

Exploring "Soft" Trust in mCommerce Activities: An Exploratory Diary and Interview Study

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ABSTRACT

Trust has been a longtime concern for people when deciding whether or not to engage in online shopping. This has resulted in a variety of studies on trust and eCommerce. Recently, there has been widespread growth of mobile shopping and buying, termed mCommerce. With this comes a need to understand if and how trust issues manifest themselves in mCommerce activities and how to design for trustful mobile transactions. To address this, we conducted a diary and interview study with mobile device users to explore their mobile shopping activities and the ways in which they managed and viewed trust. Our results describe a variety of usage patterns including spontaneous purchasing and routine shopping where people gravitate to their mobile device even if a computer is nearby. Participants generally faced little issues with trust because they had very limited access to unknown companies and app marketplaces or non-virtual friends offered a form of brand protection. Users also repeatedly trusted well-known companies, citing perceived brand reputation as the sole trust anchor.

Author Keywords

Mobile, commerce, trust, shopping

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI):
Miscellaneous.

General Terms

Design, human factors

INTRODUCTION

Historically, most online commerce activities have been based around computers utilizing the Internet as a part of eCommerce. However, as a culture we are now seeing a large uptake of mobile computational devices that expand the ways in which people connect with and obtain information. This trend has resulted in an increasing number of opportunities for people to begin to purchase items online using smartphones and other mobile devices via mobile web browsers or, more specifically, through applications targeted at specific stores—an activity termed as *mobile Commerce* or *mCommerce* for short [18]. The growth of mCommerce is noted by many companies. For example, Paypal reports that it processes up to \$10 million dollars in mobile payments a day and predicts \$3 billion in

mobile payments in 2011 [11]. eBay is predicting their gross sales through mobile devices to double from 2010 numbers to \$4 billion in 2011 [2]. In July 2010, Amazon reported that in the last 12 months, users had ordered over \$1 billion worth of products on Amazon.com [1] through a mobile device. In total, Forester Research predicts mCommerce to total \$6 billion in revenue in 2011 and \$31 billion in 2016 [12].

While there has been a large amount of research on eCommerce [5,7,13] there has been comparatively very little that focuses on understanding mCommerce practices, routines, and the needs of typical mobile shoppers. This gap is important as mCommerce is not a simple extension of eCommerce. “mCommerce has its own technological infrastructure, new business models and value chain, and new value for consumers. Hence, it requires new thinking for its dissemination and adoption” [10].

Our own interest in the topic was twofold. First, we were interested in understanding the everyday routines of people who perform mCommerce activities (e.g., shopping or buying via a mobile device) to learn what people buy, when they buy, and how they feel about buying on mobile devices. Second, we wanted to focus in on the topic of *trust* and explore how mobility and the use of mobile devices affects the trust concerns of shoppers. In the past, consumer trust (or a lack thereof) has been cited as a major barrier to the adoption of eCommerce [24] and researchers have even developed trust models to understand and address buyer concerns [7,24]. We wanted to understand how such models might extend to mCommerce, if at all.

To address this, we conducted an exploratory study of mCommerce activities where 17 participants recorded their mobile shopping activities in a daily electronic journal for three weeks. After the three weeks, we conducted semi-structured interviews with them to further our understanding of their routines and, specifically, issues or moments related to trust in their mCommerce activities. Here we focused on issues of “soft” trust (e.g., willingness to make a transaction, knowledge of companies) [5], as opposed to “hard” trust (e.g., encryption) [5, 13], in order to limit the scope of our study to a reasonable size. Our results show that users don't often have soft trust issues as it relates to their mCommerce activities. App marketplaces (e.g., the

Apple App Store) lend brand protection, consumers' friends make shopping recommendations, the social web ranks, reviews and policies, and large brands dominate other mediums to provide a level of perceived trust for mobile shoppers. The challenge following from this is that mobile shoppers may be lead into a (potentially) false sense of security.

Our paper unfolds as follows. First, we talk about related work on mobile device usage, eCommerce, and frameworks for understanding trust. Second, we outline our diary and interview study methodology. Third, we detail the main findings from our study. We conclude by discussing the importance of our findings for the design of mCommerce applications and devices to support them.

RELATED WORK

Our related work section details the patterns of usage people commonly have for mobile devices in general, and trust issues and frameworks as they relate to eCommerce.

Mobile Device Usage

People use mobile devices in a variety of situations and for different purposes. Using a diary and interview study, Nylander et al. [14] explored the use of mobile phones and found that they were most often used in the home (31% of the time), in addition to outdoors (23%), in transit (23%), indoors (16%), and at work (8%). Most surprisingly, more than the 50% of their participants used their mobile phones to access the Internet even though they had access to a computer that was close-by [14]. Reasons for this ranged from convenience to laziness to simply preferring to use a mobile phone over a computer [14]. They also found that Internet usage on mobile phones was for situated or general searching (30% of the time), reading news (20%), passing time (19%), checking email (17%), and mCommerce transactions (6%). Our study builds on this by focusing on mCommerce activities to understand where and when they occur.

