ITU-T Focus Group Digital Financial Services

Consumer Experience and Protection


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Foreword

An estimated 2 billion adults are still without access to a bank account, but some 1.6 billion of them have access to a mobile phone. 'Mobile money services' show great promise to expand financial inclusion by bringing basic financial services to people that remain on the margins of society.

In 2014, the Bill & Melinda Gates Foundation joined ITU to establish an ITU-T Focus Group on Digital Financial Services (DFS). The financial-services and information and communication technology (ICT) sectors are converging, and the aim of the Focus Group was to bring all the key players together to build a common understanding of the route to broader financial inclusion.

The Focus Group was successful to an extent that exceeded expectations. After two years of extensive consultation, the Focus Group concluded its work in early 2017 with the publication of 85 policy recommendations and 28 supporting thematic reports.

The Focus Group's work was driven by the collaboration of more than 60 organizations from over 30 countries. Asked what made the Focus Group unique, all of the group's participants highlighted its diversity. This was the first initiative to bring together all the actors working in the interests of financial inclusion. We opened new lines of communication to build a strong understanding of the components of the DFS ecosystem.

In the next phase of our collaboration, we will be certain that we are speaking on the same terms.

This next phase of collaboration – the 'Financial Inclusion Global Initiative' – will be a three-year programme of collective action led by ITU, the Bill & Melinda Gates Foundation, the World Bank Group, and the Committee on Payments and Market Infrastructure.

The new multi-partisan will provide targeted assistance to selected countries in their pursuit of financial-inclusion targets. This implementation work stream will be supported by annual symposia and thematic working groups.

Our Focus Group responded to a diverse set of challenges by mobilizing a diverse set of expertise. We are moving forward in exactly this spirit. The Focus Group demonstrated DFS stakeholders' commitment to collaboration. ITU was glad to provide a neutral platform for this collaboration and we look forward to our continued work together to achieve universal access to financial services.

Dr Chaesub Lee

Director, ITU Telecommunication Standardization Bureau

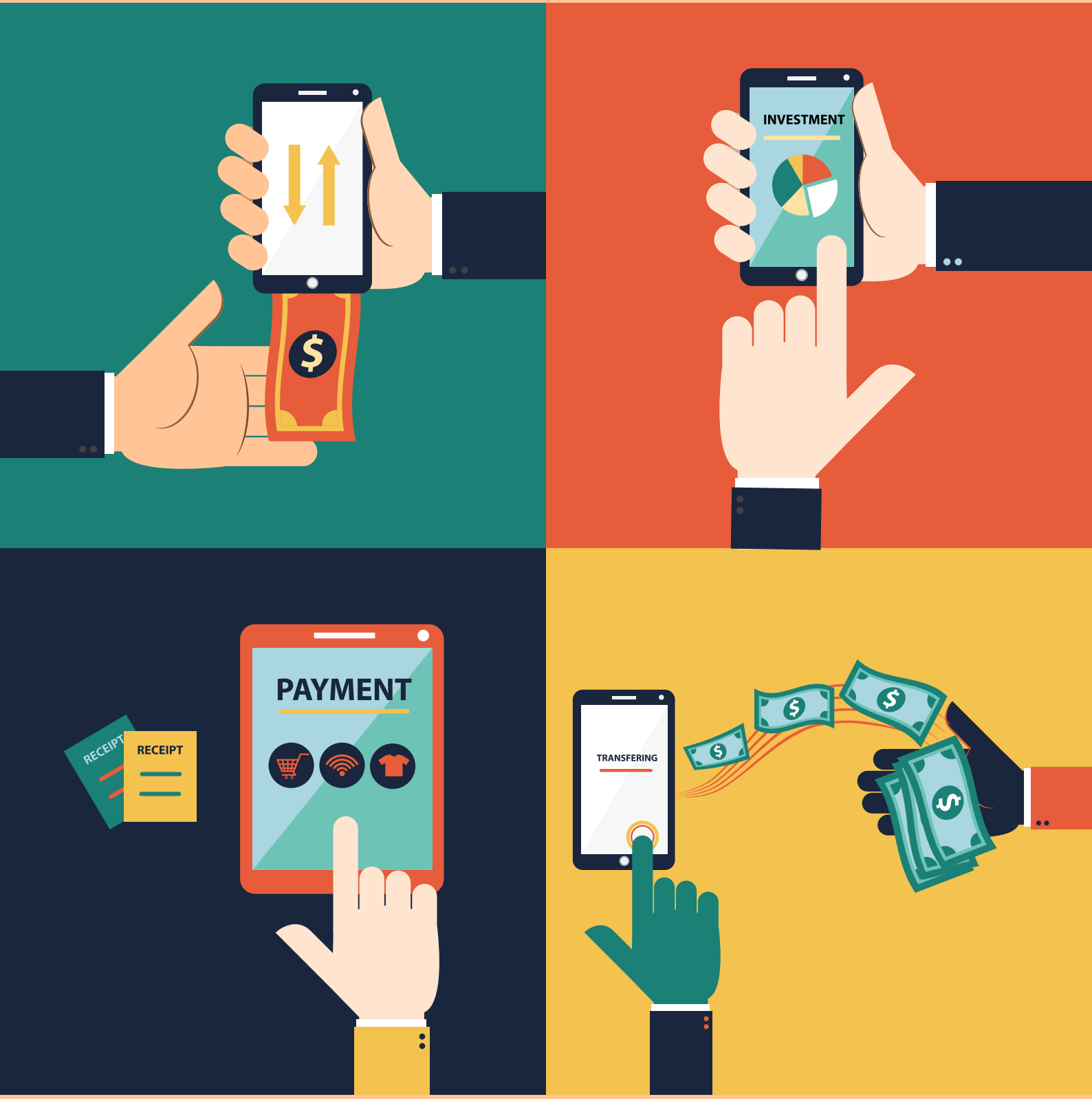
INVESTMENT
PAYMENT
RECEIPT
RECEIPT
TRANSFERING

Table of Contents

I Commonly identified Consumer Protection themes for Digital Financial Services

About this report

This Technical Report was researched and written by Rebecca Martin, Junior Programme Officer, and Vijay Mauree, Programme Coordinator, Telecommunication Standardization Bureau (TSB), ITU.

The authors are grateful to Ms Vinod Kotwal (Telecom Regulatory Authority of India), Abdul Musoke (Uganda Communications Commission), MD Rashed (Bangladesh Bank) and Ivan Ssettimba (Bank of Uganda) for the invaluable information provided through questionnaire responses, email correspondence and conference calls. The authors would also like to extend their gratitude to the co-chairs and participants of the Consumer Experience and Protection working group for their feedback and support of this report.

If you would like to provide any additional information, please contact Vijay Mauree at tsbfgdfs@itu.int

Executive Summary

This report is a synthesis of existing research, legal provisions, guidelines, and other related resources related to consumer protection for digital financial services. The report identifies four common themes that policy makers or regulators may want to consider when developing laws, regulations, or guidelines related to DFS.

