Winter 2011

Mobile Application Adoption by Young Adults: A Social Network Perspective

David G. Taylor
Sacred Heart University, taylord44@sacredheart.edu

Troy A. Voelker
University of Houston - Clear Lake

Iryna Pentina
University of Toledo

MOBILE APPLICATION ADOPTION BY YOUNG ADULTS: A SOCIAL NETWORK PERSPECTIVE

David G. Taylor, Troy A. Voelker, Iryna Pentina

Abstract:
The use of mobile applications, defined as small programs that run on a mobile device and perform tasks ranging from banking to gaming and web browsing, is exploding. Within the past two years, the industry has grown from essentially nothing to a $2 billion marketplace, but adoption rates are still on the rise. Using network theory, this study examines how the adoption of mobile apps among young consumers is influenced by others in their social network. The results suggest that the likelihood of adoption and usage of mobile apps increases with their use by the consumer's strongest relationship partner. In addition, the authors find marginal support for the hypothesis that the adoption of mobile apps will be more strongly influenced by a consumer's social contacts (friends, compared to family members), possibly due to their closer similarity to the consumer. Managerial and theoretical implications are discussed.

Keywords: *mobile applications, diffusion of innovation, young adults, network theory, social comparison, strong ties*

INTRODUCTION

The number of consumers using mobile phones for purposes beyond personal communications is exploding world-wide. In a November 2011 study, 44% of U.S. mobile subscribers over the age of 13 reported using their mobile phones devices to access the Internet, and 33% used them to access social networking sites or blogs, while 72.6% sent text messages (comScore, 2011). For marketers, this growth has created a frenzied increase in advertising expenditures as they seek to capitalize on this emerging communications channel. By 2016, global mobile ad spending is estimated to reach as much as $22.6 billion, compared to just $3.4 billion in 2010 (Nathan, 2011). Text messaging represents the majority of mobile advertising, but rich-media formats such as Apple's iAd and Google's new AdMob are predicted to surpass text messaging as the predominant format in 2012 (Patel, 2010).

However, another form of mobile advertising may hold even more promise for marketers. Rather than connecting through an Internet browser, mobile applications, or apps, "cut through the clutter of domain-name servers and uncalibrated information sources, taking the user straight to the content he or she already values" (Johnson, 2010, p. 24). For example, Hulu offers a free app that for a subscription fee allows unlimited access to television programming. Other apps allow customers to create shopping lists, book travel, or even securely engage in banking transactions. Of adult cell phone users in the U.S., an estimated 44% of them are smartphone users, and of these, 62% report downloading an app to their phones within the last 30 days (Nielsen, 2011). Among users aged 25-35, the numbers are even higher, with 62% owning a smartphone (Nielsenwire, 2011). The market for apps is enormous and growing. In the space of two years, it has grown from essentially nothing to a US$2 billion market. The iPhone's Apple Store dominates

with more than 350,000 apps, but the rapidly growing Android app marketplace is expected to surpass that in 2012 (Lookout_Mobile_Security, 2011).

In addition to representing an opportunity for advertising and branding, apps hold tremendous potential as a mobile commerce, or m-commerce, channel. According to a Nielsen (2010) study, approximately 21% of smartphone owners reported using shopping and retail apps during the preceding 30 days. Furthermore, 87% of smartphone users use 'deal of the day' sites like Groupon and Living Social, while 54% frequently use their smartphones while actually shopping (Nielsen, 2011). Nielsen finds that games represent the most popular category of apps, followed by weather, navigation and social networking. Thus, apps represent an emerging technology in a largely untapped marketplace.