Researchers have also investigated specific instances of mobile device usage. Using a voicemail diary, Palen et al. [17] explored the mobile phone practices of new adopters. Results showed that people normally started using mobile phones for reasons of safety, business, or to replace a landline phone; however, usage often migrated to unsuspecting things such as constant accessibility and microcoordination [17]. Together this showed that mobile phones are very much social devices [17]. Our results further this idea by showing how trust in mobile shopping is socially-influenced.

O'Hara et al. [15] explored mobile video telephony and found that a large proportion of video calls were made from home (30%) and the workplace (19%). Yet video calling was often seen as being awkward in public places because other people could easily observe the activity [15]. We explore whether or not the same issue arises for mCommerce activities done in public. O'Hara et al. [15]

also explored the consumption of video on mobile devices and found that people would watch videos both in and outside the home [15]. This is, again, despite having computers or televisions nearby [15]. People also watched video on their mobile devices at routine times during their day (e.g., while in transit) and would even turn shared spaces (e.g., a carpool) into a more private place by watching video in a solitary manner [15]. We show how a similar activity occurs for mCommerce.

Using a survey and 'screenshot' diary study (similar to ours), Karlson et al. [6] explored how users migrate between smartphones and computers when completing workplace tasks. Results showed email activities, reviewing calendar appointments, and making phone calls to be the most common mobile activities with their participants [6]. Participants also found it was difficult to follow-up (or continue) with uncompleted tasks at a later point, especially if this was done on a different device or computer [6]. Our study builds on this by showing that mCommerce activities do not typically migrate between devices.

eCommerce and Trust

Online shopping, or eCommerce, is an activity that has been around nearly as long as the Internet. People commonly shop for any and all things online, though some people are less likely to adopt online shopping behaviors than others [7]. A common assumption is that consumers are vulnerable and likely to expose themselves to loss if they provide personal information during an online purchase transaction [5]. Thus, one of the main focal points of eCommerce research is trust. In fact, it is one of the main factors that affect whether or not people engage in eCommerce activities and to what extent [7].

Trust is a complex term. Researchers typically describe trust as being based around: predictability, reliability, fairness, benevolence and integrity [4]. Social exchange theory illustrates that social behavior is the result of an exchange process whereby people make social decisions based on perceived costs and benefits [7]. The purpose of this exchange is to maximize benefits and to minimize costs [7]. How people go about trusting online purchasing is most certainly a cost-benefit relationship; that is, if the perceived risk is low enough, people will purchase products online [7]. McKnight et al. describe *trusting intentions* as the willingness of a consumer to engage in trusted transactions with a company [4].

Head and Hassanein [5] differentiate between "hard trust" and "soft trust" as it relates to eCommerce. First, hard trust is based around technical solutions and secure interactions with the belief that data will be transmitted and encryption and firewalls can protect customer information. For example, see Ngai and Gunasekaran [13] for a review of commerce topics related to hard trust. On the other hand, soft trust—the focus of our study—is centered around the privacy of personal information and vendors' quality of service [5]. This type of trust can't normally be resolved

through the application of back-end technology such as new encryption methods, data transfer protocols, etc. [8].

Head and Hassnein [5] also review the factors that make it difficult for online companies to develop trust with their customers as compared to in-person stores. First, online stores have lower barriers of entrance and exit [5]. For example, it is relatively easy to create a eCommerce web site when compared to a retail store. This means that consumers may not trust them to stay around for long periods of time [5]. Second, consumers are not able to view a company's investment in buildings and personnel, which would further establish feelings of longevity [5]. Third, consumers are unable to physically evaluate products in an online environment to the same extent that they can in an in-person store [5]. And, fourth, online stores often lack human elements and interaction [5]. This makes it so there is less of a chance that 'trading partners' know each other [5].

In 1986, Zucker developed three types of Trust Production Mechanisms based on sociological and economical analysis of historical data from 1840 through to 1920 [24]. Luo [7] subsequently extended these mechanisms to describe three ways that trust can be encouraged in eCommerce. First, *characteristic-based trust* relies on similarities between consumers and companies in order to establish trust (e.g., similar sex, ethnicity, or affiliations) [7,24]. Similar characteristics build a similar cultural value, which in turn creates the idea of shared moral and ethical habits in line with a member's social group [24].

Second, *process-based trust* refers to trust that is built through a history of past transactions [24]. This type of trust builds on reputation and therefore is dependent upon customer satisfaction [24]. Luo describes process-based trust as a form of gift-giving and sharing of information that is especially important in the business-to-business (B2B) world [7]. For example, companies often create and distribute 'white papers' to promote their company [7].

