

Consumer Behavior Marketing Analysis Using Data Mining Apriori Algorithm

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ABSTRACT

In this Generation of mobile phones has reached to each and every part of India. Within last few years, number applications have increased. There are about more than 900 million cell phone users in India and internet users will be around 500 million incoming future. Starting from the first mobile phone which was introduced by Motorola, the mobile phones have evolved in a big way over the last four decades. Smartphone's now dominate our lives and the penetration is increasing like never before. The major reasons for this increase in Smartphone's are declining handset costs, low tariffs, faster bandwidth and greater connectivity. This has caught the attention of marketers in a big way and mobile marketing is now emerging as one of the best platforms for advertising, brand awareness, promotions and reaching the customers in a way that have much bigger impact than the conventional method of marketing communication. This paper tries to understand the acceptance level and behavior of Indian consumer towards the increasing mobile marketing communication. It demonstrates as to how the acceptance and attitude varies with gender, age, city, education, profession and income groups. A questionnaire based survey was carried out for the study. The sample size for the study was 180 respondents. It was found that the customers are reacting to these mobile based communications in a fairly positive manner provided these communications are customized to their needs. However, the acceptance level varies with different variables under observation and hence the marketers should adapt and design their strategies accordingly.

Keyword: *Mobile phone, Marketing, Usages, Data Mining, Apriori, FP Growth*

INTRODUCTION:

After high penetration of the internet, mobile broadband subscription rate also increased dramatically. Subscriptions of mobile broadband outnumbered the subscriptions of broadband by 2008, which is indicating tremendous potential for mobile internet (International Telecommunication Union, 2009). Another research conducted by ITU (International Telecommunication Union, 2010) shows that 90% of the world population has internet access, and 80% of people who is living in rural areas also have internet access. Different reasons are playing a role in rise of mobile devices usage; Improvements in mobile technology, and integration of data, video and audio context

in one mobile device absolutely increased the usage of mobile devices. Flexibility in communication and information sharing became possible with improvements in mobile technology and integration of internet and computing in to mobile medium. The possibility of reaching the information anytime and anywhere triggered the improvements of mobile devices lately. Potential of interaction with consumer, target marketing and managing consumer relationship made mobile devices especially important channel for marketers. Mobile services and marketing has become powerful source for marketing communication and distribution. Backed up marketing activities with mobile devices provide companies an opportunity to

directly communicate with consumers anytime, anywhere.

ATTITUDE

“Attitude is the individual predisposition to evaluate an object or an aspect of the world in a favorable or unfavorable manner.” Currently there is no formal agreement of definition of mobile commerce, but widespread acceptance of mobile commerce is the use of mobile devices to interact with consumers and transactions that takes place on private or public networks.

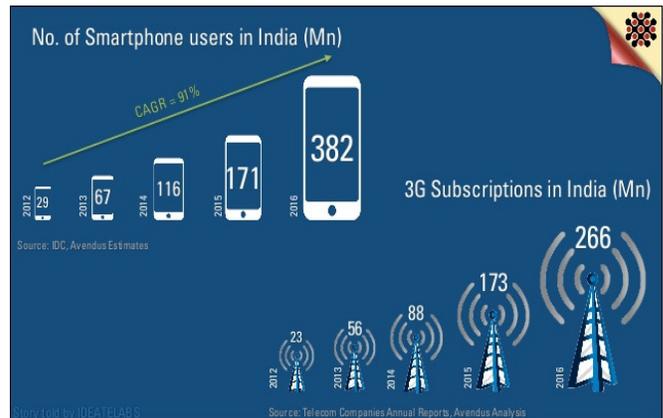
Inevitably, developments and innovation bring about change for businesses and people alike. The Industrial Revolution led the way towards a new economy, “defined in terms of assembly-line production of standardized products, mass distribution of these products to consumers in a wide geographic area and mass media vehicles to carry standardized advertising messages” In other words, selling underwent a major transformation from personal one-to-one persuasion to what Solve calls “large-scale advertising campaigns designed for the nameless, faceless consumer.”

SURVEY OF MOBILE USAGE TECHNOLOGY:

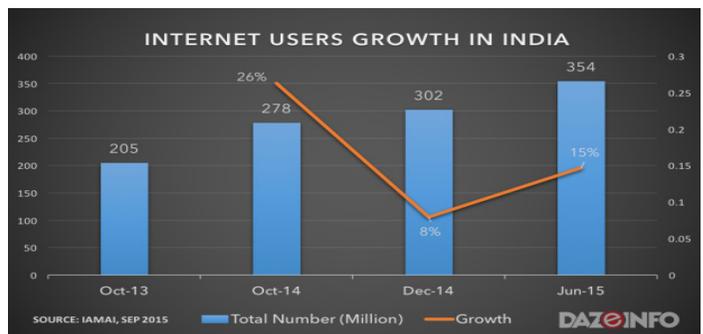
India is one of the fastest growing mobile markets in the world and currently there are around 870 million mobile users. At the same time it has the largest youth population in the world. It is clear that this type of market offers great opportunities for mobile marketing. However, Google has recently realized that the Smartphone penetration languishes at 10 million users and is likely to grow with cheaper handsets. Seeing and understanding this potential, Google is targeting SMEs in India. Internet growth in India will be through mobiles as currently there are only 100 million Internet users; this will simultaneously provide a huge boost for mobile marketing. Of course,

India is a very heterogeneous country and therefore mobile marketing will pose challenges for many years to come.

