SWIPE RIGHT WITH A CHANCE OF RAIN: WEATHER APP USAGE ON SMARTPHONES

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Abstract

Prior to the IT revolution, weather information was typically broadcast through non-electronic and electronic media. However, through the advent of technology, populations are now able to receive routine weather information through media other than the traditional sources of television and radio. These media channels include various forms of computing devices, such as personal computers, laptops, tablets, phablets and smartphones. In view of the growth, the ever-increasing penetration and adoption of smartphones, coupled with the mobility of societal lifestyle patterns, the 'smartphone' would seem to be well suited as a device for consumer acceptance of weather information by means of weather apps.

As part of a larger study into the acceptance, trust and value of weather apps by smartphone users, a number of key consumer-based insights are illustrated within this paper. These insights may have implications for both marketers of smartphones and developers of weather apps.

Key Words

Location based services; weather apps; usage; smartphones; consumers.

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INTRODUCTION

In view of the growing dependence of technology for weather information, this research aims to examine weather applications (apps) used on smartphones. Weather apps, for example, can now deliver weather information from the global meteorological organisations to various ICT (Information Communication Technology) devices of end users; notably the smartphone. Extant literature clearly identifies app market growth and accelerated rates of global smartphone penetration and adoption. Coupled with the nomadic nature of societal lifestyle patterns, it would appear that the smartphone is currently a technologically and commercially well suited device for consumer ready weather information via weather apps. Therefore, research seeking to understand key influences into weather app usage on smartphones is worthy of attention.

LITERATURE REVIEW

Many smartphone weather apps fall within the classification of location-based services (LBS), in that these mobile apps rely upon the location of a mobile device that is capable of determining and transmitting the locations within a mobile network (Kennedy-Eden & Gretzel 2012; Vanjire et al. 2014; Virrantaus et al. 2001). LBS are widely used on smartphones, tablets and phablets adding functionality to an app and being extremely useful for location finding through the commercially available Global Positioning System (GPS), by delivering information based on the end users location. For example using a weather app with LBS activated on a smartphone enables the user to view the latest weather conditions from their current location (Turner 2012; weatherzone 2014). Examples of LBS apps available from the Google Play Store, Apple's App store and Microsoft's Windows are listed in Table 1.

Table 1: Examples of Location Based Services Apps

Classification	App type	Source Availability
Emergency Services	Emergency	Google Play Store, iTunes Preview , Windows
Travel	Mobiata	Google Play Store, iTunes Preview, Windows

Weather	WeatherZone, WeatherPro, AccuWeather	Google Play Store, iTunes Preview Windows
Communications	Yellow Pages	Google Play Store, iTunes Preview, Windows
Transport	Brisbane Yellow Cabs, Taxi Catcher	Google Play Store, iTunes Preview, Windows

Source: Developed for the research

Location services date back to the 1970's when the United States Department of Defense introduced the GPS, a satellite system used for the positioning and navigation of people and objects, initially for military use (Schiller & Voisard 2004). Later in the 1980's, the United States Government opened up GPS for use in commercial markets, leading to the rapid adoption of GPS-based services in areas such as the emergency services, travel, commerce, entertainment and recreation (Google Play 2014; Grossi 2011; iTunes Preview 2014; Windows 2014; Kushwaha & Kushwaha 2011; Steiniger, Neun & Edwardes 2006; Sturdevant 2009; Vanjire et al. 2014).

Schiller and Voisard (2004) believed a new era of electronic communications services was emerging with the ubiquitous use of LBS in new and traditional markets. Rao and Minakakis (2003) expected the slow growth of LBS apps would be due in part to security issues of privacy, technical solutions and sustainable business models, noting however that widespread adoption of location based apps would take place with effective technical solutions and marketing strategies implemented (Kaasinen 2005a).

The technical and commercial issues referred to by Rao and Minakakis (2003) have been progressively addressed throughout the years since LBS apps first appeared commercially. This would appear to be indicated by the current widespread acceptance of LBS apps on smartphones (Kennedy-Eden & Gretzel 2012; Portico Research 2013). The terminology, 'App' is the common expression used to identify software computing applications.

Apps can be downloaded onto various computing devices that have Internet access, such as desktops, laptops, some basic mobile phones, smartphones and tablets. Some travel based apps, such as compasses and speedometers, including a planned new map app release by Nokia in 2014 (Grundberg 2014), can run by simply turning on location services functionality, enabling the use of GPS without any Internet data being utilised. Downloads of apps are available from several online app stores that support various Operating Systems (OS) such as Android, iOS, Windows Blackberry, Symbian and others. However the three major online stores are

currently Google Play Store, the App Store (developed by Apple Inc), and the Windows app store. Identified by current app and smartphone penetration statistics, there would appear to be some justification for Rao and Minakakis (2003) and Schiller and Voisard (2004) cautious optimism mentioned previously of future widespread adoption of LBS apps.

