Determining Social Media Components for Scalable Healthcare

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Abstract

The issue of access is an essential concern for any health care policy formulation and reform, especially in emerging nations such as India. It has been recognized that all people deserve access to similar levels and quality of health care services. Penchansky and Thomas (1981) recognized five dimensions of access to health services as affordability, acceptability, accommodation, availability and accessibility. Seventy three percent of Indian population lives in the semi-urban and rural areas. The strong mismatch of ratio of hospitals to patients, rising costs of health care, rapidly changing demographics, increasing population and heightened demands in pricing for technological healthcare usage in emerging economies necessitate a unique health delivery solution model using social media. The prominent gaps in the healthcare delivery among the population which has greater disease burden might be relaxed using social media tool. Based on research we framed the key question of this paper as what are the expectations of consumers or users of social media for healthcare. The authors have tried to find how these factors depend on social media for healthcare.

Keywords

Entrepreneurship, patient satisfaction social media, healthcare, mobile healthcare, networking

1. Introduction

The advent of social media and social networking has completely changed the way world saw the Web1.0 in 1993 (Leiner et al., 2000) which was used to search for and read information and later Web 2.0. Social media has become a buzzword everywhere in the new generation of digital communications. Barry Wellman (1995) had defined social networks as computer networks which link people as well as machines. People are becoming more conversant with social media due to numerous players offering mobile and handheld devices having social networking applications at competitive prices. In present scenario, people use social media right from business, automobiles, arts, bookmarking, cooking, entertainment, general networking and what not. It creates highly synergistic virtual environment where individuals and communities share, co-create discuss, and modify user-generated contents and this process mostly employs mobile and web based technologies (Kietzmann & Hermkens et. al, 2011). Supporting and adopting social networking interventions can lead to the cost effective and scalable solutions for development and it has already left no area untouched. This change
is transformational for healthcare consumers whose ideas have shifted from costly high-tech healthcare to non-traditional healthcare using social media.

There have been various attempts to reform healthcare by innovative healthcare delivery models. They are mostly the private sector (Bhattacharya et al., 2010) players benefitting the poor. Most of them are efforts made by the local entrepreneur with some non-profit seeking organizations or partnerships with bigger organizations. Many successful efforts have also been done for developing telemedicine like De Novo Group and Arvind Eye Care System, IBM Health-care solutions, Voxiva, Narayana Hrudayalaya and Pilot Projects by Indian Space Research Organization (ISRO) with Apollo Hospital (Ghosh et al, 2011) in the rural and semi-urban regions for healthcare delivery. Moreover, wide prevalence of mobile usage adds to the flexibility of the healthcare delivery system in India. Recent reports on mobile usage shows that India constitutes 10 percent of the total mobile usage in the world. This is very clear when we look at the 1.2 billion population residing in India out of which 72 percent are from the rural areas.

However, technology has influenced the spread of information and in the manner it can be disseminated to the world. The advent of new technologies and media has also made the society well informed about the happenings in the other parts the world in many ways. This has made the modern Indian society aware of the new technologies being developed for healthcare too. Conversely, they are ignorant about the usage and outcomes of the same. There lies the issue of “Technology to Health (T2H)” Gap (Amrita et al 2010, Amrita & Biswas 2011). The healthcare needs an overhaul. We need to develop a model which should cater to the healthcare needs of the Indian population. Keeping in mind the mobile usage statistics and technology awareness, we might rely on the most effective methods of social media for the purpose.

2. Literature Review

Barry Wellman (1995) had defined social networks as computer networks which link people as well as machines. Social media can be defined as a group of internet based rich applications such as collaborative projects, blogs, content communities, social networking sites, virtual game worlds and virtual social worlds that build on the ideological and technological foundations of Web 2.0 and it also allows the editing of user generated contents (UGI) (Kaplan & Haenlein, 2010; Kambil, 2008; Jacobs, Egert & Barnes, 2009; Short, Williams & Christie, 1976; Daft & Lengel 1986) . It creates highly synergistic virtual environment where individuals and communities share, co-create discuss, and modify user-generated contents and this process mostly employs mobile and web based technologies (Kietzmann & Hermkens et. al, 2011).