This study examines patterns of diffusion and acceptance of the app technology among mobile phone users. Specifically, it studies how an individual's most significant advisor affects the adoption preferences for apps among young adults.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Social Networks and Diffusion of Technology

Myriad studies have looked at the process by which new products or innovations spread through the consumer population (e.g., Bass, 1969; Kalish, 1985; V Mahajan & Muller, 1979; V Mahajan, Muller, & Srivastava, 1990; Vijay Mahajan & Peterson, 1979; Rogers, 1976, 1983). Diffusion models represent the spread of innovative products over time, depicting the increase in the number of adopters over time (V Mahajan & Muller, 1979). Diffusion models typically depict this process as analogous to epidemiological phenomena in the natural world (i.e., they spread from person to person like a virus might spread from a "patient zero"). Unlike epidemiology, however, innovations spread not through pathological infection, but rather through a process of imitation (Rogers & Shoemaker, 1971). This appears to be the case with mobile apps, wherein users adopt the technology, and individual apps, based largely on the influence of peers and others within their social networks. Indeed, the process of developing, marketing and selling apps is fragmented and decentralized; the Apple Store and Google Marketplace are merely channels through which myriad developers peddle their wares (Johnson, 2010). Thus, it can be inferred that the adoption of individual apps, as well as the adoption of apps in general, is an organic process driven by peer-to-peer contact.

Network theory conceptualizes these types of peer-to-peer relationships as a series of nodes (i.e., app users), and ties (i.e., relationships between the actors) (Burt, 1980). It is becoming increasingly clear that these networks play an important role in the diffusion of innovation (J. J. Brown & Reingen, 1987; Goldenberg, Han, Lehmann, & Hong, 2009; Christophe Van den Bulte & Joshi, 2007; Christopher Van den Bulte & Wuyts, 2007). Confronted with uncertainty (i.e., a new and unfamiliar product or technology), consumers will often turn to their social networks as informational and normative referents (Burkhardt & Brass, 1990; E. Katz, 1980; R. Katz & Tushman, 1979). Extant research suggests, however, that some members of these social networks exert more social influence than others. The notion of opinion leadership – that a small minority of people influence the opinions and decisions of the majority – dates back more than a half-century ago (E. Katz & Lazarsfeld, 1955). With their outsized influence, opinion leaders can either increase the likelihood of adoption or, conversely, prevent the adoption of a product. The source of this influence is the subject of much interest, but researchers generally agree it is a combination of personal and social factors. Drawing upon the work of Katz (1957), Weimann (1991) identifies three components of influence: "(1) the

personification of certain values (or 'who one is'); (2) competence ('what one knows'); and (3) strategic social location ('whom one knows')" (p. 267).

The first two factors, "who one is" and "what one knows," are associated with personality traits and knowledge and are largely beyond the scope of this study. While the disproportionate influence of some contacts over others is a critical component of the hypothesized effects, the question of *why* these contacts are more influential is left to future research. However, the third factor, "whom one knows," gets to the heart of the question at hand; that is, do others within a consumer's social network influence whether or not (s)he will adopt mobile applications? Within the context of technology adoption, the extant research strongly suggests the affirmative. Previous studies (e.g., Malhotra & Galletta, 1999) found that social influence, in addition to ease of use and perceived usefulness, was a significant determinant of acceptance of a new technology. Indeed, Venkatesh and Davis (2000) revised the venerable TAM model into TAM2 to account for the influence of social forces.

In the context of mobile devices, it appears that social influence is particularly important, as the adoption of these devices is often used to enhance the consumer's sense of self-importance and social status (Sarker & Wells, 2003). Studies suggest that the adoption of mobile devices themselves is influenced not only by the perceived usefulness and ease of use, but also the behaviours and attitudes of the consumer's social network (Lu, Yao, & Yu, 2005). In fact, Gladwell's (2000) "tipping point" effect appears to be in play with mobile devices, as previous research suggests that a certain number of a consumer's social network must use a feature before that consumer is willing to use the feature himself (Sarker & Wells, 2003). A similar relationship may be in play in the process of mobile apps adoption and use. It is thus proposed that, in addition to the number of contacts tested in previous studies, there will also be a social influence effect of particularly influential members of the consumer's social network. Specifically, it is hypothesized that the most influential contact linked to a consumer's social network will affect the likelihood that the consumer will adopt mobile applications.