Third, *institutional-based trust* is deliberately intended to build trust in the holder's ability, integrity and intentions [24]. This is done through third party guarantors such as universities with certified education, associations with professional conduct standards, and medical and law licenses to guarantee ethical practice [7, 24]. McKnight et al. [4] elaborates on institutional-based trust by dividing it into two components: *structural insurance* which encompasses the belief that structures, such as regulations, promises and legal resources are in properly in place; and, *situational normalcy* which is the belief that the company is operating in a normal fashion.

Together, the aforementioned theories and frameworks on trust in eCommerce provide a backdrop for our study of mCommerce activities. We return to these theories in our Discussion section as we interpret the findings from our exploratory study.

DIARY & INTERVIEW STUDY METHODOLOGY

We conducted a diary and interview study of mobile device users to understand their shopping and purchasing behaviors, as well as issues relating to soft trust.

Participants

We recruited 17 adult participants (9 female, 8 male) who were regular mobile device shoppers (e.g., purchased online at least once every two weeks). Our recruitment strategies included posting advertisements on social media applications (e.g., Facebook, Twitter) and online services (e.g., Craigslist), advertising to undergraduate classes, and forwarding advertisements to people we knew through a form of snowball sampling. Given our recruitment strategy, all participants but one was from the same metropolitan city within North America. Participants' ages ranged from 19 to 44 and occupations varied heavily (e.g., students, social workers, designers, salespeople, teachers, administrative assistants, marketers). Participants also ranged in terms of their main mobile device: eight people used an iPhone, three used an iTouch, three used a Blackberry, two used an Android device, and one person used an iPad. In all cases but the iPad, the participant carried the device with them nearly all the time.

Method

Our study method was deliberately exploratory, despite there being existing knowledge of mobile device routines, eCommerce activities, and trust frameworks. Rather than look for these same patterns, routines, and frameworks, we wanted to explore mCommerce without preconceived notions of what the activity "should" entail; however, we return to these topics later in the paper to compare our findings. This is in line with Min et al's [10] view that mCommerce requires new thinking in order to understand it. Our study method consisted of two distinct stages.

1. Electronic Diary. We recognized that mobile device activities can take place at various times and places and it can be difficult to directly observe these activities as a result [6,14,17]. For this reason, participants first kept an electronic diary of their mCommerce activities over a period of three weeks where we asked them to fill out an online form for each of their mCommerce activities. This included both shopping (without purchasing) and buying. The diary form asked participants to describe their activity, any concerns about trust (where we purposely did not define 'trust'), and their location when the activity occurred. Participants received a daily reminder via email and SMS, encouraging them to visit the e-diary form and enter their mCommerce activity for the day. Participants were also asked to send in a diary entry even if they did not do any shopping activity that day in order to indicate this was the case. To aid in accessibility, participants were asked to install a shortcut on their computer and mobile devices to the diary webpage.

We recognized that participants might not be able to make a diary entry as soon as they participated in a mCommerce

activity due to the mobile and likely spontaneous nature of such activities. It was also apparent during test runs of the study that having memory aids were useful when making diary entries. Because of this, participants were encouraged to take a screenshot of their mCommerce activities as they happened in order to capture an in-the-moment visual that could be later used for recollection; this is similar to [6]. Participants could upload screenshots using the e-diary form.

2. Semi-Structured Interview. Following the three-week diary period, we conducted a semi-structured interview with each participant. The goal of the interview was to expand on the understanding of the activities recorded in each participant's diary, to check the accuracy of entries, and allow participants to voice any other additional insight. Example questions included: what prompted you to perform the activity; what were you doing before/after the activity, were you familiar with the company you purchased or shopped from, did you have any trust concerns, etc. Participants were paid a total of \$40 for both study stages.

Data Collection and Analysis

In total, participants completed 161 diary entries that contained mCommerce activities. All participants had at least one activity and the average was 9.5 entries across the three-week span (median 9, range 1 to 20). All interviews were audio recorded in order to review interview data numerous times. We also kept handwritten or typed notes. We inductively analyzed all diary entries along with our interview notes using open, axial, and selective coding to draw out the main themes [19] and compare our findings across participants.

Next we outline our results where we focus on several main themes that we found in our data. First, we explore people's mCommerce shopping and purchasing activities to describe what it is they commonly shop for and purchase. Second, we describe when and where people shop from and why. Third, we explore in detail the trust concerns (or a lack thereof) that participants experienced and the reasons for this.

SHOPPING AND PURCHASING ACTIVITIES

Participants used their mobile devices for a large variety of mCommerce activities. This was dominated by shopping without purchase, followed by the acquisition of software for their mobile device (e.g., apps), and then the purchase of 'real world' items. Some people performed certain activities more than others, yet we did not notice any broad trends related to specific participant demographics. Thus, our results focus on practices across all participants.

