

**TECHNOLOGY FRAMES AND SENSE MAKING OF RESTAURANT
MOBILE APPS**

by

Robert Nchor

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Masters of Science in Hospitality Information Management

Spring 2012

© 2012 Robert Nchor
All Rights Reserved

**TECHNOLOGY FRAMES AND SENSE MAKING OF RESTAURANT
MOBILE APPS**

by

Robert Nchor

Approved: _____
Muhammed Naveed Baqir, Ph.D.
Professor in charge of thesis on behalf of the Advisory Committee

Approved: _____
Francis Kwansa, Ph.D.
Interim Chair of the Department of Hotel, Restaurant and Institutional
Management

Approved: _____
Bruce W. Weber, Ph.D
Dean of the Alfred Lerner College of Business and Economics

Approved: _____
Charles G. Riordan, Ph.D.
Vice Provost for Graduate and Professional Education

ACKNOWLEDGMENTS

I would like to express my deepest appreciation to my committee chair, Muhammed Naveed Baqir, Ph.D. Without his encouragement and support this study would not have been completed. I also express my warmest appreciation to my other committee members Srikanth Beldona, Ph.D and Brian L. Miller, Ph.D whose immense contribution and support ensured the successful completion of my study.

I also owe my sincere appreciation to Francis Kwansa, Ph.D for introducing me to the interesting world of hospitality information management. His optimism concerning my future, encouragement, and continuous support for me has been remarkable.

I want to express my deepest appreciation to all my colleagues and staff of the department of –Hotel, Restaurant and Institutional Management (HRIM) who in diverse ways have contributed to the completion of this study.

TABLE OF CONTENTS

LIST OF TABLES	vi
LIST OF FIGURES	viii
ABSTRACT	ix

Chapter

1. INTRODUCTION	1
1.1. Motivation of the Study	2
1.2. Significance of the Study	3
1.3. Purpose of the Study	3
1.4. Objectives of the Study	4
1.5. Research Questions	5
2. THEORETICAL FRAMEWORK	6
2.1. Sense Making	6
2.2. Research on Sense Making of Technology	6
2.3. Research Gap	9
2.4. Role of Technology Frames	9
2.5. Social Influence Model	12
2.5.1. Social Groups	14
2.5.2. Social Influence	18
2.5.3. Sense Making of Technology	20
3. RESEARCH METHODOLOGY	24
3.1. Sample	24
3.2. Pre-Test Instrument	24
3.3. Measurement Scales	25
3.4. Instrumentation	26
3.5. Instrument Validation	26
3.6. Statistical Analysis	27

4. RESULTS AND FINDINGS	28
4.1. Descriptive Statistics	28
4.2. Smartphone or iPad Users	32
4.3. Restaurant Diners	33
4.4. Restaurant Mobile Apps Users	36
4.5. Restaurant Mobile Apps	38
4.6. Restaurant Mobile Apps Use	40
4.7. Relevant Social Groups	42
4.8. Restaurant Mobile Apps Adoption Issues	46
4.9. Factor Analysis	47
4.9.1. Social Influence	48
4.9.2. Sense Making of Restaurant Mobile Apps	50
5. DISCUSSION	53
5.1. Restaurant Mobile Apps Adoption	53
5.2. Discovering Restaurant Mobile Apps	54
5.3. Application of Restaurant Mobile Apps	55
5.4. Restaurant Mobile Apps Adoption Issues	56
5.5. Social Influence	56
5.6. Sense Making of Technology	57
5.7. Implications and Limitations	58
5.8. Conclusion	60
REFERENCES	61
Appendix	
A SOCIAL INFLUENCE SCALE	63
B SENSE MAKING SCALE	64
C LETTER	65

LIST OF TABLES

Table 1:	Constructs.....	14
Table 2:	List of Social Groups.....	15
Table 3:	Dimensions of Social Influence	20
Table 4:	Gender	28
Table 5:	Age	30
Table 6:	Education.....	31
Table 7:	Smartphone or iPad Users	32
Table 8:	Restaurant Diners	33
Table 9:	Categories of Restaurant Diners Based on Gender	35
Table 10:	Restaurant Mobile Apps Users.....	36
Table 11:	Restaurant Mobile Apps.....	39
Table 12:	Cross Tabulation (Google Places and Yelp)	39
Table 13:	Restaurant Mobile Apps Use.....	41
Table 14:	Relevant Social Groups.....	43
Table 15:	Cross Tabulation (Friends and Online review sites)	44
Table 16:	Categories of Social Groups.....	45
Table 17:	Restaurant Mobile Apps Adoption Issues	46
Table 18:	Descriptive Statistics	47

Table 19: Social Influence	49
Table 20: Descriptive statistics (social influence).....	50
Table 21: Sense Making of Restaurant Mobile Apps.....	51
Table 22: Descriptive Statistics (sense making).....	51

LIST OF FIGURES

Figure 1:	Individual Sense Making of Technology	12
Figure 2:	Social Influence Model	13
Figure 3:	Gender	29
Figure 4:	Age	30
Figure 5:	Education	31
Figure 6:	Smartphone or iPad Users	32
Figure 7:	Restaurant Diners	34
Figure 8:	Categories of Restaurant Diners Based on Gender	35
Figure 9:	Restaurant Mobile Apps Users	37
Figure 10:	Frequency of Mobile Apps Use	38
Figure 11:	Restaurant Mobile Apps Use	42

ABSTRACT

This study examined social influence on sense making of restaurant mobile apps adoption individuals. The study identified social groups and examined their influence on the individual's sense making of restaurant mobile apps. One hundred and fifty restaurant consumers who used smartphones or iPads participated in this study online. The analysis of the results indicated that using restaurant mobile apps to locate restaurant was the influential reason for adoption. The study also found that restaurant mobile apps adoption is inhibited by ability and risk inhibitors more than value inhibitors. Technology frames by Social Networks were found to be the most preferred for discovering restaurant mobile apps. Sense making of restaurant mobile apps was influenced by externally oriented social influence or personally oriented social influence. However, the results demonstrated that individual adopter's sense making of restaurant mobile apps within the social context varies.

Chapter 1

INTRODUCTION

Technology adoption and use has been a popular topic in information systems (IS) research and in the hospitality industry in general (Venkantes & Davis, 2000; Lin & Silva, 2005). It has been argued that adopters of technology draw on specific cognitive devices to make sense of new technology and that these cognitive devices are crucial in shaping individuals understanding of the technology (Orlikowski & Gash, 1994; Davidson, 2002). The cognitive device that an individual uses in relation to technology adoption is termed a technological frame (Lin & Silva, 2005). During system adoption stakeholders draw on specific technological frames (TF) to make sense of new systems which ultimately shape their perceptions and subsequent actions (Mengesha, 2010).

Theories that shape sense making of technologies rely mainly on socio-cognitive models that focus on organizational and environmental contexts, leaving nearly the entire social context of users out of the model (Olikowski & Gash, 1994; Acha & von Tunzelmann, 2001, Davidson, 2006; Vishwanath, 2009; Mengesha, 2010). Research that has addressed the social processes of organizational sense making has tended to follow one of two approaches (Maitlis, 2003). The first of these investigates how groups influence others' understandings and interpretations of issues. Leaders have received particular attention (Dutton & Jackson, 1987; Smircich & Stubbart, 1985; Maitlis, 2003). These studies emphasized the role of leaders' technological frame in sense-making within the organizational context (Edmondson,

2002). For instance, a leader's technological frames can shape the interpretation of technology projects or strategy (Acha & von Tunzelmann, 2001; Edmondson, 2002; Mengesha, 2010). A second approach to organizational sense making has examined the social processes associated with sense making more holistically, but it has tended to do so in contexts that are marked by crisis (Maitlis, 2003). The analysis of the Mann Gulch disaster which suggests a dialectical relationship between social structure and sense making was cited as an example (Weick, 1993; Maitlis, 2003). Without social roles and relationships in place, sense making can be difficult or impossible, leading to confusion and distress (Weick, 1993).

1.1. Motivation for the Study

Research scrutinizing the adoption and use of IT in the hospitality industry is motivated by the desire to help understand, predict, and to some extent control the factors which influence IT adoption and use. Despite a common motivation for investigation, our understanding of sense making of technology in the hospitality industry specifically the restaurant industry, remains under examined. A restaurant app is an application that allows users to find out where to head to, based on their location, and the kind of food that they want (Mediatique, 2010; Mobile Marketing Association, 2011). The apps market is characterized by heterogeneous information from various restaurateurs, apps vendors and so forth. The adopters of these restaurant apps are therefore overwhelmed by data. The social groups of the adopter play an important role in filtering, analyzing and integrating data to present information in usable form to the adopter. The adopter in turn, tries to use the processed information from the social groups to make sense of the various

restaurant apps in the market. The question of how the adopters make sense of the various restaurant mobile apps can be assessed by sense-making.

1.2. Significance of the Study

The significance of this research for restaurants is far reaching. A poor understanding of adopters' sense making process can lead to poor framing of plans, and consequently to poor decisions (Gioia and Sims, 1986). Restaurant mobile apps are fast gaining popularity, which means it's a good idea to understand the social influence on the adopters' use behavior not only for marketing purposes but also to increase existing knowledge of technology adoption in the restaurant industry.

1.3. Purpose of the Study

Mobile applications especially developed for restaurants have been gaining a rapid acceptance. There are mobile apps for finding restaurant vouchers, location and services. Restaurant mobile apps could be split into two main categories (Willard, 2012):

- Restaurant review and ratings apps: Popular restaurant website apps include Bookatable, Yelp, OpenTable, TripAdvisor, Foodspotting, Google Places and Urbanspoon. These allow customers to enter their location (if it's not already selected with GPS) and choice of food. The app will then provide suggestions on local places to eat. These apps encourage people to share their opinion whenever they are eating out.

- Restaurants marketing apps: These apps generally comprise of a restaurant locator for each particular chain and a booking or ordering system. Pizza Hut's app as an example enables people to order pizzas with their choice of topping.

Research on adoption and use of new technology reveals that social context is crucial in understanding adopters' sense making of the technology (Klein and Kleinman 2002). This is because adoption and use of a particular technology can be understood from its social context (Davidson, 2002). In addition, social influence theories suggest that adopters' actions did not occur through a well-thought out plan, but occurred due to interrelationships among social groups (Vannoy & Palvia, 2010). The purpose of this study, therefore, is to explore restaurant mobile apps adoption and investigate social influence on restaurants customers' adoption. In the process of restaurants apps adoption and use, this study draws on the concept of sense making of the technology (Weick, 1995). In doing so, this study considers that the social context of restaurant apps users' serves as a catalyst for better understanding of the adoption of restaurant apps.

1.4. Objectives

This research achieved the following two broad objectives;

- The study examined the adoption and use of restaurant mobile apps. This identified the social groups that restaurant consumers interacted with prior to their adoption of the mobile apps. Also, the study determined the underlying reasons that prompted consumers to adopt mobile apps. And identified the adoption issues regarding restaurant mobile apps.

