

Real Time Communication Services

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Abstract:

In the first section the paper introduces mobile communication, challenges of the bottom of the pyramid and need for value innovation. In the second section, the paper details about deploying mobile applications on ground and the major challenges that are faced in mobile communication. The larger objective of the paper is to engage all parties in the Mobile Communication ecosystem to develop a dynamic system of information gathering & delivery for the Indian market while retaining flexibility in the system so that it allows all parties to reach out to other markets where the basic issues and needs are similar to the ones in India. The third section caters to email service. The paper ends with a set of recommendation in the fourth section.

Keywords: Mobile applications, Email, Real Time Communication, Linked Data, Semantic Web, Mind Mapping, Open source, VAS, feedback, market survey, Software as a Service, SaaS, Multi-lingual support

1. Introduction

Mobile communication systems in India have brought the kind of social & economic unification that had previously happened with the introduction of the Indian Railways. Railways catered to the natural human need to travel and socialize, while at the same time allowed students and business persons access to better facilities and larger markets. In the same manner, mobile phones while satisfying a basic human need of communication, has become the primary mover for access to information and a tool for conducting business.

In recent years, the number of mobile connections has far exceeded the number of fixed line phones and internet connections. As has been emphasized in numerous articles and forums, mobile has become the most convenient channel not just for person to person communication, but also machine to person communication. Such a scenario would have been difficult to imagine 15 years back when cost of equipment was the primary reason for lack of internet penetration and internet awareness. Even today internet access at home requires approx Rs. 20,000 as initial investment and Rs. 300 as monthly charge. In sharp contrast a fully featured phone today costs Rs. 5000 and monthly expense on an average is close to Rs. 150. Additionally, the user has an enormous range of mobile devices to choose from based on the features & budgets, making it the gadget of the common man.

Mobile Communication – A Blue Ocean Strategy

It may be interesting to note that, Government policies & industry leaders in telecom addressed the issue of communication in a manner explained much later in the popular management book 'Blue Ocean Strategy' by W Chan Kim & Renee Mauborgne. The book talks about a business strategy that is based on

'looking across Alternative Industries'. For instance, Southwestern Airlines in USA pitted itself against travel by private cars, and created value for the traveler by increasing speed of travel while retaining the convenience of point to point travel and matching the price.

The telecom revolution began with the broad objective of making communication as cheap as sending a postcard. By pitching mobile telephony against postcards, we have improved upon the speed & reliability of communication while matching postcards in cost & convenience. This offers a blueprint to all future entrepreneurs looking to serve the Indian markets.

Fortune at the bottom of the Pyramid

The paper tries to capture the spirit of the book by Dr. C.K. Prahalad, Fortune at the Bottom of the Pyramid. As propounded by the book, we choose to consider all citizens in the Bottom of the Pyramid as our clients and assume that all principles of good business must apply when we build mobile applications for them. Quite simply, this means that, we shall bill our clients for the services that we offer and in return we promise to deliver what the client wants. This involves a bottom up innovation and technological development as against building technology before finding application. The challenge therefore lies in identifying the need of our targeted customer, offering services in a package that is best utilized and pricing that is most appropriate.

Value Innovation

What we feel is that often, we fail to grasp the exact nature of the problem that our end user experiences and solve problems at the superficial level. This happens in part because we do not initiate surveys & interact with our 'potential customers' directly, which in turn means that we do not have sufficient data to base our analysis upon.

The focus should therefore be on 'value innovation'. Pure value creation means incremental benefit to the end user that may not be worth an investment from the consumer's point of view. Pure innovation means shooting beyond existing requirements. Value innovation is a comprehensive phrase explaining innovation that creates value for the end user and hence constitutes a sound business. Value innovation involves creativity on all fronts including technology, logistics, supply chain, sales & marketing channel and billing.

