



Telecom Regulatory Authority of India



**Consultation Paper on
USSD-based Mobile Banking Services for Financial Inclusion**

New Delhi, the 20th September, 2013

Mahanagar Door Sanchar Bhawan, Jawahar Lal Nehru Marg,
New Delhi – 110002

Stakeholders are requested to furnish their written comments by 4th October, 2013 and counter-comments by 11th October, 2013 to the Advisor (F&EA), TRAI. The comments may also be sent by e-mail to manishsinha@traigov.in. Comments would be posted on TRAI's website www.traigov.in. For any clarification/information, Shri Manish Sinha, Advisor (F&EA) may be contacted at Tel. No. +91-11-23230752 Fax: +91-11-23236650.

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Chapter-I

Introduction and Background

A- Banking Services and Financial Inclusion

- 1.1. Easy access to public goods and services is essential in an open and just society. Banking services have characteristics of a public good. This is why availability of banking services to the entire population without discrimination is a major objective of public policy.

- 1.2. In India, significantly large regions and populations are still unbanked/ under-banked. Despite the expansion of the banking network over the past four decades, a sizeable proportion of households (41.3%) does not have a bank account¹. As per the Census 2011, only 54.4% of rural households had access to banking services. Purely on grounds of equity, it is essential that financial services are made available at an affordable cost to those who are presently excluded from the formal financial system. Large sections of our population would then no longer have to take recourse to borrowing funds from informal sources at usurious rates of interest. Borrowing apart, a host of other services would become available to those who currently stand deprived of such services. In a larger perspective, the expansion of banking and reach of financial services is vital for the long-term sustainable development of the country. Banks serve as intermediaries between savers and investors, channeling savings into productive investment. Without outreach to large regions and segments of our populace, the economy is deprived of capital that can create value and increase the output of goods and services.

- 1.3. The Reserve Bank of India (RBI), in its Annual Policy Statement of April 2005, urged banks to review their existing practices to align them with the objective

¹ Financial Inclusion, Department of Financial Services, June, 2013, website-<http://financialservices.gov.in/banking/Overviewofefforts.pdf>

of financial inclusion². With a view to achieving greater financial inclusion, all banks were advised to make available a basic banking 'no frills' account³ that could be operated with a nil (or very low) balance at a charge that would make such accounts accessible to vast sections of the population. In subsequent years, the Government of India and RBI have taken various initiatives to extend the reach of banking to those outside the formal banking system. As per a report⁴ of the Department of Financial Services (DoFS), some of the initiatives taken by the Government and RBI are as follows:

- (i) Opening of bank branches
- (ii) Expansion of the ATM network
- (iii) Using the Business Correspondent Model to increase the outreach of the banking sector; setting up Ultra Small Branches (USBs) through Business Correspondent Agents (BCAs)
- (iv) Each household to have at least one bank account; Direct Benefit Transfer (DBT) through bank accounts

1.4. However, there is still a long way to go before the goals of financial inclusion are realised. Anecdotal evidence suggests that many of the 'no-frills' accounts opened by banks are lying dormant as low-income households are generally reluctant to access their bank accounts; visiting the nearest bank branch means not only expenditure on transport but also the loss of a day's wages.

1.5. What are the expectations of the poor from the financial system? They are: low transaction costs, quick and easy operability, minimum paper work, security and safety of their money, the possibility of making frequent deposits and remittances and having access to credit and other products as and when required. The biggest barriers to financial inclusion in India are: (a) the poor

² Financial inclusion is the process of ensuring access to appropriate financial products and services needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost in a fair and transparent manner by mainstream institutional players.

³ Subsequently, through a circular dated 10.08.2012, RBI advised all the scheduled commercial banks excluding Regional Rural Banks (RRBs) to convert all the 'no-frills' accounts into 'Basic Savings Bank Deposit Accounts'. Source: <http://www.rbi.org.in/scripts/NotificationUser.aspx?Id=7501&Mode=0>

⁴ Financial Inclusion, Department of Financial Services, June, 2013, website-<http://financialservices.gov.in/banking/Overviewofefforts.pdf>

accessibility of banking services and (b) when accessible, the high costs incurred by households to access such services. The rural- urban divide is also glaring. While the rural population⁵ is 83.3 crore, there are only 37,953 branches of scheduled commercial banks functional in these rural areas as on 31.03.2013 – viz. a bank branch in rural India serves about 22,000 persons. On the other hand, the urban population⁶ of 37.7 crore is served by 64,390 branches – viz. there is a branch for every 6000 persons in urban India.

1.6. On the supply side, the banks find it uneconomic (and impractical) to operate a large number of tiny accounts and micro transactions. Opening even a small branch entails costs, and commercial banks may simply find this economically non-viable. The solution could lie in technology-driven service delivery models. Technology, however, has to be suitable from the point of view of affordability, accessibility, security and privacy.

1.7. Mobile telephony could be the answer to the problem. There are 87.34 crore⁷ mobile connections in the country of which 35.11 crore⁸ are in the rural areas. The fact that a large number of mobile subscribers in rural areas do not have access to banking facilities presents an opportunity for leveraging the mobile telephone to achieve the goal of financial inclusion.

B- Report of the Inter-Ministerial Group on 'Framework for Delivery of Basic Financial Services Using Mobile Phones'

1.8. The Government of India constituted an Inter-Ministerial Group (IMG) to submit a report and recommendations on the framework for delivery of basic financial services using mobile phones. The Group was headed by the

⁵ As per Census 2011 data

⁶ Source- Ibid

⁷ There were 87.34 crore mobile subscribers in the country as on 30.06.2013. Overall mobile tele-density was 71.08.

⁸ There were 35.11 crore mobile subscribers in rural areas of the country as on 30.06.2013. Rural mobile tele-density was 41.14.

Secretary, Department of Information Technology (DIT), and consisted of representatives from DoFS, Department of Telecommunications (DoT), Department of Posts (DoP), Ministry of Rural Development, Unique Identification Authority of India (UIDAI), Telecom Regulatory Authority of India (TRAI), RBI and Ministry of Home Affairs (MHA). The recommendations made by the IMG along with relevant extracts from the IMG report are in **Annexure-I**.

1.9. The framework proposed in the IMG report has been accepted⁹ as the basis for delivery of basic financial services using mobile technology by a Committee of Secretaries under the chairmanship of Cabinet Secretary in April 2010. The IMG has suggested a framework in which delivery infrastructure and processes are shared by service providers. It envisages the opening of mobile linked 'no-frills' accounts, which would be operated using mobile phones. These accounts would be held by banks and the money would be stored in the banks' accounts and not in the users' mobile phones i.e. the loss of a user's mobile phone/ SIM would not result in loss of money. The customer would be able to perform five basic transactions - cash deposit, cash withdrawal, balance enquiry, transfer of money from one mobile-linked account to another, and transfer of money to a mobile-linked account from a regular bank account. The framework also proposes compensation to the key players after taking into account the actual costs incurred by them.

1.10. The IMG Report envisages that the telecom service providers (TSPs) would provide prioritized secure communication for mobile banking and they would charge not more than Re. 1 per transaction from their subscribers viz. mobile linked 'no-frills' account holders/ BCs¹⁰. Further, as per the IMG report, banks

⁹ Reference Web-site: <http://deity.gov.in/content/government-approves-framework-provision-basic-financial-services-through-mobile-phones>

¹⁰ RBI, through its circular dated 28.09.2010, has permitted all the commercial banks to engage companies registered under the Indian Companies Act, 1956, excluding Non Banking Financial Companies (NBFCs), as BCs in addition to the individuals/entities permitted earlier, subject to compliance with the guidelines. Source: RBI, web-site: rbidocs.rbi.org.in/rdocs/notification/PDFs/CPC28092010.pdf

are not expected to make payments to the TSPs for transactions initiated by the subscribers.