H1: A consumer is more positively disposed to use mobile applications for (a) banking/finance, (b) gaming, (c) digital imaging and video, (d) travel services, (e) mobile search, (f) sports/culture, or (g) navigation to the extent his or her most influential contact uses these applications

Typologies and Strength of Ties

Most of the literature regarding social networks (e.g., Brass, Butterfield, & Skaggs, 1998; J. J. Brown & Reingen, 1987; Granovetter, 1973, 1983) divides ties into two categories, weak and strong, with the former including casual relationships and the latter consisting of family, friends and those with whom contact is frequent and relationships are close. However, it is becoming increasingly clear that strong ties may be further delineated based on the nature of the relationship, with differing types of influences from family, social and business ties (Brass, Butterfield, & Skaggs, 1998; Krackhardt, 1992). Thus, a family member and close friend, while exhibiting an identical level of tie strength, may exert different types and amounts of influence over a consumer. According to social comparison theory (Festinger, 1954), consumers evaluate their opinions, desires and behaviors by measuring themselves against others. Research suggests that this effect is strongest when the comparative other is similar and goals are shared (R. Brown & Abrams, 1986). While family members share a biological connection and emotional bond that often result in strong ties, social relationships (i.e., friends) tend to be more similar in attitudes and opinions. The

social identity theory suggests that comparisons are strongest when the referent's relationship is group-based and people tend to categorize themselves according to the prototypical image of their in-group (Hogg & Hardie, 1991). Further, the concept of *homophily* (Blau, 1977; McPherson, Smith-Lovin, & Cook, 2001) underscores that people who choose each other's company are likely to be similar to each other. Homophily manifests in multiple dimensions of similarity (life experiences, attitudes, opinions, etc.). It follows that linked consumers probably are like-minded, and like-minded consumers tend to engage in similar activities and prefer similar products.

Among adolescents and young adults, this effect is particularly notable. For example, smoking behaviour in this age group is highly correlated with the closest friend's smoking or non-smoking behaviour, while parents exert little or no influence (Wang, Fitzhugh, Westerfield, & Eddy, 1995). Indeed, not only may friends and family members within a social network exert differing levels of influence, they may also influence them in different directions. Just as peers may influence teens to smoke while parents pressure them to avoid tobacco, research on cosmetic procedures among young women suggests the influence of parents tends to decrease the likelihood to seek procedures, while peer influence tends to increase the likelihood (Pentina, Taylor, & Voelker, 2009). In the area of cosmetic procedures, it has also been shown that an individual's access to others who have utilized cosmetic augmentation increases the positive attitude toward cosmetic surgeries (Voelker & Pentina, 2011). Furthermore, teens and young adults appear to take their cues most primarily from peers with regard to risk-taking and risk preference (Gardner & Steinberg, 2005), from which it may be inferred that, with regard to adoption of innovation, these same peers may play a strong and important role in influencing whether or not they adopt new technologies in the face of uncertainty. It is suggested, then, that social relationships will more strongly influence the consumer's adoption of mobile apps than other types of relationships.

H2: The primary contact's usage of mobile apps for (a) banking/finance, (b) gaming, (c) digital imaging and video, (d) travel services, (e) mobile search, (f) sports/culture, or (g) navigation exerts a stronger influence over a consumer's propensity to use mobile apps for the same purpose when the relationship is social than when the relationship is not social

METHOD

Sample

A convenience sample of 180 students from a medium-sized university in the U.S. Midwest was surveyed about their usage of mobile phone apps. Specifically, they were asked "Which applications have you *purchased* in the last two years?" and "Which applications have you *used* in the last two years?" In addition, the researchers measured their likelihood to use mobile apps for banking, entertainment, information services, marketing, shopping, ticketing and telematics (remote diagnosis of vehicles, navigation services, vehicle tracking, theft protection, etc.). Next, each respondent was asked to name as many contacts as they could think of who influenced them. For each contact, the respondent indicated the type (friend, family, coworker, etc.), years of acquaintance and the types of mobile applications that contact utilized. Finally, demographic information was collected.

While all of the respondents provided information on their uses, perceptions and intentions to use mobile applications, information about influential advisors varied greatly across the sample. One hundred and forty-three respondents provided information about the individual who most influences them, 43 provided information about their second most influential figure and 30 provided information

about their three most influential advisors. Further, 37 individuals offered no information pertaining to individuals they found personally influential. While this drop-off in advisors precludes an examination of advice networks and application adoption, the fact that roughly 80% of the sample provided information on their most significant advisor permits evaluation of the correlations between advisor characteristics and adoption of mobile applications. Therefore, analysis of the data proceeds using the 143 respondents who provided information on their most significant advisor.