Shopping. Across all participants, 87 of 161 (54%) diary entries were about shopping. By shopping, we mean looking for a particular item at one or more stores (on the mobile device) or comparing prices on an item. In this case, however, there is no purchase. In total, 16 of 17 participants submitted at least one diary entry for just

generally shopping for deals, 10 of 161 entries were for clothing, 3 were about looking for a hotel, while the rest shopped for a variety of products such as: housing, accessories, shoes, car insurance, cellphone accessories, toys and pet products. Reasons for not purchasing included: a high price, the item or service was not what they were looking for in terms of location, quality, or they were just browsing for fun and nothing 'caught-their-eye.' Most shopping was done within apps created and published by specific stores (e.g., eBay, Amazon). To a much lesser extent, some participants would use their mobile device's web browser to shop on a particular company's web page.

Software Downloads. Participants also downloaded a reasonably large amount of software to their mobile devices. In total, 39 of 161 (24%) diary entries were about downloading items on to the device itself. This was dominated by apps (36 of 39) with the addition of a browser download, OS upgrade, and a podcast.

Item Purchases. 28 of 161 (17%) entries related to the actual purchase of a 'real world' item (e.g., not software for the device) from a company. Participants bought a variety of products including 3 instances of movie ticket purchases, 4 instances of food purchases, 2 instances of jewelry purchases and a variety of one-off purchases such as shoes, yoga, flowers, ebooks, books, clothing, and sports event tickets. 17 participants logged in to a previously created account to make a purchase; this included using Amazon and eBay apps, along with apps made by Social Couponing sites and local food stores. The other 11 participants entered their credit card information from scratch into a web browser page for a variety of reasons:

"Because I get points to travel on [the credit card]" - P4

"I looked up if they've apps, unfortunately that don't" - P13

"Gouletpens.com is a very reliable reputable site." - P15

"After a few frustrating attempts on eat Vancouver requesting me type my email 3 times!! My partner requested flying wedge. Their website was easy navigation wise and there was nothing lost while making choices. It was quite simple to order, type in my address, phone even [credit card]." - P2

Auctioning and Selling. A small number of activities related to auctioning or selling items. 5 of 161 (3%) entries were bids on items for sale on eBay, and 1 was about the selling of an item on eBay.

In total, participants had 41 diary entries based on free products and services, 7 were between \$1-\$5, 42 were between \$10-\$30, 20 between \$30-\$100, 20 between \$100-350 and 8 were \$500 and up. This shows that people predominantly shop for small value items on their mobile devices, but occasionally people do shop for more expensive things. When it came to whether or not people purchases these items, we saw greater than a 76% percent purchase rate for items under \$5. Only 5 of the 25 \$30-

\$100 products were purchased or downloaded. On the expensive end, 2 of the \$100-\$350 were purchased or downloaded.

DAILY ROUTINES AND TIMING

We found that the timing of mobile shopping and purchasing fell into three broad categories. People either shopped spontaneously when the need arose, as a habit or routine, or during fixed time intervals based on schedules.

Spontaneous Mobile Shopping

First, nearly half of our participants (8 of 17) were highly spontaneous in their shopping habits. In these cases, participants' shopping and purchasing activities were a response to their external environment and other activities. This included triggers from activities both on and off their mobile device. For example, participants were already out shopping in person and needed to compare prices on products, they were told that new software updates were available for their device, or they completed certain activities, such as reading a book, which prompted them to shop for and download a new book to read. Because participants carried their mobile device with them nearly all the time and most had constant Internet connectivity, they were able to act on this stimuli in the moment, regardless of their location or time of day.

For example, when asked on the diary form why they engaged in each shopping activity, P2's diary described several points in time where other activities were the trigger, both on and off the mobile device:

"while in future shop we were about to purchase a laptop when we thought we saw it at London drugs for cheaper"

"Today I received an email that OS Lion was ready to download and purchase"

P9's diary entries also reflected very spontaneous shopping activities. This included browsing for products based on recommendations from friends (both in person and via online messages), going on a vacation to Seattle and looking for a tourist pass, and looking up board games after a night of playing games with friends.

For two participants, shopping and purchasing on their mobile device were very infrequent acts; they both had only one diary entry each. Because of this infrequency, the activities were not routine events and, instead, occurred only in instances where a specific need arose.

Shopping as a Habit or Routine

We also found that just under half of our participants (6 out of 17) were much more routine in their shopping activities. Routines certainly varied across participants, but the fact that shopping activities occurred in a consistent and repeating pattern was somewhat surprising. That is, participants had a specific time and place where they shopped on their mobile device, they looked for a specific type of item or specific stores' items, and the behavior repeated regularly. Shopping was either simply for the sake

of having something to do, or it was because the participant had a particular interest in a certain type of item.

Routine shopping was most often reported to occur during public transit rides to or from work or school. In these situations, participants often had 'time to kill' and would shop in these moments of downtime. The mobility of their device and constant Internet connectivity made this possible. For example, 6 of 7 diary entries made by P1 were shopping activities that occurred during the participants' commute from home to work where all occurred within the same two-hour window of time. This is despite the participant feeling that her shopping activities were more spontaneous in nature than routine. While the items purchased may have been spontaneous, the routine nature of the timing of such shopping activities was certainly routine for the participant.