- 1.11. In the framework proposed by the IMG, TRAI is a key stakeholder and is expected to provide the required regulatory framework governing the quality of service, provisioning and pricing of mobile services for delivery of basic financial services. Accordingly, TRAI is required to devise a mechanism to support the operation of market forces for ensuring that services of adequate quality are provided for mobile services at charges that are cost-oriented and reasonable.

C- Follow-up to the IMG Report

- 1.12. The follow-up action on the framework envisaged in the IMG Report, taken by the various stakeholders, is as below:
 - (i) In November, 2010, National Payment Corporation of India (NPCI)¹¹ launched Immediate Payment Service (IMPS), an instant, 24X7, interbank electronic fund transfer service through mobile phones and other channels (Internet or ATM).
 - (ii) In December, 2011, DoT allocated a USSD¹² code *99# to DoFS for mobile banking services through the USSD gateway of NPCI and asked the TSPs to connect to it as per the requirement of service in consultation with NPCI.
 - (iii) In April, 2012, TRAI issued the 'Mobile Banking (Quality of Service) Regulations, 2012', which, *inter-alia*, require that every TSP shall facilitate the banks to use SMS, USSD and IVR to provide banking services to its customers and deliver the message generated by the bank or the customer within a specified time frame.

¹¹ **National Payments Corporation of India (NPCI):** National Payments Corporation of India (NPCI) is a Section 25 Company under Companies Act aimed at creating and operating for the benefit of all the member banks and their customers a high-volume low cost infrastructure for providing payment services at fraction of the present cost structure.

¹² USSD is an abbreviation for Unstructured Supplementary Service Data.

- (iv) In November, 2012, NPCI launched a USSD Gateway (National Unified USSD Platform) for enabling mobile banking through the USSD channel.
 - (v) By July, 2013, the RBI had already permitted 78 banks to provide mobile banking services to their customers.
- 1.13. TRAI also released a Consultation Paper (CP) on 'Issues Arising out of Provisioning and Delivery of Basic Financial Services Using Mobile Phones in the Context of Pricing of Services by Mobile Service Providers' on 25.01.2011. The CP, *inter-alia*, sought comments of stakeholders on the tariff for telecom services used for providing financial services over a mobile phone. This CP discussed the overall question of tariff fixation for financial services using mobile phones on all varieties of communication channels. The issues connected with the use of the USSD channel were not specifically raised in the CP.
- 1.14. In the meanwhile, a communication dated 19.06.2012 was received from DoFS stating that the high charges for USSD service by TSPs was a major constraint to the widespread use of USSD for mobile banking. Since USSD is a very convenient means of communication for all, the DoFS suggested that TRAI intervene and stipulate a tariff of 25 paise per transaction for USSD based transactions so that the costs of mobile banking become affordable to the under-privileged and financial inclusion is realised.
- 1.15. In view of the communication from DoFS, the Authority constituted a Group of Officers led by Secretary, TRAI, which held meetings with all the various stakeholders viz. TSPs, DoFS, banks and NPCI from August, 2012 to June, 2013. Although 9 rounds of meetings were held, the banks and TSPs were unable to reach agreement as to the business model to be adopted for mobile banking using USSD. The views that emerged out of these meetings will be discussed in the following chapter.

D- The Present Consultation Paper

1.16. In this backdrop, the present Consultation Paper discusses various issues and seeks stakeholder comments on devising a tariff framework for telecommunication services using USSD for delivery of basic financial services through the mobile phone.

Chapter-II
Devising a Tariff Framework for use of USSD for Mobile
Banking Service

2.1. This chapter begins with a discussion of the benefits of mobile banking for unbanked/ under-banked citizens and preferred communication modes for mobile banking for such citizens. It then attempts to identify an optimal business model and tariff framework for delivery of basic financial services using the preferred communication mode.

A- Mobile Banking Services

2.2. Mobile banking involves the use of a mobile phone or other mobile devices to conduct banking transactions. As per the extant guidelines of RBI, banks that are licensed, supervised and have physical presence in India, are permitted to offer mobile banking services. Mobile banking policies in India aim to enable funds transfer from an account in any bank to any other account in the same or any other bank (inter-operability) on a real time basis irrespective of the mobile network the customer has subscribed to. It is imperative that the method used for mobile banking should be secure and should ensure confidentiality, integrity, authenticity and non-repudiability.

2.3. The provision of mobile banking to the unbanked/ under-banked population could be the quickest way to achieve the goal of financial inclusion. On the demand side, mobile banking will make banking products and services affordable and immediately accessible. On the supply side, mobile banking would be cost effective; it would save costs of providing physical access (bricks and mortar) and become a viable economic proposition for banks to handle small value transactions made by low-income citizens.

B- Stakeholders in the eco-system for mobile banking

2.4. Stakeholders who have an important role to play in mobile banking for financial inclusion are the following:

- (i) **RBI:** RBI has been pursuing the goal of financial inclusion as a necessary condition for sustaining equitable growth. RBI has introduced several measures such as 'no-frills' accounts with simplified KYC norms, 100% financial inclusion drive, the Business Correspondent (BC) model etc.
- (ii) **Banks:** Banks provide different types of financial services to customers. These institutions are important stakeholders as they are currently responsible for opening and maintaining 'no-frills' accounts.
- (iii) **TSPs:** The TSPs have a crucial role as the wireless telephony infrastructure created by them can provide the communication channel for mobile banking.
- (iv) **Citizen:** The citizen is the most important stakeholder in the entire system. Today, a citizen having a mobile phone and a bank account can access various banking services (including inter-bank fund transfer) if his bank has mobile banking infrastructure and his TSP allows him to access the bank's infrastructure through the TSP's network resources. Mobile banking would help to draw more and more of the presently unbanked/ under-banked population into the banking fold. Citizens would be facilitated in depositing, transferring and withdrawing money to and from remote locations in the country at a vastly lower cost.

C- Preferred communication modes for mobile banking for financial inclusion

2.5. Mobile banking services can be deployed using any of the following communication modes:

- (i) Interactive Voice Response (IVR)
- (ii) Short Messaging Service (SMS)
- (iii) Wireless Access Protocol (WAP)
- (iv) Stand-alone Mobile Application Clients (Mobile Apps)
- (v) Unstructured Supplementary Service Data (USSD)
- (vi) Using SIM tool Kit (STK)

2.6. **Annexure-II** presents a brief description of the afore-mentioned communication modes.

2.7. While any of the communication modes listed in para 2.5 above can be deployed for mobile banking services, some are better suited for financial inclusion. Mobile banking for higher-end urban customers is more in the nature of a value added service. They already have multiple ways of accessing bank accounts and services viz. bank branches in the neighborhood, ATMs and Internet banking. Some are familiar with the use of downloaded applications on their mobile phones. They not only have access; technology has made that access easier, more convenient and cheaper.

2.8. From a financial inclusion perspective, the target groups are those who currently do not have access to banking services, or for whom such access is unaffordable. These target groups are likely to be low-income, semi-literate and with limited knowledge of technological applications. They would, however, be mobile phone users who are able to read simple menus and use simple applications that are an integral part of the phone. To begin with, such consumers would prefer a mode for mobile banking which is user friendly (viz.

menu driven but without the need to download software etc.), has a low cost of operation (viz. cost per transaction) and does not require any significant investment (viz. requirement of a high-end phone instrument).