- The study investigated social influence on sense making of restaurants mobile apps. This helped to comprehend the adoption of restaurant mobile apps at the individual level within the social context.

1.5. Research Questions

The study answered the following research questions;

1. What types of restaurant mobile apps do restaurant consumers adopt and use?
2. What are the relevant social groups of restaurant mobile apps adopters?
3. What are the main reasons that prompt consumers' adoption and use of restaurants mobile apps?
4. What are the main reasons why restaurant consumers' do not adoption and use of restaurants mobile apps?
5. What is the impact of social influence on adopters' sense making of the restaurant mobile app?

Chapter 2

THEORETICAL FRAMEWORK

This chapter provided an overview of sense making and technology frames literature from various information systems (IS) theories and models. The chapter looked at the definition of sense making, the role of technology frames in sense making and the various theories that explained individual sense making and technology frames.

2.1. Sense Making

The concept of sense making is defined as an interpretive activity (Weick, 1993). It involves gathering information, gaining an understanding of the information and then using the understanding to accomplish a task. Thus, sense making occurs in organizations when members confront events, issues, and actions that are somehow surprising or confusing (Gioia & Thomas, 1996; Weick, 1993, 1995).

2.2. Research on Sense Making of Technology

Theories that investigated sense making of technology adoption and acceptance focused on the role a technology frame of reference. Technology frames are fundamental in shaping users' perception of the ease of use, usefulness of the technology, and nature of the technology (Lin & Silva, 2005). The research domains that examined the role of technology frames on sense-making of technology are discussed below.

➤ **Cognitive Theories**

Cognitive theories focus on how individuals cognitively process information and how their information processing affects behavior, decisions, and performance (Davidson, 2002). The underpinning of cognitive theories is that reality is socially constructed through human beings interpretations of experience and action and their social negotiation of meaning (Berger & Luckmann, 1967; Weick 1979). Cognitive theory has been criticized for its inability to enhance a systematic articulation of the role of technology of reference (Orlikowski & Gash, 1994). This takes the discussion to the next domain of research.

➤ **Socio-cognitive**

Socio-cognitive research shares the fundamental tenet that an individual's knowledge about an informational domain is cognitively structure through experience and interaction (Orlikowski & Gash, 1994; Davidson, 2002). A review of the literature reveals that though cognition occurs at the individual level, socio-cognitive researchers have hypothesized the existence of group level knowledge structures which of shared knowledge and beliefs but function in a similar way as individual knowledge structures (Davidson, 2002). Although research in this domain have explicitly observed the role technology frames play in the individual sense-making, it only focused on interaction from the organizational and technological contexts. The cognitive model failed to consider the individual's interaction outside the organizational context.

➤ **Social Construction of Technology (SCOT)**

Social construction of technology researchers have investigated how knowledge shared by members of a social group (e.g. inventors, users, etc.) influences their development of artifacts and their understanding of a technology's properties and uses in a social context (Davidson, 2002). SCOT assumes that social groups are present equal and that all relevant social groups are present in the adoption process (Klein & Kleiman, 2002). SCOT is heavily criticized for its failure to adequately attend to power asymmetry between groups (Klein & Kleiman, 2002).

➤ **Social Influence**

The main underpinning of social influence research is that, the individual sense making of technology is socially influenced. Social influence research indicates that individual sense making of technology is influence by others with whom they interact (Contracter, Seibold & Heller, 1996, Fulk, Schmitz, & Steinfield, 1990; Krau et al. 1998). Sense-making is a social process in which organizational members interpret their environment through interactions with others, construct accounts which allow them to comprehend the world, and respond to events collectively (Maitlis, 2005). New technologies are equivocal because they are complex, abstract, uncertain, esoteric, and recondite (Weick, 1990) and since potential adopters during the early stages of adoption face higher levels of uncertainty (Rogers, 2003), their definition of technology innovation is influenced by social interaction.

Sense making is a process of social construction (Berger & Luckmann, 1967) in which individuals attempt to interpret and explain sets of cues from their environments (Maitlis, 2005). In other words, individuals sense making of a technology is not actually objective fact about the technology, independent of human subjectivity, rather, are socially constructed.

2.3. Research Gap

Despite the significant contributions of the above research domains, our understanding of how the technological frames influence the individual sense making of technology within the social context remains deficient. In this study we therefore focus our attention to the individual's sense making of technology and the role of technological frames within the social context.

2.4. Role of Technological frames

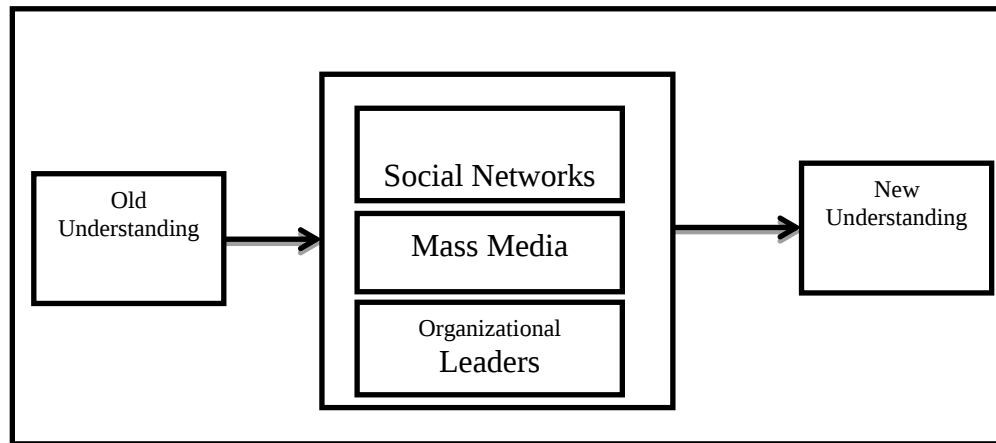
In order to understand the individual's sense-making of the technology, there is the need to understand the role of technological frames of reference within the social context. This study draws from Davidson (2002) technological frames model to illustrate the role technological frames play in the individual's sense making of technology. Davidson (2002) identified four technology frames and the influence of frames on the individual sense-making of technology. Davidson (2002) explains that in the framing process, (1) technology frames act as socio-cognitive filters to direct individuals' attention and (2) to filter contextual information inconsistent with existing frames. (3) Change triggers may shift frame salience, possibly leading to new understandings or use of the technology. Davidson (2002) assumes that

reality is socially constructed through human interaction. Therefore it is imperative to understand individual's sense making in the social context. In the model, the author explains that since technological frames provide a useful lens to interpret and arrive at an understanding of a technology, individuals' draw on these frames to make sense of the technology. In this process of interpretation, frames act as templates for problem solving as well as imprecise, conservative filters for new information (Davidson, 2002). In a social context diversity of group and individual technology frames provide an array of possible socio-cognitive filters for interpreting contextual information and sense making of technology (Davidson, 2002). Contextual changes can trigger shifts that bring new knowledge to the forefront of sense making (Bartunek 1984; Barr 1998; El Sawy & Pauchant 1988; Gioia, 1986; Davidson, 2002). Changes that trigger a shift in salient technology frames could lead to reinterpretation of information and lead to new understandings of IT requirements (Davidson, 2002).

The model provides a theoretical and conceptual perspective that deepens our understanding of individuals' sense making processes in organization and social contexts, focusing on technology frames of senior executives in the organization (Davidson, 2002). However, the technology frame comprises much more than senior executive representation and influence on high-level corporate strategy (Acha & von Tunzelmann, 2001). The individual's sense making of technology is socially oriented and takes place within a predefined social context (Lyytine & Ngwenyama, 1992) rather than just within the organizational context. That is, how individuals perceive technology depends upon the particular social context in which the technology should be applied (Scupola & Fitzgerald, 2006). This is

because the social context provides a repository of rules and resources that enable individuals to make sense of a technology. These resources and rules allow individuals to interpret collective activities while adjusting their own understanding accordingly (Ngwenyama & Klein, 1994; Scupola & Fitzgerald, 2006). Within the social context, the individual has access to diverse sources of technological frames from formal and informal sources which include the mass media, hotel website, user blogs, feedback forums and technology portals (Vishwanath, 2009). The individuals depend on the accessible technology frames of these social groups because they are limited in their cognitive ability (Fiske & Taylor 1991) and ordinarily are not motivated to search for more relevant information (Petty & Cacioppo, 1986). Since many technology innovations are equivocal (Weick, 1990) – that is, they can be interpreted in multiple, conflicting ways (Fulk, 1993) – and since potential users during the early stages of innovation face higher levels of uncertainty (Rogers, 2003), they tend to use technology frames from the social groups (such as hotel website, friends, senior managers, etc.) to define the technology. Sense making of the technology is therefore easily manipulated by the technology frames from the social context because they provide the most recent or memorable technology frames (Zaller & Feldman 1992; Cobb, 2002). Technology frames facilitates understanding, interpretation, reduces uncertainty and provides basis for sense making of the technology (Lin & Silva, 2005). Figure 1 below is an illustration of the individual's sense making process of technology and the role social groups technological frames play in the process.

Figure 1: Individual sense-making of technology within the social context.



The graphical illustration above assumes that the individual have not had any experience or used a similar technology before. This is because an individual who had used a similar technology before will probably understand the new technology on the basis of his/her past experience and knowledge and as such, expects to see similar results (Lin & Silva, 2005). On the other hand, if an individual does not have experience with the new technology, the individual will likely rely on the social sources technological frames for knowledge and sense making of the technology (Lin & Silva, 2005). This is because a technology frame serves as a short cut and filter with which to understand some technologies and ignore others.

2.5. Social influence Model

The Social Influence Model (SIM) of sense-making of Technology developed for this study incorporates the use of a Social Influence construct as the antecedent to Technology adoption/acceptance and sense making from the studies of (Lewis, Agarwal & Sambamurthy; Palvia, 2010). Prior social

influence research has been criticized for adopting a narrow theoretical lens to examine role of social influence on technology adoption by focusing on the role subjective norm constructs play (Vannoy & Palvia, 2010). Even though subjective norm incorporates the idea of the influence that others in one's social environment have over one's behavior, further researchers have found mixed and inconclusive results in technology adoption studies utilizing the subjective norm construct (Vannoy & Palvia, 2010). In this research model (figure 2 below) consistent with the theoretical arguments underlying Social Influence Model of Technology Adoption (Lewis, Agarwal & Sambamurthy; Palvia, 2010), we anticipate direct impacts of social influence on sense-making of technology innovation.