In the recent trends the technological advances have increased the health costs (Mueller et al., 1993; Cowan et al., 1999; Berndt et al., 1999; Cutler et al., 1999). Technology is prevalent in healthcare but the major expenditures are limited to profit-making sectors such as surgery and treatment (Lohr, 2005). Medical technologies have also been termed as the “culprit” behind the rise in health spending (Cowan et al., 1998). Cost effective new technology often turns expensive after diffusion into patients with mildly symptomatic disease, or those who were
previously too ill for treatments (Goldsmith, 1994). The challenges of high-technology is formidable as it is creating a chaos in the healthcare system by high price points and accretion of assorted interest groups creating an ideologically divided public, and a steady stream of new and expensive technologies added to those already in place (Daniel Callahan, 2008). However, these challenges can be relieved for those who might use information technology to an extent by knowing about similar kinds of patients with same disease patterns, share their experiences and many more by the introduction of a one step ahead social media tool for healthcare. It is widely accepted that even while reducing unit costs of new technologies, the net health expenditure is often increased by increasing the overall volume (Schwartz, 1994). Thus, social media for healthcare as technology intervention strategy in information technology may exert their influence through both volume and price effects. Technological interventions at every stage in innovation will direct to sustainable healthcare system especially in the emerging economies context.

There have been many versions of this social media networking in the last two to three years with Facebook being the highest rated in the current scenario. Those who are at least able to use computers are connecting to their friends and family through such sites rather being in touch through e-mails and text messaging. There have been tremendous efforts to improve the functionality and user interface of these sites. Moreover, these are getting more popular amongst the younger generations (Mcmillan and Morrison, 2006). It is also popular amongst those who use mobiles which connect to internet. Internet World Stats (www.internetworldstats.com) has reported that Asia alone has 44 percent of total internet users as on 31 March 2011. India alone has 100.0 million users which is 10.7 percent of the total internet users in Asia. Keeping in mind the internet and mobile usage the same can be employed for creating health care social media.

Tim Weber (2010) the BBC Business Editor in a statement explained the impact of social media by telling that just a smart tweet on a blog post or a devastating video can be forwarded to hundreds of friends at the click of a mouse which might kill a project or a company’s reputation and hence the share price. Utilizing the power of social media might create healthy communities. It has been seen from the survey of internet, that there are many social media networks which deal with doctor networks, nurses’ networks, popular disease support forums, health blogs, patients voices and expert answers. Kahn (2008) in a research for social media users for social health has stated in Health 2.0 that consumers who search for health information are at an average age of 35 to 40 years. It has also been stated that the consumer-generated content in health is finding a receptive audience as well. Health blogging has already been seen as an influential category in social media especially for the chronic conditions. However, there is a gap in the existence of an all inclusive social media tool which could be more than a portal for social media where people would be able to share specific health care interests, contact to doctors, patients of same kind sharing a common and private forum, search for applicability of medicines they are using as well as rate themselves on a health-ability index.

Presently, social media builders and business creators are focusing to introduce new avenues for the usage of social media in different fields. Though it has been a recent phenomenon, tremendous businesses are being carried out through it. It has reached to a point where the
social media is being used not only for friendship, buying-selling and sharing ideas, but for noble reasons like healthcare.

Parks and Floyd (1996) in their research have stated about the online relationships which over time gets expanded and are then broadened to include family and friends too. Ryan (2000) has proved in her research that those communities that demonstrate higher levels of interpersonal, lively, face-to-face contact have subsequent high qualities of lives. It has been observed that the building blocks of a successful social media are identity, conversations, reputation, sharing, relationships, presence and groups. The benefits of using social media in healthcare might be focused on accessibility, usability, immediacy and privacy. It could be a vent to those patients who do not dare to share their thoughts with local community and seek medication results.

3. **Objective**

Based on research we framed the key question of this paper as what are the expectations of consumers or users of social media for healthcare. Hence the following are the key questions:

   a. Determining the factors which affect the social media components of healthcare.

   b. Finding which of the above determined factors affect the preferences of users of social media.

4. **Methodology**

The paper is based on the premise that the health customer is able to choose from where and whom they get treated or prefer the kiosk relationship for taking such decisions.

![Figure 1: Model for Components determining Social Media in Healthcare](image-url)
Step 1: The factor analysis was conducted using the response on what factors the users of social media would like in a social site created especially for healthcare.

- A simple questionnaire was created with 48 factors and respondents were asked to rate these factors.

- Received response from 45 respondents who belonged to different backgrounds of education and profession.

Step 2: Three factors namely privacy, immediacy and usability were obtained from the above step.

- These were used as the independent variables to predict the dependent variable called the social media and regression analysis was performed.

- SPSS 19 was used to analyze regression.