2. Deploying Mobile Application

A mobile application deployed on the ground would constitute the following

1. Mobile Device & network
2. Application on mobile
3. Information Bank
4. Market surveys & feedback system to keep the information bank up to date
5. Sales & Marketing
6. Billing & recovery

In the current scenario, mobile device is a part of the open market where manufactures offer devices directly to the customer. However, mobile network,

applications on mobile, sales & marketing & billing is owned and managed by the operators. Information banks could be maintained by the operators or by individual firms. Interestingly, however, there is little work being done on market surveys & developing a customer feedback system in the true sense.

Future challenges in mobile communication

By making mobile devices and mobile network available we have only solved a part of the bigger problem. As we understand, the next set of challenges lies in

- A. Information storage
- B. creating system for continuous updation of information banks
- C. making information delivery cheaper and faster
- D. making information available in the format best understood by the user, and
- E. Delivering information available when it is most needed, preferably in real time.

This forms the basis of discussion in this paper, where we try to exhibit the importance of **Intelligent Real Time Communication Systems** through specific cases and propose execution strategies for some of the cases. The larger objective of the paper is to engage all parties in the Mobile Communication ecosystem to develop a dynamic system of information gathering & delivery for the Indian market while retaining flexibility in the system so that it allows all parties to reach out to other markets where the basic issues and needs are similar to the ones in India.

A) Information Storage

Linked Data

Linked Data is a concept where data, possibly stored on two or more different databases, can be related and searched. For instance, data on location of polling stations can be linked with data on security threat levels in different areas and presented on a map for the benefit of journalists. In this case, the location of polling booths and threat levels would be stored in two different databases, possibly owned by two different organizations. However, if the data is published in standards prescribed in Linked Data format, the data can be combined to serve information in an easily consumable form.

Linked Data is a part of the Semantic Web (described later in the paper) movement popularized by Tim Berners Lee and is being adopted by private and government organizations around the world for presenting information on the web. Such data sharing begins with the fundamental assumption that it must be left to the people how they wish to use and consume information, since the various permutations and combinations may not interest the authorities owning the data. Individual parties may, however, develop business models around such information for the benefit of everyone.

It may be interesting to note that when users mark their home or office location on Google Maps or similar websites, they are contributing to the Linked Data. The information entered by the user may be combined with other data points to provide relevant information to other people around the world.

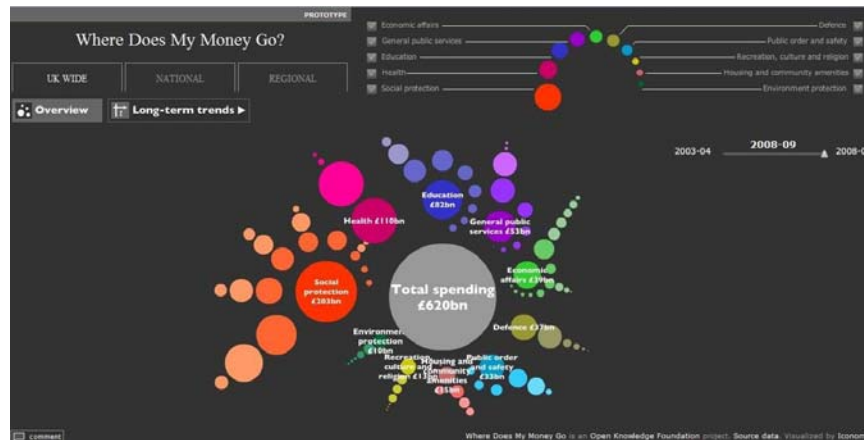


Fig. Power of Linked Data: Screenshot showing the real time spending of UK gov. on various schemes. Ref: www.wheredoesmymoneygo.org

B) Updating of information Banks

Market Surveys & Feedback Loop

There are quite a few firms which offer telecom reports, but most of the conclusions and findings are based on broad subjects. There is very little information on specific subjects, specific problems and specific inefficiencies in the system. As a result, it is left to the user's imagination as to what could be potential business opportunities. In most cases, since the 'feedback loop' is absent, there is practically no chance of validation of business ideas and refinement.