This list is not exhaustive, but rather indicative of the types of issues that can be considered. In addition, consumer protection for digital financial service is a new area for regulations, and in many cases there is continued discussion and debate about which aspects can be best addressed by industry-led actions, versus requiring regulations. Finally, the feasibility of implementation and enforcement have not been taken into account when developing this list; these of course are critical elements when developing actual DFS guidelines.

The four themes are:

1 Provision of information and transparency

2 Fraud prevention

3 Dispute resolution

4 Data privacy and protection

For each theme a set of key issues have been identified, which are discussed in the following sections.

Abbreviations

AFI	Alliance for Financial Inclusion
BB	Bangladesh Bank
BTRC	Bangladesh Telecommunication Regulatory Commission
CBN	Central Bank of Nigeria
CCI	Competition Commission of India
CEP	Consumer, Experience and Protection Working Group
CGAP	Consultative Group to Assist the Poor
DFS	Digital Financial Services
FGDFS	Focus Group Digital Financial Services
GSMA	Groupe Speciale Mobile Association
ITU	International Telecommunication Union
MNO	Mobile Network Operator
MMO	Mobile Money Operator
NCC	Nigerian Communications Commission
PPIs	Prepaid payment instruments
RBI	Reserve Bank of India
TRAI	Telecom Regulatory Authority of India

1 Introduction

Digital Financial Services (DFS) in this report refers to the use of an electronic device or system to access financial services such as storing funds, making and receiving payments, applying for credit or for insurance. Due to the inaccessibility and high costs of formal banking for low income and rural communities and the increase in access to mobile phones, DFS has become a viable way for the unbanked to access formal financial services (Potnis, 2014). Increasing access to formal financial services and thus reducing financial exclusion is seen as an important development goal as it has been argued to stimulate economic growth, thereby increasing welfare and reducing poverty (Kundu, 2015).

The legal and regulatory frameworks which govern DFS play a critical role in creating an enabling environment for low income and unbanked populations to become financially included. One important aspect within regulation is how the rights and interests of consumers are protected and promoted. Consumer trust is the foundation for achieving sustainable uptake and active usage of DFS. This includes protecting consumers from fraud, safeguarding personal data and consumer funds, ensuring transparency and ensuring recourse mechanisms are available.

Financial consumer protection has gained increased attention since the global financial crisis, which increased pressure for providers to be transparent in their business conduct, disclose key information about their products and services, and treat consumers fairly and ethically (Tiwok, 2013).

An effective consumer protection framework within DFS can increase consumer confidence thereby increasing adoption and active use of the services. This is even more important for unbanked users who may not have prior experience with formal banking services (World Bank, 2014). While the interests of consumers (and especially low income consumers to increase financial inclusion) are important it is also imperative that the legal and regulatory framework remains fair and balanced for all stakeholders (World Bank, 2015).

2 Methodology

The study involved a desk review of key issues for consumer protection in digital financial services. This involved reviewing the key publications and research conducted by leading international organizations and experts within DFS on the consumer risks and consumer protection approaches.

The methodology did not, however, attempt to analyze the feasibility of implementation or enforcement of the identified issues. It also did not aim to identify which consumer protection issues are best addressed through industry action, and which are best addressed through regulation. Therefore, a more detailed analysis is necessary before regulators take action on any of the point listed below.

3 Key themes in Consumer Protection for Digital Financial Services

The publications, reports and focus notes from leading DFS organisations and research groups such as AFI, CGAP, GSMA, and the World Bank were reviewed to determine the key themes for consumer protection. These organisations were chosen as they are at the forefront of driving financial inclusion in low income countries.

Good consumer protection practices protect the interests of consumers, creating trust in using digital financial services, while preserving the commercial incentive to provide these services at scale. Developing a regulatory framework requires regulators to analyze the roles of players in the value chain (banks, MNOs, non-banks, agents, e-money issuers, etc.) and consumer risks. DFS in many emerging economies are driven by innovations in mobile technologies, so the mobile network operators that provide the telecommunications infrastructure are critical players in the ecosystem.

Consumers can experience a number of potential risks when conducting DFS transactions. Fraud is an example of the various forms these risks can take. For example, DFS provider employees, may gain access to consumer accounts and use the private information for dishonest purposes, or fraudsters may use social engineering scams to obtain money or information from unsuspecting customers. Consumers can also experience fraud from agents, who could charge them unauthorized fees, or access private customer information including their PINs.

The DFS provider is the entity which is actually providing the service to the consumer and is ultimately responsible for ensuring transparent, fair, and safe services and protecting the consumer's funds and personal information. For instance, clear terms and conditions in the DFS service contract explaining the consumer rights and obligations, clear explanation of fees charged to consumers, the availability of timely complaint mechanisms and dispute resolution process reduces risk while enhancing consumer trust in using DFS. The liability of consumers, agents and DFS providers in case of errors is also an important part of transparency.

Four core themes were identified as central to consumer protection in order to mitigate the risks for consumers.

1 Provision of information and transparency

2 Dispute resolution

3 Fraud prevention

4 Data privacy and protection

Each of these areas of focus are now considered in more detail.

3.1 Provision of Information and Transparency

Providing consumers with information and transparency in all digital financial services and products is crucial to develop trust and uptake. Absence of information is likely to result in consumer lack of knowledge and awareness on key product features, terms and conditions, which heightens the risk to consumers. To counter this, 'clear, adequate, accurate and complete information' should be provided to all users (AFI, 2014, p. 6).

It is vital that providers are transparent about their services and products so that consumers have the opportunity to make informed choices and avoid risks such as agent misconduct, overcharging or misleading advertisements and scams (McKee, Kaffenberger, & Zimmerman, 2015; World Bank, 2014). Collaborative research undertaken by MicroSave, CGAP and BFA in four countries (Uganda, the Philippines, Bangladesh and Colombia) found that unclear pricing was seen as a high risk by consumers (Malady, 2015).

In addition to providers delivering transparent and accurate information it is essential that consumers are able to understand the information provided to them in order to increase their capabilities and empower consumers to make informed choices.

