 0.05$

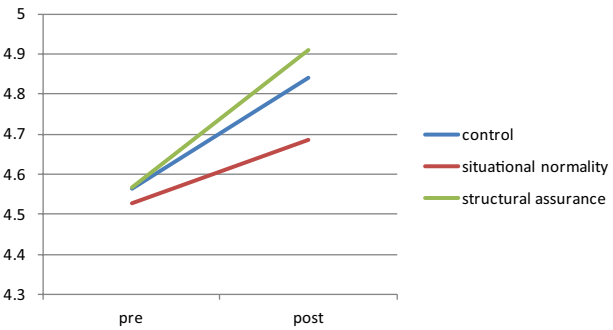

Fig. 6 H3a: situational normality and vendor trust for virtual-to-physical

physical-to-virtual transfers, situational normality has negative effects on both vendor-based and technology-based trust ($\beta = -3.72$ and $\beta = -2.74$, respectively), but no effect is observed for the structural assurance treatment for either dependent variable, which means that the experiment supports the hypothesis that structural assurance is more effective than situational normality in physical-to-virtual transfers. For virtual-to-physical transfers, structural assurance and situational normality cause positive effects for both vendor-based (SA: $\beta = 2.80$; SN: $\beta = 2.88$) and technology-based trust (SA: $\beta = 2.63$; SN: $\beta = 2.24$), furthermore, the sizes of these effects relative to one another are statistically insignificant, which means the experiment fails to support the hypothesis that situational normality is more effective than structural assurance in virtual-to-physical transfers.

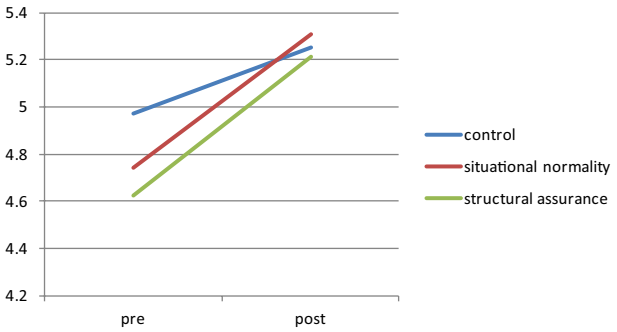

Fig. 7 H3b: situational normality and technology trust for virtual-to physical

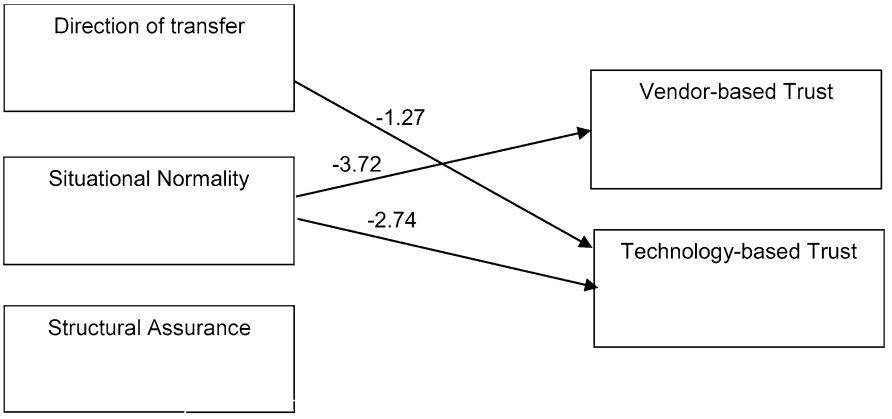

Fig. 8 Physical-to-virtual transfer

5 Discussion

It is necessary that established organizations venturing into a new distribution channel recognize trust is multidimensional and that vendor and technology-based trust will be dependent on the distribution path first chosen. Both vendor trust (knowledge-based) and technology trust (institution-based) will have different effects depending on the initial distribution channel and the new, proposed distribution channel.