Measures

This study uses several dependent variables in its analysis. Each dependent variable represents the subject's response to a yes/no question pertaining to their use of: (a) banking/finance, (b) gaming, (c) digital imaging and video, (d) travel services, (e) mobile search, (f) sports/culture, or (g) navigation applications. In all cases, a result of one indicates the individual currently uses the application while a zero indicates they do not use the application. The independent variable for our first hypothesis (Contact Usage) is a count-measure of the number of mobile-applications used by the respondent's most significant advisor. The independent variable for our second hypothesis (Social Contact) determines whether the most influential contact was a social contact or family member. This variable is a binary variable set to one for friends and zero for family.

We also control for a number of demographic factors for our respondents. In addition to age, gender and ethnicity, we additionally control for aspects of the respondent's social background. Dummy variables for small town and suburban residence distinguish respondents from non-urban settings and those from urban settings. Similarly, we control for whether the respondent's parents were degreed or not to reflect the basic socioeconomic background for the respondent's childhood.

ANALYSIS

The analysis examined the influence of social contacts on the use of apps for the categories that respondents indicated they used: banking/finance, gaming, digital images/video, travel services, mobile search, sports/cultural and navigation. Demographic and correlation information are provided in Table 1. On the whole, respondents in our sample are not widespread adopters of mobile applications. Adoption rates by application type range from a low of 19% for banking and financial applications to a high of roughly 28% for use of digital images. This is somewhat lower than, but comparable to, estimated usage rates of the general population in the United States ranging from approximately 20%-33% for smartphone users and 13%-22% for users of other types of mobile phones (Nielsen, 2010).

Our sample averages 25 years of age with minorities (97%) and women (65%) comprising the majority of the respondents. Our respondents' upbringing is relatively equally distributed between small town (38%), suburban (28%) and urban (35%). Our respondents are relatively evenly split between first generation college students and those whose household includes a parent with a college degree.

Most of our respondents indicated that their most significant advisor is a friend (67%) or family member (32%) with only one respondent indicating their most significant advisor came from a different background (a co-worker in this case). Most significant contacts exhibit some usage of mobile apps with the average contact using just under two mobile applications. Results of the correlation analysis suggest mixed support for our hypotheses.

Contact usage (H1) is positively correlated with each of our seven dependent variables with correlations ranging from .17 for gaming and digital images to .25 for banking and financial applications. However, the type of contact is not significantly correlated with any of our dependent variables.

Table 1: Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Banking/ Finance	Y = 29	N = 120														
Gaming	Y = 41	N = 108	0.11													
Digital Images/Vid	Y = 42	N = 107	0.18*	0.18*												
Travel Services	Y = 34	N = 115	0.1	0.09	0.12											
Mobile Search	Y = 36	N = 113	0.16*	0.14†	0.2*	0.22**										
Sports/Cultural	Y = 39	N = 110	0.32***	0.25**	0.27**	0.26**	0.45***									
Navigation	Y = 39	N = 110	0.29***	0.21**	0.1	0.15†	0.23*	0.34***								
Age	25.18	6.798	-0.08	0.01	0.01	0.25**	-0.02	0.03	-0.02							
Male	YM = 52	F = 97	0.06	0.08	0.01	-0.03	0.01	0.14†	0.17*	-0.18*						
Caucasian	C = 4	Min = 145	0.17*	0.23**	0.02	-0.08	0.14†	0.02	-0.09	-0.07	-0.01					
Small Town	Y = 56	N = 92	0	-0.2*	-0.12	-0.06	-0.02	0.1	-0.12	-0.03	0.01	-0.01				
Sub Urban	Y = 41	N = 107	0.04	0.12	0.25**	0.09	-0.03	-0.03	0.08	-0.03	-0.01	0.02	-0.48***			
Parents Degreed	Y = 73	N = 75	-0.01	-0.1	0.22**	0.1	0.07	-0.04	0.05	-0.12	-0.02	-0.05	-0.21**	0.27***		
Social Contact	Y = 100	N = 48	-0.09	0.11	0.08	0.04	0.02	0.05	0.05	0.1	-0.22**	0	-0.05	-0.09	-0.07	
Contact Usage	1.74	1.85	0.25**	0.17*	0.17*	0.22**	0.19*	0.18*	0.23*	0.05	-0.05	0.02	-0.11	0.18*	0.1	-0.21*

† = .10, * = .05, ** = .01, *** =.001

Additionally, the direction of correlations vary slightly, with family contacts more closely related to use of banking and financial applications (r = -.09) and friends more closely correlating with use of mobile gaming applications (r = .11).