Figure 2: Social Influence Model

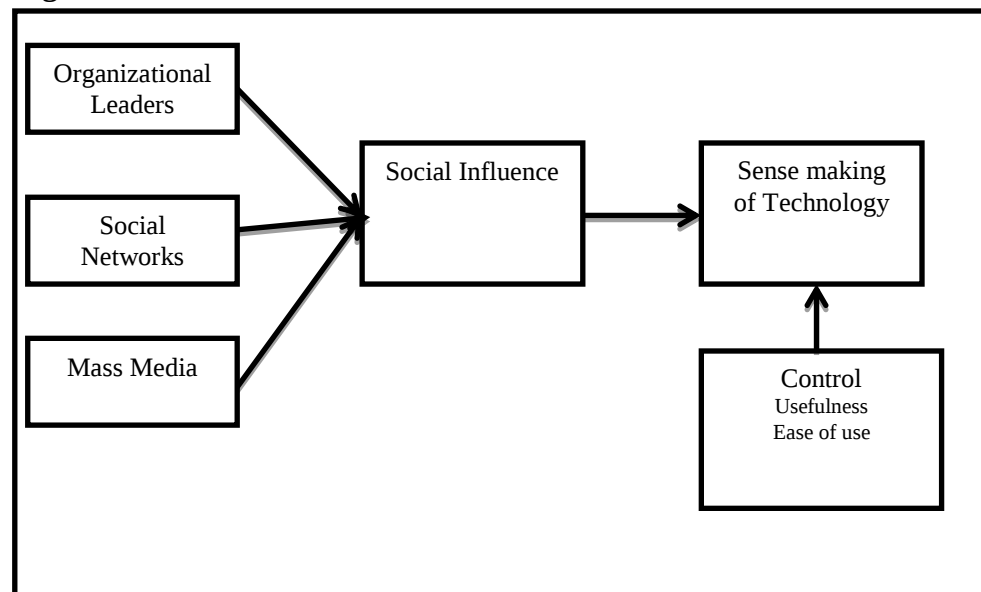


Table 1: Constructs

Constructs	References
Organizational Leaders	Edmondson (2002), Lewis et al (2003)
Social Networks	Schmitz and Fulk (1991) Rice and Aydin (1991)
Mass Media	Garud and Rappa (1994)
Control (Ease of use, Usefulness)	Davis et al (1992)
Sense making of technology	Weick (1995)

The model above illustrates that an individual sense-making of technology is dependent on the social influence of the social groups which are the main sources of the individual's technological frames. It is important to note that this model does not illustrate that certain independent constructs share relationship with one another. The three main antecedent constructs for social influence are based on social influence theories. Social influence theories suggest that sense-making of technology adoption and use is influenced by social interaction. The view that sense making of technology adoption and use does not occur independently but is influenced by social groups of the adopter through interaction is the central argument of this study.

2.5.1. Social Groups

The “social groups” are the sources of the individuals' technological frames for sense making of technology innovation within the social context. Social information processing theory (Salancik & Pfeffer, 1978)

proposes multiple mechanisms influence the individuals' sense making of technology (Fulk, 1993). The analysis of social influence literature identified organizational leaders, professional networks, personal networks, mass media, hotel websites, and social media as examples of social groups. Table 2 below is a list of the social groups

Table 2: List of Social Groups

Social Groups	Examples	Author(s)
1. Organizational Leaders	• Senior executives • Project managers • Supervisors	• Vishwanath, 2009 • Edmondson, 2002
2. Social Network	• Professional • Co-workers • Colleagues • Personal • Family • Friends	• Professional • Fulk, Schmitz, & Steinfield, 1990 • Schmitz & Fulk, 1991 • Fulk, 1993 • Edmondson, 2002 • Personal • Rice & Aydin, 1991 • Garud & Rappa, 1994 • Rosenkopf & Tushman, 1998
3. Mass Media	• Magazines • Television • News paper • Websites	• Garud & Rappa, 1994 • Rosenkopf & Tushman, 1998 • Vishwanath, 2009

The technological frames of these social groups (e.g. Co-workers or organizational leaders) can take many forms: (1) interpretation of a technology, (2) enhances salience of a technology by drawing attention to the technology, (3) provision of standards for evaluating the capabilities, ease-of-use and usefulness of the technology, (4) comparison against any existing technology practice. Below is a further discussion of the social

group and the role these groups' technological frames play in individual sense making of technology.

➤ **Organizational Leaders**

Organizational leaders are influential in the individual's sense making of technology because leaders are the most visible spokespersons and translators of the potential implications of a new technology to the users (Edmondson, 2002). In this sense, organizational leaders' technology frames provide cues regarding sense making of technology. Nowadays, IT constitutes the core of organizations (Doherty and King 2005), and its adoption and use have been influenced by the frames of reference held by organizational members (Markus 1983; Orlikowski & Gash 1994).

➤ **Social Network**

The social network of the individual constitutes his or her professional and personal networks. These categories are discussed below. **Personal Network:** In sense making of technology, individuals align their interpretations by observing others actions (Latham & Saari, 1979; Manz & Sims, 1986). Individuals will often observe their friends or family members successfully using a technology to accomplish organizational or individual work and then believe that they would benefit from using the technology in a similar manner (Bandura 1986; Kraut et al. 1998). Consistently, it was found that individuals perceived

their network partners as holding similar attitudes individuals toward a technological application and therefore are likely to adopt it (Rice & Aydin, 1991). Individuals that experience attraction to a personal network will “buy in” to the network’s norms and behaviors that mirror the network (Hackman, 1976; Fulk, 1993).

Professional Network: Individuals’ professional or occupational training may be seen as an attempt by co-workers or superiors to transmit the use of particular technological frames, especially to new members (Tolbert, 1988; Van Maanen & Schein, 1979). The research on social information processing (Salancik & Pfeffer, 1978), suggests that people tend to share assumptions, knowledge, and expectations with others with whom they have close working relationships (Orlikowski & Gash, 1994). In addition, individuals often interact with the professional network (co-workers) to discuss the use of an IT application and how its capabilities support organizational work (Lind & Zmud, 1991). These interactions lead to sense making of the technology. This study therefore acknowledges the strong effect of professional network on the individuals’ sense making of technology. Professional networks such as co-workers handle the key systems and are knowledgeable of its functions and capabilities. Their frames are key to the evaluation and sense-making of the technology.

➤ **Mass Media**

Mass media frame is defined as “a central organizing idea or story line that provides meaning to an unfolding strip of event” (Gamson & Modigliani, 1987). The authors viewed media frames as necessary to turn meaningless and ambiguous situations into discernible ones. Mass media play an important part in shaping individuals sense making of technology (Diermeier, 2009) as they provide the individuals with technology frames (Entman, 1993). The framing and presentation of a technology in the mass media can thus affect how recipients make sense of the technology (Price, Tewskburry & Powers, 1995).

2.5.2. Social Influence

Social influence is the process by which individuals make real changes to their feelings and behaviors as a result of interaction with others who are perceived to be similar, desirable, or expert (Rashotte, 2006). “Social Influence as constructed for this study is defined as the degree the degree to which the individual values being a member of the group, the degree to which group membership is perceived important, the degree to which the individual believes in group authority, and the degree to which the individual believes the needs of the group are more important than that of the individual (Vannoy & Palvia, 2010). Individuals engage in symbolic action and thereby construct a social reality that reflects their common assumptions, beliefs, and

understandings, and that includes particular rules, rituals, and customary practices (Orlikowski & Gash, 1994). Consistently, individual will construct meaning from a social group's technological frames that they consider to hold similar attitudes or expectation about the technology (Rice & Aydin, 1991). Another manifestation of social influence is that individuals are regularly confronted with multiplicity of informal rules and expectations, regarding their conduct, which in part regulates members' behavior (Hackman, 1976; Moch & Seashore, 1981). Conformity is considered an instance of social influence (Rashotte, 2006). Conformity with a social group's norms raises the prospects for affiliation with the group. According to social influence theory, group members develop expectations about the future task performance of all group members, including themselves (Rashotte, 2006). Expectations guide the group interaction once developed. Because expectations guide and are maintained by the interaction. Hence, those group members for whom the highest expectations are held will be the most influential in the group's interactions. Social influence is therefore a strong indicator of an individual's sense making of technology. Previous research has identified three major types of social group influences: informational influence, utilitarian influence, and value-expressive influence (Park and Lessig, 1977; Bearden and Etzel, 1982). Table 3 below depicts the types of social groups influence on technology adopters.

Table 3: Dimensions of Social Group Influence

Dimension	Description
Normative Influence	The tendency to conform to positive expectations of others
Informational Influence	Accepting information obtained by another as evidence of reality

2.5.3. Sense Making of Technology

Sense making of technology appears in this research model as a dependent variable. In the model (see figure 2 above), sense making of technology is dependent on social influence. Previous literature on sense making reveals two important approaches guiding our investigation of the sources of sense making. The first strand of thought examines how technology features may influence technology sense making (Huo, 2008). For example, a technology may contain concrete or abstract features, and additionally, that a technology may consist of core and tangential features, which may affect how users make sense of technology (Griffith, 1999). Usually, users notice concrete or core features more easily and their sense making of technology features may be more predictable, whereas users may have difficulty in noticing abstract/tangential features and their technology sense making may be open for negotiation (Hou, 2008). When these different technology features create various triggering conditions, users will make sense of the technology, generate

local interpretations, and decide whether to accept or reject the technology (Hou, 2008).

A second strand of thought examines how social interaction may influence sense making of technology. For example, how different types of social interaction may affect a user's adoptive attitude (Burkhardt, 1990). This research follows a similar direction. Drawing from literature on the social construction of technology, (Orlikowski & Gash 1994; Davidson, 2002) articulated the construct of a “technological frame” as a useful analytical unit to make sense of IT in organizations, and it concludes “that subset of members’ organizational frames that concern the assumptions, expectations, and knowledge they use to understand technology in organizations. This includes not only the nature and role of the technology itself, but the specific conditions, applications and consequences of that technology in particular contexts”.

Sense making is a theory and a process of how people reduce uncertainty or ambiguity and socially negotiated meaning during decision-making events (Burkhardt, 1990). Similarly, sense making refers to how meaning is constructed at both the individual and group level (Weick, 1995). This study focuses on how technology adopters make sense of the new technology at the group level. Thus, how the adopters interaction with their social groups influences their sense making of the technology. This is because, a variety of social groups, whose actions significantly influence the process and outcome of technological change, take part in the social context of technology innovation (Kling & Gerson 1987). In this social context, organizational leaders, social networks, and mass media are default actors. By virtue of

individuals' membership to a particular group and the different roles and relationships they have with technology, they tend to share the group's technological frame (Orlikowski & Gash 1994). The social construction of technology (SCOT) identifies groups which share the same set of meaning attached to a specific artifact as relevant social group (Klein and Kleinman 2002).

There are quite a number of theoretical dimensions of sense making including technological frames (Orlikowski & Gash, 1994; Davidson, 2002) and Weick's (1995) seven dimensions of sense making. This study employs Weick's (1995) sense making dimensions for because they have been used in previous studies and have generated valid data (Louis, 1980; Yates & Okumara, 1995; Bergman & Mark, 2002). Weick's (1995) sense making dimension for this study

- (i) Identity construction: Measuring how a restaurant app adopter understands the adoption process and how the adopter articulates information into a single identity
- (ii) Retrospect: Measuring how past experience influence information integration
- (iii) Enact: Measuring the quality or degree to which information has been integrated as a standard for similar situations
- (iv) Sociality: Measuring the level of social group cognition and the amount of commonality evolved from the social group

- (v) Evolve: Measuring the quality and influence of social groups cues in substantiating restaurant apps information
- (vi) Plausibility versus accuracy: Measuring the degree to which restaurant apps adopters prefers practically acceptable solutions

Chapter 3

RESEARCH METHODOLOGY

This chapter illustrates how the study was operationalized by looking at the sampling method, the instrumentation and statistical analysis. This study used an online survey to investigate the adoption and use of restaurants mobile apps users. Email survey questionnaire was sent to the participants. The survey was voluntary and it took 5 – 10 minutes to complete.