Further, till very recently, the mobile application domain was controlled by the mobile operators. Operators to a great extent relied on the market insights of the application developer which we understand would be limited in absence of the 'feedback loop'. In a recent development, mobile operators have opened Application Stores where developers can place their applications for sale directly to the consumer while the operator helps out with the billing. The onus is now on the developer to understand user requirements and tailor the development accordingly.

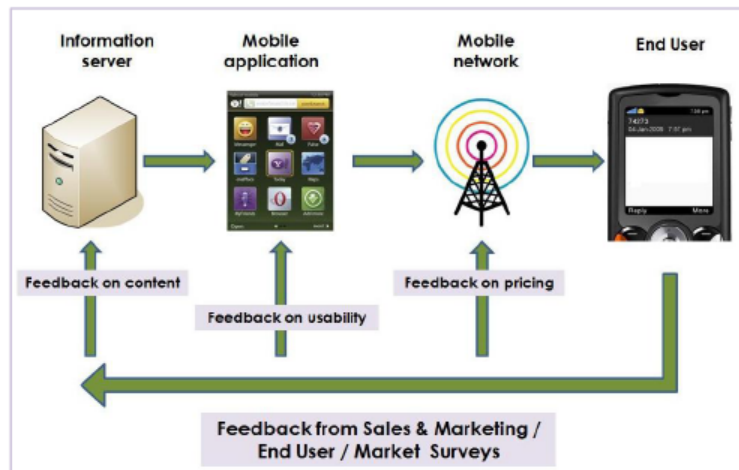
This further emphasizes the importance of 'feedback loops' in the application development environment. Market surveys & advanced analytics based on these feedbacks will assist the developer community in designing products and will also let them focus on development & innovation.

It is important to note that the 'feedback loop' is an essential step towards e governance. The 'feedback loop' once created will serve the larger objective of participation of the public in governance activities. Today, most people even in the developed parts of a city feel left out simply because they firmly believe that their views are not

being heard and will make no difference to the working of the public or private bodies.

In a recent interview, Sam Pitroda, father of India's telecom revolution, has proposed voting via mobile phone. This clearly establishes the fact that mobile can be looked upon as a channel for citizen participation in a democratic setup. Mobile can therefore be used as a tool to gauge the public sentiment or opinion and can influence the functioning of the government. Just like in the case of mobile applications, the feedback loop will help in quicker reaction and hence faster action, leading to a refined product or policy in a shorter period of time.

There is clearly a case where mobile application developers can collaborate with survey agencies, marketing agencies to identify problems and develop solutions accordingly.



C) Faster & Cheaper information delivery

Application development –SaaS for Mobile

Mobile application development is a function of the device & network capabilities. Hence, applications must always be customized given the plethora of mobile form factors (screen sizes, keypads) & mobile operating systems. Apart from making application development a complex task, the associated overheads of application up-gradation, bug fixing, installation / un-installation and user handholding make it almost impossible to have a cost efficient application development ecosystem. In effect, an application deployment strains not just the developer but also the call center and after sales staff.

Mobile ecosystem community can adopt Software as a Service (SaaS) model for all application development. SaaS in the computing world means that the user does not need to purchase and install utility software on every device. Instead the software is hosted on the web, from where a single license can be purchased and used anytime and from any device. For instance, Google Docs is a SaaS version on Office Tools. Google Docs allows users to create & store excel, PowerPoint etc. on the web.

Apart from delivering benefit in terms of cost and accessibility to the end user, what SaaS model also does is, that it allows a firm like Google to continuously

upgrade the software, add or remove features and customize based on user feedback. In the current scenario where software is installed on device, the version of software remains the same state until a new license is purchased, thus stifling the process of continuous innovation.

In addition, SaaS also offers the possibility of passing on the elasticity of cost to the user. For instance, the software developer may offer the software on Pay as you go basis, charging the user for every usage instance rather than a lump sum fee. User is therefore given the power of multiple payment/subscription options.