2.9. The following table presents a comparison of the various communication modes that can be used for mobile banking:

Table-2.1
Comparison of Various Modes of Mobile Banking

S. No.	Mode	Handset Requirement	Cost per transaction	Ease with which the service can be provided to the subscriber
1	IVR	Any phone	High	The subscriber is automatically enabled to use these modes; there is no need for any separate provisioning.
2	SMS	Any phone	Medium	
3	USSD	Any phone	Medium	
4	WAP	GPRS enabled phone	Low	The TSP is required to enable the services for the subscriber.
5	Mobile Apps	Smart phone	Medium	The subscriber may have to download an application on his mobile phone.
6	STK	Pre-programmed phone	Medium	The TSP is required to change/program the SIM of the subscriber.

2.10. As can be seen in the above table, IVR, SMS and USSD score high against the yardsticks of ease of provisioning, overall affordability and availability across all mobile handsets. These features make IVR, SMS and USSD eminently suitable communication modes for providing banking services for financial inclusion. Considering these factors, the Authority, through the Mobile Banking (Quality of Service) Regulations, 2012 dated 17.04.2012 has, *inter-alia*, mandated that every access provider, acting as a bearer, shall facilitate

the banks to use SMS, USSD and IVR to provide banking services to its customers.

2.11. Of the three preferred modes for mobile banking, banks have deployed the IVR channel for services like balance enquiry, mini-statement, cheque-book request and complaint booking and not for the full-suite of mobile banking services, as the human interface in IVR exposes the system to the potential risk of misuse and the cost of operation is also high. However, SMS and USSD have been deployed for a wider range of services by most banks that have implemented mobile banking services.

2.12. Both SMS and USSD travel on inexpensive signaling channels¹³ and, therefore, they are cost-efficient tools for messaging from the perspective of TSPs. The following table presents a comparison of the features of USSD and SMS:

Table-2.2
Comparison of the features of USSD and SMS

S. No.	Features	USSD	SMS	Suitability for Mobile Banking
1	Use of signaling channels	Yes	Yes	Both USSD and SMS are inexpensive modes.
2	Type of functionality	<p>USSD is real-time and session oriented.</p> <p>USSD service can involve a menu-based continuous session.</p>	<p>SMS uses a store-and-forward technique to deliver text messages.</p> <p>SMS service is of single instance type and cannot involve continuous session.</p>	USSD offers a better customer experience for mobile banking because it is interactive (menu based) and allows real-time transactions.
3	Average duration for exchange of each message	2 second	7 second	USSD provides faster response to the customers.

¹³ Mobile Networks use a variety of channels in which the information is carried. There are two main types of dedicated channels viz. traffic channels and signaling channels. The traffic channels carry voice and data traffic. On the other hand, signaling channels are used for call set-up, maintenance of call etc. and also to carry SMS and USSD messages.

4	Message storage in mobile	Messages are of flash type and cannot be stored.	Messages are stored in the handset.	In case of USSD based transactions, there is no potentially risk of misuse of MPIN as the messages are not stored in the handset.
5	Ease of Use	Subscriber does not have to create a message. It is as simple as dialing a telephone number from a contact list.	Subscriber needs to type the message and then send it.	USSD is superior in terms of ease of use.

2.13. From the analysis presented in tables 2.1 and 2.2, USSD clearly appears to be one of the most appropriate modes for mobile banking for financial inclusion. It may be noted that in view of the usefulness of the USSD channel, the DoFS in its letter dated 19.06.2012 had requested TRAI to fix a tariff for USSD based mobile banking transactions.

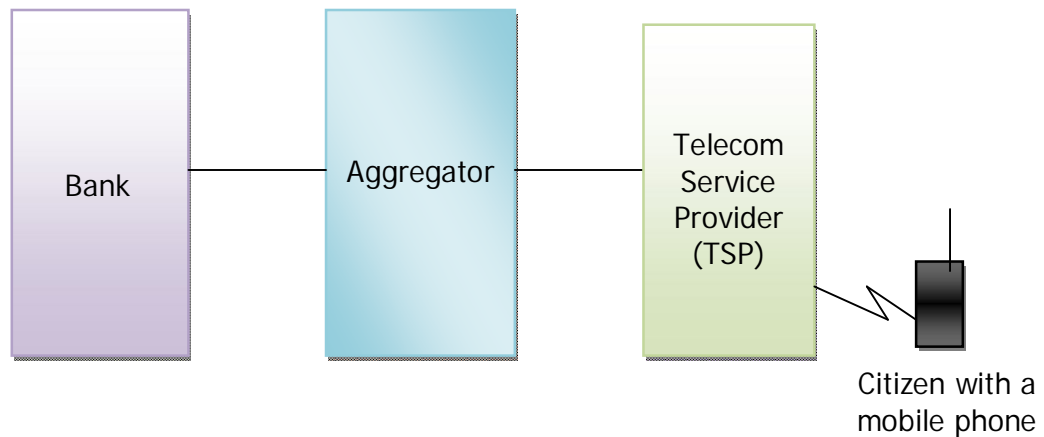
Issue for Consultation:

Q1: Do you agree that USSD is one of the most appropriate modes for mobile banking for financial inclusion? If not, which mode do you think is more appropriate? Please support your viewpoint with reasons.

D- USSD based implementations of mobile banking in India

2.14. Some banks in India, such as State Bank of India (SBI) and ICICI Bank have already launched USSD based mobile banking services. While the subscribers of Airtel, Idea, Vodafone, Aircel and MTNL can use the banking services of SBI through USSD code *595#, the subscribers of Vodafone, Idea, Aircel, MTNL, Reliance and Tata Docomo can access the banking services of ICICI Bank through USSD code *525#. The schematic diagram below depicts these deployments:

Diagram-2.1
Implementation of Mobile Banking by SBI and ICICI



2.15. An entity generally referred to as an 'Aggregator' compiles (aggregates) the mobile banking transactions of the TSPs and acts as a mobile banking solution provider to the bank. In the case of USSD based mobile banking, it can also provide equipment and services to the TSPs who do not own the necessary infrastructure e.g. USSD gateway and capability of generating Call Data Records (CDRs) for USSD transactions. In all the afore-mentioned mobile banking solutions, the TSPs charge their subscribers for USSD transactions on a pay-per-use basis viz. the underlying model is Business-to-Consumer (B2C).

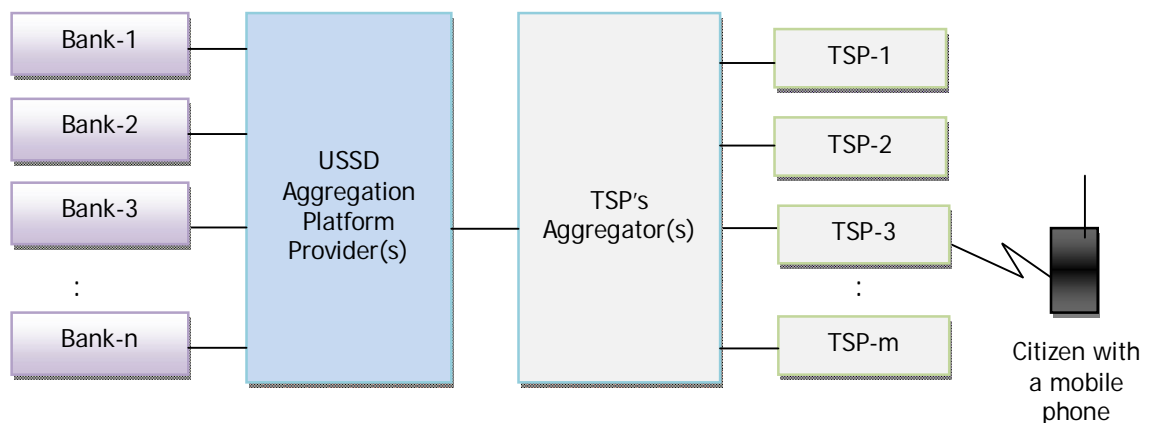
2.16. The use of USSD based mobile banking by SBI and ICICI Bank is at present limited to the provision of value added banking services to their existing customers. These mobile banking solutions are not designed to meet the objective of providing banking services to the unbanked/ under-banked population i.e. financial inclusion. The implementation depicted in the above diagram appears to sub-optimal for the following reasons:

- (i) The mobile subscribers of only a select few TSPs can presently access the mobile banking services of a particular bank.