3.1. Sample

The sampling frame constituted restaurant customers aged eighteen and over. The online survey was sent to about 5980 emails that were developed through the registration lists from several conferences. A target sample of 200 smartphone or iPad users was considered for this study.

3.2. Pretest Instrument

The brands of restaurant mobile apps used in the Social Influence Questionnaire were selected based on the literature review analysis of the types of restaurants review and ratings apps. The questionnaire was administered to 15 students of the University of Delaware and actual restaurant customers. The participants were asked to select the brand of restaurant app that they use or list the names of restaurant apps that they use which are not included in the list provided. The instrument was pilot-tested to ensure that the participants in this study provide

consistent answers and also to ensure that the instrument measures the dimensions of social influence accurately. Based on the results of the pilot, revisions and additions were made to the instrument if necessary. Following the pretest questionnaire, selected participants were presented a five point likert-scale questionnaire to complete online. Participants were allowed to complete the questionnaire at their own pace of time.

3.3. Measurement Scale

Measurement of the participant's susceptibility to social group influence involved a scale consisting of twenty two Likert items with which the participant were asked to indicate the extent of agreement or disagreement (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). First developed by Park and Lessig (1977), the social influence scale was found to be both reliable and valid for multiple samples of student and nonstudent subjects. The Social Influence Questionnaire was developed using 11 statements with the brands of restaurant review and ratings app identified from the literature to assess informational and normative influence. In the scale, statements from 1 to 8 measured the normative influences and from 9 to 11 informational influences. The eleven statements used were adapted from Girard (2010). See Appendix A.

In order to handle the issue of possible social desirability of the scale, 11 scales items relating to the participant's self-sufficiency were adapted from the study of Dubois and Beauvois (2005). These items were then mixed the social group susceptibility scale items. See Appendix B below.

3.4. Instrumentation

The questionnaire was divided into various parts. The first part of the questionnaire was the demographic profile. It is designed to collect information about the participants' gender, age, education, and occupation. Those demographic features are important factors that may affect the adopters' normative susceptibility to social group influence. The second part of the questionnaire was designed to gather information concerning the types of the restaurants mobile apps that have been adopted, the reasons underlining participants' adoption and use of these mobile apps. In addition this section collects information on the reasons why some restaurant customers do not use restaurant apps. The third part of the questionnaire contains questions on restaurant apps adoption and use process so that the information collected can reflect and capture the two manifestations of social group influences such - informational influence, normative susceptibility to social group influence. The last part of the questionnaires captured information on how the participants make sense of restaurant apps. The questions were designed to collect information that can reflect the social group influence on the participant's sense-making of restaurant apps. In order words, the scale was designed to capture information how social groups influence the adopters information integration which leads to sense making of technology.

3.5. Instrument Validation

An instrument can be deemed invalid on grounds of the content of the measurement items (Straub, 1989). An instrument is valid if it measures what it is intended to measure and accurately achieves the purpose for which it was designed (Patten, 2004; Wallen & Fraenkel, 2001). Instrument validity involves content

validity, construct validity, reliability, internal reliability and statistical conclusion reliability (Straub, 1989). To ensure content validity of the instrument, the items were drawn from a number of previous studies. An instrument valid in content is one that has drawn representative questions from a universal pool (Cronbach, 1971; Kerlinger, 1964). Validation of any measurement procedure requires a variety of different types of evidence to establish the constructs being measured (Landy, 1986). In order to ensure construct validity, this study relied on previous studies scales to measure the constructs. In other words, the constructs were operationalized through constructs validated in prior research studies. For example, the scales for measuring the constructs in this study were adopted from established and renowned researcher; Weick's (1995) sense making dimensions and Girard (2010) susceptibility interpersonal reference groups scale.

3.6. Statistical Analysis

Based on the information collected, statistical analysis was conducted to examine the restaurant consumers' susceptibility to social group influence during their download and use decision making process. Using SPSS (Statistical Package for the Social Sciences), a factor analysis was conducted on the scale items. T-Tests were carried to evaluate and determine if the mean standard deviations for social influence and sense-making were significantly different.

Chapter 4

RESULTS AND FINDINGS

This chapter presents analyzes of the results and findings of the study. The results and findings were presented using tables and graphs. SPSS (Statistical Package for the Social Sciences) was used to analyze.

4.1. Descriptive Statistics

The responses for this study were obtained from online survey. About 5980 emails obtained through registration lists of several conferences were sent out. 61 emails returned as undeliverable. 193 participants started the survey, 150 completed all the responses, and 36 of them did not use smartphones or iPads and 7 of the responses were incomplete responses. Therefore 150 sample was used for this analyzes. Of the 150 completed responses 82 respondents representing 54.7% were from males and 68 responses came female 45.3%. See table 4 below

Table 4: Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	82	54.7	54.7	54.7
Female	68	45.3	45.3	100
Total	150	100	100	

Figure 3: Gender

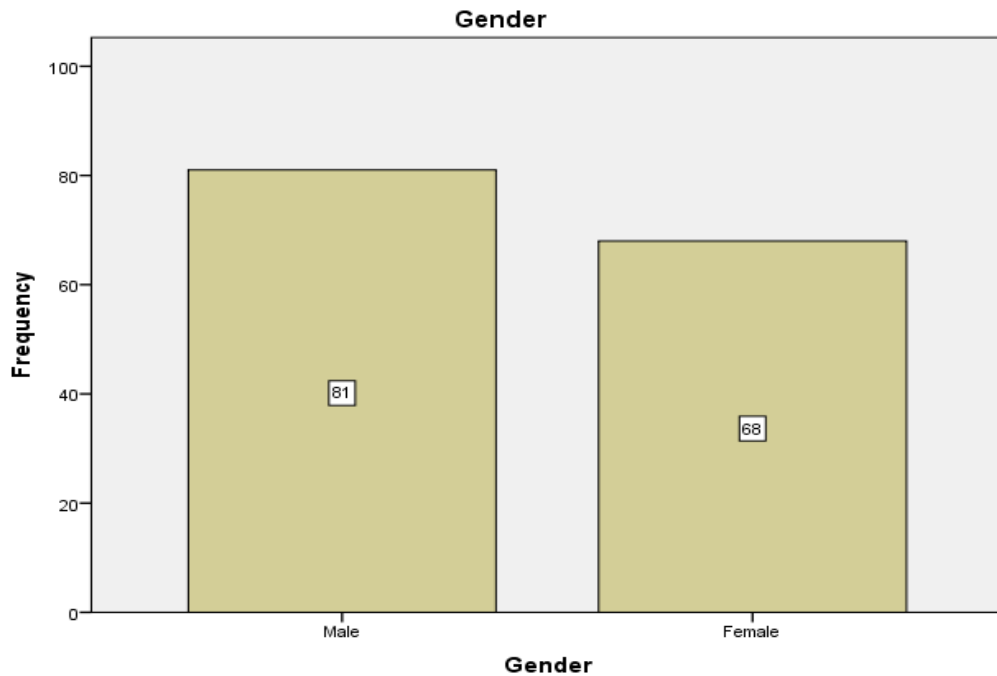


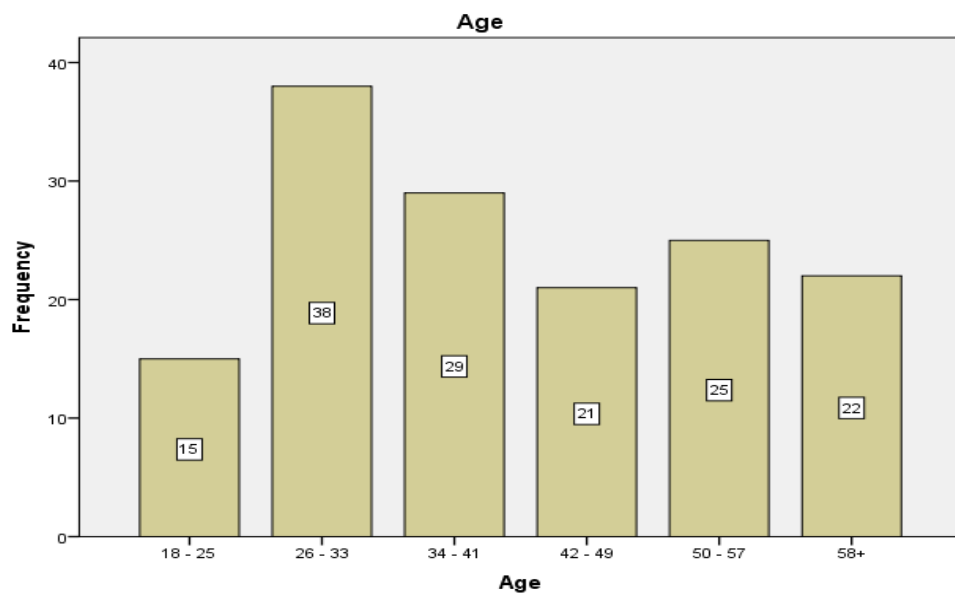
Figure 3, above is a graphical representation of the gender of smartphones or iPad users. Of a total 150 responses, the male respondents were 81 representing 54.4% and 68 respondents were female. In terms of age of the respondents, there were responses from ages that ranged from 18 to 58+. Adults aged between 26 and 33 represented the highest responses with 25.3%. Table 5 presents the various age ranges and the number of responses.

Table 5: Age

	Frequency	Percent	Valid Percent	Cumulative Percent
18 - 25	15	10	10	10
26 - 33	38	25.3	25.3	35.3
34 - 41	29	19.3	19.3	54.7
42 - 49	21	14	14	68.7
50 - 57	25	16.7	16.7	85.3
58+	22	14.7	14.7	100
Total	150	100	100	

Figure 4 below is a histogram illustrating the age distribution of the respondents. Most of the respondents were aged from 26 – 33. 22 of the respondents were aged 58+. See figure 4 below.

Figure 4: Age



With regards to the level of education of the respondents, of the 150 responses 118 responses representing 79.3% had post graduate education in their respective

disciplines. 6 responses had high school or less education background. This was shown in table 6 below.