All these benefits make SaaS the perfect model for mobile application deployment. Application developers can get off the ground quicker, test their services and get user feedback before they evolve a subscription model. This system gives the flexibility of trial and error at little or no cost and hence encourages more people to become a part of the ecosystem.

The biggest benefit of SaaS model can be understood in multi lingual application development. Most phones & browsers are not designed for local language support. A common problem that many developers face is that they are not able to test the translation, transliteration sufficient number of times to announce a failure proof commercial system. A local language SaaS application deployed on the ground will mean a continuous stream of inputs leading up to a refined product.

SaaS deployment however requires data connectivity and browsers on mobile, which is not available on most phones today. However, keeping future potential and benefits of such a deployment in mind, the mobile designs can be adjusted accordingly. As a matter of fact, mobile devices are already moving in the direction of larger screen sizes, better keyboards, touch screen, browser support owing to the fact that such features improve the user experience.

D) Information available in easily understood format

Multi lingual support

A critical factor in service adoption is the ease of use and the learning curve. Needless to say, the learning curve must be smaller and for this reason it is important that information is presented in the user's native language. The challenges associated with developing front end applications and backend system for multi lingual support is being looked into aggressively by firms such as Google. However, it would be easier for local players to work on this subject, primarily for two reasons. Regional firms can grasp the nuances of communication in local language better and hence develop a more comprehensive refined translation/transliteration system. Further these firms will have a better grip of regional aspirations and can develop a business model around such an initiative.



Screenshot of a mobile with Hindi support

Information processing & delivery

As discussed earlier, an important part of application development is the 'feedback loop'. Similarly information banks must keep step with rapid changes in the kind of information that is being consumed and the manner in which it is consumed.

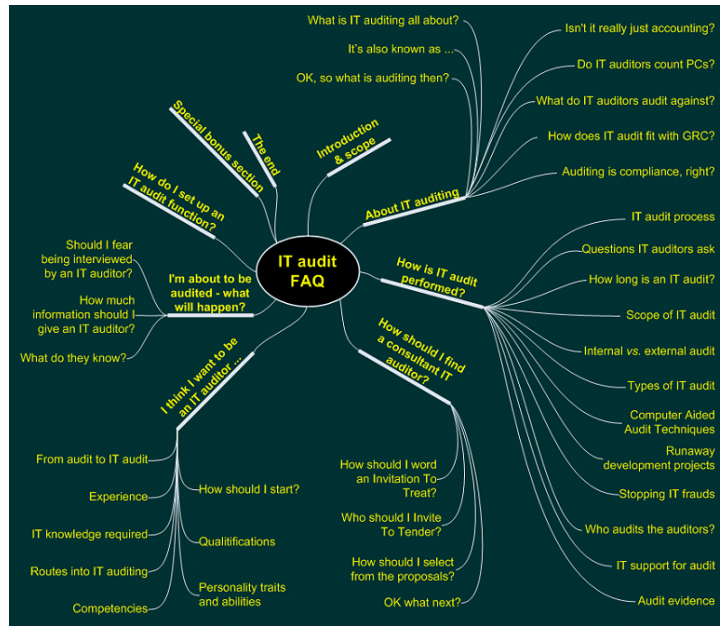
What this essentially means, is that the information gathering system has to be improved so that all possible clients are catered to. For instance, it could be possible that poems in local language are popular. In this case it is important to be able to gather the poems while suitably incentivizing the creator.

What would be an ideal case is where the poet is able to type out the poem in the local language on his mobile phone through a pre installed application, which can be transferred seamlessly to the content (information) bank from where again it can be re distributed via multiple media (website, mobile website, SMS etc) on various subscription schemes suited to the end user across the country on any operator.

Mind Mapping for information presentation

A mind map is an intuitive diagram used to represent ideas or tasks or other items linked to and arranged around a central key word or idea. Mind maps can be used to visualize ideas and use as an aid in study, organization, problem solving, decision making, and writing. Mind maps may also be used as a memory aid. The graphical, non linear manner of information arrangement encourages a brainstorming approach to planning and organizational tasks.