Questionnaire Design

A questionnaire with variables of privacy, immediacy, usability, social media and demographic profiles were designed. The distribution of the questions in 5 sections was as follows:

<table>
<thead>
<tr>
<th>Section</th>
<th>Variable</th>
<th>No. of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Privacy Issue</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Immediacy</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Usability</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Social Media</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Demographic Profile</td>
<td>10</td>
</tr>
</tbody>
</table>

The questionnaire was designed as a webpage using the tool of google forms from www.google.com. This link of the form was shared using various online methods such as email, facebook, twitter and some forums. The 5 point Likert Scale options ranging from ‘Strongly Disagree’ to ‘Strongly Agree’ was used. There were multiple choice questions for some measuring variables.

Data Collection

The data was collected using the online form in an excel sheet. However, the response rate was very low and after 5 reminders, 92 response were generated. It is assumed that the sample is highly random due to the fact that people from various age and domains responded to the survey. Since the number of data points collected ‘n’=92, we can say using the Central Limit Theorem (i.e., sample size is >30) holds true. Hence the data is normally distributed.
**Hypothesis Testing**

The hypothesis looks at the perspective of how the indicator variables affect social media for healthcare.

\[ H_0 : \beta_0 + \beta_2 + \beta_3 + \ldots + \beta_{26} = 0 \]  
... Null Hypothesis

The null hypothesis establishes that the independent variables privacy, immediacy and usability do not affect the dependant variable social media for healthcare.

\[ H_a = \beta_i \neq 0 \]  
... Alternate Hypothesis

The alternate hypothesis established that at least one of the coefficients of the components determining social media for healthcare are not zero.

**5. Results**

An analysis of primary data from 92 respondents out of the numerous distributed questionnaires over the internet has been done.

Table 1: Respondents distribution

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>5</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>35</td>
</tr>
<tr>
<td>Urban</td>
<td>37</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>15</td>
</tr>
</tbody>
</table>

The socio-economic characteristics of the respondents are show below in table 2. These characteristics are representative of the population who would at least try using social media for reasons of health information and usage.

Table 2: Socio-economic characteristics of respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage (out of 92 respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>84</td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>15 to 24</td>
<td>28</td>
</tr>
<tr>
<td>25 to 35</td>
<td>65</td>
</tr>
</tbody>
</table>
Based on the ranking of the mostly used social media sites, the people were enquired about their presence with first 15 of them i.e. Facebook, Twitter, LinkedIn, MySpace, Ning, Google Plus+, Tagged, Orkut, hi5, myyearbook, Meetup, Badoo, bebo, mylife, and friendster

The social media presence of the respondents have been seen as follows:

- 100% of the respondents use at least one social media site. The most common of them are facebook, twitter, linkedIn, google+ and orkut.
- Only 11% use healthcare sites in internet.
- 39% know about at least one of the healthcare sites.
- 50% of them do not know or searched about the healthcare sites.

<table>
<thead>
<tr>
<th>Education</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Matriculation</td>
<td>11</td>
</tr>
<tr>
<td>Graduate</td>
<td>34</td>
</tr>
<tr>
<td>Post Graduate</td>
<td>55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>715€ to 1430€</td>
<td>10</td>
</tr>
<tr>
<td>1430€ to 5715€</td>
<td>30</td>
</tr>
<tr>
<td>5715€ to 11445€</td>
<td>35</td>
</tr>
<tr>
<td>11445€ and above</td>
<td>25</td>
</tr>
</tbody>
</table>

Figure 2: Social media presence of the respondents
**Anova Testing**

Regressing the data using SPSS 19, the following table in anova was derived. The test statistic used was F test where from the log table the value of $F=1.81$.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>25,228</td>
<td>28</td>
<td>.970</td>
<td>1.818</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>34,685</td>
<td>65</td>
<td>.534</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>59,913</td>
<td>91</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Usability10, Privacy Issues6, Immediacy5, Immediacy4, Usability3, Usability6, Privacy Issues7, Privacy Issues3, Immediacy1, Privacy Issues2, Immediacy3, Usability6, Immediacy2, Usability1, Privacy Issues4, Privacy Issues8, Privacy Issues1, Usability9, Privacy Issues5, Immediacy8, Usability4, Immediacy6, Usability2, Usability5, Usability7, Immediacy7

b. Dependent Variable: Social Media6

The p-value = 0.027 which is < 0.05. Hence the model is significant. At 95% confidence interval we can say that the Null hypothesis can be rejected which says that all the coefficients are zero. Hence the designed model is fit.
### Table 2: Reporting the Standardized coefficients – Beta