- (ii) In case the customer has accounts in more than one bank, he needs to remember separate USSD codes for each bank for mobile banking transactions.
- (iii) If another bank wants to offer mobile banking services, it would have to make arrangements to connect to each TSP. In this way, there would be the need for separate one-to-one connectivity between each bank and TSP.

2.17. These problems can be addressed by creating a common platform to connect banks and TSPs, through which all interested banks can provide USSD-based mobile banking services to their customers. One such platform viz. National Unified USSD Platform (NUUP) has been attempted by NPCI, under the aegis of the RBI and with the support of the public sector banks, which has the potential to bring banks that have permission to offer mobile banking and GSM TSPs on to one platform for facilitating USSD based mobile banking. The creation of common aggregation platforms to connect several banks and TSPs can simplify USSD based mobile banking. The following schematic diagram depicts an implementation through a USSD aggregation platform provider such as NPCI.

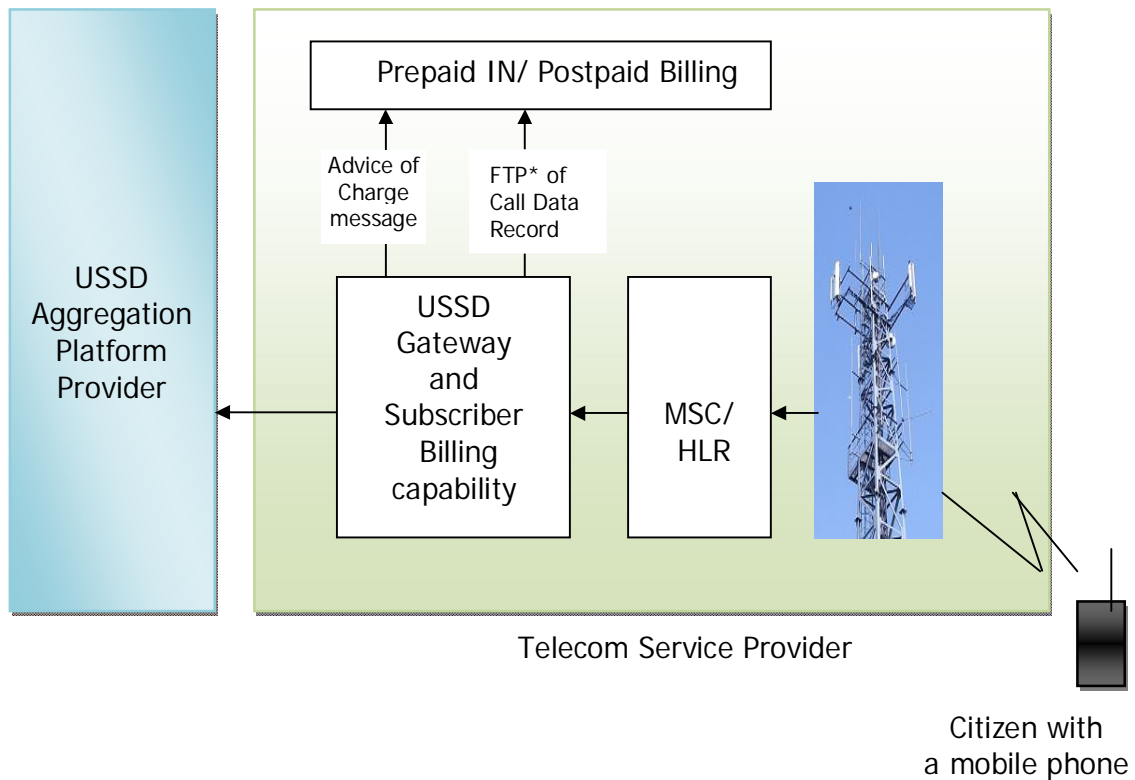
Diagram 2.2
USSD based Mobile Banking
through a USSD Aggregation Platform Provider



E- Capabilities Required by TSPs to Connect to a USSD Aggregation Platform Provider

2.18. In order to connect to any USSD aggregation platform provider, a TSP, typically, requires a USSD Gateway and the capability to bill its subscribers for USSD transactions. The following diagram depicts the manner in which a TSP can route the USSD traffic originated by its subscribers to a USSD aggregation platform provider:

Diagram 2.3
Routing of USSD Traffic to the USSD Aggregation Platform Provider



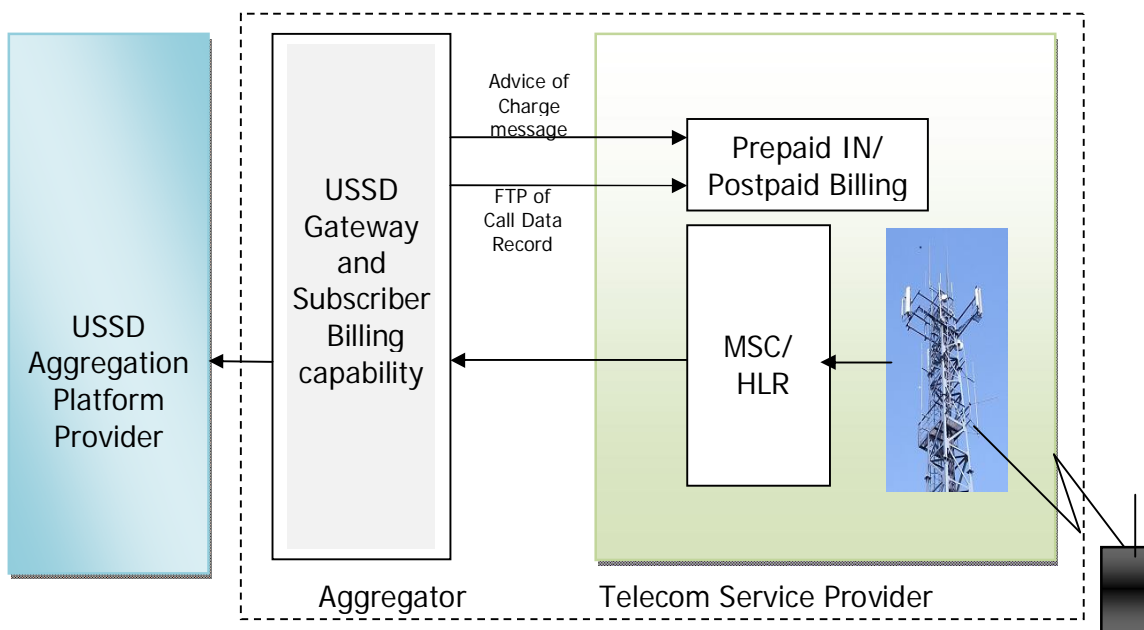
* FTP is an abbreviation of File Transfer Protocol. It is a standard network protocol used to transfer files from one host to another host over a TCP-based network, such as the Internet.

2.19. As depicted in the above diagram, when a mobile subscriber dials the USSD code viz. *99#, the request from the subscriber reaches the USSD Gateway which then routes the message to the USSD aggregation platform provider.