The key issues in information and ensuring transparency are detailed below:

Table 1: Information and transparency

Key Issues	Examples
1. TRANSPARENCY OF FEES	Full disclosure of all fees and charges is provided prior to a transaction. Ideally fees are disclosed in multiple formats (in brochure, verbally, on website etc.)
2. KEY FACTS OR SUMMARY DOCUMENT	Standardized key fact documents can enable providers to give consumers the key information related to the service or product concisely and in local language.
3. TERMS AND CONDITIONS ARE TRANSPARENT	Full disclosure of terms and conditions of contract is made prior to the customer initiating use of the services. Unclear terms or complicated sentences are avoided so that they are as easy to understand as possible. T&Cs are available in common local languages. Simplified contracts and standard form contracts also enable simplified disclosure of terms and conditions to customers.
4. COOLING OFF PERIOD	Cooling off period is available to consumers so that if they change their mind on a product/service within x weeks and terminate a contract without facing penalties.
5. NOTICE PERIOD FOR CHANGES TO T&CS, FEES	There is an adequate time given to consumers by the providers before any changes to fees or terms and conditions come in effect.
8. MISLEADING ADVERTISEMENTS AND SALES PROMOTIONS ARE PROHIBITED	Advertisements which are misleading are prohibited. Ideally advertisements should use plain and simple language
9. POLICY ON DORMANT ACCOUNTS	Clear policies over when an account is considered dormant and what happens to the funds are effectively communicated to the consumers.

3.2 Dispute Resolution

As the DFS ecosystem continues to expand with more services and products available to consumers, it becomes increasingly essential to have effective recourse mechanisms in place. Principle 9 of the G20 High Level Principles on Financial Consumer Protection states that access to redress should be 'accessible, affordable, independent, fair, accountable, timely and efficient.' (World Bank, 2014, p. 27). Effective dispute resolution is even more important for DFS users who were previously unbanked and are new to formal financial services as it can help consumers in overcoming challenges related to adoption and trust (Mazer & Garg, 2015; Chapman & Mazer, 2013). Evidence of this was found in a study of M-Pesa in Kenya where the ability to receive effective dispute resolution led to increased trust and loyalty which had a positive effect on increasing customer uptake of the services (Collins and Zollman 2011 cited in Chapman & Mazer, 2013).

Effective dispute resolutions are not only important in improving trust and adoption for consumers but the wealth of information which can be collected and analysed offers an opportunity to improve products and services. For example in Pakistan, Tameer Microfinance Bank used data collected from complaints to identify the consumers who have a higher default risk and subsequently were able to target these consumers with more assistance (Chapman & Mazer, 2013).

Table 2: Dispute resolution

Key issues	Examples
1. COMPLAINTS POLICY AND PROCEDURES IN PLACE	DFS providers have a complaints policy and procedure in place
2. COMPLAINTS POLICY IS TRANSPARENT AND COMMUNICATED TO CONSUMERS	Policy is effectively communicated using multiple channels (such as in branch, online, leaflets, verbally by agents etc.), and the policy is made available in common local languages.
3. MULTIPLE RECOURSE CHANNELS AVAILABLE TO THE CONSUMER	Access to a variety of channels to make complaints such as toll free numbers, local agents, social media, and branches etc.
4. ALTERNATIVE DISPUTE RESOLUTIONS OR EXTERNAL RECOURSE	Consumers who are not satisfied with how their complaint was handled by their provider are able to access alternative or external channels to seek redress. Information on how to use alternative methods is readily available.
5. TIME FRAME PROVIDED FOR DISPUTE RESOLUTION	Time frames of how long consumers should expect to wait for a response are reasonable and clearly communicated to consumers.
6. DEDICATED, TOLLFREE RECOURSE HELPLINE AVAILABLE	Consumers have access to a designated phone line for dispute resolution and it is toll free.
7. COORDINATION BETWEEN THE FINANCIAL AND TELECOM REGULATORS IN DISPUTE RESOLUTION	Close coordination and collaboration between the financial and telecom regulators (including sharing data and analysis on DFS complaints) ensures effective resolution. This information can also inform their DFS-related licensing, supervision/oversight, and enforcement roles.
8. OVERSIGHT OF THE RECOURSE SYSTEM BY THE FINANCIAL REGULATOR OR SUPERVISOR	Financial regulator or supervisor has the remit to monitor complaints and listen to and resolve disputes. This can include providers sharing complaints data with the regulator and/or onsite checks for compliance.
9. EMPLOYEES AND AGENTS ARE TRAINED IN HANDLING DISPUTES	Employees are trained and provided with scripts/procedures for the most common complaints received. Moreover the categorisation of complaints makes handling disputes more efficient.

3.3 Fraud Prevention

Fraud is a key issue for consumer protection as not only can it result in loss of funds or the misuse of personal data but the fear of fraud can prevent users from adopting DFS in the first place or prevent OTC users from adopting wallets and more advanced services. There are a number of ways that fraud can be categorised. GSM Association has identified three common types of fraud by the perpetrator[1]:

1 **Transactional** – fraud which may be committed by a user posing as a genuine consumer

   a) **vishing/smishing** – use of phone calls or SMS to gather personal information such as account details, PINs or passwords or other identification details

   b) **advance fee scams** where customers are tricked into sending funds under fake circumstances or promises (i.e. lottery scams)

   c) **reversal requests** – where a person may ask a user to refund them an incorrect transaction which was deposited in their account

2 **Channel** – fraud which may be carried out by the agent

   a) **split transaction** – agents split transaction to earn more commission

[1] Source: Managing the Risk of Fraud in Mobile Money, GSMA

b) **false transactions** – agents transfer a consumers funds to their own account

c) **registration fraud** – creating false accounts for the purpose of obtaining extra registration commissions

d) **overcharging** – agents charging unauthorised or incorrect fees

3 **Internal** – fraud which may be committed by an internal employee

a) **internal fraud** – employees colluding for unfair personal gain

b) **identity theft** – employees accessing and exploiting customer information without authorisation

Examples of when fraud has occurred include lottery scams in Bangladesh where users were told they must send a fee in order to gain access to their winnings. In Uganda cases of reversal requests were reported where SMS requests were sent to users informing them that funds had been incorrectly deposited in their account and that they should return them (McKee, Kaffenberger, & Zimmerman, 2015). While the occurrence of fraudulent activity is relatively low the perception of the threat of fraud is high. The key issues for fraud prevention are described below:

Table 3: Fraud prevention issues

Key issues	Examples
1. DFS PROVIDERS ARE LICENSED AND SUPERVISED UNDER A REGULATORY FRAMEWORK	DFS can only be provided by licensed entities (banks and non-banks) and are regulated by the financial regulator. The DFS provider is required to adhere to the licensing requirements at all time.
2. REGULAR NETWORK TESTING, REAL-TIME MONITORING AND ONGOING CHECKS FOR SECURITY SYSTEMS AND PROCESSES	To prevent and detect fraud there should be ongoing checks to ensure that information systems and applications are working correctly.
3. DUE DILIGENCE TO BE CONDUCTED ON STAFF AND AGENTS	Due diligence is carried out on all staff (employees, contractors, agent etc.) prior to hiring.
4. PROVIDERS ARE RESPONSIBLE FOR THEIR AGENTS	Providers are responsible for the conduct of their agents, ensuring providers effectively manage and train their agents.
5. AGENT MONITORING	To ensure that agents comply with regulations and guidelines their activities are monitored by providers. This may be done through onsite checks or mystery shopping. Clear sanctions are in place for agents who are found to be not complying.
6. AGENT TRAINING	Providers ensure agents are trained to a high standard to reduce the chance of errors occurring and to be able to offer knowledgeable support to consumers. Ideally training should be compulsory and ongoing.
7. TRANSACTIONS OCCUR IN REAL TIME	When the network is down, consumers sometimes leave money with agents to carry out the transaction later. This can leave customers open to agent fraud, if the agent instead keeps the money. Real time transactions would cut down on this type of fraud, though in many geographical areas real time transactions are still challenging in practice.
8. CONSUMERS ARE ENCOURAGED TO REPORT FRAUDULENT ACTIVITY	Consumers are aware of and understand the process to report suspected incidences of fraud to their provider or to financial and telecom regulators.
9. CONSUMER AWARENESS CAMPAIGNS ON THE COMMON TYPES OF FRAUD	Consumers are informed of the common types of frauds prevalent in the market through various channels (such as SMS alerts, radio announcements, signage at agent location etc.).

3.4 Data Protection and Privacy

Data protection and privacy measures are concerned with the way that data is collected, stored, shared and exploited. This is important for consumers because the misuse of data may result in identity theft, damage to a user's credit profile, unsolicited offers, nuisance calls and the influx of fraudulent or unsolicited messages among other risks and harms. This area of consumer protection in DFS is in very early stages, with little law and regulation in existence.

Many new users of DFS are creating a 'digital footprint' for the first time. This refers to the accumulation of data which takes places when a consumer uses their digital device (McKee, Kaffenberger, & Zimmerman, 2015).

In recent study carried out by Makulilo (2015) on data privacy for DFS in Africa, it was noted that there are many opportunities for data abuse and leakage due to extended value chains and many players involved in a transaction. In addition, there may be incentives for data commoditization for things such as targeted advertising. Makuilio claims that in Uganda the government has misused data on claims of national security and then passed it on to business entities to promote their services through unsolicited messages.

Early considerations in data privacy include:

Table 4: Data protection and privacy

Key issues	Examples
1. ENCRYPTION OF DATA	Where feasible, data related to DFS is encrypted both when in transportation and when stored. The systems in place which encrypt data are regularly tested and problems addressed.
2. ACCESS RESTRICTION TO CONSUMER DATA	As a measure to prevent the misuse of data, providers implement levels of authorization and/or separation of roles to ensure that employees, agents, or business partners are not able to access the entirety of a consumer's data without justification.
3. INFORMED CONSENT	Customers are clearly and effectively informed of what data will be collected and how it will be used, prior to its collection and use, and are given the option to consent or not.
4. MINIMISATION OF DATA COLLECTION AND LIMITATION OF RETENTION	Providers limit the amount of personal data they collect from consumers to only what is necessary for the purpose. Providers limit the retention of data and destroy data after it is used for its intended purpose.
5. PROTECTION OF PERSONAL DATA	Providers ensure that personal data is maintained securely, and there are authentication systems in place. There are repercussions in place when personal data is misused.
6. CLEAR POLICY ON DATA COLLECTION AND SHARING	Providers should have a data collection and handling policy which states what types of data will be collected and under which circumstances it may be shared.

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II QoS and QoE Aspects of Digital Financial Services

About this report

This Technical Report was written by Joachim Pomy and Wolfgang Balzer.

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Executive Summary

This Report summarizes the Quality of Service (QoS) and Quality of Experience (QoE) aspects of Digital Financial Services (DFS) as concluded by the ITU-T Focus Group on Digital Financial Services (FG DFS).

Guidance and suggestions are provided for stakeholders involved in DFS taking into account regulatory and consumer related aspects.

It analyses different use cases and the applicability of currently available standards.

The report details that persisting problems with the KPIs basic functionalities of a mobile network need to be resolved by the stakeholders in the interest of any mobile service and are therefore out of scope of QoS-for-DFS-considerations.

Since the number of technical KPI is overwhelming and target values cannot be set on a global level, the report provides a novel scheme, which enables stakeholders in any region or country to assess the fitness of networks, terminals, users, DFS implementations and society / government of the use of DFS implementations.

In addition, a motivation for future KPIs is discussed from a technology-agnostic point of view.

At various places in the report motivation for future standardization is included which is expected to be actively taken up by ITU-T Study Group 12.

1 Introduction

This Report summarizes the Quality of Service (QoS) and Quality of Experience (QoE) aspects of Digital Financial Services (DFS) as concluded by the Focus Group DFS.

Guidance and suggestions are provided for stakeholders involved in DFS taking into account regulatory and consumer related aspects.

The objective is to provide guidance mainly for Telecom Regulators but also to Service Providers of DFS. One main topic is the selection of Key Performance Indicators (KPIs) which should be focussed on.

Besides that, the report contains comments and notes which might not be appropriate for immediate guidance; this material is considered of importance for future work.

- Annex A discusses existing standards which are related to DFS.
- Annex B introduces underlying functionalities of DFS applications.
- Annex C summarizes a possible selection of a set of KPIs appropriate for DFS

1.1 Relationship of QoS and QoE

In addition to the term QoS, the term Quality of Experience (QoE) is often used nowadays in order to stress the purely subjective nature of quality assessments in telecommunications and its focus on the user's perspective of the overall value of the service provided.

The increased significance of the term QoE is related to the fact that in the past the term QoS was used mostly for only technical concepts focused on networks and networks elements. The definition of QoS, however, does include the degree of satisfaction of a user with a service. Thus, non-technical aspects are included, like e.g. the user's environment, his expectations, the nature of the content and its importance. But most service providers did use the QoS only in relation to the actual user-service interaction in order to cross-check whether the user 18

requirements have been met by the service implementation of a provider (as perceived by the user). So there was a strong focus on the actual network performance and its immediate influence on user perceivable aspects while additional subjective and not directly service related aspects were omitted.

QoE is defined in in Appendix I of Recommendation ITU-T P.10 as the overall acceptability of an application or service, as perceived subjectively by the end-user. It includes the complete end-to-end system effects (client, terminal, network, services infrastructure, etc) and may be influenced by user expectations and context. Hence the QoE is measured subjectively by the end-user and may differ from one user to the other. However, it is often estimated by a combination of objective measurements and metrics describing subjective elements.

NOTE: The definition of QoE and, in particular, the dividing line between QoS and QoE is, however, quite fuzzy, and up to today it does not appear that a globally accepted definition exists. For example, the Recommendation ITU-T E.800 does not use the term QoE at all; instead, it uses a 4-viewpoint model (similar to the one in Recommendation ITU-T G.1000) with terminology, like QoSE (E=experienced) or QoSP (P=perceived). In any case, the amount of energy put into the QoS/QoE discussion in the context of the FG DFS should be limited, since this is already on the agenda of ITU-T Study Group 12 and several other organizations.