For some participants, the routine act of shopping was tied strongly with checking their email, which was also a routine act done at particular times in the day. For example, P8 recorded eight diary entries, all of which took place while on the train commuting to school in the morning and shortly after the participant checked his email. His diary entries repeated the same scenario over and over:

"I went on the Internet to check my email and saw a daily deal for Groupon"

"While waiting for my train to class, I went on the Internet to check my email and saw the daily deal for Indulge and Groupon"

"checking email while taking [train] to school this morning. Saw Groupon and Indulge daily deal..."

Other participants were also triggered to shop based on their routine checking of email but this activity occurred at either at home or work where the timing was typically the same each day. This included first thing in the morning, first thing once arriving at work, or in the evening before bed. Email triggers ranged from eBay alerts of daily deals to 'one off' specialty stores' promotions. For example, P17's 15 diary entries all involved the same routine of checking email:

"every morning I wake up, shower and everything, flip through my emails, either first thing in the morning, before I leave for work or first thing when I get to the office ... that is what I do every day, literally, every day ... if something comes in, in the middle of the night, I want to get jump on it and if there is deals within those I share with my friends."
– P17

Two participants used their mobile devices to shop eBay, Amazon, and specific interest stores for collectable items on a regular basis from their work or homes. Here they were interested in specific items as opposed to simply 'filling the time.' This illustrates the more targeted nature of some participants' shopping routines. For example, P15 is an avid collector of pens, inks, and flutes and satisfies his

interests by frequently browsing eBay for ‘good value’ items to add to his collections. The participant talks about shopping during routine times, *"it was my usual browsing time after lunch..."*. P10 was remarkably similar to P15 and frequently shopped on his mobile device on eBay (using its app) and specialty stores. Here the interest was in specialty clothing and occurred at his workstation at work (where shopping was done on his mobile device and *not* the computer at his desk) or at home with the majority of activity happening late at night. Several diary entries from P10 illustrate this behavior:

"decided to check on what's new at Macy's for the Sean John Men's line"

"Quickly checked on eBay to see the Sean John auctions as it has been a while since I last checked"

"Went on to Dr. Jay's to check out the Sean John clothes".

Together, we see several interesting patterns in these results. First, not all participants are restricting themselves to purchasing in the privacy of their own home. This suggests a lack of concern that others might see their shopping activities, in particular, in places of (often) tight quarters such as public transit. Second, we see the strong tie of mCommerce activities to the routine checking of emails from companies as well as friends. We return to this later as one important factor affecting trust.

Shopping During Fixed Time Intervals

We also saw that while not necessarily routine, three participants had fixed time intervals when they would shop. That is, they would shop at a certain time, yet they wouldn't do this on a consistent basis and they weren't looking for specific items. These instances were also not spontaneous in nature.

For example, several participants described being at work and having a few spare minutes where they decided to shop online. Their company policy was such that they were not allowed to ‘surf’ certain websites so, instead, they would use their mobile phone for these shopping activities. Thus, the time interval for shopping was during the participants' work hours, but it didn't occur every workday and there was no particular spontaneous trigger for the activity. It was simply out of a desire to shop.

Another participant would similarly shop in the evening when she was at home after work. This too wasn't a recurring routine, but her shopping always occurred at this time and place when it did happen:

"well I suppose I don't really use it to browse (shop) when I am at work, because I just use it for my emails and my work related stuff and then by the time I get home it is about 6:30pm-7:00pm and then by the time I eat it is probably 8pm and that is when I have spare time to mess around and do shopping".

CHARACTERIZING TRUST (AND MISTRUST)

Overall, participants had few trust concerns when shopping and making transactions on their mobile devices. This was a surprising finding given the concerns people often have for eCommerce activities [7]. We explore the reasons for this next.

Little Risk

First, many participants felt that most of their mCommerce activities presented little actual risk to them. Participants who in particular felt there was little risk were not surprisingly those who: spent very little money, mostly only acquired free products or services, or simply shopped as opposed to purchased. For example, P2 and P4 both told us that they had no trust issues because they did not actually purchase anything. P9 elaborates with a very common reaction from participants who just shopped:

"I was just looking at prices and seeing product descriptions so I don't have trust issues associated with that."

P5 similarly told us he had no trust concerns when downloading a podcast because *"it's free and no cost is involved."* Low cost items were also often regarded as low risk because of the cost of the service or product.

On the other hand, one participant did mention she had trust concerns when buying free or low cost items. P13 only downloaded free applications for her mobile device, but instead of seeing this as little risk she saw it as a potential invasion of privacy. The participant explains her concern:

"I briefly thought about how (the app) now knows about some of the types of music I listen to, after I played a song for the app and they offered me ringtones. Will they now try and market similar types of music/lifestyle products to me?" And during another free download purchase the participant mentions "(it) made me think if this information (is) being accessed and used for marketing."