2.20. The Mobile Switching Center (MSC) of the TSPs has the capability of generating CDRs which are required for billing the subscribers for voice calls. However, the MSC cannot presently generate CDRs in case of USSD transactions. In order to ensure that the subscribers are suitably billed for the USSD transactions they make, the TSPs make use of the USSD platform (comprising the USSD Gateway and subscriber billing capability). The USSD platform sends on-line Advice of Charge (AOC) during a USSD session to the IN/ Billing system and can also send CDRs of each USSD session on a periodic basis through File Transfer Protocol (FTP), which would address issue of billing subscribers.

2.21. In order to provide the USSD channel, a TSP can choose to own the USSD platform comprising the USSD Gateway and subscriber billing capability as depicted in the Diagram 2.3 above. The TSP can also outsource the USSD platform to a third party such as an aggregator. Diagram 2.4 depicts routing of USSD traffic to an aggregator who, in turn, routes such traffic to the USSD aggregation platform provider.

Diagram 2.4
Routing of USSD Traffic to the USSD Aggregation Platform Provider
through an Aggregator



2.22. In the USSD based mobile banking solutions devised by SBI and ICICI Bank, the connectivity between the TSPs and banks is generally through a secure communication e.g. https¹⁴through the Internet or SMTP. Sending USSD transactions using a secure communication on the Internet such as https is cost effective and it is easy and quick to roll-out services. However, it is possible that the bank(s) and/ or aggregation platform provider(s) may seek leased line connectivity in place of https on the Internet. In such cases, it is only logical that the bank(s) and/ or aggregation platform provider(s) take the responsibility for provisioning and maintaining such connectivity and bearing the cost thereof.

F- Which entities should be allowed to connect to the TSPs for Mobile Banking?

2.23. As discussed in para 2.17 above, utility of mobile banking as a means of financial inclusion can be greatly enhanced by creating a common platform (for aggregation of mobile banking transactions) to connect banks and TSPs, through which all interested banks can provide USSD based mobile banking services to their customers. To enable aggregation platform providers to assume their role in the delivery model, it is necessary that they are able to establish a connection with the network of the TSPs.

2.24. The Mobile Banking (Quality of Service) Regulations, 2012 issued on 17.04.2012, *inter-alia*, mandates that every TSP, acting as bearer, shall facilitate the banks to use SMS, USSD and IVR to provide banking services to its customers. Since aggregation platform providers would act as agents of the banks in building a platform for bringing the banks and TSPs together, the TSPs would need to facilitate not only the banks but also the banks' aggregation platform providers to connect for use of the communication channels such as IVR, SMS and USSD. The Mobile Banking (Quality of Service) Regulations, 2012 would have to be amended for mandating every

¹⁴ https is an abbreviation of Hypertext Transfer Protocol Secure. It is a communications protocol for secure communication over a computer network such as the Internet.

TSP, acting as bearer, to facilitate not only the banks but also the agents of banks acting as aggregation platform providers to use SMS, USSD and IVR to provide banking services to its customers.

Issue for Consultation:

Q2: Do you agree that the Mobile Banking (Quality of Service) Regulations, 2012 should be amended for mandating every TSP, acting as bearer, to facilitate not only the banks but also the agents of banks acting as the aggregation platform providers to use SMS, USSD and IVR to provide banking services to its customers? Please support your viewpoint with reasons.

G- Who should the TSPs charge for providing communication services for mobile banking to their subscribers?

2.25. As discussed in the Chapter-I, the IMG Report envisages that the TSPs shall provide prioritized secure communication for mobile banking and would charge not more than Re. 1 per transaction from their subscribers viz. mobile linked 'no-frills' account holders/ Business Correspondents. Further, the banks are not expected to make payments to the TSPs.

2.26. Clearly, the IMG has recommended a business to customer (B2C) pricing model in which the TSPs levy a cost-oriented tariff on their subscribers for using communication services for mobile banking. It is pertinent to note that, in the case of the USSD based mobile banking solutions by SBI and ICICI Bank, the TSPs charge their subscribers on a pay-per-use basis.

2.27. During the interactions of TRAI with the TSPs, DoFS, banks and NPCI, it was contended by some TSPs that the banks should compensate them for providing communication channels for mobile banking services i.e. there should be a Business-to-Business (B2B) pricing model. On the other hand, the

DoFS and the banks pressed for a B2C pricing model in which the TSPs collect charges directly from their subscribers upon usage.

2.28. In the mobile banking solutions provided by SBI and ICICI Bank, the TSPs have taken the help of aggregators for provisioning of the USSD Gateway and subscriber billing capability. In these models, the TSPs collect charges from their subscribers and pay a portion of the charges so collected to their aggregators for services rendered by the latter.

2.29. From Diagram 2.2, it can be clearly seen that there are three important groups of players in the mobile banking value chain viz.

- (i) TSPs and their aggregator(s), if any
- (ii) Banks and the USSD Aggregation Platform Provider(s) e.g. NPCI
- (iii) Citizens i.e. subscribers of TSP and customers of banks

2.30. All the parties in the value chain viz. citizens, TSPs, aggregators, application platform providers and banks are likely to gain from their participation in the delivery model. Citizens would benefit with easy access to banking facilities and the financially excluded would be drawn into the coverage of the banking system. The TSPs would derive revenues through charges levied for delivery of messages. The aggregators on either side would be reimbursed by their respective principal viz. banks in the case of aggregation platform providers and TSPs in the case of their aggregators. Banks would save on costs of servicing their customers through traditional means such as bank branches, ATMs etc.

2.31. It is evident that the core relationship in this value chain for mobile banking is that between the bank and the citizens as customers of the banks. The TSPs perform the critical function of USSD message delivery in this value chain. Hence, it has to be ensured that they are compensated adequately for the work done by them, either by the banks who provide the banking service or by the citizens who use the banking services. Any one of the following methods for compensating the TSPs would make economic sense:

- (i) The TSPs collect charges from the subscriber for every USSD session (B2C pricing model)
- (ii) The TSPs collect charges from the banks for every USSD session (B2B pricing model)

2.32. However, the prescription of an appropriate pricing model for mobile banking for financial inclusion should be viewed in the light of the following facts:

- (i) The IMG Report has recommended that the user of USSD based mobile banking i.e. Business Correspondent/ mobile linked 'no-frills' account holder should compensate the TSP for the service.
- (ii) In the case of USSD based mobile banking solutions provided by various banks in India, subscribers are charged by the TSPs on a pay-per-use basis.
- (iii) TSPs collect charges from subscribers in case of SMS-based and Application (App) based mobile banking.
- (iv) If users (subscribers) do not pay for the USSD transactions initiated by them, it may have the perverse effect of encouraging overuse/misuse of the service.

2.33. In light of the above facts, it can be argued that subscribers should pay for the USSD transactions for mobile banking.

Issue for Consultation:

Q3: Do you agree that in the case of USSD transactions for mobile banking, TSPs should collect charges from their subscribers as they do in the case of SMS-based and Application (App) based mobile banking? Please support your viewpoint with reasons.

H- Billing for USSD Transactions

2.34. During the interactions of the group of officers constituted by TRAI with the TSPs, some of the TSPs expressed their inability to bill their subscribers for the use of USSD services. They contended that the billing system for USSD services is currently not available; in order to provide USSD-based mobile banking services based on the B2C model, all TSPs would have to put in place new billing systems in order to charge their subscribers which would amount to a sizeable investment for the TSPs.

2.35. At present, the TSPs in India have devised the following methods for billing their subscribers for USSD sessions:

- (i) During a USSD session, the USSD platform comprising the USSD Gateway and subscriber billing capability (available with the TSP himself or provided by the TSP's aggregator) sends an on-line AOC message to the Intelligent Network (IN)/ billing system of the TSP. It can also send CDRs to the billing system of the TSP on a periodic basis through FTP. On the basis of these messages, the TSP can debit the account balance of the prepaid subscribers and generate bills for the post-paid subscribers.
- (ii) Some TSPs send an SMS to subscribers after completion of each USSD session. Upon delivery of the SMS to the subscriber, he is charged for the USSD session.