For working purposes, preferably the use of QoS can be limited to things which can be measured by machines or technical means (including e.g. speech quality metrics, like POLQA, Rec. ITU-T P.863, which already contain some perceptual considerations), and QoE should be used for items further down a “processing chain” where some kind of assessment has been applied. This assessment can be, for instance, some kind of usually nonlinear (clipping) function expressing limits where service quality is either “inacceptable” anyway, or so good that a further improvement will not have any practical consequences. It is important to note that such limits will be strongly dependent on previous experience, i.e. will vary between regions or countries, and will also vary

with time as people get accustomed to improvements. Therefore, the issue of "typical values" or "threshold values" is characteristic for the QoE domain.

Objective measurements deal with quantities which can usually be determined by technical measurements, such as information loss and delay. Subjective elements are components of human perception that may include emotions, linguistic background, attitude, motivation, etc. which determine the overall acceptability of the service by the end-user. An important part of subjectivity are expectations which usually are formed by previous experience of users for the same or similar types of service.

The following figure shows factors contributing to QoE. These factors are organized as those related to Quality of Service and those that can be classified as human components. QoE for voice and video is often measured via carefully controlled subjective tests where voice or video samples are played to viewers, who are asked to rate them on a scale. The ratings assigned to each case are averaged together to yield the mean opinion score (MOS).

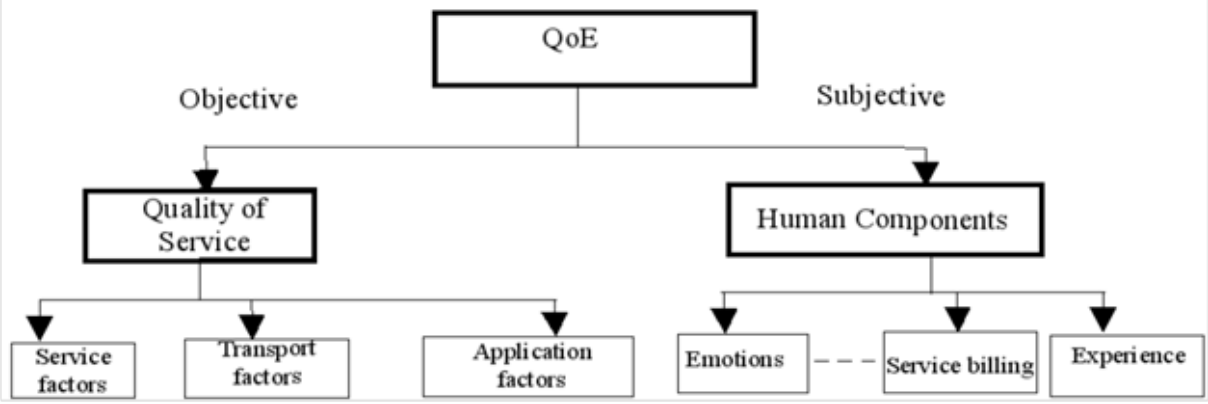
Quality of service (QoS) is defined in Recommendation ITU-T E.800 as the collective effect of performance which determines the degree of satisfaction of a user of the service. In general, QoS is measured in an objective way.

In telecommunications, QoS is usually a measure of performance of services delivered by networks QoS mechanisms include any mechanism that contributes to improvement of the overall performance of the system and hence to improving the end-user experience. QoS mechanisms can be implemented at different levels.

EXAMPLE: At the network level, QoS mechanisms include traffic management mechanisms such as buffering and scheduling employed to differentiate between traffic belonging to different applications. Other QoS mechanisms at levels other than the transport include loss concealment, application Forward Error Correction (FEC), etc.

QoS parameters are used to describe the QoS observed. Similar to the QoS mechanisms, QoS parameters can be defined at different layers. Figure 1 below shows the factors that have an influence on QoS and QoE.

Figure 1: Factors that have an influence on QoS and QoE



In general, there is a correlation between the subjective QoE as measured by the MOS and various objective parameters of Quality of Service.

Typically, there will be multiple service level performance (QoS) metrics that impact overall QoE. The relation between QoE and service performance (QoS) metrics is typically derived empirically. Having identified the QoE/QoS relationship, it can be used in two ways:

1) Given a QoS measurement, one could predict the expected QoE for a user.

2) Given a target QoE, one could deduce the net required service layer performance.

These prediction and deduction steps are built on assumptions and approximations.

Due to the complexity of services and the many factors which have an influence on QoS/QoE, there is not a close one-to-one relationship which would allow statements like "If the bandwidth is increased by 200 kbit/s, then the rating by the user will rise by 0.5 points".

To ensure that the appropriate service quality is delivered, QoE targets should be established for each service and be included early on in system design and engineering processes where they are translated into objective service level performance metrics.

Quality of Experience is an important factor in the marketplace success services and is a key differentiator with respect to competing service offerings. Subscribers to network services do not care how service quality is achieved. What matters to them is how well a service meets their expectations (e.g. in terms of price, effectiveness, operability, availability, and ease of use).

1.2 Services, Applications or "Popular Services"

Within the formal standardization community the term "Service" was always understood as a functionality for which all aspects are standardized (i.e. standardized service); the concept behind was that globally all networks would (be able and willing to) offer exactly the same – fully interoperable – harmonized service.

However, over time the terminology got corrupted in a sense that service today stands for any application. For example the Internet Engineering Task Force (IETF) refers to their standards which basically describe network functionalities as services.

Under end-user aspects the term service is used for any application offered in the networks; this makes it very difficult to standardize assessment methods and target values or requirements for related KPIs.

Therefore, if we speak about services, today, we can distinguish multiple dimensions:

a) applications with global reach vs. b) locally limited applications

c) specifically named applications vs. d) application class denominators

Typical examples are:

– Netflix or YouTube™

– eGovernment application in country xyz

– Netflix or YouTube™

– Video streaming, IPTV

Since services in all these dimensions are not being standardized in their functionality a-priori, the communities involved in assessing QoS and QoE for such services have focussed on what is called "popular services". The concept behind is to provide assessment methods and targets at for such services which are used frequently by a huge number of users.

- Looking first at dimension a) with the examples given above, these are truly "popular services" – however the underlying technical aspects, such as carrier services may be changed from time to time.
- For dimension b) the main obstacle is the limitation itself. It is highly probable that there will not any international standard to measure the QoS or QoE of exactly one of that specific services.
- Dimension c) requires close cooperation between the stakeholder providing these services and the standardization experts.
- Proper dealing with dimension d) requires the standardization of new end-to-end mechanisms. Otherwise the existing carrier services will be confronted with more stringent targets for existing services.

1.3 Is DFS a “Popular Service”?

DFS is popular, yes – but DFS is only a class denominator.