We test our hypotheses using logistic regression models with each dependent variable regressed separately in a two-stage analysis. In stage one, demographic controls are used as a predictor, while in stage two our hypothesized independent variables are added. Results of the logistic regressions appear in Table 2 and Table 2a.

Table 2: Logistic regressions

	Banking and Finance		Mobile Gaming		Digital Imagery		Travel Services	
D.V.	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)
Constant	0.4	0.29	0.41	0.17†	0.11*	0.04*	0.03***	0.01***
Age	0.97	0.96	1.01	1	1.02	1.01	1.08**	1.09**
Male	1.22	1.4	1.59	1.87	1.12	1.36	1.08	1.24
Caucasian	8.31	8†	1	1	1.42	1.35	1	1
Small Town	0.98	1.13	0.34**	0.36*	1.13	1.24	1.01	1.05
Suburban	0.64	1.06	1.38	1.36	2.72*	2.78*	1.49	1.32
Parent Degreed	0.94	0.8	0.48†	0.46†	2.23*	2.34*	1.83	1.82
Contacts Social		0.89		2.47†		2.41†	0.03	1.65
Contact Usage		1.39**		1.27*		1.22†		1.32*
Log Likelihood	138.59	132.27	155.31	148.58	163.16	157.65	146.77	140.6
Nagelkerke R^2	0.05	0.15	0.17	0.23	0.12	0.17	0.12	0.18

Our controls do not consistently relate to the adoption of specific mobile applications. Older users are more likely to use travel service applications (β = 1.09). Males are more likely to use mobile applications for sports and cultural (β = 2.69) and navigation (β =2.84) purposes. White respondents are more likely to use mobile applications for banking and financial purposes (β = 8.00). Individuals from small towns are

Table 2a: Logistic regressions

	Mobile Search		Sports/Culture		Navigation	
D.V.	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)	Exp(B)
Constant	0.30	0.16†	0.12*	0.04**	0.29	0.1*
Age	1.00	0.99	1.02	1.02	1.00	1.00
Male	1.09	1.24	1.93†	2.69*	2.28*	2.843*
Caucasian	7.12	7.26	1.60	1.62	1.00	1.00
Small Town	0.85	0.89	1.68	2.14	0.61	0.66
Suburban	0.66	0.54	1.21	1.11	1.11	0.98
Parent Degreed	1.52	1.53	0.99	0.92	1.10	1.12
Contacts Social		1.49		2.26†		2.257†
Contact Usage		1.29*		1.33**		1.37*
Log Likelihood	159.67	153.97	163.67	156.81	161.63	152.17
Nagelkerke R^2	0.04	0.10	0.04	0.13	0.08	0.17

less likely to engage in mobile gaming (β = .36) while those from the suburbs are more likely to use mobile applications for digital imagery (β = 2.78). Socioeconomic background of the parents has mixed effects, with first generation students being more likely to engage in mobile gaming (β = .46) and less likely to use mobile applications for digital imagery (β = 2.34).

In each of our models, inclusion of the independent variables strengthens the overall model. In all cases, log likelihood decreases and Nagelkerke's R^2 increases noticeably with the inclusion of our independent variables.

Our first hypothesis predicts a positive relationship between the primary contact's use of mobile applications and the adoption of mobile applications for our respondents. Here, the results of the regression analysis strongly support our hypothesized relationship. Contact usage is a positive, significant predictor for six of the seven types of mobile applications and approaches significance for use of digital imagery. The logistical regression analysis indicated the contact's usage of apps was a significant predictor of the respondent's usage of apps in the categories of banking and finance (β = 1.39, p = .01), mobile gaming (β = 1.27, p = .05), travel services (β = 1.32, p = .05), mobile search (β = 1.29, p = .05), sports/cultural (β = 1.33, p = .01) and navigation (β = 1.37, p = .05). Having a close contact who uses a number of mobile applications increases the odds that an individual will use mobile applications.