According to Apple Press Info (2014), the App Store offers more than one million apps to iPhone, iPad and iPod touch users in 155 countries around the world. Google Play offers apps for Android systems and as reported by Nickinson (2011), this online store had 250,000 apps available with 6 billion total downloads recorded. Available apps from the App Store, Google Play Store and Windows include a large number that are LBS apps with collectively several hundred weather apps available from all three mentioned major app stores as either a no cost download or for low cost purchase.

It can be seen from the previous discussion of LBS, that there are positive indications of increased usage of smartphone LBS apps. However, little empirical research into user acceptance and adoption of weather apps on smartphones exists. This paper therefore provides some important consumer-based influences in speaking to the shortage of research into this area.

METHOD

A quantitative, web–based survey instrument was utilised in this study. Respondents invited to participate in the research encompassed users of weather apps on smartphones from a specific target population, namely students and staff from Southern Cross University, a regionally university based in Australia. Thus a nonprobability self–selection sampling technique was utilised for the data collection.

DATA ANALYSIS AND DISCUSSION

Data analysis was carried out using SPSS. Data collection resulted in 305 usable responses being received. To establish whether the data appeared to be normal, indicators such as mean, standard deviations and measures for skewness and kurtosis were inspected (Tabachnick & Fidell 2001). A review of these key indicators underlined a reasonable assumption that normality has been met.

Of the 305 responses used for analysis, 67.9% (n=207) were females and 32.1% (n=98) were males. The quantitative instrument also presented six

choices with respect to age groupings. In Group 1, 18-25 years olds represented 29.8% (n=91) of respondents. In Group 2, 26-35 year olds represented 27.2% (n=83) of respondents. In Group 3, 36-45 years olds represented 22.6% (n=69) of respondents, with Group 4, 46-55 years olds representing 13.8% (n=42) of respondents. It should be noted in the survey the fifth group was listed as 56 – 65 and group six consisted of ages 66 and over. As there was only 1 respondent recorded in group 6, it was felt this would skew the results and therefore was collapsed into a new category of 56 year old and over. Thus the distribution for the fifth group of 56 years old and over represented 6% (n=19) of respondents.

Results from the survey revealed that 26.9% of respondents were studying or had completed an undergraduate university degree and 20.7% indicated they were studying or completed a post graduate university degree. The Australian Bureau of Statistics (2013) reported that 37% of the total population of Australia had a university degree. For respondents to the current research, 47.6% indicated they were studying or had completed a university degree.

Respondents were also asked to indicate how many years they have used a smartphone. Underpinning this question were 7 options: 1 year or less, 1-2 years, 2-3 years, 3-4 years, 4-5 years, 5-6 years, 6+ years. Respondents using a smartphone for 3-4 years was the largest group of respondents, representing 21% (n=64) of respondents. This was closely followed by respondents with 2-3 years usage at 20% (n=61) and 4-5 years of usage representing 19% (n=58) of the number of smartphone users.

Several questions in the survey sought information about the respondent's smartphone, weather application in use and usage of the weather application. A choice of the current smartphone operating systems were presented to respondents, asking: What operating system does your smartphone use? The results showed by far the majority of respondents, being 62.6% (n=191), indicated they used the iOS (iPhone) operating system, 35.1% (n=107) utilising the Android operating system, with 2.3% (n=7) using Windows as the operating system on their smartphone.

Survey respondents were asked which statement described the weather application(s) they were using: 1) I am using the weather app pre-installed on my smartphone; 2) I am using the weather app I downloaded onto my smartphone; and 3) I am using multiple weather apps on my smartphone.

The results showed that 41.6% (n=127) respondents used a preinstalled weather app. The majority of respondents indicated they downloaded a weather app (58.4% or 178 respondents). These respondents comprised 34.8% (n=106) who downloaded a weather app, and 23.6% (n=72) who used multiple weather apps. By definition, respondents who indicated that they

used multiple weather apps would have needed to download one or more weather apps onto their smartphone. The survey also posed the question: How frequently do you use a weather app on your smartphone? Seven choices were presented to respondents: Rarely, Yearly, Monthly, Fortnightly, Weekly, Daily and Hourly. The frequency of usage shows the largest group (47.5% or 145 respondents) uses the weather app on their smartphone Daily. This result was followed by 31.8% (97) of respondents using a weather app on a Weekly basis. The remainder of the respondents (20.7% or 63 respondents) indicated using their weather app: Hourly (5), Fortnightly (24), Monthly (20), Less than a month (10) and Rarely (4).

Gender Influence – Type of Smartphone and Type of Weather App

Analysis of the data revealed that gender was seen to influence a number of consumer-based aspects reviewed as part of this study. The first influence gender made was on choice of smartphone. Even though the question was "What operating system does your smartphone use", choosing iOS identifies the brand iPhone. From the total number of female survey respondents, 70% of females used the iOS (iPhone) operating system, whereas only 46.9% of male respondents used iPhones. There are several possible reasons that may explain the gender preference for the iOS platform of smartphones which are now posited.