Table 6: Education

	Frequency	Percent	Valid Percent	Cumulative Percent
High School or Less	6	4	4	4
Bachelor's Degree	26	17.7	17.7	21.7
Post Graduate	118	79.3	79.3	100
Total	150	100	100	

Figure 5: Education

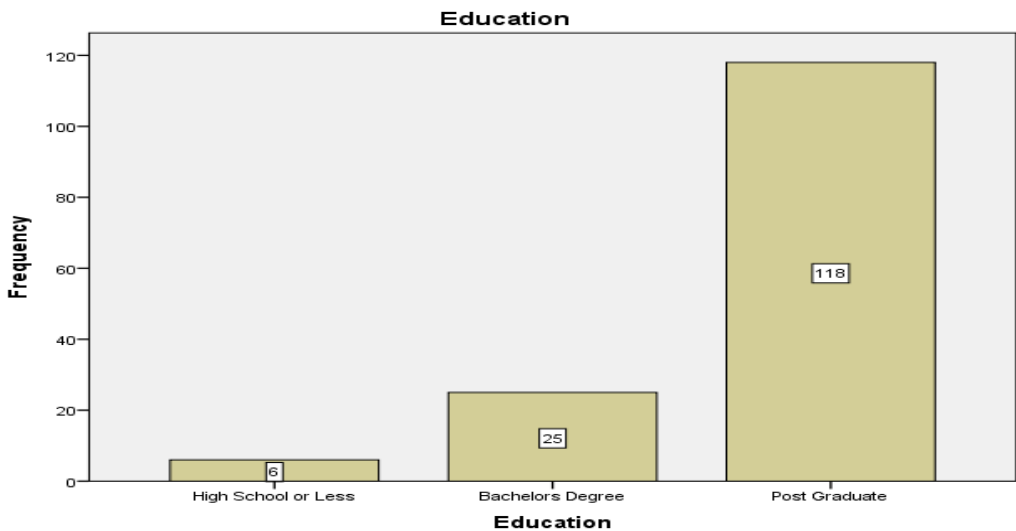


Figure 5 is presents the education backgrounds of the respondents. A majority of the respondents had post graduate in their respective disciplines. Very few of the respondents had a high school or less education background. This finding is not surprising since the sample for this study came largely from academic conferences. A

high number of the respondents were either employed or students. 104 of responses came from employed respondents, thus represent 69.3% of the total responses. Students made up 25.3% of the responses. Again, this finding is a reflection of the sample considered for the study.

4.2. Smartphone or iPad Users

150 responses representing 80.6% of usable responses indicated that they use smartphones or iPads. On the other hand, 36 respondents representing 19.4% indicated that they do not use those devices. The 36 respondent were dropped from the study since this study is restricted to only smartphone or iPad users. Table 7 below presents these figures.

Table 7: Smartphone or iPad Users

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	150	80.6	80.6	80.6
No	36	19.4	19.4	100
Total	186	100	100	

Figure 6: Smartphone or iPad Users

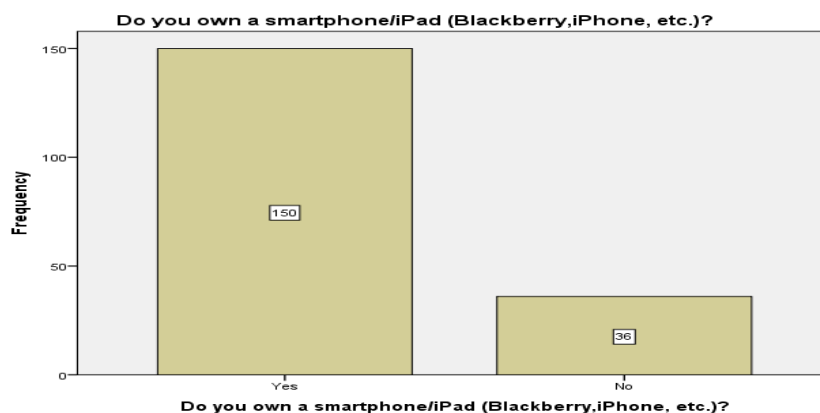


Figure 6 above is a graph showing the smartphone or iPad users against respondents who do not use those devices. 150 respondents use smartphones or iPads.

4.3. Restaurant Diners

Of the 150 smartphone or iPad users,

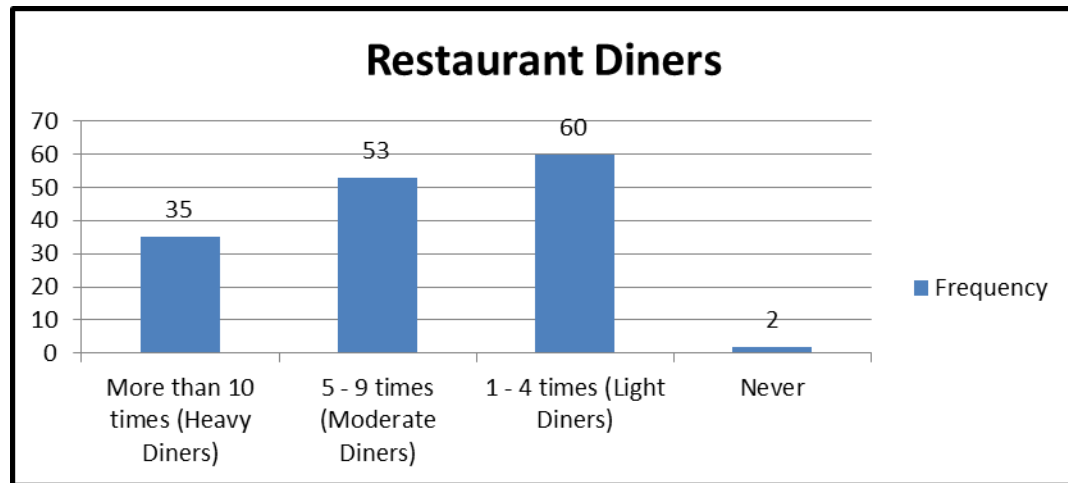
- 23.2% visit a restaurant more than 10 times in a month
- 35.1% visit a restaurant 5 – 9 times in a month
- 41.1% visit a restaurant 1 – 4 times in a month

This was presented in table 7 below

Table 8: Restaurant Diners

	Frequency	Percent	Valid Percent	Cumulative Percent
More than 10 times (Heavy Diners)	35	23.3	23.3	23.3
5 - 9 times (Moderate Diners)	53	35.3	35.3	58.6
1 - 4 times (Light Diners)	60	40	40	98.6
Never	2	1.3	1.3	100
Total	150	100	100	

Figure 7: Restaurant Diners



The figure 7 above is graph that illustrates the frequency at which smartphone or iPad users visit a restaurant within a period of one month. 35 of the respondents visited a restaurant more than ten times within a month. Only two of the responses indicated that they never visit a restaurant within the period considered. This result reflected the respondents' income status since a majority of the respondents were employed.

Further analysis of the results in terms of demographics revealed that, the Female gender represented 32.4% of the Heavy diners, 44.4% of Moderate diners and 54.2% of Light diners. For Heavy diners, the proportion of the male gender responses was twice that of the female gender (67.6%). 55.6% male respondents were found to be moderate diners and 45.8% are said to be light diners. See table 8 below

Table 9: Categories of Restaurant Diners Based on Gender

		Gender		Total
		Male	Female	
More than 10 times (Heavy Diners)	Count	23 _a	11 _a	34
	%	67.6%	32.4%	100.0%
5 - 9 times (Moderate Diners)	Count	30 _a	24 _a	54
	%	55.6%	44.4%	100.0%
1 - 4 times (Light Diners)	Count	28 _a	32 _a	50
	%	45.8%	54.2%	100.0%
Never	Count	1 _a	1 _a	2
	%	50.0%	50.0%	100.0%
Total	Count	81	68	150
	%	54.4%	45.6%	100.0%

Each subscript letter denotes a subset of Gender categories whose column proportions do not differ significantly from each other at the .05 level.

Figure 8: Categories of Restaurant Diners Based on Gender

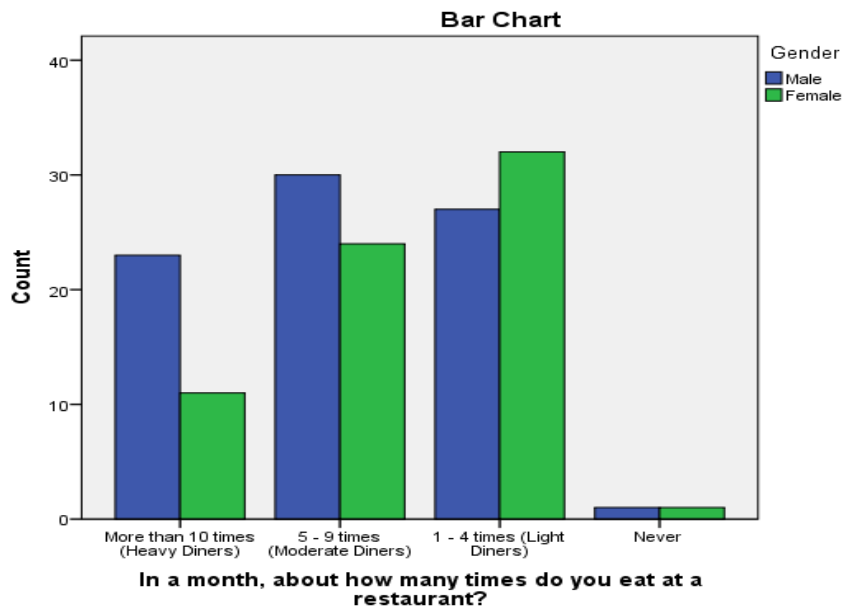


Figure 8 above is a bar graph displaying the categories of restaurant diners based on gender. From the graph, looking at the heavy diners' category, more males visited a restaurant more than their females' counterparts. However, the light diners categories category, females were more than the males. In terms of the respondents age, adults aged 18 – 25 recorded the lowest responses as heavy diners with 8.8% of the responses. Majority of heavy diners are aged 34 – 41 representing 29.4% for the total responses.

4.4. Restaurant Mobile Apps User

The results of this study indicated that, 56.9% of restaurant smartphone or iPad users adopted one or more restaurant mobile apps and 43.1% of the 150 smartphone or iPad users indicated otherwise. This was illustrated in table 10 and figure 9 below.