Our experiment demonstrates several key effects. First, physical-to-virtual transfers affect technology-based trust negatively and virtual-to-physical transfers affect vendor-based trust positively. Secondly, for physical-to-virtual transfers, situational normality treatments cause a negative effect on both vendor-based and technology-based trust, but there is no effect caused by structural assurance treatments, even for

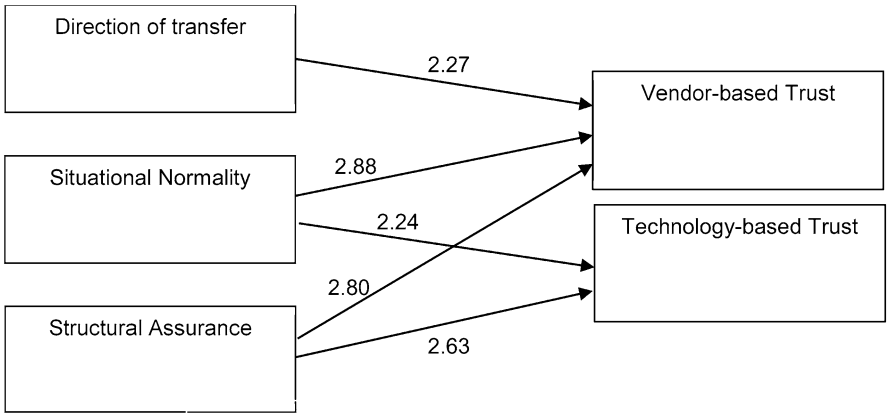

Fig. 9 Virtual-to-physical transfer

technology-based trust which is affected negatively by the control condition. Therefore, it seems structural assurance prevents the loss of trust that is normally expected for physical-to-virtual transfers. Thirdly, in virtual-to-physical transfers, both structural assurance and situational normality create positive gains in trust, even for technology-based trust for which there is no effect in the control condition. In other words, either structural assurance or situational normality is capable of producing a positive effect in virtual-to-physical transfers, although there is no effect in control conditions. These effects have several implications, both theoretical and practical.

Interaction effects and the various covariates were insignificant. Since structural assurance and situational normality produced different effects between the physical-to-virtual and virtual-to-physical conditions, it would seem to suggest that there should be interaction present for the "direction of transfer" variable. However, that would only be true if physical-to-virtual and virtual-to-physical both represent opposite ends of the scale in the same "direction of transfer" variable. The insignificant interaction test suggests that they should be treated as separate variables in a main effects model, as additive effects, such as: trust = structural assurance + situational normality + physical-to-virtual + virtual-to-physical.

Expanding from physical to virtual environments negatively affects technology-based trust. This indicates virtual spaces require higher levels of technical expertise and technology-based trust than physical spaces and that the level of technology-based trust available from transacting in the physical space is not enough, or simply unavailable or inappropriate, to be lent to transactions in the virtual space. It would also indicate that consumers' perceived safety in an online transaction endures a corresponding decline as consumers' perception change from the physical space to the virtual space. Consequentially vendors with brick-and-mortar locations must give as much attention to their virtual stores as virtual-only vendors and enforce equal levels of standards to their virtual spaces. This would require eliminating the greatest amount of transaction uncertainty as possible, particularly regarding quality assurances and providing

other diagnostic signals [14]. They will need to provide equal amounts of evidence for trust beliefs to form and satisfy consumer needs for situational normality and structural assurances [57]. These findings have practical relevance because vendors may prevent loss of trust in physical-to-virtual transfers by enhancing customer beliefs about the reliability, safety, and security of their virtual store.

Transfers from a virtual to a physical retail location maintain the same level of technology-based trust since the perceived technological sophistication and reliability of a virtual store is attributed to the physical store. Although physical stores receive the benefit of association with the technological sophistication of their virtual extension, physical stores need to reinforce their ability to make a transaction safe in a virtual environment to soften the negative effect of transfers to the virtual environment. The downside of the physical to virtual store transfer is the associated costs and financial commitment to a physical location to promote technology-based trust for the benefit of the trust transfers to the virtual location. These findings have theoretical implications because virtual-to-physical transfers have rarely been researched, yet it is common for customers to encounter a vendor first in a virtual context. The practical implications are that investments in physical facilities benefit both technology trust and vendor trust.

Vendor-based trust is positively affected by transfers from virtual to the physical store locations, but it is also true in the opposite direction. A physical location is a signal inferring credibility [14] and therefore becomes a visible cue for trustworthiness [75]. Human interaction in the physical location engenders a sense of security [73]. This physical permanence and human interaction creates trust that is transferable from the physical to the virtual space [29]. Consumers seem to believe that an honest and trustworthy store which operates in a non-opportunistic manner will do so regardless of the distribution path. However, the results indicate a clear preference for physical locations with regard to vendor-based trust.