NOTE: At the time work on mobile QoS started (about 10 years ago), the experts considered “service” as something which has a direct impact to the customer’s perception. Typical examples would be telephony or web browsing. A “service” in this view is understood as something connected to an end to end use case. However, many end to end use cases relate to “carrier services” (such as some type of packet data functionality having their own QoS metrics (KPI).

In this context DFS can be considered as a classical example of such a user-related service, which can be realized in several ways, using “carrier services” such as SMS or packet data functionality of networks.

DFS is not alone in this “top level service” view. Today's telephony is a prominent example. End users basically do not care if the function they are looking for (being able to orally communicate with another) is realized using legacy GSM or UMTS, VoLTE or some OTT VoIP technology. Their quality assessment is based on universal metrics such as setup time, call drop rate or speech quality, which are exactly those metrics which are at the core of standards such as Recommendation ITU-T E.804 or ETSI TS 102 250.

The sometimes very detailed KPI definitions in these standards are owed to a “diagnostic” approach, but by no means not "the golden rule". Future developments will attempt to reveal true “end customer” related Key Quality Indicators (KQI).

An additional example for this may be web browsing using HTTPS instead of HTTP. For the user, nothing seems to have changed, so top-level QoS KPI to assess user perception are the same - however, the networks are treating HTTPS and HTTP traffic in many cases differently, which will lead to a difference in usage of such KPI for diagnostic purposes.

If we want to technically assess the expected top-level QoS of a particular DFS offering using a carrier service point of view, we need to know the technical flow of data and signalization. This information is not normally available from service providers’ websites or brochures.

NOTE: Strictly speaking this is true for most of the other services offered by network operators. First of all, operators typically do not commit themselves (at least not towards end customers) to strict performance targets; in the case of mobile networks this is perfectly understandable as the local conditions vary in a wide range (e.g. from rooftop to cellar of a house even in the same geographical spot). Then, with networks going even more towards “content sensitive” behaviour for the sake of resource optimization, the performance cannot safely be predicted from just some general “bit pipe” properties, measured using simple end to end services such as web browsing. However, DFS can be - as will be shown later - made subject to objective measurement quite easily.

Ideally, this must be dealt with when licenses are negotiated between regulators and potential DFS service providers.

NOTE: This is well known and understood for other services like for example, video streaming:

When “YouTube™” first became popular it was based on TCP streaming; with this information KPIs could be defined in standards, QoS could be assessed and QoE could be predicted. Today, for good reasons, the same service by the same entity is rendered as adaptive streaming using HTTPS. Consequently, new standards have been written with new KPIs in order to assess QoS for the “same service”.

Strictly speaking, the KPI with respect to video quality are still the same; only the methods have changed (or were forced to change). Most importantly, KPI definitions using “low level” technical events as those from the IP level do not work anymore if encrypted connections such as HTTPS are used.

If we can identify categories of different DFS offerings, we could conclude, which of such categories constitute “popular services” (i.e. which are widespread and used by many customers) and start a more selective look into KPI definitions.

2 Problem statements

2.1 Different use cases

QoS aspects of DFS need to be assessed for two different use cases:

1) In use case #1 the targeted group of users of such service is limited to the use of (cheap) basic feature phones. This excludes for example browser-based DFS solutions.

2) In use case #2 the additional QoS aspects are assessed when the minimum requirements to the phones used for DFS are raised and basic smartphone functionality can be assumed.

2.2 Legal entities

Today, one can observe that the provision of a service offer ("service") is – as a general rule – independent from the physical operation of a telecommunication network.

Whereas for most service offers there is – beside the general legal framework – no specific regulation, DFS "services" are under the close control of the regulators of the banking sectors, whereas operators of telecommunication networks are under the control of the regulators of the telecom sectors.

Therefore, legal aspects (from a QoS perspective) need to assess two different legal cases:

a) In legal case #a: the provider of a DFS "service" and the operator of a physical telecommunication network are two distinct and different legal entities.

b) In legal case #b: the provider of a DFS "service" and the operator of a physical telecommunication network are the same and identical legal entity.

2.3 Mobile Network QoS affecting all services

The figure 2 (adapted from Recommendation ITU-T E.804 and ETSI TS 102 250) shows a model for quality of service parameters. This model has four layers.

The first layer is the Network Availability, which defines QoS rather from the viewpoint of the service provider than the service user. The second layer is the Network Access. From the service user's point of view this is the basic requirement for all the other QoS aspects and parameters. The third layer contains the other three QoS aspects Service Access, Service Integrity and Service Retainability. The different services are located in the fourth layer; the performance of these services is characterized by service specific QoS KPIs.

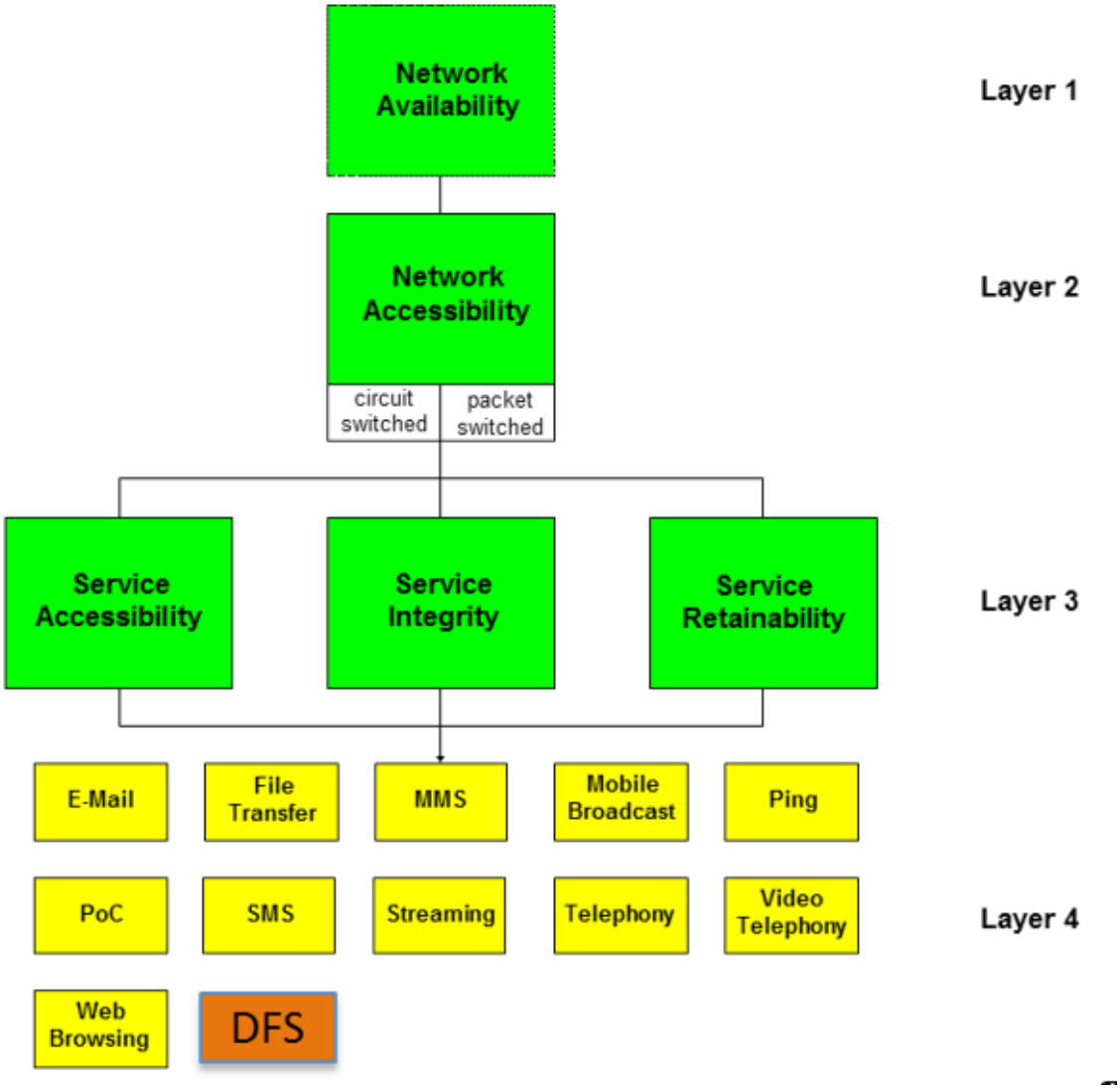
The first three layers (highlighted with green boxes) are common to ALL mobile services or applications.