Table 10: Restaurant Mobile Apps Users

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	86	56.9	56.9	56.9
No	64	43.1	43.1	100
Total	150	100	100	

Figure 9: Restaurant Mobile Apps User

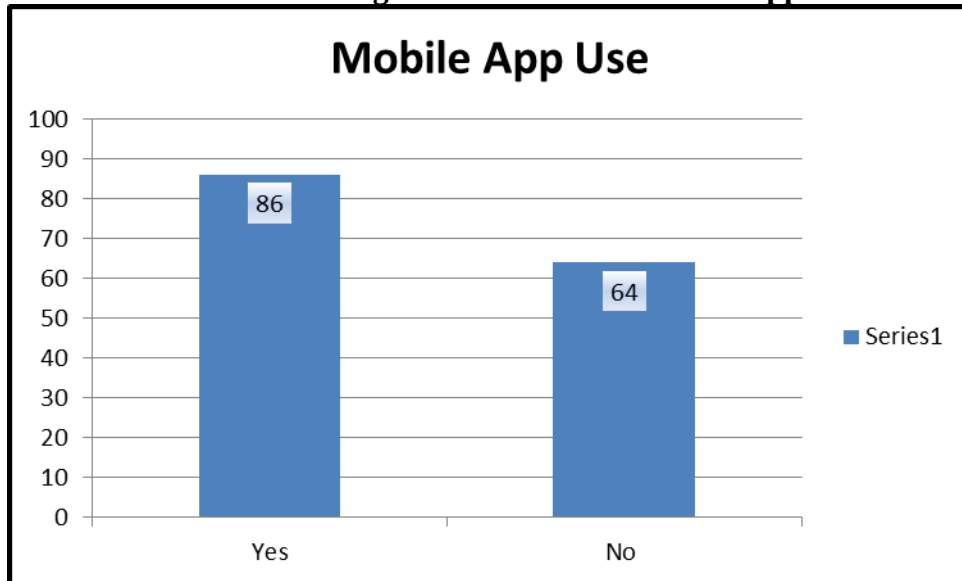


Figure 9 above, is a graph showing the number of smartphone or iPad users who have adopted one or more restaurant mobile apps for use in their mobile devices. Of the 150 smartphone or iPad users considered for this study, 86 of them representing 56.9% have adopted one or more restaurant mobile apps. 64 respondents who made up 43.1% of the sample indicated otherwise. Further breaking down the figure of consumers who indicated that they have adopted and a restaurant mobile apps, showed majority of adopters use these apps 1 – 5 times in a month. See graph below

Figure 10: Frequency of Mobile Apps Use

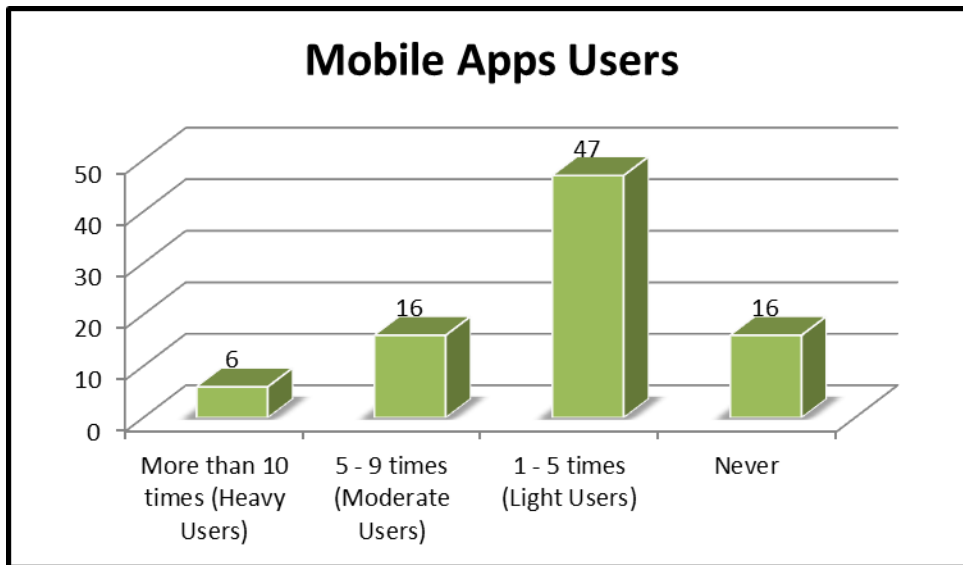


Figure 10 above, illustrates the frequency at which the respondents use a restaurant mobile apps within a period of one month. The results indicated that a majority (48) of the respondents use a restaurant mobile app, at least one to five times. Interestingly, 16 respondents indicated that they have adopted a restaurant mobile but they never use the application within the period looked at.

4.5. Restaurant Mobile Apps

The respondents who indicated that they use restaurant apps were further asked to indicate the types of restaurant apps that they use. In table 11 below, of the 86 restaurant apps users, 16 respondents did not indicate the types of mobile applications that they used. Of the remaining 70, a majority of the restaurant mobile apps adopters selected Yelp (50%), OpenTable (41%) and Google Places

(40%) their most preferred restaurant mobile app. The respondents were allowed to select one or more apps.

Table 11: Restaurant Mobile Apps.

Mobile Apps	Frequency N = 70	Percent
Yelp	35	50%
OpenTable	29	41%
Google Places	28	40%
Urbanspoon	23	33%
TripAdvisor	21	30%
Zagat	15	21%
Facebook Places	8	11%
FoodSpotting	3	4%
Foursquare	3	4%
Have2eat	0	0%
Bookatable	0	0%
Food Nutrition	0	0%
Loso	0	0%
Gowalla	0	0%

Further analysis using cross tabulation of the top three apps revealed that of the 28 respondents who used Google Places, 10 of them also used Yelp. See table 13 below.

Table 12: Google Places and Yelp Cross tabulation

		Yelp		Total
		No	Yes	
Google Places	No	17	25	42
	Yes	18	10	28
Total		35	35	70

9 respondents indicated that they used both UrbanSpoon and Yelp. Of the 29 respondents who used OpenTable, 18 of them also used Yelp.

4.6. Restaurant Mobile Apps Use

This study investigated the reasons why smartphone or iPad users adopted restaurant mobile apps. Several variables were identified which influenced smartphone or iPad users to adopt restaurant mobile apps. Some of the variables identified as being influential included locating restaurants, because mobile apps are free, to review and rate restaurant services, to find prices of restaurant services, to compare prices of restaurant services, etc. A five point likert-scale was then used to solicit the adopters' views. The adopters were asked to indicate the extent to which they agree or disagree with each variable. A factor analysis was conducted to identify the latent variables or factors. The output was shown in 12 below. The 86 participants who indicated that they used restaurants mobile apps answered this question. However a few participants left some of the scale items unanswered. This study did not restrict the participants to answer everything.

Table 13: Restaurant Mobile Apps Use

	N	Min	Max	Mean	Std. Deviation
To locate restaurants	86	1	5	4.6	0.8
Because mobile apps are free	86	1	5	3.9	0.8
To review and rate restaurant services	86	1	5	3.8	1.3
Easy to use	79	1	5	3.8	0.9
To find prices of restaurant services	84	1	5	3.8	1.0
To compare prices of restaurant services	68	1	5	3.7	1.1
To order restaurant services online	79	1	5	2.9	1.3
Because it is convenient using mobile apps to order food	78	1	5	2.9	1.2
To use coupons	86	1	5	2.8	1.3
I know someone who uses it	86	1	5	2.6	1.3
To find restaurant vouchers	86	1	5	2.5	1.4
To earn loyalty points	86	1	5	2.1	1.2

Table 13 above is a table of descriptive statistics for all the variables that were investigated. Looking at the mean, one can conclude that using restaurant mobile apps to locate restaurants is the most important variable that influences smartphone or iPad users to adopt restaurant mobile apps. The variable has the highest mean of 4.6. Restaurant mobile apps adopters are also influenced by the fact that restaurant mobile apps are free. It had the second highest mean of 3.9.

Figure 11: Restaurant Mobile Apps Use

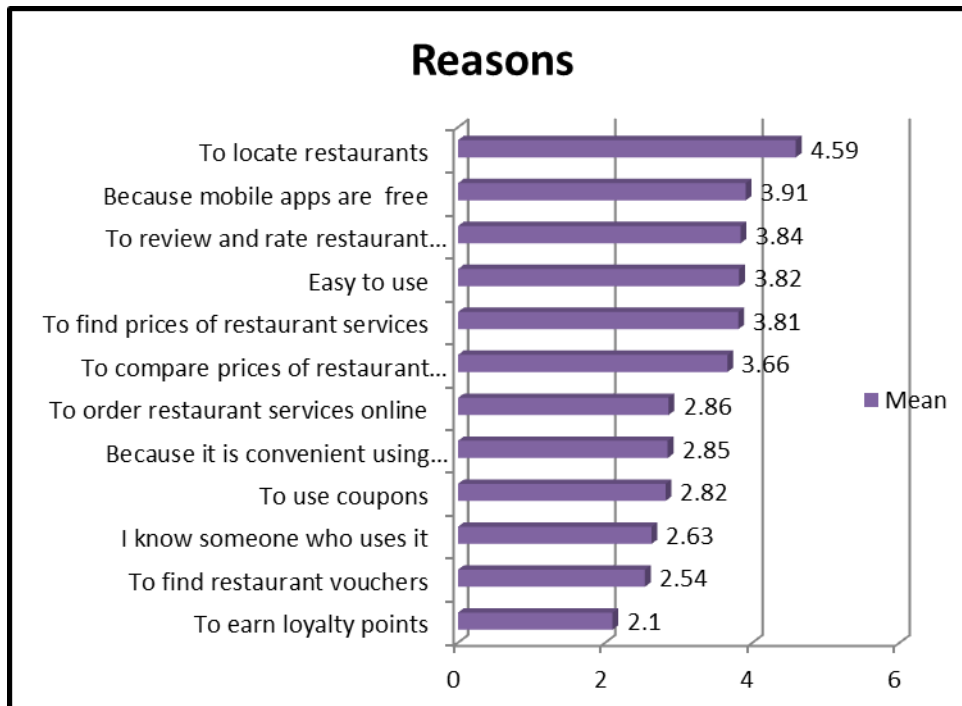


Figure 11 above ranked the respondents' reasons for adopting and using restaurant mobile apps based on the mean scores. Locating restaurants using mobile apps was the highest ranked. This means that most restaurant consumers adopt and use restaurant apps because they want to locate restaurants with a mean score of (4.59). Using restaurant apps to earn loyalty points was ranked at the bottom of the table. This means that variable has the least influence on the adopters' decisions to adopt and use restaurant apps. The results also suggest that smartphone or iPad users adopt restaurant mobile apps because they are free.

4.7. Relevant Social Groups

The respondents who indicated that used restaurant apps were further asked to indicate how they discovered these apps. The restaurant were therefore presented a

number of social groups (sources) were identified as significant to the adopters when they are searching for information regarding different brands of restaurant mobile apps. The relevant social groups considered included restaurant managers', friends, co-workers, technology forums, etc. The respondents were the asked to indicate where they discovered their respective brands of restaurant apps. The table 14 below presents the findings.

Table 14: Relevant Social Groups

Answer	Response N = 68	%
Friends	39	57%
Online review or ratings websites	34	50%
Technology Forums	14	21%
Restaurant website	13	19%
Family	11	16%
Co-workers	9	13%
Colleagues	9	13%
Classmates	5	7%
Television	5	7%
Restaurant managers	3	4%
User blogs	2	3%
Supervisor	1	1%
Newspaper	1	1%

From table 14 above, friends are the most preferable form of social group that served as a relevant source of information to restaurant mobile apps adopters. Online review or rating websites are the second preferred social source of information for discovering restaurant mobile apps.

Table 15: Cross Tabulation (Friends and Online review sites)

		Friends		Total
		No	Yes	
Online review or ratings websites	No	13	21	34
	Yes	17	17	34
Total		30	38	68

A cross tabulation was used to observe if the respondents relied on multiple social groups to discover. It was found that restaurant mobile apps adopters depended on multiple social groups for information about brands of apps. From table 14 above, of the 34 respondents who used online review or ratings websites, 17 of them also indicated friends as their preferred social group. Only three people indicated both technology forum and friends as their relevant social group.