The Indian Telecommunications network with 110.01 million connections is the fifth largest in the world and the second largest among the emerging economies of Asia. Today, it is the fastest growing market in the world and represents unique opportunities for U.S. companies in the stagnant global scenario. The total subscriber base, which



has grown by 40% in 2005, is expected to reach 250 million in 2007. According to Broadband Policy 2004, Government of India aims at 9 million broadband connections and 18 million internet connections by 2007. The wireless subscriber base has jumped from 33.69 million in 2004 to 62.57 million in FY2004-2005. In the last 3 years, two out of every three new telephone subscribers were wireless subscribers. Consequently, wireless now accounts for 54.6% of the total telephone subscriber base, as compared to only 40% in 2003.

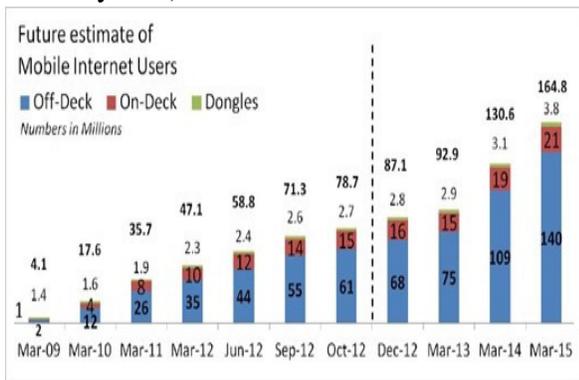


Wireless subscriber growth is expected to bypass 2.5 million new subscribers per month by 2007. The wireless technologies currently in use are Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA). There are primarily 9 GSM and 5 CDMA operators providing mobile services in 19 telecom circles and 4 metro cities, covering 2000 towns across the country.

Data collection and processing

Data on composition of feeds was obtained from peer reviewed journal on animal nutrition extending over a period of last ten years (2000-2010) and the data was tabulated. The composition parameters were crude protein, crude fiber, Nitrogen free extractives, total ash and ether extract. Of these parameters crude protein and crude fiber are the most

important parameters. Crude protein, ether extract and nitrogen free extractives are positively related to feed quality while crude fiber and total ash share negatively related to the feed quality. The feed resources included commonly used feed resources and other uncommon feed resources from different parts of the country. A total of 356 samples data was collected and after preprocessing –leaving incomplete data, unusual values (very high or very low) etc a total of 236 observations



were used forth represent study. To further

validate the results a fresh set of 106 observations were included in the study. General Process Association rule

Apriori algorithm

generation is usually split up into two separate steps: 1.First, minimum support is applied to find all frequent itemsets in a database. 2. Second, these frequent itemsets and the minimum confidence constraint are used to form rules. While the second step is straight forward, the first step needs more attention. Finding all frequent itemsets in a database is difficult since it involves searching all possible itemsets (item combinations). The set of possible itemsets is the power set over I and has size 2ⁿ - 1 (excluding the empty set which is not a valid itemset). Although the size of the powerset grows exponentially in the number of items in I, efficient search is possible using the downward-closure property of support (also called anti-monotonicity) which guarantees that for a frequent itemset, all its subsets are also frequent and thus for an infrequent itemset, all its supersets must also be infrequent. Exploiting this property, efficient algorithms (e.g., Apriori and Eclat) can find all frequent itemsets.

Motivations to purchase a cell	Age of the Respondent		
	15-19 Yrs.	20-24 Yrs.	25-29 Yrs.
Everybody around you had one with them	68.40%	73.10%	0%
You wanted to buy it	13.10%	6.52%	56.20%
Somebody (friend/parents) asked you to get one for yourself	2.63%	0%	3.13%
Passed on to me	2.63%	6.25%	0%
Gifted to me	13.10%	2.17%	6.25%
Extra set available	0%	2.17%	0%
Business purpose	0%	2.17%	6.25%
Convenience	0%	2.17%	0%
Work required it	2.63%	0%	28.13%

Apriori Algorithm Pseudocode

```
procedure Apriori (T, minSupport) { //T is the database and minSupport is the minimum support
  L1= {frequent items};
  for (k=2; Lk-1 !=∅; k++) {
    Ck= candidates generated from Lk-1
    //that is cartesian product Lk-1 x Lk-1 and eliminating any k-1 size itemset that is not
    //frequent
    for each transaction t in database do{
      #increment the count of all candidates in Ck that are contained in t
      Lk = candidates in Ck with minSupport
    } //end for each
  } //end for
  return  $\bigcup_k L_k$ ;
}
```

CONCLUSION:

It can be concluded from the research that mobile phones now have a much greater penetration in common man's life and can act as a very important tool for the marketers and a platform for mobile marketing communications. The marketers now have an opportunity to reach newer markets and customer target segments, where it was really difficult and expensive to carry on effective marketing activities. It is reaching much deeper in the Indian population where a PC/laptop has never reached. Companies should focus more on one to one marketing so as to target the right class of customers, increase sales and creating brand awareness. All efforts should be taken so as to involve the customer in a much better way and for this the limiting factors and barriers are needed to be identified and removed or minimized.

FUTURE WORK

In future, FP-array technique that allows using FP-trees more efficiently when mining frequent item sets. Our technique greatly reduces the time spent on traversing FP-trees, and works especially well for sparse data sets.

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