2.36. It is important that the records (such as CDRs) for USSD-based mobile banking transactions are generated and stored in order to provide an audit trail for amounts deducted from prepaid subscribers and bills raised to postpaid subscribers.

Issue for Consultation:

Q4: Do you agree that records for USSD transactions must be generated by the TSPs to provide an audit trail for amounts deducted from prepaid subscribers and bills raised to postpaid subscribers? Please support your viewpoint with reasons.

I- How much should be charged for a USSD session?

2.37. As mentioned in the Chapter-I, DoFS had suggested that TRAI stipulate a tariff of 25 paise per transaction for USSD based transactions so that the costs of mobile banking become affordable to the under-privileged and financial inclusion is realised. However, the TSPs during interactions, have argued that the tariff for USSD transactions for mobile banking needs to be pegged at a reasonable level to compensate them for the investment that they would have to make for augmenting their infrastructure for offering mobile banking services on a mass scale. On the other hand, the banks have contended that, in the initial years, the volume of USSD transactions for mobile banking would not be so high as to require any significant investment in the infrastructure except for the requirement of setting up USSD Gateways and associated equipment; besides, all major TSPs are already facilitating USSD-based mobile banking services of SBI and ICICI Bank.

2.38. In the USSD-based mobile banking solutions already deployed in the country, subscribers are charged on a pay-per-use basis i.e. a fixed amount is charged from the subscriber for each USSD session regardless of the duration of the session.

2.39. Similar to an SMS message, a USSD message travels over an inexpensive signaling channel, unlike a voice call which travels over traffic channel. In the tariff plans offered by the TSPs, the current prevalent tariff for an ordinary SMS is Re. 1 per SMS in case of a local SMS and Rs. 1.50 per SMS in case of a

national SMS. It may be noted, however, that the SMS tariff is message based i.e. it is the charge for a single message, whereas the USSD tariff is session based. A single USSD session may consist of multiple steps.

2.40. Nonetheless, it is seen that in the case of mobile banking solutions of SBI and ICICI Bank, the tariff for an USSD session is in the range of Re.1.00 to Rs. 1.50 per USSD session.

2.41. In light of the above, it would seem logical to fix a ceiling tariff of Rs. 1.50 per USSD session for mobile banking.

Issues for Consultation:

Q5: Would it be appropriate to fix a ceiling of Rs. 1.50 per USSD session for mobile banking? Please support your viewpoint with reasons.

Q6: In case your response to Q5 is in the negative, please suggest an alternative methodology to fix a ceiling tariff for a USSD session for mobile banking. You may also support your viewpoint with a fully developed model with associated assumptions, if any.

J- Other Issues Related to USSD Based Mobile Banking

2.42. The TSPs, during discussions, have contended that the commencement of mobile banking services would inundate their call centers with complaints relating to banking services which they would not be in a position to handle.

2.43. It is worth mentioning that such issues have not been reported in the case of SMS/ USSD transactions taking place in the mobile banking solutions by SBI and ICICI Bank. The experience with Internet banking also suggests that customers reach out to their banks in case of failed transactions or on banking related matters.

2.44. In this regard, the Mobile Banking (QoS) Regulations, 2012, *inter-alia*, require the TSPs, acting as bearers, shall ensure that messages such as USSD and SMS are delivered within a stipulated time frame. Apart from this requirement from the TSP, the responsibility for making the transaction successful reposes with the banks and it is the bank that has to handle all customer complaints related to mobile banking transactions.

2.45. It, therefore, seems that there is no imminent threat of an inordinate increase in the number of customer complaints to TSPs for mobile banking services. It would appear to be a misplaced concern.

Issue for Consultation:

Q7: Is there any other relevant issue which should be considered in the present consultation on the use of USSD as a bearer for mobile banking services?

Chapter-III

Issues for Consultation

It may please be noted that answers/ comments to the issues given below should be supported with justification. The stakeholders may also comment on any other issues related to the use of Unstructured Supplementary Service Data (USSD) as a bearer for mobile banking services, along with all necessary details.

Q1: Do you agree that USSD is one of the most appropriate modes for mobile banking for financial inclusion? If not, which mode do you think is more appropriate? Please support your viewpoint with reasons.

Q2: Do you agree that the Mobile Banking (Quality of Service) Regulations, 2012 should be amended for mandating every TSP, acting as bearer, to facilitate not only the banks but also the agents of banks acting as the aggregation platform providers to use SMS, USSD and IVR to provide banking services to its customers? Please support your viewpoint with reasons.

Q3: Do you agree that in case of USSD transactions for mobile banking, the TSPs should collect charges from their subscribers as they do in the case of SMS based and Application (App) based mobile banking? Please support your viewpoint with reasons.

Q4: Do you agree that the records for USSD transactions must be generated by the TSPs to provide an audit trail for amounts deducted from prepaid subscribers and bills raised to postpaid subscribers? Please support your viewpoint with reasons.

Q5: Would it be appropriate to fix a ceiling of Rs. 1.50 per USSD session for mobile banking? Please support your viewpoint with reasons.

- Q6: In case your response to Q5 is in the negative, please suggest an alternative methodology to fix a ceiling tariff for USSD session for mobile banking. You may also support your viewpoint with a fully developed model with associated assumptions, if any.
- Q7: Is there any other relevant issue which should be considered in the present consultation on the use of USSD as a bearer for mobile banking services?

List of Acronyms

S. No.	Acronym	Expansion
1	AOC	Advice of Charge
2	ATM	Automated Teller Machine
3	B2B	Business-to-Business
4	B2C	Business-to-Customer
5	BCAs	Business Correspondent Agents
6	BCs	Business Correspondents
7	CDMA	Code Division Multiple Access
8	CDRs	Call Data Records
9	DCC	Direct Client-to-Client / Data Care Corporation
10	DeitY	Department of Electronics & Information Technology
11	DIT	Department of Information Technology
12	DoFS	Department of Financial Service
13	DoP	Department of Posts
14	DoT	Department of Telecommunications
15	FI	Financial Institutions
16	FTP	File Transfer Protocol
17	GSM	Global System for Mobile Communication
18	IMG	Inter Ministerial Group
19	IMPS	Immediate Payment Service
20	IN	Intelligence Networks
21	INFAST	Interoperable Infrastructure for Accounting Small Transactions
22	IVR	Interactive Voice Response
23	KYC	Know Your Customers
24	MHA	Ministry of Home Affairs
25	Mobile Apps	Mobile Applications
26	MoRD	Ministry of Rural Development
27	m-PIN	Mobile Personal Identification Number
28	MSC	Mobile Switching Center
29	MSPs	Mobile Service Providers
30	MTNL	Mahanagar Telephone Nigam Limited

31	NBFCs	Non-Banking Financial Companies
32	NPCI	National Payment Corporation of India
33	NUUP	National Unified USSD Platform
34	POS	Point of Sale
35	QoS	Quality of Service
36	RBI	Reserve Bank of India
37	SBI	State Bank of India
38	SLBC	State Level Bankers' Committee
39	SMS	Short Message Service
40	SMS-MT	Short Messaging Service - Mobile Terminating
41	STK	SIM Tool Kit
42	TRAI	Telecom Regulatory Authority of India
43	TSPs	Telecom Service Providers
44	UID	Unique Identification
45	UIDAI	Unique Identification Authority of India
46	USBs	Ultra Small Branches
47	USSD	Unstructured Supplementary Service Data
48	VLR	Visitors Location Registry
49	WAP	Wireless Access Protocol
50	WML	Wireless Mark-up Language
51	XML	Extensible Mark-up Language