The concept of mind mapping can be re created as a mobile application. This kind of application can be used in schools and colleges for explaining multi dimensional concepts to students or used by business persons for clearing thoughts & framing plans.



Mind Mapping: Screenshot showing the mind mapping diagram for an IT Audit project

E) Intelligent Communication - Semantic web

This is Tim Berners-Lee, the founder of the World Wide Web's vision of the internet:

"I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web – the content, links, and transactions between people and computers. A 'Semantic Web', which should make this possible, has yet to emerge, but when it does, the day to day mechanisms of trade, bureaucracy and our daily lives will be handled by machines talking to machines. The 'intelligent agents' people have touted for ages will finally materialize."

To give an example, a person looking for some equipment is more likely to go online and search "video camera on rent" rather than "video camera on rent in Meerut". For a person, search engine itself could be a difficult concept to grasp. It is for this reason that all information searches must be context aware.

Hence, the search engine must 'pre understand' keywords such as "Meerut", "less than Rs. 2000", "wedding next week". These keywords would be picked up from calendar, emails & other information, that the user has allowed access to the search engine. A search engine such as this one will go a long way in making the user experience better.

Semantic communication

The most logical platform for delivering a semantic search engine is mobile. Mobile being primary mode of communication which is close to the consumer all the time is likely to be used for such a search service.

Add multi lingual & voice search support, and the service will be useful for almost everyone who has access to a mobile phone irrespective of the educational qualification or location.

Further, by bundling search engine with an email account, the users will have a location aware semantic communication experience. The challenges lie in making this kind of communication seamless.

Making information available in real time

An important part of information bank utilization is making information available in real time. We propose utilizing email as a media for information distribution & feedback generation. We firmly believe real time information powered by email can potentially give us the missing pieces in the puzzle which will allow us to design and develop applications that satisfy consumer needs at an appropriate price points while providing sufficient scope for up gradation & improvement at a speed faster than current levels.

3. Email Service – For Real Time Communication

Email has become the primary channel for all business communications across the world. Improved accessibility of internet (wireless or fixed line) has made email the logical alternative to fax & postal services.

Moreover, email has since long moved out of the domain of enterprise communication and made itself a must have for every student, business person and professional for private communication. Email service providers such as Gmail, Hotmail and Yahoo have realized this business opportunity by offering email services for free to the end user and earning revenues through advertisers.

How will Email benefit India?

The problem of low internet penetration in India is well known. Laying down internet infrastructure solves only a part of the problem, since last mile acceptability remains a function of equipment cost, literacy & service cost. Hence, alternative modes of making a citizen, information enabled should be looked into.

Email being almost a like replica of physical mail, can be a medium of change in India. Other than the Indian Railways, postal services have played a big hand in unifying & connecting India. Letters & postcards satisfy a basic need which we can enable at a lower cost through use of technology. Once the importance of email as a medium of fast, reliable & efficient mode is established, we can move on to make email affordable and user friendly. This will naturally require a concerted effort on the part of network operators, government agencies such as TRAI & software firms in India.

It is important that all parties are encouraged to look upon the so called 'less fortunate' citizens of developing nations as 'the next billion consumers'. This

paradigm shift will help entrepreneurs explore business opportunities where none have existed. TRAI can play its role by setting quality standards and incentivizing every initiative.

Email is a sticky media, as those who use it know. This is primarily the reason why even after so many years it is looked upon as the 'killer' internet application providing terrific opportunities to cross-sell and up-sell. We should take the lead among all developing nations to help all citizens create an email account and instead of pursuing a strategy of subsidy, we can empower everyone as customers with the right to accept or reject policies and services.

Is Email service an innovation?

One could argue that setting up an email service is not a technological challenge and current email providers ride more on brand than innovation. However, what is important to note is the focus of these firms on end user experience. Today, in India there are about 50 million email accounts in a country with 60% literacy rate. This leaves a window of opportunity for email service providers who have their ears to the ground and can match user expectations through technology. Gmail having realized this challenge started Gmail Labs feature where an add on product is delivered approx. every 2 weeks.