Our second hypothesis predicts that the type of contact influences adoption of mobile applications. Here we argue that individuals are most likely to adopt technologies from contacts most similar to themselves. For the young adult, this would likely be their college-aged friends. Results of our analysis support the direction of the proposed relationship, but are only marginally significant for mobile gaming, digital imagery, sports or cultural entertainment, and navigation applications, in partial support of H2b, H2c, H2f and H2g. However, the results were not significant (albeit odds increasing) for the adoption of travel services and mobile search apps, so H2d and H2e were not supported. Finally, results are not significant (with odds decreasing) for the use of banking and financial applications. H2a was not supported.

It is possible that the difference in social influence on the types of mobile apps adopted can be explained by the phenomenon of network effects (M. L. Katz & Shapiro, 1994), first noted in reference to telephone

adoption. It was noted that as the network of people using telephones increased, so did the value of owning a telephone, since there were more people the telephone owner could call. Similarly, while acquiring and using any mobile apps increases the value of owning a smartphone (indirect network effect), the value of social mobile apps (mobile gaming, dating, or networking) should increase with their wider diffusion (direct network effect). Therefore, it is plausible that the influence of social contacts (friends) should be higher for the adoption of such social apps as mobile games, picture sharing, and video, compared to the adoption of apps for personal use (such as banking).

DISCUSSION AND IMPLICATIONS

The results of this study suggest that social networks play an important role in consumers' decisions to download and use mobile apps. Specifically, it appears that consumers are more likely to adopt mobile apps if their most influential contact uses mobile apps. Interestingly, this effect does not appear to occur on an application-to-application basis, but rather on a meta-level; that is, regardless of whether or not that influential contact uses a specific app, the consumer is more likely to adopt an app when that contact uses a number of apps. This suggests that it is not a world-of-mouth process by which the contact suggests a specific app, but rather a more general effect. It may be that an implicit endorsement of mobile apps occurs when the influencer adopts an app, or it may be a social comparison process by which the consumer takes cues from the contact with regard to perceived risk from the adoption. In any event, the adoption of mobile apps appears to spread via social contagion.

No conclusive evidence was found that the overall effect is stronger when the most influential contact is social in nature. However, it does appear that there is an increased tendency to adopt apps for social exchange purposes (e.g., gaming and sports) when the strongest influencer is social (e.g., friend as opposed to family member). This suggests that there may be differences in the types of apps adopted as a result of a social contact's influence versus non-social contacts. Future research should consider the role of network effects in adopting various types of mobile apps, and compare the impact of social versus non-social strong ties on usage patterns of social versus personal mobile apps.

This study has important theoretical and practical implications. We are aware of no previous study examining the effect of social networks on the adoption of mobile apps. The affirmative findings suggest that social contacts play an important role in the diffusion of this technology. For theoreticians, this provides a new context for the application of network theory to an innovative technology. For practitioners, the results are especially useful. Because the technology is itself inherently social in nature (i.e., a mobile communication device), social networking avenues built into these sophisticated mobile apps may increase utilization. It suggests that mobile phone providers should use the inherent social networking functions to promote adoption of apps in general, while app developers should build networking functions into the apps themselves in order to promote the use of specific apps. In the competitive world of mobile apps, in which developers find their product surrounded by thousands of other apps in virtual stores, promotion and differentiation is vital, yet challenging. The scale of most mobile apps precludes mass promotional campaigns, and it is difficult to reach the right consumers at the right time. As such, mobile apps depend more heavily upon word-of-mouth marketing to drive sales, compared to other types of products. The good news, based upon the results of this and other studies, is that the word-of-mouth strategy appears to be working.