Expertise and market knowledge appear to be instrumental in the facilitation of trust transfer and the physical store location is considered more trustworthy, knowledgeable, competent and credible for transfers in either direction. This may help compensate for the decline in technology-based trust from physical-to-virtual stores for vendors who maintain a presence in both spaces. The perceived "permanence" of a physical store location may also influence consumer beliefs about the location's trustworthiness by suggesting greater vendor reliability and consumer power. In addition, the perceived permanence of physical store locations offers greater structural assurances by promising greater prospects for legal enforceability and accountability, as well as encourages greater perceptions of situational normality.

5.1 Future research

Physical and virtual shoppers differ: virtual shoppers are more quality oriented than physical shoppers. This supports the theory that the permanence of physical

locations offers consumers a trust signal [71]; although the advantage of the virtual environment is that it offers greater variety, it is balanced with longer wait times [9]. Future research should consider the role of these additional effects in field studies and case research to deepen our understanding of how consumers transfer trust between different retail environments. We used initial trust as a covariate, but it could have been a treatment. The preference for physical locations for vendor-based trust suggests that initial trust in physical locations may be stronger than virtual locations. This "boost" to trust might affect trust transfers from physical to virtual store locations. Trust measures could also be refined further, since both personality-based and cognitive-based trust have been shown to positively affect online trust and mediate perceived risk and purchase intentions through online trust [54]. Furthermore, there are opportunities to explore whether different groups of consumers exist with retail location preferences and how the dynamics of trust transfer vary within those groups. These groups or segments (similar needs and observed behaviors) could be coupled with demographic and behavioral data to create actionable segments that are accessible and responsive to different messages.

Generalized expectancies were operationalized both in the treatments and the covariates, familiarity and previous experience. Neither covariate was significant, though the treatments were effective. Previous research suggests that generalized expectancies may operate in novel contexts with new or previously unknown emerging technologies [56], which clearly is not the case for either commercial websites or physical stores. Perhaps the effects of generalized expectancies are weaker in the context of commercial websites because the technology and situation is too well-known. Since there are mixed results, this leaves room for future research about the effects of generalized expectancies in trust transfers.

5.2 Limitations

The experimental subjects were from only one region in the United States attending private institutions instead of across multiple schools and time periods. No measures of external validity were included in the experimental design. However, it is established that external validity is not necessary for experimental research, as it is for field study designs. We adopted an experimental design to support the goals of our research, which is to determine the causal network of electronic commerce trust transfer, not to generalize our findings to a larger population of individuals, in which case external validity and generalizability would be important. Therefore, this is not a serious limitation of our research.

Although we tested for interaction between variables in our study, other moderators may also exist under which our results hold. For example, structural assurance is implicit about potential risk; however, perceived effectiveness of e-commerce institutional mechanism (PEEIM) focuses explicitly on risk protection, for example, from credit card fraud and personal information leaks (safeguards from online transaction risk). PEEIM negatively moderates vendor trust and repurchase intentions (i.e., high PEEIM weakens positive vendor trust on

repurchase intentions) [27]. When repurchasing, high PEEIM positively moderates satisfaction and trust. Structural assurance could be explicit in the consequences it mitigates.

6 Conclusion

E-commerce is growing faster than overall retail sales and companies are attempting to seemly allow customers in a brick-and-click world. Our study addresses this migration. Trust is enhanced for physical locations whose brands originated from established virtual environments. Knowledge and honesty are more important than technology, security and confidentiality when the brand expands from the ephemeral website to a brick-and-mortar location. For transfers from virtual to physical locations, the effect is the opposite. Technology, security and confidentially are more important than knowledge and honesty. The transfer of brand equity is nuanced. It does not always transcend the transfer in distribution path. Undoubtedly, trust rules business. It is a multidimensional construct which is contingent on what the priorities emphasized by the business are and what distribution channel the business originated.

Weekly we hear of another security breach online. Consumers are skeptical of companies protecting their data. They require assurances or guarantees. Success in the ethereal Wild West that is the Internet where nefarious players move in many cases without ramifications appears more valued than when brick-and-mortar businesses become brick-and-click. From a practical standpoint, when moving from the virtual to the physical, brand equity moves freely making the transfer easier. A vendor's integrity and ability are carried over. Safety and security concerns about the transaction also port over as do perceptions about the normality of the business. What consumers trust in an online vendor is based upon more than the technology needed to consummate e-commerce. It is based upon honesty, predictability, and knowledge. This bodes well for a company like Amazon in creating physical locations, because it has both vendor- and technology-based trust in creating physical locations. Consumer trust is migrating with Amazon from the virtual to physical.