**Interpreting results**

Looking at the p-value and the t the following are significant:
- Privacy Issues 7, 8: 0.23, 0.49
- Immediacy 2, 5: 0.43, 0.35
- Usability 7: 0.069

However, looking at the higher t value and lower p value following might also be considered:
- Privacy Issues 2
- Immediacy 1, 3, 7
- Usability 4, 5, 8
**Significant Beta**

- Privacy Issues 7, 8:
  - Users should be able to send private messages to people other than friend/s. Sig: 0.23, Beta: 0.164
  - You would like to meet your friends of health groups in person. Sig: 0.49, Beta: -0.180
- Immediacy 2, 5:
  - You would like to get suggestions only from doctors. Sig: 0.35, Beta: -0.211
  - You would like to get direct and frank opinions on your health discussions.
- Usability 7:
  - You would like to be part of directory listings in the interests’ column. Sig: 0.069, Beta: 0.233

**Considerable Beta**

- Privacy Issues 2
  - Users can send request to friends of friends and their friends Sig: 0.172, t: 1.381 Beta: -0.1180
- Immediacy 1, 3, 7
  - You would like to get suggestions from anyone on health questions and experiences you are sharing on your wall. Sig: 0.306, t: 1.032 Beta: 0.071
  - You would like to get suggestions only from people with some experiences. Sig: 0.259, t: 1.139 Beta: 0.094
  - You would like to see videos from people talking about their health problems and how they recovered. Sig: 0.285, t: -1.078 Beta: -0.145
- Usability 4, 5, 8
  - You would like to learn the operations of the site in just few hours. Sig: 0.114 t: 1.603 Beta: 0.163
  - You would like to check and administer your setting sometimes. Sig: 0.210 t: 1.226 Beta: 0.161
  - You would like to use advance preferences in search and fetch fields. Sig: 0.181 t: -0.1353 Beta: -0.166

Looking at the results we can explain that considering the **privacy** on the social media for health

- Private messages in a social media has a strong positive relation.
- People do not like to meet their social health groups which has a negative relation.
- However, people like to know about other friends of friends and has somewhat positive relation.

Considering the **immediacy** on the social media for health

- There is a negative relation telling that they do not like to get opinions only from doctors on the social media sites.
- People are interested to get suggestions from anyone on health questions and experiences
They like to get suggestions only from experienced people.
It is surprising to know that they are not interested to get videos and posts
explaining their health issues.
However, they also do not like to receive very frank opinions from their friends
on these public sites.

Considering the usability on the social media for health
There is a positive relation telling that part of contacts in the social media sites.
People are interested to learn the using and preferences of these sites quickly
suggesting that people are willing to use the sites provided there are no issues
in handling the sites.

6. Conclusion

Determining the components, privacy of messages and their contacts searching are most
important. Around 40 percent of the respondents belong to the semi-urban and rural area and
do not prefer to search the internet. Where as 50 percent like to search the health information
in the internet. There is a strong relation in preference to be in the contacts lists of interest
groups. This suggests that people are willing to adopt and try the new ways in being healthy
and aware.

The implication of usefulness of social media has been well understood through its usage in
marketing and other dominant domains. The understanding of social media components for
healthcare can make the world more connected and informed. This would become more
important when we take the case of unconnected and rural areas of emerging economies like
India and China. A social media inclusive of doctors, superspeciality hubs, retail for health and
community itself could largely improve the conditions of affordability, availability and
accessibility for healthcare. The results let the designers of social media of health to keep in
mind the weight-age of healthcare components. The results explain that people are willing to
use the social media sites for health. However, it needs lots of efforts, awareness and
innovation in the process.

References

business model for non-metro Indian cities. Comb2010i, Vantaa, Finland.
Amrita, Saurabh P, Biswas .D. 2009. Health Problem Mitigation through Advocacy of Public-
Private-Partnership for Solution of Local Health Problems through Service Based
Health Care Models. RVIM Journal of Management, Vol.2 No.1 pp. 41-56
Berndt ER, Bir A, Busch SH et al. The Medical Treatment of Depression, 1991-1996:
Productive Inefficiency, Expected Outcome Variations, and Price Indexes. NBER


Jane Sarasohn Kahn (2008), People who need people use social media. Health 2.0. [Available at: http://www.health2blog.com/2008/01/people-who-need.html]


Schwartz WB. In the pipeline: a wave of valuable medical technology. Health Affairs. 1994 Summer;13(3):70-9