Our findings also have implications for advertising managers. Mobile advertising provides brands,

agencies, and marketers an opportunity to connect with consumers directly on their mobile phones "on the go" and away from other types of media. Understanding the mechanism of mobile apps adoption and usage patterns will serve to reach the desired target audiences by advertising in those apps. Knowing which segment uses which type of apps at what times will optimize the reach and frequency of mobile campaigns and create new revenue streams that may subsequently subsidize consumer app usage. Mobile app developers and network operators can also use our findings to better monetize their apps through advertising.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although this study presents useful and important contributions to the literature, some caveats must be addressed. First, the sample size is relatively small, so the generalizability of the results is limited. Second, the sample is comprised of disproportionately high numbers of minority and female respondents, and while there is no reason to presume differences based on the demographic disparity, caution should be taken when generalizing the results. Finally, the data is cross-sectional and based on self-reported information.

In spite of the caveats and limitations, this study points to interesting directions for future research. Obviously, the study should be replicated with a more representative sample. Will the results be confirmed among males, non-minority and older consumers? The study also raises additional questions about the nature of the primary advisor's influence. Do broader network effects such as strong/weak ties, centrality and brokerage play a role or is the result principally driven by the primary advisor? In addition, the mechanism behind the social influence warrants much further study. It remains to be discovered if the influence in this context is related to image and prestige, risk reduction, opinion leadership, network effects, or some other mechanism. In addition, the categories of mobile apps may be expanded to include the emerging types of new apps. Finally, are the findings limited to the context of mobile applications, or can they be generalized to adoption of other types of products and technologies?

David G. Taylor, Ph.D.*
John F. Welch College of Business
Sacred Heart University
United States
taylord44@sacredheart.edu

Troy A. Voelker, Ph.D.
University of Houston – Clear Lake
United States

Iryna Pentina, Ph.D.
The University of Toledo
United States

*Corresponding author

References:

Bass, F. M. (1969). A New Product Growth for Model Consumer Durables. Management Science, 15(5), 215-227.

Blau, P. M. (1977). Inequality and Heterogeneity: A Primitive Theory of Social Structure. New York: The Free Press.

Brass, D. J., Butterfield, K. D., & Skaggs, B. C. (1998). Relationships and unethical behavior: A social network perspective. Academy of Management Review, 23(1), 14-31.

Brown, J. J., & Reingen, P. H. (1987). Social Ties and Word-of-Mouth Referral Behavior*. Journal of Consumer Research, 14(3), 350-362.

Brown, R., & Abrams, D. (1986). The effects of intergroup similarity and goal interdependence on intergroup attitudes and task performance. Journal of Experimental Social Psychology, 22(1), 78-92.

Burkhardt, M. E., & Brass, D. J. (1990). Changing Patterns Of Patterns Of Change: The Effects Of A C. Administrative Science Quarterly, 35(1), 104.

Burt, R. S. (1980). Models of Network Structure. Annual Review of Sociology, 6, 79-141.

comScore. (2011). comScore Reports November 2011 U.S. Mobile Subscriber Market Share: comScore.

Festinger, L. (1954). A Theory of Social Comparison Processes. Human Relations, 7(2), 117-140.

Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. Developmental Psychology, 41(4), 625-634.

Gladwell, M. (2000). The Tipping Point: How Little Things Can Make a Big Difference. New York: Little, Brown and Company.

Goldenberg, J., Han, S., Lehmann, D. R., & Hong, J. W. (2009). The Role of Hubs in the Adoption Process. Journal of Marketing, 73(2), 1-13.

Granovetter, M. S. (1973). The Strength of Weak Ties. The American Journal of Sociology, 78(6), 1360-1380.

Granovetter, M. S. (1983). The strength of weak ties: A network theory revisited. Sociological theory, 1(1), 201-233.

Hogg, M. A., & Hardie, E. A. (1991). Social Attraction, Personal Attraction, and Self-Categorization-, A Field Study. Personality and Social Psychology Bulletin, 17(2), 175.

Johnson, R. (2010). Apps Culture reinventing mobile Internet. Electronic Engineering Times(1588), 24.

Kalish, S. (1985). A new product adoption model with price, advertising, and uncertainty. Management Science, 31(12), 1569-1585.

Katz, E. (1957). The Two-Step Flow of Communication: An Up-to-Date Report on an Hypothesis. Public Opinion Quarterly, 21, 67-68.

Katz, E. (1980). On Conceptulizing Media Effects. Studies in Communications, 1, 119-141.