The social groups that were investigated were further categorized into three broad groups (i.e. Social Networks, Mass Media and Organizational Leaders) in order to achieve the goal of this study.

Table 16: Categories of Social Groups

Category	Frequency
Social Networks	
• Family	11
• Friends	39
• Online review and rating websites	34
• Technology Forums	14
• Colleagues	9
• Co-workers	9
• Classmates	5
Mass Media	
• Newspaper	1
• Television	5
• Restaurant websites	13
• User blog	2
Organization Leaders	
• Restaurant Managers	3
• Supervisors	1

Table 16 above is a descriptive statistics output for the three main categories of the adopter relevant social groups. Observation of the frequencies of the categories in the table above, social networks and the mass media are the most important to the restaurant mobile apps adopters when they are searching for information about a particular brand of restaurant apps.

4.8. Restaurant Mobile Apps Adoption Issues

The 64 smartphone users who do not use restaurant apps were asked to indicate what they considered as adoption issues. An eight variables scale was developed for this purpose. The variables included lack of understanding of restaurant mobile apps, lack of awareness, security reasons, etc. A questionnaire was developed to solicit the extent to which the adopters' agreed or disagreed with the variables under investigation. An exploratory factor analysis was conducted to find latent variables or factors among the observed variables. The number of variables was reduced to five. The analysis categorized the five variables into two major groups - "ability and risk inhibitors" and "value inhibitors". See table 17 below

Table 17: Restaurant Mobile Apps Adoption Issues

	Component	
	1	2
<u>Ability and Risk Inhibitors</u>		
I find it difficult to download and install	.91	
I need training on how to use restaurant mobile apps	.84	
I have concerns about confidentiality and security of my information	.60	
<u>Value Inhibitors</u>		
I am not convinced of the usefulness of restaurant mobile apps to me		.91
I don't know the value of restaurant mobile apps to me		.85

Looking at table 17 above, there were two major loadings of the factors that were categorized as adoption issues – ability and risk inhibitors were substantially loaded into component one. Value inhibitors were loaded into factor two.

A paired mean t-test analysis was further conducted to determine which factor is considered a strong hindrance to adoption of restaurant mobile apps. From table 18 below, looking at the means of the two factors, ability and risk inhibitors were major hindrances to adoption of restaurant mobile apps.

Table 18: Descriptive statistics

	Mean	N	Std. Deviation
Ability and Risk Inhibitors	3.6	64	.95
Value Inhibitors	2.9	64	1.0

A paired sample test was also carried out to determine if there exists any significant difference between the means of the two factors. The result suggested that there exists a significant statistical difference between the means of the factors ($t = 7.4$, $df = 63$ and $p\text{-value} = 0.000$).

4.9. Factor Analysis

This study used an exploratory factor analysis with Varimax rotation method to determine the dimensionality of the factors. After the data was pooled, no factor was deleted. The final solution comprised of two factors contributing 64.69% of the total variance explained. This finding was similar to the results obtained by Makgosa and Mohube (2007) when they adopted the scale and got 67.84% of total variance. This study found that normative and informational dimension are reliable measures of susceptibility. This finding is consistent with results obtained by Bearden et al. (1989), Tudor and Carley (2004) when they utilized this same scale.

Reliability coefficients for the present study were .991 for the normative factor and .675 for the sense-making factor.

4.9.1. **Social Influence**

The restaurant mobile apps users were again asked to complete a scale. The scale with eleven items was developed to measure the restaurant apps adopters' susceptibility to social influence. After a factors analysis was conducted on the items measuring social influence, these items were grouped into two – externally oriented influence and personally oriented influence. Three items dropped from the analysis because those items had a higher loading which caused variability issues. The remaining eight items were successfully loaded into factor one or two. *See table19 below*

Table 19: Social Influence

	Component	
	1	2
<u>Externally Oriented Influence</u>	.87	
If others can see me using a mobile app, the best approach is to use the mobile app that they expect me to use		
If I want to use the latest mobile app, I make sure I use what others want	.87	
When I choose a brand of mobile app, the only thing that counts is whether others think I look good with it (r)	.82	
When I want to be like someone, it is important I use the same mobile app he/she uses	.79	
When using restaurant mobile apps, I like to use brands of apps that make good impression on others	.74	
<u>Personally Oriented Influence</u>		
It is important that I use the restaurant mobile app that I want to use		.83
When I want to download a new mobile app, it is important that I like the mobile app (r)		.75
When I don't know which mobile app to use, the best approach is to try and understand it on my own (r)		.66

Extraction Method: Principal Component Analysis.

Paired mean t-test analysis was conducted to detect the difference between the means of the variables (externally oriented influence and personally oriented influence). The descriptive statistics were shown in table 20 below.

Table 20: Descriptive Statistics

	Mean	N	Std. Deviation
Externally Oriented Social Influence	3.9	86	.93
Personally Oriented Social Influence	2.2	86	.78

From table 20 above, looking at the means of the two factors, restaurant mobile apps adopters will be highly susceptible to externally oriented social influence (3.9) than personally oriented social influence (2.2). A paired sample test of the variables indicated a significant statistical difference ($t = 11.7$, $df = 85$ and $p = 0.00$).

4.9.2. Sense making of Restaurant Mobile Apps

A set of eleven scale items were identified to measure the restaurant mobile apps adopters' sense-making of restaurant mobile apps. The adopters were asked to indicate the extent to which they either agree or disagree with the items. An exploratory factor analysis was conducted on the eleven items. After the analysis, six items were dropped. The remaining five items were loaded into two factors. These were identified broadly as – independent and interdependent. See table 21 below

Table 21: Sense-making of Restaurant Mobile Apps

	Component	
	1	2
<u>Independent</u>	.73	
When I have little experience with a mobile app, it is best to try and find my own answer		
If I want to use the latest mobile app, it is best I use what I want	.73	
If others can see me using a mobile app, the best approach is to use the mobile app I want	.71	
To choose the best alternative available from a group of mobile apps I have rely on myself	.63	
<u>Interdependent</u>		
To choose the best alternative available from a group of mobile apps, I rely on other people		.89
When I don't know which mobile to use, the best approach is to get information from others		.86

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

The means of the two variables were later paired. Table 22 presents the descriptive statistics of the output.

Table 22: Descriptive Statistics

	Mean	N	Std. Deviation
Independent Sense-making	2.5	86	.68
Interdependent Sense-making	3.2	86	.89

Comparing the means of the two variables in table 22 above, restaurant mobile apps adopters make sense of restaurant apps interdependently because it had the highest mean score of 3.2. To determine if the means of the two variables were statistically different, a paired sample test output showed that there exists significant difference between the means ($t = -6.3$, $df = 128$ and $p\text{-value} = 0.000$).

Chapter 5

DISCUSSIONS

Chapter five discussed the results and findings of this study and synthesized the findings of this study with extant studies to give a comprehensive understanding of the restaurant mobile apps adoption and sense making.

5.1. Restaurant Mobile Apps Adoption

Assumptions of technology adoption and usage have been based on demographic variables such as age, gender, education, income, etc. According to Anderson (2000), a higher degree of formal education is thought to increase software application usage. Previous literature supported his claim (Danowski, 1984; Fichman, 1993; Rogers 1995; Huff & McNaughton, 1991). It was found that more innovative individuals have higher education (Danowski, 1984). This is consistent with the findings of this study. This study found that 77.1% of restaurant consumers who use mobile apps have post graduate degree in their respective disciplines compared to bachelor's degree holders who made of up 19.1% of the responses. Though a majority of previous studies have found an association between education and technology adoption, a study by (Kwon & Zmud, 1987) found mixed results in innovation literature. Education is positively related, but has some negative associations with usage based on information systems studies (Kwon & Zmud, 1987).

With regards to age and technology adoption, older people are often categorized as being more resistant to using new technology (Anderson, 2000). It has been contended that heavy users can be differentiated from light users in terms of their age (Huff &

McNaughton, 1991; Fichman, 1993). The findings of this study supported this argument. This study found that 28.6% of restaurant consumers who use smartphones or iPad are aged 50+. With regards to adoption and usage of restaurants mobile apps, adults aged 50+ constituted 29.2%. Very few of adults in this age category are heavy users of mobile apps (1.4%). In contrast, a later study found that earlier adopters are not different from later adopters in age (Rogers, 1995).

Gender, is another demographic variable that has been examined by most technology adoption research. The findings of this study suggest that male and female vary in their adoption and use of restaurant mobile apps. 59.4% of male restaurant consumers adopted and used restaurant mobile apps as compared to their female counterparts with 40.6%. Extant research explained that the female have consistently assessed themselves lower on technology adoption and use (Phillip, 2004).

5.2. Discovering Restaurant Mobile Apps

This study's results indicate that social networks have strong influence on the restaurant mobile apps adopters' sense-making of the technology. This is consistent with Klein and Kleiman (2002) who stressed that the social context of a technology is important. The results of this study suggested that restaurant apps mobile apps adopters rely heavily on their social networks than both the mass media and organization leaders for information concerning brands of restaurant apps. Social networks such as friends were the most preferred way for discovering new restaurant mobile apps for smartphone or iPad users (57%). This finding supports existing literature that suggests individuals are likely to adopt a technology when their network partners hold similar attitudes towards a technology (Rice & Aydin, 1991). Also, social information is

provided by individuals within one's personal and professional network, who make overt and subtle statements about the innovation, provide reinforcement, and serve as behavioral prompts (Bandura, 1986; Fulk, 1993; Vishwanath, 2009)

Diermeier (2009) indicated that mass media is vital in shaping individuals sense-making of technology. The finding of this study supports that claim. Searching through online review and rating websites and through technology forums are the next popular preferred form of app discovery with (48% and 22%, respectively). Individuals use the mass media to make sense of technology because they provide the individuals with technology frames (Entman, 1993). According to Vishwanath (2009), today's adopters receive information from a multitude of formal and informal sources, which include the mass media, manufacturer websites, user blogs, feedback forums (e.g., on Amazon, and Ebay), and technology portals (e.g., ZDNet*<http://www.zdnet.com/>, and CNet*<http://www.cnet.com/>). Other forms of discovering restaurant mobile apps are through the restaurant managers. This discovery is consistent with the study by Edmonson (2002) who wrote that organizational leaders such restaurant managers are influential in the individual's sense-making of technology. Since organizational leaders translate the potential implications of a technology to the adopters (Edmonson, 2002).

5.3. Application of Restaurant Mobile Apps

Using restaurant mobile apps to earn discounts, to compare prices, to order online services, etc. were found not to be important to restaurant mobile apps adopters. Locating restaurant with mobile apps is the top most reason why consumers adopt mobile apps. This finding confirms Frost and Sullivan prediction the 20% of smartphone or iPad users that adopt mobile apps will make use of location based

services (Vaughan-Nichols, 2009). Restaurant consumers who adopted restaurant mobile apps crave convenience when it comes to using mobile apps for restaurant services.