The opposite direction, brick-and-mortar to e-commerce has a negative effect on technology-based trust. Consumers do not believe the skillset required for physical locations suffice online. This is reinforced by the idea that a "normal" physical location has a negative effect on technology- and vendor-based trust when moving online. The assurances provided in the physical location do not port to the virtual. Like Amazon entering the brick-and-mortar location, it may behoove brick-and-mortar stores to purchase e-commerce stores for their technology and vendor-trust similar to Walmart purchases Jet.com.

Appendix A: Instrumentation

Vendor-based trust	
vtrust1	I know the vendor is honest
vtrust2	I know the vendor cares about customers
vtrust3	The vendor has the ability to handle sales transactions
vtrust4	I know the vendor is not opportunistic
vtrust5	The vendor has sufficient expertise and resources to do business
vtrust6	I know the vendor is predictable
vtrust7	The vendor has adequate knowledge to manage their business
vtrust8	I know the vendor knows the market
Technology-based trust	
ttrust1	I feel safe conducting business with the vendor because I believe that my personal information will be secure and confidential
ttrust2	I feel safe conducting business with the vendor because the transaction is conducted through a technologically reliable website (or, at a physical "brick-and-mortar" store)
ttrust3	I feel safe conducting business with the vendor because the website provides encrypted transactions (or, because I believe my transactions are completely secure and confidential)
ttrust4	I feel safe conducting business with the vendor because it uses electronic security technology (or, because it's physically secure)
Generalized expectancies: familiarity	
fam1	How familiar are you with using the Internet in general?
fam2	How familiar are you with using the Internet to buy things?
fam3	How familiar are you with sending personal information over the Internet?
fam4	How familiar are you with buying textbooks over the Internet?
Initial trust	
Itrust1	It is easy for me to trust a person/thing
Itrust2	My tendency to trust a person/thing is high
Itrust3	I tend to trust a person/thing, even though I have little knowledge of it
Itrust4	Trusting someone or something is not difficult
Generalized expectancies: previous experience	
Surf	On average, how many hours do you spend surfing the Internet or using email per week? _____ hours
ebook	Have you ever purchased a textbook over the Internet? ____ (Y/N)
Ebuy	Beside textbooks, have you ever purchased anything over the Internet? ____ (Y/N)

Appendix B: Treatment scenarios

Treatments	Control	Structural assurance	Situational normality
Brick-and-mortar to online	No treatments, answers same questions in same order, but w/o instructions	The bookstore uses modern best-practices for safe and secure shopping, transactions, and customer confidentiality The bookstore's website uses rigorous security measures and state-of-the-art technology to assure that credit card numbers and personal information transmitted and stored electronically will remain safe, secure, and confidential	The bookstore is in all respects comparable to other local bookstores with good reputations, including textbook availability, competitive pricing, payment options, refunds, and guarantees of customer satisfaction The bookstore's website is in all respects comparable to other Internet bookstores with good reputations, including textbook availability, competitive pricing, payment options, prompt delivery, refunds, and guarantees of customer satisfaction
Online to brick-and-mortar	No treatments, answers same questions in same order, but w/o instructions	The bookstore's website uses rigorous security measures and state-of-the-art technology to assure that credit card numbers and personal information transmitted and stored electronically will remain safe, secure, and confidential The same campus bookstore has a physical brick-and-mortar store on campus. The bookstore uses modern best-practices for safe and secure shopping, transactions, and customer confidentiality	The bookstore's website is in all respects comparable to other Internet bookstores with good reputations, including textbook availability, competitive pricing, payment options, prompt delivery, refunds, and guarantees of customer satisfaction The same campus bookstore has a physical "brick-and-mortar" store on campus. The bookstore is in all respects comparable to other local bookstores with good reputations, including textbook availability, competitive pricing, payment options, refunds, and guarantees of customer satisfaction

Appendix C: Factor analysis of vendor-based trust and technology-based trust

	Factor 1	Factor 2
vtrust1	0.30384	**0.53884**
vtrust2	−0.00441	**0.67669**
vtrust3	0.12389	**0.63372**
vtrust4	−0.27091	**0.80859**
vtrust5	0.09047	**0.69015**
vtrust6	0.17197	**0.501**
vtrust7	0.20949	**0.65332**
vtrust8	0.31945	**0.46205**
ttrust1	**0.72389**	0.24072
ttrust2	**0.87031**	0.00605
ttrust3	**0.86478**	0.1194
ttrust4	**0.9296**	−0.05548

Bold values indicate items that are associated with a factor

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