Katz, E., & Lazarsfeld, P. (1955). Personal Influence. Glencoe, IL: Free Press.

Katz, M. L., & Shapiro, C. (1994). Systems Competition and Network Effects. Journal of Economic Perspectives, 8(2), 93-115.

Katz, R., & Tushman, M. (1979). Communication Patterns, Project Performance, and Task Characteristics: An Empirical Evaluation and Integration in an R&D Setting. Organizational Behavior and Human Performance, 23(2), 139.

Krackhardt, D. (Ed.). (1992). The strength of strong ties: The importance of philos in organizations. Boston, MA: Harvard Business School Press.

Lookout Mobile Security (2011). App Genome Report (Vol. Feb. 2011): Lookout Mobile Security.

Lu, J., Yao, J. E., & Yu, C.-S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. The Journal of Strategic Information Systems, 14(3), 245-268.

Mahajan, V., & Muller, E. (1979). Innovation diffusion and new product growth models in marketing. The Journal of Marketing, 43(4), 55-68.

Mahajan, V., Muller, E., & Srivastava, R. (1990). Determination of adopter categories by using innovation diffusion models. Journal of Marketing Research, 27(1), 37-50.

Mahajan, V., & Peterson, R. A. (1979). First-purchase diffusion models of new-product acceptance. Technological Forecasting and Social Change, 15(2), 127-146.

Malhotra, Y., & Galletta, D. F. (1999). Extending the technology acceptance model to account for social influence: theoretical bases and empirical validation. Paper presented at the 32nd Hawaii International Conference on Systems Science, Maui, HI.

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. Annual Review of Sociology, 27, 415-444.

Nathan, E. (2011). Mobile Devices to Boost Online Ad Spending in 2012: Berg. Channel Insider, (December 21, 2011). Retrieved from http://www.channelinsider.com/c/a/Mobile-Devices/Mobile-Devices-to-Boost-Online-Ad-Spending-in-2012-Berg-410641/

Nielsen (2010). The State Of Mobile Apps: The Nielsen Company.

Nielsen (2011). The Mobile Media Report: State of the Media Q3 2011: Nielsen.

Nielsenwire (2011). Generation App: 62% of Mobile Users 25-34 own Smartphones. Nielsenwire. Retrieved from http://blog.nielsen.com/nielsenwire /online_ mobile/generation-app-62-of-mobile-users-25-34-own-smartphones/

Patel, K. (2010). Apple's IAd Aided Growth in 2010, but Google and AdMob Will Accelerate It, Says EMarketer. Advertising Age.

Pentina, I., Taylor, D. G., & Voelker, T. A. (2009). The roles of self-discrepancy and social support in young females' decisions to undergo cosmetic procedures. Journal of Consumer Behaviour, 8(4), 149-165.

Rogers, E. M. (1976). New Product Adoption and Diffusion. The Journal of Consumer Research, 2(4), 290-301.

Rogers, E. M. (1983). Diffusion of Innovations. New York: Free Press.

Rogers, E. M., & Shoemaker, F. F. (1971). Communication of Innovations: A Cross-Cultural Approach. New York: The Free Press.

Sarker, S., & Wells, J. P. (2003). Understanding Mobile Handheld Device Use and Adoption. Communications of the ACM, 46(12), 35-40.

Van den Bulte, C., & Joshi, Y. V. (2007). New Product Diffusion with Influentials and Imitators. Marketing Science, 26(3), 400-421.

Van den Bulte, C., & Wuyts, S. (2007). Social Networks and Marketing. Cambridge, MA: Marketing Science Institute.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186.

Voelker, T. A., & Pentina, I. (2011). Cosmetic Surgery Intent Among Generation Y Consumers: A Social Network Perspective. Health Marketing Quarterly, 28(1), 38-56.

Wang, M. Q., Fitzhugh, E. C., Westerfield, R. C., & Eddy, J. M. (1995). Family and peer influences on smoking behavior among American adolescents: an age trend. Journal of Adolescent Health, 16(3), 200-203.

Weimann, G. (1991). The Influentials: Back to the Concept of Opinion Leaders? The Public Opinion Quarterly, 55(2), 267-279.