While seemingly mundane, the above findings show that when people think about ‘trust’ in their mCommerce activities, they mostly think about loss of money. Because the cost of many items (e.g., apps for their devices) is low or free, they do not feel trust is a concern. Yet there are certainly many other issues that could arise and pose trust issues for mobile shopping and purchasing such as the reveal or surreptitious use of personal information (e.g., credit card information), the tracking of one's browsing activities, the tracking of one's purchases, poor quality of service, etc. P13's comments begin down this path; however, this line of thinking was rare amongst participants.

When items were expensive, participants never mentioned a heightened level of trust. Instead they would just comment on the cost being too expensive. One participant, who bought car insurance, a \$550 purchase, indicated she would have had no problem ordering over her mobile device but

the company would not allow her to do so. Instead, she had to migrate from shopping on her phone to purchasing on her computer.

Product and Store Brands

Aside from simply a lack of risk due to little money being exchanged, ‘brand’ played the most significant role in trust for mobile commerce activity. By brand we are referring to the actual company that participants engaged with to shop or make purchases (e.g., the eBay app, the Macy’s web page). Participants continually stressed their trust in these brands either as a marketplace app or the actual vendor. Only one participant recorded diary entries which, excluding price comparison activity, had no past experience with the vendor. Some comments around large well-known brands included:

"Amazon is a trustworthy site" – P10

"eBay is a trusted company"- P15

"(Macy's) are the most reputable big department retail store in the U.S., so in terms of security, if that fails I don't know who to trust then" – P10

"[the] Apple App store is an official app for Apple brand and since Apple is a famous brand so I have no problem trusting and purchasing online with them." – P8

In cases where participants had negative feelings towards a brand, the company’s app was never downloaded to the person’s mobile device. Participants simply knew the companies before they would shop at their stores (via the store’s app) on their mobile device.

Several participants commented that they repeatedly purchased from the same places and this history made them feel safer and lead to them trusting the company and their activities with it. When it came to first time shopping with a particular company, participants relied on other indicators to increase the level of trust they felt. These included the overarching approval process of many mCommerce applications and relying on the recommendations of others; we discuss these in the next two sections.

Brand Transfer through the ‘App’ Approval Process

In addition to trust in store and product brands themselves, participants mentally transferred their trust from larger companies (e.g., Apple) that approved mCommerce applications to the applications themselves. That is, app marketplaces were highly successful in transferring trust from their well-known brands—Android App Market, Amazon's marketplace, Apple's iTunes, and the Apple App Store—to their affiliates and partners. For example, if participants were using an app on their mobile device for shopping, regardless of which company made the individual app, because the app had been approved through a larger trusted company (e.g., Apple), the trust the participant had with that company transferred to the app itself. A similar phenomenon occurred for purchasing or downloading apps themselves. Because apps were approved by a larger,

trusted company, apps themselves were considered to be trustworthy.

For example, many participants said that apps found in the Apple store were trustworthy because, as consumers, they felt they were protected by the Apple brand and the ‘prescreening’ that the company does before permitting an app to be present in the store.

"everything is prescreened in the (Apple) app store, so there is no worry about (trust)". – P1

"it just feels like a more cohesive thing when it is under that one umbrella company of Apple... [not using the app store] just feels like you are opening up your phone to all the internet and random companies". – P4

"It was through iTunes so I didn't have any trust issues... I trust the iTunes brand and I believe they really check the quality in products before they release them to the public" – P17

We also found that in some cases participants were not even conscious of the mental transfer of trust between brands in this way. For example, during some interviews, participants would first claim that they would not download an app without knowing the company who created it or offered it. However, in subsequent interview questions, they admitted to doing just that.

Recommendations from Friends or Family Members

We also found that participants had few trust concerns because many of their shopping or purchasing activities were based on recommendations by close friends or family. For example, 9 of the 17 participants engaged in mCommerce activities that were initiated by a friend or family member's recommendation, either in person or via an electronic medium (e.g., email). Within these nine, four of the participants even engaged in a mCommerce activity directly through a social media platform (e.g., Twitter or Facebook).

The times of items and stores that people received recommendations on varied heavily. For example, P1 downloaded a sports team app for her mobile phone based on a friend’s recommendation, P2 downloaded a recipe from a recipe site recommend by her partner, P9 shopped for racquets based on the recommendations of her friend, a tennis ‘pro,’ and P13 bought frozen yogurt based on a friend’s recommendation. Perhaps the most self-aware of the influence that friends had on his shopping was P17 who said, *"I have a whole shopping network... me and my friends all usegroupon."*

Because of the social influence of others, interactions with particular vendors or products were deemed to be trustworthy, regardless of whether they actually were or not in fact. The sheer act of social recommendation elevated companies, brands, or items to a trustworthy status.