5.4. Restaurant mobile apps Adoption Issues

This study examined and categorized the restaurant mobile apps adoption issues into two. These included value inhibitors and risk inhibitors. Value inhibitors included factors that reveal that concerns of the adopter regarding the value of the technology to the adopter. Risk inhibitors referred to the adopters concerns about security and privacy.

5.5. Social Influence

This study examined social influence at the individual level within the social context. In the model for this research, it was proposed that social groups' are the main sources of influences on the individual's sense-making of restaurant mobile apps. These social groups were identified and categorized as social networks, mass media and organizational leaders.

Social networks were identified as the most influential factors on the individual sense-making of restaurant mobile apps. Social networks included the individual's friends, family, co-workers, etc. Social networks influence restaurant mobile apps adopters sense-making of the technology. Consistently Bandura (1986; Kraut et al, 1998) stressed that individuals often observe their family or friends successfully using a technology and then believe that they would benefit from using the technology in a similar manner.

The Mass Media was also found as a strong influence factor on the individual adopter sense-making of the restaurant apps. Mass media provide the individual

adopter with technology frames (Diermeier, 2009). The mass media therefore can affect how a mobile apps adopter makes sense of the technology. This implies that an individual's will be influenced by interacting with a particular media channel.

Organizational Leaders also add to the social influence on the individual sense-making of restaurant apps. Organization leaders refer to the managers of the organization who translate the potential implication of a new technology to the adopter or users (Edmondson, 2002). The organization leaders' technology frames serve as cues for sense-making of the technology. Interacting with organizational leaders thus, can influence one's sense-making of a technology.

Further analysis of the data revealed restaurant mobile apps adopters can be influenced in two ways – externally oriented social influence or personally oriented social influence. Externally oriented social influence impacts individuals more than personally oriented.

5.6. Sense making of Technology

Using the social influence model for technology adoption or sense-making as the theoretical underpinning, this study examined the individual's sense-making of restaurant mobile apps within the social context. This study found a significant relationship between social influence and sense-making of restaurant apps. The findings supported the suggestion that sense-making of technology is manipulated by technology frames from the social context since social groups provide the most recent technology frames (Cobb, 2002). The finding of this study also suggested that social influence on the individual's Sense-making of restaurant apps is a combination of multiple sources. The social information processing theory supports this (Fulk, 1993).

These sources were referred to as the relevant social groups of the restaurant apps adopters by the Social Construction of Technology (SCOT). By virtue of the adopters interaction with a particular relevant social group they tend to share group's technological frames (Orlikowsk and Gash, 1994).

5.7. Implications and Limitations

This section is a discussion of this study's contribution to both theory and practice. This research expanded the conceptual understanding of Sense-making of technology adoption. The study identified and categorized social groups of restaurant mobile apps adopters. The Study also highlighted the role of social groups and technological frames in Sense-making of restaurant apps within the social context.

The implications of this study were discussed below;

- Social networks such as friends and technology forums are the preferred sources of information for discovering brands of restaurant mobile apps. This finding implies that marketing of brands of restaurant mobile apps should be channeled through social networks more than through the mass media and organizational leaders.
- Using restaurant mobile apps to locate restaurants, the ease of using these apps and also because restaurant mobile apps are free were the main reasons why consumers adopted restaurant mobile apps. Using restaurant apps to earn loyalty points, compare prices, etc. were found not to be influential. This implies that restaurant managers or mobile developers should develop easy to use apps and the mobile apps should be free.

Markets should not focus their marketing resources on using apps for discounts or to earn loyalty points.

- The results of this study also suggested that restaurant mobile apps adoption is hindered by the ability and risk inhibitors more than value inhibitors. Ability and risk inhibitors referred to the adopters' ability to download and install a particular brand of mobile apps and also the adopters concern about the privacy of their personal data. The implication here is that, mobile apps developers as well as restaurant operators need to focus on developing apps that are less easy to download and install. Also, the practitioners need to assure potential adopters that their data will be safe and will not be used for other purposes that might jeopardize the adopter's privacy. The value inhibitors factors concerned issues such as the adopters' knowledge about the value of restaurant mobile apps to them. This implies that mobile apps developers as well as restaurants which intend to launch a mobile app must educate their target market about the value of the apps.
- Social influence is integral in the adoption and Sense-making of restaurant mobile apps. This implies that developer should consider strongly the social context of the restaurant mobile apps adopters when marketing or advertising the application.

As a limitation to this study, some of the participants left some of the scale items unanswered since the study did not restrict them to complete every item.

5.8. Conclusion and Future directions

In conclusion, the results suggests a need for restaurants owners or mobile apps developers to consider the social context of the adopter when marketing mobile apps or introducing new mobile apps into the market. It results also suggests that there is a need for increased scholarly work on social influence on the individual sense making of technology from the social context. There is a need for future studies to investigate whether restaurant consumers who did adopt and use restaurant mobile apps have adopted other mobile apps. This study is the first step in understanding the potential effects of social groups' technology frames on the individual sense making of technology.

REFERENCES

- Acha, V., & von Tunzelmann G.N. (2001). Technology Frames: a fourth organizational capability? *Paper presented at the Nelson and Winter Conference in Aalborg, Denmark June 12-15 2001, organized by DRUID*
- Baron, D.P. (2008). *Business and Its Environment*, 6th Edition. Upper Saddle River, NJ: Prentice Hall.
- Fiske S.T. & Taylor, S.E. (1991). *Social Cognition* (2nd ed.). New York: McGraw-Hill
- Bijker, W.E. (1995) *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Scio-technical Change*: MIT Press, Cambridge, MA
- Boland, R. (1978). The process and product of system design. *Management Science* 24(9), 887–898.
- Daft, R. L. & Lengel, R. H. (1984) Information Richness: a New Approach to Managerial Behavior and Organization Design. In Staw, B. M. and Cummings, L.L. Eds.) *Research in Organizational Behavior* 6: (pp. 191 -233)
- Daft, R. L. & Lengel, R. H. (1986) Organizational Information Requirements, Media Richness and Structural Design. *Management Science* 32(5):554-571
- Davidson, E. (2002) Technology Frames and Framing: A socio-cognitive investigation of requirements." *MIS Quarterly* 26: 329-358
- Davidson, E. (2006). A Technological Frames Perspective on Information Technology and Organizational Change. *Journal of Applied Behavioral Science*, vol. 42(1) 23-39
- Davis, F (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13(3), 319–332
- Fulk, J., Steinfield, C. W., Schmitz, J. A., & Power, J. G. (1987) A social information processing model of media use in organizations. *Communication Research*, 14: 542-543
- Fulk, J., Schmitz, J.A., & Steinfield, C.W., (1990) A social influence model of technology use. In J. Fulk. & C. Steinfield (Eds). *Organizations and communication technology*. 117 – 142: Newbury Park, CA: Sage
- Jin, G. & Leslie P., (2009) Reputational Incentives for Restaurant Hygiene, *American Economic Journal: Microeconomics*, Vol. 1(1), pp 236-267.
- Lin, A., & Silva, L. (2005) The Social and Political Construction of Technological

- Frames: *European Journal of Information Systems* 14(1), pp 49-59
- Orlikowski, W. J. (1992) The Duality of Technology: Rethinking the Concept of Technology in Organizations: *Organization Science*, Vol 3(3), pp. 398-427.
- Orlikowski, W.J., & Gash, D.C. (1994). Technological Frames: Making Sense of Information Technology in Organizations. *ACM Transactions on Information Systems* 12(2)
- Park, C. W. & Lessig, V. P. (1977). Students and Housewives: Differences in Susceptibility to Reference Group Influence. *Journal of Consumer Research*, 4 102-110.
- Pirolli, P. & Rao R., (1999). Table Lens as a Tool for Making Sense of Data. Readings in Information Visualization; Using Vision to Think. S K Card, J D Mackinlay and B Shneiderman, eds. Morgan Kauffman Publishers, Inc, pp. 597–615
- Purvis, R. L., Sambamurthy, V., & Zmud, R. W. (2000). The Antecedents of Knowledge Embedded-ness in CASE Technologies in Organizations," *IEEE Transactions on Engineering Management* (47:2), 2000, pp. 245-257.
- Rice, R. E., & Aydin, C. (1991). Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing. *Administrative science quarterly*, 36: 219 – 244
- Rice, R.R., Grant, A.E., Schmitz, J.A., & Torobin, J. (1990) Individual and Network Influences on Adoption and perceived outcomes of electronic messaging. *Social Network* (12) pp 27 - 56
- Stone, B. (2010). OpenTable versusgroupon: Party of two? Bloomberg Business, <http://www.businessweek.com/magazine/content/y/b4198037763659.htm>, accessed 11 October 2010.
- Weick, K .E., (1993). The Collapse of Sense-making in Organizations: The Mann Gulch Disaster. *Administrative Science Quarterly*, vol. 38: 628–652, 1993.

Appendix A

SOCIAL INFLUENCE SCALE

Variables	Description of measures	Reference
Normative Social Influence (Bearden et al. 1989)	1. It is important that I use the same restaurant mobile app that others use 2. When I want to be like someone, it is important I use the same mobile apps that he/she uses 3. When I choose a brand of mobile app, the only thing that counts is whether others think I look good in it. 4. If I want to use the latest mobile app, I have to make sure I use what others want 5. When I want to download a new mobile app, it is important that others like the mobile app 6. When searching for new mobile apps, I generally search for those brands that I think others will approve of. 7. If others can see me using a mobile app, the best approach is to use the mobile app that they expect me to use 8. When using mobile apps, I like to use brands of mobile apps that make good impressions on others	Mokgosa & Mohube, 2007
Informational Influence (Bearden et al. 1989)	9. When you don't know which mobile app to use, the best approach is to get information from others 10. To choose the best alternative available from a group of mobile apps I have to rely on others 11. When you have little experience with a mobile app, it is best to find people who can guide you get the right answer	Mokgosa & Mohube, 2007

Appendix B

SENSE MAKING SCALE

Variable	Description of Measures	Reference
Self-sufficiency Vs. Others Dependency	1. It is important that I use the restaurant mobile app that I want to use (r) 2.If others can see me using a mobile app, the best approach is to use the mobile app that I want (r) 3.When I don't know which mobile app to use, the best approach is to try and understand it on your own (r) 4.When I want to be like someone, it is NOT important whether or not I use the same mobile apps that he/she uses (r) 5. When using mobile apps, I like to use brands of mobile apps that impress me (r) 6.To choose the best alternative available from a group of mobile apps I have to rely on myself (r) 7.If I want to use the latest mobile app, I have to make sure I use what I want (r) 8. When I have little experience with a mobile app, it is best to try to find my own answer. (r) 9. When I want to download a new mobile app, it is important that I like the mobile app (r) 10. When searching for a new mobile app, I generally search for those brands that I approve of. (r) 11.To choose the best alternative available from a group of mobile apps I have to rely on myself (r)	Dubois & Beauvois (2005)

Appendix C

LETTER

DATE: March 12, 2012

TO: Robert Nchor, Masters

FROM: University of Delaware IRB

STUDY TITLE: [320579-1] Survey of Restaurant Consumers

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: March 12, 2012

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.