**Recommendations of Inter Ministerial Group and Relevant Extracts from
its Report**

A. Recommendations of IMG

The following are the recommendation of the Inter Ministerial Group (IMG):

1. Mobile linked no-frills accounts will be created by the banks. The mobile linked no-frills accounts will have daily and monthly transaction limits. The basic financial transactions on these accounts (cash deposit, credit customer's mobile linked no-frills account, cash withdrawal, peer to peer transfer & balance inquiry) can be executed through a mobile based m-PIN system using mobile banking POS or through a biometric based system using micro ATMs of the BCs (or sub-agents of BCs).
2. The current RBI guidelines on technology and security standards for mobile banking as well as the guidelines for ensuring authenticity of the BCs are sufficient and will be applicable to these mobile linked no-frills accounts.
3. The following common infrastructure will need to be created to enable real time transaction processing, to ensure interoperability and to reduce costs.
 - a. An account mapper that provides linkages between UID No, mobile number and the mobile linked no-frills account
 - b. An interoperable central payments switch that will facilitate real time transaction routing amongst BCs (or sub-agents of BCs), Banks (or associated FIs and outsourcing partners of Banks), UIDAI, account mapper and mobile service providers
 - c. Interoperable repositories at the national level for hosting and managing mobile linked no-frills accounts that may be created and managed by

independent third party service providers / organisations on behalf of the participating banks. Present RBI guidelines on outsourcing of financial services by banks permit banks to outsource data processing and back office related activities. The sharing of IT infrastructure for account maintenance for scaling up operations as envisaged above would be in line with such permissible outsourcing arrangements and should also facilitate inter-bank settlement. However, this would be subject to the banks adhering to extant outsourcing guidelines and the RBI guidelines on customer data confidentiality.

4. In the interim period, mobile linked no-frills accounts may be opened by banks as per the existing guidelines on “no-frills” accounts. Mobile linked no-frills account services will be made available on the existing “no-frills” accounts. Access to these mobile linked no-frills accounts may be provided to the citizens on mobile devices through a PIN based mechanism.
5. RBI may constitute a committee with key stakeholders to create a simplified common template for the KYC requirements for the mobile linked no-frills accounts, based on the norms and associated verification procedures evolved by UIDAI, which will be shareable across service providers. Till such guidelines are finalized, the KYC requirements of “no-frills” accounts should remain applicable on the mobile linked no-frills accounts.
6. A committee comprising of members from RBI, TRAI and DoT may be constituted to lay the standards for the m-PIN based mobile banking POS.
7. MSPs must provide prioritized services with respect to these transactions. The charges levied in this regard should be regulated by TRAI and through competitive market forces to ensure that they sufficiently cover costs incurred for secure communication without resulting in inordinate profits. A committee constituted by TRAI may also draw up guidelines to ensure high availability of

associated communication services. TRAI should resolve all issues arising out of the provisioning and pricing of such services by the MSPs.

8. To promote adoption, Government payments under various schemes will be directly credited to these mobile linked no-frills accounts once the citizen registers the mobile linked no-frills account with the Government agency providing such benefits.
9. A compensation based incentive system for all players is needed for effective implementation.
10. RBI could revise the following guidelines with respect to BCs (and subagents of BCs) of mobile linked no-frills accounts
 - a. The stipulation that the BC or his sub-agent should be within 30 Km distance of a branch of the sponsoring Bank may be relaxed in cases where there is no branch of any Bank within a 30 km distance. The IMG notes that extant RBI guidelines on BC model provide for such relaxations only after consideration by the DCC/SLBC on merits "in respect of under-banked areas or where the population is scattered over large area and where the need to provide banking services is imperative but having a branch may not be viable, keeping in view the ability of the base branch of the bank making the request to exercise sufficient oversight on the BC." Given the fact that provision of banking services to every citizen is now a national priority, the IMG recommends that RBI consider a general relaxation of the 30 km stipulation for all such cases where there is no branch of any bank within a 30 km distance.
 - b. Organizations allowed to act as BCs may be allowed to act as BCs of one or more banks in different locations. However, the individual subagents interfacing with the customer would be associated only with one bank, which has appointed the BC (who in turn has appointed the subagent) with regard to opening of mobile linked no-frills account. This bank will be known as the sponsoring/holding bank of the BC/sub-agent.

- c. The sub-agents of BCs would be able to carry out basic banking transactions (except opening of the Bank account) for all banks and not be limited to the bank which has appointed the BC who in turn has appointed the sub-agent.
11. "For-profit" corporate entities should be allowed to become BCs of the banks. However, the IMG recognizes that the current RBI guidelines do not allow such a facility nor is RBI in favor of permitting the same. It nevertheless recommends that RBI may consider allowing "for-profit" corporate entities to become BCs of the banks since in the model being proposed by the IMG, the BC does not have custody of the customer's funds in his account even momentarily. Hence there would be no dilution of the role of the banks in this model even if "for-profit" corporate entities were to become BCs.
 12. The IMG report provides indicative figures with respect to the compensation for each player involved in implementation of the model, keeping in view the costs likely to be incurred by the player in completion of activities / transactions under this model. This could serve as the basis for initial assessment and apportionment of transaction fees to be levied to get the system started.
 13. RBI may constitute a committee with necessary representation from DIT, UIDAI, MoRD and DoT, among others, to ensure transparency and fair play in the operations under this framework as well as to ensure that these operations remain viable for all stakeholders and do not get skewed in favour of a single stakeholder or a group of stakeholders. This committee would also review the transaction fees payable to different stakeholders under this model from time to time based on experiential information.

B. Indicative Process for Execution of Five Basic Transactions

Services/ Players	A/c Opening	Deposit	Withdrawal	Transfer / Remittance	Balance Enquiry
BC with a network of subagents	Compensation to at least cover marketing and management costs	Compensation to at least cover deployment and management of sub-agents network, cash management costs, which will include cost of maintaining 100% coverage for all transactions, adequate liquidity to avoid running out of cash at the sub-agent retail outlet as also the costs of secure movement of cash from remote retails outlets to the Bank			None
Individual BCs / Sub-agents of BCs	Compensation to at least cover KYC, customer education costs	Compensation to at least cover cash management costs, which will include cost of maintaining 100% coverage for all transactions, adequate liquidity to avoid running out of cash at the BC retail outlet as also the costs of secure movement of cash from remote outlets to the Bank.			Compensation to cover transaction costs
Bank	Interest Income				
Technology Provider	Build, develop and maintain the front-end applications for the Banks, train the BC interface the application with INFAST / Bank server, resolve interface issues and application-related problems				
MSP	Collects and retains service fee for connectivity, Secure mobile based communication, Security etc. Charges should not differentiate between "Home" BC Network and others				
ONFAST	Opex from Banks derived on the basis of number of A/cs managed / transactions				
REMIT /NPCI	Opex from Banks derived on the basis of number of transactions executed				
Account Mapper	Opex from Banks derived on the basis of number of transactions executed				
UIDAI	May charge fee from Bank, MSPs etc. for sharing KYC	May charge fee from Banks for providing authentication services.			
	Service Fee to Banks, MSPs etc. in case KYC is done by them initially for UID				