They are characterized typically by the following parameters (KPIs):

- network availability
- network accessibility
- service accessibility
- service integrity
- service retainability

In cases where the KPIs in layers 1, 2 and 3 are not maintained at a stable high level it is useless to make attempts to assess the QoS of any kind of services because the statistical relevance of QoS figures received will be close to zero.

Figure 2: Model for quality of service parameters



Persisting problems with the KPIs for layers 1, 2and 3 of a mobile network need to be resolved by the stakeholder in the interest of any mobile service and are therefore clearly out of scope of QoS-for-DFS-considerations.

NOTE: This diagram is in the process of being updated. First of all, layers 1 to 3 describe actually a kind of “pyramid of needs”, i.e. before one can start to think about service integrity (e.g. call drop rate in telephony), the service needs to be accessible first. Also, the “service” picture needs an overhaul. The “circuit/packet switched” division is legacy from 2G or 3G. Some of the “services" in Layer 4 actually depend on each other or belong to different groups. There are “carrier services” such as basic IP, and also combined services using one or more such carrier services, e.g. MMS relies on SMS (which is actually an end user related service as well) for notification, and uses packet data to actually transfer data. A “service” with the same effect for end users, e.g. some kind of OTT chat with attached files, uses only basic packet data.

In any case, there is no real “technology dependency” anymore. If an operator decides to suppress Skype, or prioritizes certain video streaming, this is not the result of some fundamental ability or inability, but just the effect of some “traffic shaping” elements.

2.4 Possible Solutions

Digital Financial Services are realized through utilization of basic services provided by a network. Assuming that the reliability of DFS has to be very high, there are two basic ways to ensure this reliability.

- By default, the QoS level for these basic services needs to be very high too. This is where we are with DFS today.
- The alternative is the use of robust end to end protocols which ensure the reliability of the actual service even in the presence of deficiencies in the underlying functionality. An analogous example would be the TCP protocol level which ensures lossless data transmission even in the presence of packet loss in lower layers. This needs to be developed and standardized.

Such robustness can be described by key criteria for DFS. Topmost is, for each transaction, a clear indication if it was successful or not, which needs to be consistent for both sides. Assume a transaction is composed of a number of steps, each step being the exchange of a data token. If the transfer of a data token has no clear "lost" criterion, but can take, in principle, indefinite time, a time-out needs to create a defined situation. The essential property of robustness is that, if a data token now arrives after its time-out, the protocol needs to ensure that this token is not causing any action any more.

With respect to practical aspects of DFS implementations, this poses some fundamental differences. When the main goal is to introduce DFS in the near future, it needs to operate with the existing installed base of end-user devices. This will automatically limit the spectrum of applicable methods to those which can be supported by those devices. A possible drawback of this approach is, of course, the fact that if a technology has been deployed and is widely used, it will – as long as is working without major problems- be difficult to replace it even if the new technology is superior. This may be less an issue with respect to end user devices as the penetration of smartphones will be continue to increase strongly due to their manifold advantages. It may be the case that these retaining factors are more on the side of infrastructure, as introduction of new technologies requires new investment which may, at least in the first years of usage, not be balanced by likewise new opportunities to generate additional revenue.

3 Conclusions

The following conclusions are, with respect to the preceding clause, based on the assumption that necessary DFS performance is achieved by ensuring a sufficiently high performance of the basic services used to implement DFS. The case of using a robust end to end protocol is not treated here.

3.1 Conclusions for use case #1

Four different techniques are discussed in Annex B which might be used in conjunction with DFS offers for use case #1.

- SMS is a store and forward service. Even if the share of short transfer times may be high in typical cases, it cannot – without modifications – be used reliably for real-time transactions.
- DTMF has limited transfer capabilities and will most probably only be used to complement one of the other techniques.
- IVR typically requires reasonably high listening quality which might pose a problem with feature phones in environments with higher levels of background noise.
- USSD is a true real-time technique. However, the message transfer which could be used for DFS are not standardized.

3.2 Conclusions for use case #2

Seven different techniques are discussed in Annex B which might be used in conjunction with DFS offers for use case #2.

As per availability on smartphones, HTTPS based solutions appear to be the optimal carrier technology for DFS.