Why would anyone promote an Email solution?

While, from consumer perspective email allows quick, easy and generally free mode of communication, email service providers see every new account registration as an opportunity to up sell and cross sell. For instance, registration on Gmail allows users access to seemingly unrelated service such as online payment and related services such as photo sharing, social networking, chat etc.

Additionally, just like phone numbers, email ID becomes an identity which is shared with friends and relatives, making it difficult for users to shift to a new provider. This stickiness is what can be utilized for marketing, education, tele medicine, e governance, commerce and general awareness.

Email for accountability & streamlining

Email is recognized as proof of communication within enterprises. Email is understood to be media for intimation of events, assigning responsibility, reporting and communication with customers & partners. Even government bodies recognize email as a secure way for updating citizens on taxation and related issues.

We can therefore look towards a time when, every citizen by virtue of having an email account can receive public and private notices directly without being dependant on 3rd parties for printing & delivery. This will push all agencies towards being accountable & efficient and at least reduce a sense of uncertainty for the citizen.

Simplicity & affordability of email solution

Email, in India & most developing nations, is difficult to access. Some of the well understood reasons are low internet penetration and high cost of equipments. Some other issues like, infrequent electricity supply cause far greater problems and unstable communication being a small but significant one.

Another problem with email is that it does not work in end users language. Although, established firms may have the resources to customize email services for everyone, the ROI might not make it worthwhile. This opens up an opportunity for local players with better understanding of regional aspirations to evolve a business idea.

The most obvious channel for email communication in India post the wireless telecom revolution is Mobile phone. Interestingly, basic mobile services bring lesser and lesser revenue per user every month. From > Rs. 350 in Jan 2007 it has fallen to < Rs. 200 in Jan 2009. In such a scenario where voice & SMS services do not bring sizeable revenues, mobile operators are looking to sell Value Added Services.

However, to make matters more interesting, mobile number portability (MNP) is being introduced in Indian markets while MVNO services are being discussed. MNP will most likely cause churn away from operators which do not offer the best pricing, as against best services which is the norm in the rest of the world. In such, a scenario email offers a new way to the operator to bind the customer to itself. We can imagine a scenario, where a customer who has moved away from basic services might still continue to use the previous operator's email services.

Email binding, may in turn cause the original principles of operator driven VAS market to change. If today, VAS is offered to the subscriber of a particular operator, VAS would be offered to a particular email provider. This will enable operators to continue revenue streams from older customers while allowing entrepreneurs a far bigger & open platform for developing services. Ideally, the most creative & most innovative (not necessarily in terms of technology) will come out the winner.

4. Recommendations

- i) To improve the usability of SMS, TRAI can make it mandatory for all mobile phones sold in India to have regional language support or make regional language support application available for free via TRAI website.
- ii) Also, SMS communication remains an expensive proposition, with Rs. 3 being charged for premium SMS. Although premium SMS charges are a major revenue earner for the operators, they also in a way discourage usage for socially relevant and educational services.
- iii) TRAI can prepare a list of services that it considers to be of social relevance or necessary for e governance. These services can be made mandatory on all networks and publicized by TRAI and other organizations. Development of

services falling under this list can be incentivized by TRAI.

- iv) TRAI should encourage all parties in VAS ecosystem to move to open source systems to bring down development costs.
- v) Encourage development of Value Added Services based on SaaS so that the benefits of price elasticity can be transferred to the end user
- vi) Enterprises & government bodies should be encouraged to upload information on the web in Linked Data format to allow easy manipulation and use.
- vii) TRAI can work with operators to create billing system which can be used by firms who wish to promote VAS services on their own without tying up with operators. This will allow firms to innovate not just on technology front but also encourage them to come out with innovative marketing strategies, while being assured that billing will be done through a standardized and transparent system.

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