In most cases, social recommendations were just from close friends or family members, yet they did sometimes come from strangers where a person would rely on them if their was a large response from people:

"The seller has 100% positive feedback on eBay and I don't buy from sellers that (have) neutral or negative feedbacks"
- P15

Mistrust

In some cases, mistrust did arise but this was rare. Across all 161 diary entries, only 11 entries indicated there was a trust issue. The reasons for why the participants had trust issues often related to the previously discussed reasons for assuming trustworthiness.

Social Recommendations. Four diary entries discussed a lack of trust in the purchasing of a mobile device app because the app had a low rating as recommended by other users. In only one case did the participant continue on to downloading the app. Another participant commented *"I decided not to download even the free version because the comments were all negative."* Together, this further suggests that even if a person doesn't receive advice or recommendations from people they know, if there is a large enough response, they will rely on the advice of strangers.

Brand. In total, four diary entries related to mistrust because of brand. Two diary entries by the same participant reflected instances where he simply did not trust a brand because of a lack of recent history with it. When asked if he had trust issues, he told us in the first case, *"yes, as I have not purchased on this site before,"* and, in the second case, *"yes because I haven't ordered flowers for a long time and I couldn't remember what website I had used before."* In addition to this, we saw two more diary entries where the brand (the company) was not trusted because of the company's location; one was located in Hong Kong and one was in England, which are both a long distance away from the participant.

Hard Trust Issues. Two diary entries related to hard trust concerns. One participant was concerned about a potential virus, while another was worried about the security of the wireless network they were on in a mall.

Other Reasons. In addition to the above, participants cited usability issues (1 entry) and the limited ability to physically evaluate a product (1 entry) as reasons to mistrust mCommerce activities.

Even though the frequency of the above occurrences is small, it further suggests the importance of the aforementioned reasons why people have few trust concerns for their mCommerce activities.

DISCUSSION

The purpose of our study was to explore people's mCommerce routines and activities, identify how people think about trust during these activities, and understand how trust affects their shopping and purchasing behaviors.

We now turn to a discussion of our results and reflect back on the related work for mobile device usage along with theories of trust.

Mobile Device Usage

First, our work builds on the related work of mobile device usage. We now know that mCommerce activities occur in a variety of locations, including the home, public transit, and, to a lesser extent, at work. This more specifically builds on Nylander et al.'s location classification for mobile device usage [14] and shows that people turn to their mobile devices for shopping even if computers are located close by. This is because a large amount of mCommerce activities relate to purchases for the mobile device itself, but also because people simply have a preference for shopping in this way. Like the consumption of mobile video and video telephony services [15,16], mCommerce activities also occur in public spaces like transit commutes where the act of shopping represents a private activity in a more public space. We also have found that shopping activities typically stay on the mobile device with little concern about migrating the activity to other computers or devices; this contrasts Karlson et al.'s [6] findings about email-based activities. And, lastly, Palen et al. [17] showed that mobile phones are very much social devices; we extend this to show the impact of social recommendations on mobile shopping activities and trust.

Trust in mCommerce Activities

Our work has also illustrated the ways that trust is thought about by people participating in mobile commerce activities and how trust concerns are largely mitigated.

First, Zucker [24] developed three trust mechanisms—characteristic-based, process-based, and institutional-based trust—that have been used as a lens for eCommerce trust [7]. If we look at these mechanisms in relation to our findings about mCommerce, we see how some of them continue to play a significant role in establishing consumer trust. However, the fulfillment of these mechanisms often took on a new form that was specific to mCommerce when compared to eCommerce or traditional retail shopping.

Characteristic-Based Trust. Characteristic-based trust refers to trust that is developed through similarities between consumers and companies (e.g., similar gender, ethnicities, affiliations) [7,24]. In age of mobile shopping, devoid of much human contact (at least between company employees and consumers), one might think that it would be hard to establish trust in this way. Yet, as mentioned in the results section, many participants engaged in mCommerce activities that were initiated by a friend or family member's recommendation. Because of the social recommendation, people placed trust in a site, service, or product, regardless of whether or not it was trustful. Thus, having friends, family, or, to a lesser extent, social networks provide recommendations for shopping makes characteristic-based trust a key component for mCommerce trust.

This is promising for companies; however, if one thinks about targeted advertising, consumers face a challenging future where it will be increasingly difficult to know if social recommendations are valid. For example, social networking sites (e.g., Facebook) are increasingly placing advertising amongst information about one's friends and family. The mere placement of such information in close proximity to one's trusted social network may easily suggest a false sense of security for mCommerce activities.