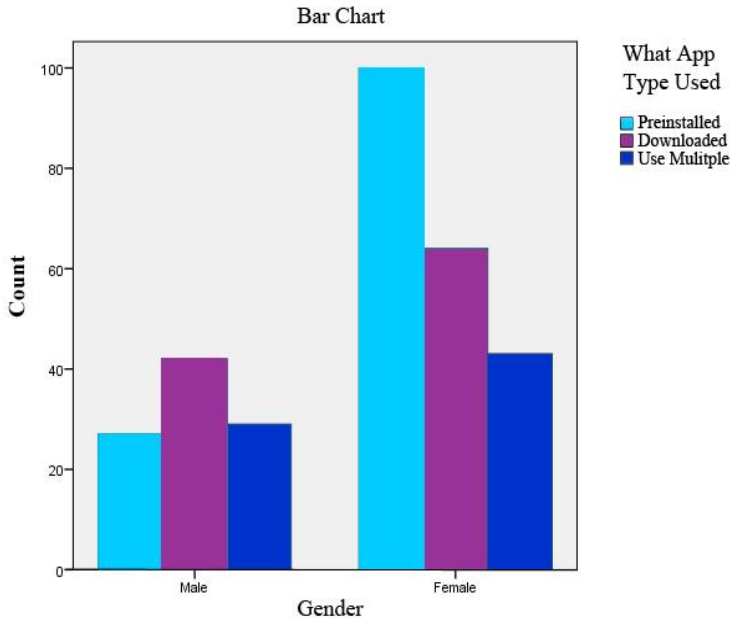
One possible reason for females choosing to use an iPhone comes from an Intel Corporation researcher and anthropologist, Genevieve Bell, whoindicated women are now believed to be the lead adopters of new technologies (Barclay 2012). Hence female respondents may reasonably perceive the iPhone to be one of the world's most popular smartphones, as in fact it is the most popular smartphone in the United States of America (comScore 2014).

Nielsen (2010) conducted a survey that found females were more likely to choose an iPhone than males whom were found to prefer Android smartphones. Furthermore, females, whom are generally considered to be more astute in terms of fashion consciousness than males, are possibly making a fashion statement by using an iPhone (Pentecost & Andrews 2010; Lewis 2013).

The second influence gender made was on the use of preinstalled, downloaded or multiple weather apps in use. Females were more likely than males to use the preinstalled weather application shipped with their smartphone. Figure 1 illustrates the type of weather app used by female and male genders.

As can clearly be seen in Figure 1, females are far more likely to use the preinstalled weather app on their smartphone than are males.

Figure 1: Type of Weather App Used



Source: Data from current research

Other Key Influences

Other influences revealed by the Mann-Whitney U test dealt with the items associated with the ease of use and ease of adoption of weather apps. In all cases females found it easier to adopt and use their weather apps. The researchers suspect this may be due the predominance of iPhone use by females and that 48.3% of females were content to use the preinstalled weather application shipped with their smartphone.

Cross tabulations identified other possible influences. A Mann-Whitney U test (iOS and Android, n=298) identified that the operating system showed significant influence on measures describing ease of use, ease to configuration (significance .000), ease to become skilled (significance .000), and ease to customise (significance .001). In all cases iPhone users perceived these measures in relation to weather applications, to be easier to handle than Android users. A final influence, related to trusting a weather app, was found when looking at aspects of security within this quantitative instrument. IPhone users (significance .000) perceived the weather app on their iOS phone to be more secure than apps based on the Android operating system.

CONCLUSION

This exploratory paper has highlighted as number of key consumer-focused insights, in relation to the use and adoption of location-based smartphone weather apps. Key findings included:

- The majority of respondents prefer to download their own weather application (58.4%).
- Females show a clear preference for iPhones (70%).
- Females were more likely than males to use the preinstalled weather application shipped with their smartphone.
- iPhone users perceived their smartphone weather app to be more secure.
- iPhone users perceived their smartphone weather app easier to configure, customise and become skilled with.

The aforementioned points may have implications for both the manufacturers and marketers of smartphones, in addition to the developers of LBS weather apps. These implications may include a greater emphasis on targeted marketing, based on key user preferences highlighted in the current research. Additionally, the findings of this research have the potential to impact a wider range of other Location Based Services (LBS) apps on smartphones. LBS are available to users of smartphones and other ICT compatible devices where usage is seen as having application in: the military, emergency services, government industries and the commercial sectors. Some of these include (but are not limited to): travel, entertainment, emergency services and information services.

While the scope of this research was limited to a study of users of weather apps *exclusively on smartphones* it is acknowledged weather information is delivered to societies via numerous Information Communication Technology (ICT) devices. Therefore future research could aim to further embed user influences as they pertain to weather apps in an expanded set of geographical locations across a range of ICT devices including: smartphones, laptops, tablets, phablets (a larger screen format of a smartphone) and wearable smart technology devices.

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