C. Indicative Compensation Matrix for each Stakeholder recommended in IMG Report

Stakeholder	Suggested Compensation (per transaction)	Paid By	Comments
REMIT	0.4 paise	Bank	
Account Mapper	0.6 paise	Bank	
INFAST	20 paise	Bank	
MSP	Prioritized Secure communication charges not exceeding Re.1 per transaction (a transaction may contain multiple messages)	BC/ Mobile linked no-frills account holder (depending on the charging model)	
BCs with Mobile Banking POS	Minimum of Rs. 2.25 or 1.4% of the transaction amount	Bank	Viability of the BC needs to be ensured on a per transaction basis. As the number of transactions increase over a period of time, a lesser compensation may be paid to the BC (suggested compensation by year 5 - around 1%)
BCs with Micro ATMs	Minimum of Rs. 3 or 2.24% of the transaction amount	Bank	Viability of the BC needs to be ensured on a per transaction basis while the cost of Micro ATM will be recovered over a period of time. As the number of transactions increase over a period of time, a lesser compensation may be paid to the BC(suggested compensation by year 5-around 1.2%)
Tech Vendor	Not exceeding Re.1	Bank	

Bank	2% transaction fees. Additionally it would earn an interest income on the deposits. It is expected to make payments to the other players (except MSPs) from the above revenues	Transaction fees borne by the mobile - linked no frills account holder, which can be partly or wholly offset by the Bank. Contribution from other sources could also be considered in consultation with the committee created to ensure fair play and transparency.	After providing for various operational costs relating to supervision , call centre operations, etc the Banks would still make a profit by operating the model as suggested
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Communication Channels for Mobile Banking Service

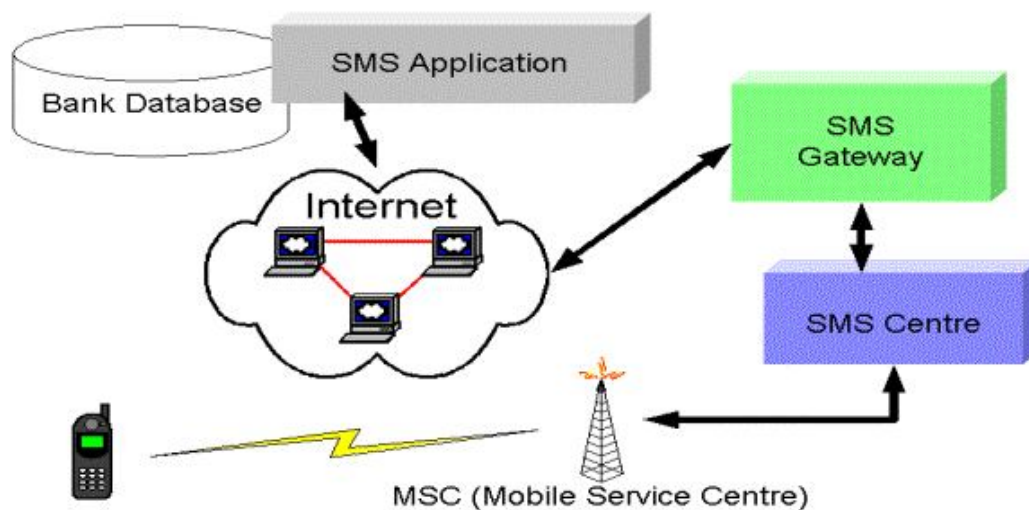
(1) IVR – Interactive Voice Response

IVR or Interactive Voice Response service operates through pre-specified numbers that banks advertise to their customers. Customers make a call at the IVR number and are usually greeted by a stored electronic message followed by a menu of different options. Customers can choose options by pressing the corresponding number in their keypads, and are then read out the corresponding information, mostly using a text to speech program.

(2) SMS – Short Messaging Service

SMS uses the popular text-messaging standard to enable mobile application based banking. The way this works is that the customer requests for information by sending an SMS containing a service command to a pre-specified number. The bank responds with a reply SMS containing the specific information. In a few instances even transaction-based services are made available to the customer using SMS.

Figure: SMS Network Architecture



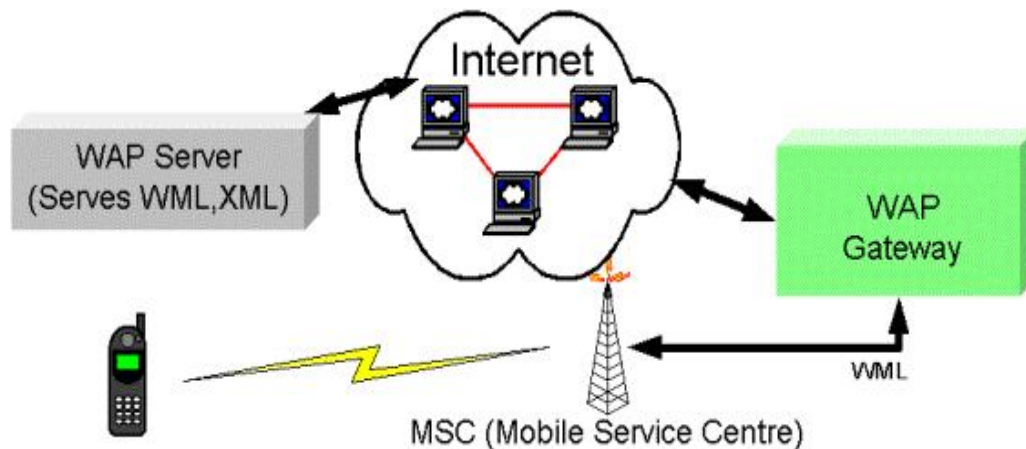
(3) WAP – Wireless Access Protocol

WAP uses a concept similar to that used in Internet banking. Banks maintain WAP sites which customer's access using a WAP compatible browser on their mobile phones. WAP sites offer the familiar form based interface and can also implement security quite effectively. The banks' customers can have an anytime, anywhere access to a secure reliable service that allows them to access all enquiry and transaction based services and also more complex transactions like trade in securities through their phone.

A WAP based service requires hosting a WAP gateway. Mobile Application users access the bank's site through the WAP gateway to carry out transactions, much like Internet users access a web portal for accessing the bank's services.

The following figure demonstrates the framework for enabling mobile applications over WAP. The actually forms that go into a mobile application are stored on a WAP server, and served on demand. The WAP Gateway forms an access point to the Internet from the mobile network.

Figure: WAP Network Architecture for Mobile Applications



(4) Standalone Mobile Application Clients

Standalone mobile applications are most suitable to implement complex banking transactions like trading in securities. They can be customized according to the user interface complexity supported by the mobile. In addition, mobile applications enable the implementation of a very secure and reliable channel of communication with end-to-end encryption.

One requirement of mobile applications clients is that they require to be downloaded on the client device before they can be used, which further requires the mobile device to support one of the many development environments like J2ME or Qualcomm's BREW. J2ME is fast becoming an industry standard to deploy mobile applications and requires the mobile phone to support Java.

(5) SIM application Tool Kit

SIM Application Toolkit (STK) is a standard of the GSM system which enables the SIM to initiate actions which can be used for various value-added services. The SIM Application Toolkit consists of a set of commands programmed into the SIM card which define how the SIM should interact directly with the outside world and initiates commands independently of the handset and the network. This enables the SIM to build up an interactive exchange between a network application and the end user and access or control access to the network. STK has been deployed for many applications, often where a menu-based approach is required, such as Mobile Banking.

(6) Unstructured Supplementary Service Data (USSD)

Unstructured Supplementary Service Data (USSD) is a protocol used by cellular telephones to communicate with the service provider's computers. USSD can be used for WAP browsing, prepaid callback service, location-based content services, menu-based information services, and as part of configuring the phone on the network.

USSD messages are up to 182 alphanumeric characters in length. Unlike Short Message Service (SMS) messages, USSD messages create a real-time connection during a USSD session. The connection remains open, allowing a two-way exchange of a sequence of data. This makes USSD more responsive than services that use SMS. Some payment methods such as SharEpay, SWAP Mobile in South Africa, Mobipay in Spain, M-PESA in Tanzania, and mPay in Poland use USSD channels.