Process-Based Trust. For process-based trust—trust that is built through a history of past transactions [7,24]—we see that even though participants were experiencing a new medium for shopping (e.g., mobile shopping), they brought notions of trust with them through their prior experiences with eCommerce and retail experiences. For example, they continued to shop with companies that were previously known to them in the non-mobile space, such as eBay, Amazon, etc. For companies that are designing applications to support mCommerce, this suggests that designers should fully integrate their mobile commerce opportunities with existing commerce sites and interactions such that notions of trust will transfer. For example, a company that presents an eCommerce web presence should provide a similar mCommerce presence in look and feel where a person could easily migrate between the two. Some companies already do this to a certain extent (e.g., eBay), yet we now see and understand the importance in doing so as it relates to trust.

Institutional-Based Trust. Institutional-based trust relates to trust that is established by presenting a public presence that is respected and shows integrity [24]. This is commonly done through third-party guarantors, membership in associations with professional codes of conduct, etc. [4,7,24]. The definition of this type of trust mechanism did not historically include distribution models such as app marketplaces, yet these have in essence played the role of third party guarantors when it comes to mCommerce. That is, the (often stringent) approval processes (e.g., Apple's App Store) that mobile apps must go through before they are even placed in the hands of consumers acts as a guarantor of service or products acquired through it. This is regardless of whether or not such approval processes actually do make companies more trustworthy with their apps or shopping services. For consumers, it doesn't matter; they simply assume so.

One could argue that historically this trust role has been associated with search engines in eCommerce. Yet in mCommerce, app marketplaces have now taken over this role. While the actual creator of the app might not get the brand recognition for the experience, in the mobile space this seems to be one of the best ways for companies to get their products in the hands of potential new users. Traditional more obvious eCommerce institutional-based trust mechanisms such as third party seals and security seals

were never mentioned or became apparent amongst participants.

Consumer Vulnerability. If we look at Head and Hassanein's [5] factors which make consumers vulnerable in eCommerce transactions—providing their email address, shipping information, credit card numbers, etc.—it is evident that these happen at the time of purchase. For example, a user must input detailed information in order to finalize a purchase on an eCommerce web site. Yet this does not transfer to mCommerce. As our results showed, nearly all purchases occurred through an app marketplace, which means that purchase information went through the larger trusted brand provided by the marketplace and not necessarily at the actual time of purchase. For example, when making a purchase in the Apple App Store, payment information is entered when a user first creates an Apple account. Then, when consumers decide to purchase something through the App Store, they need only enter in an account password in order to make the purchase. This type of 'automatic' payment eliminates factors of perceived vulnerability. One could compare this to the manner in which PayPal provides assurances for eCommerce purchases.

Retail Shopping. Finally, Head and Hassanien's [5] developed a set of factors that describe why it is difficult for eCommerce companies to develop trust as compared to retail stores. These include lower barriers to entrance (e.g., it is quick to create an eCommerce web site), the inability for consumers to view a company's investment in personnel and buildings, and the inability for consumers to physically evaluate products, and a lack of human interaction [5]. When considering mCommerce, we can see less concern when it comes to establishing a mobile shopping presence as there is typically a rigorous process to create and publish mobile apps. Our participants recognized this and felt increased trust because of it. Similarly, one could argue because of the higher barrier of entrance, having a mobile presence would be a show of longevity similar to that of a physical investment. This would be akin to consumers being able to see a retail store's investment in buildings and personnel. In the case of human interaction, our participants often relied on social recommendations and brand recognition to establish trust; this makes such interactions less of a concern for mCommerce. Yet such social recommendations could easily become problematic if they are based on minimal knowledge.

Limitations. While beneficial, we recognize that our work did not explore all routines and practices that might be experienced by mCommerce users. Our users were all periodic to regular shoppers and, as such, we did not collect any data from people who were new to mobile shopping and purchasing. It is likely the case that such individuals would have increased trust concerns at least initially; however, further studies are needed to explore this.

CONCLUSION

Our paper explored the shopping and purchasing behaviors of users on their mobile devices through a diary and interview study. Here we found that mobile commerce activities are a ubiquitous activity that occurs in many places, including home, work, and on transit, where some people are very spontaneous in their shopping, while others have distinct routines or timing for their shopping or purchasing activities.

In relation to trust, many people had few concerns and this can be attributed to several factors that map at a high level to trust mechanisms established for eCommerce. That is, most of the trust mechanisms/factors that we saw for mCommerce could be translated in some form to those established for eCommerce. However, in each case, mCommerce brought unique nuances in terms of how the trust mechanisms were being applied and thought about by users. Our results showed that because purchases were made on a mobile device, unlike personal computers, they tended to be made from companies which either already had a strong relationship with users from previous mobile transactions or those done in other mediums, or because of a strong referral by friends (or at the very least a referral in a social space). Compared to eCommerce, mCommerce seems to be more of an extension of the entire 'brand experience' and less of a starting point in an introduction to a brand. This suggests that the more mCommerce applications tie to existing friend networks or established and known brands, the more likely people will trust them for their shopping and purchasing activities.

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