3.3 Conclusions related to the fitness for DFS

A successful introduction of DFS via a mobile network requires fitness of the whole environment used, which is

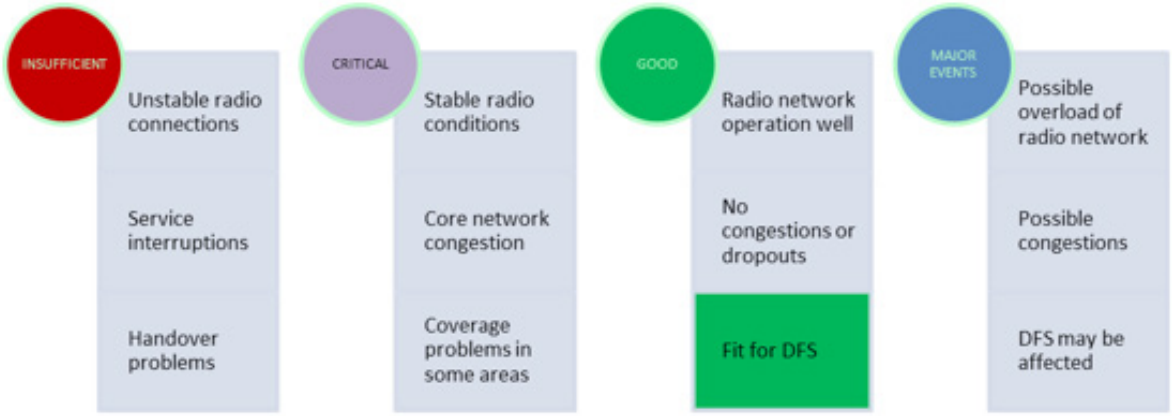
- Fitness of the mobile network, to provide a minimum level of availability and accessibility
- Fitness of the mobile network to provide the services required for realization of DFS
- Fitness of mobile devices used, to support the basic services used to realize DFS
- Fitness of the DFS service itself to provide useable interfaces
- Fitness of users to successfully use DFS. This may include the necessary skills to operate DFS on phones as well as basic understanding of properties of DFS in general, to protect users against exploitation of insufficient knowledge
- Fitness of the general society and the governmental institutions for DFS

The following subsections contain decision diagrams, figures 3 to 7 which are meant to facilitate the discussion between stakeholders in the different regions or countries. The diagrams do not contain any numbers or specific target values. This is by intention, because target values acceptable for all stakeholder will vary from region to region and from country to country.

The term "Major Events" used throughout the five diagrams refers to work in progress in ITU-T SG12, Question 12, aiming at QoS in mobile networks during major events, as for example, major sports events.

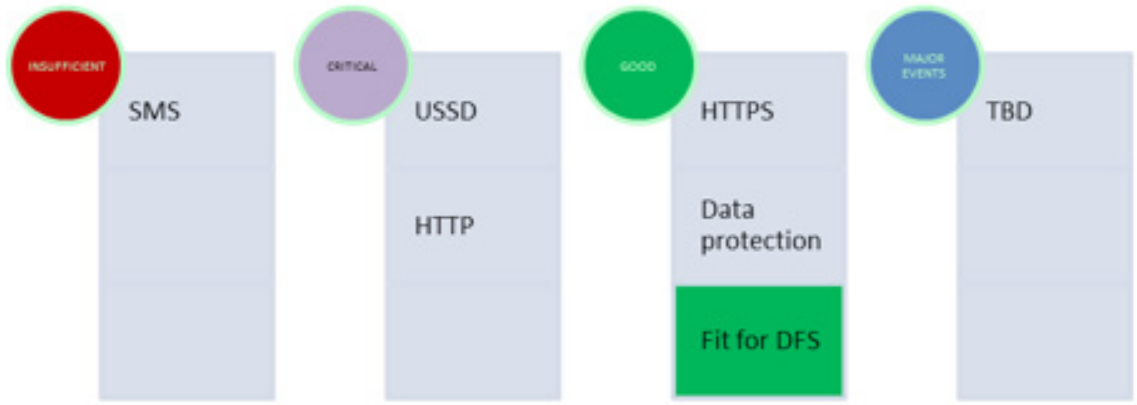
3.3.1 Fitness of a mobile network for DFS

Figure 3: Decision diagram for fitness of a mobile network for DFS



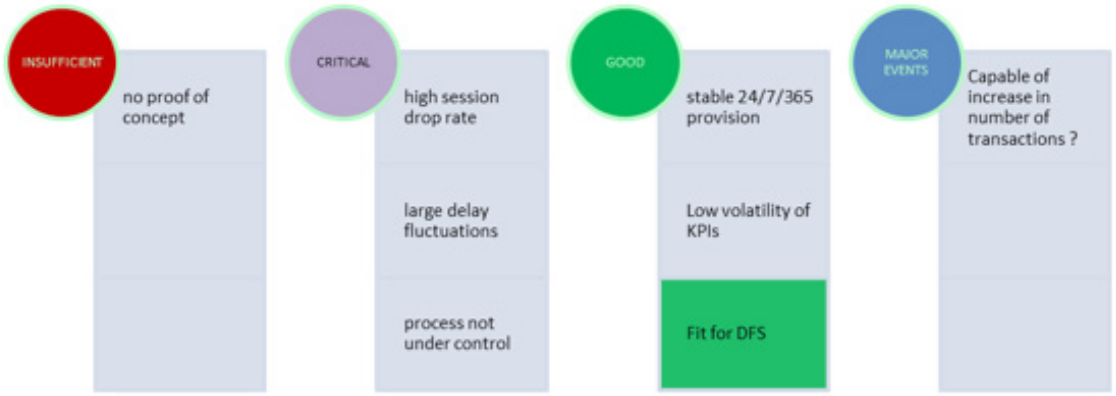
3.3.2 Fitness of mobile terminals for DFS

Figure 4: Decision diagram for fitness of mobile terminals for DFS



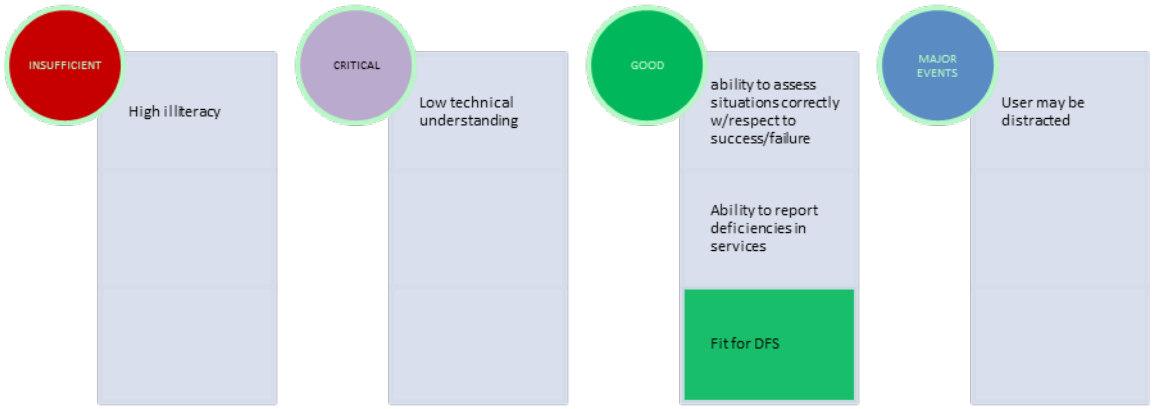
3.3.3 Fitness of mobile services for DFS

Figure 5: Decision diagram for fitness of a mobile services for DFS



3.3.4 Fitness of mobile users for DFS

Figure 6: Decision diagram for fitness of a mobile users for DFS



3.3.5 Fitness of society / government for DFS

Figure 7: Decision diagram for fitness of a society / government for DFS

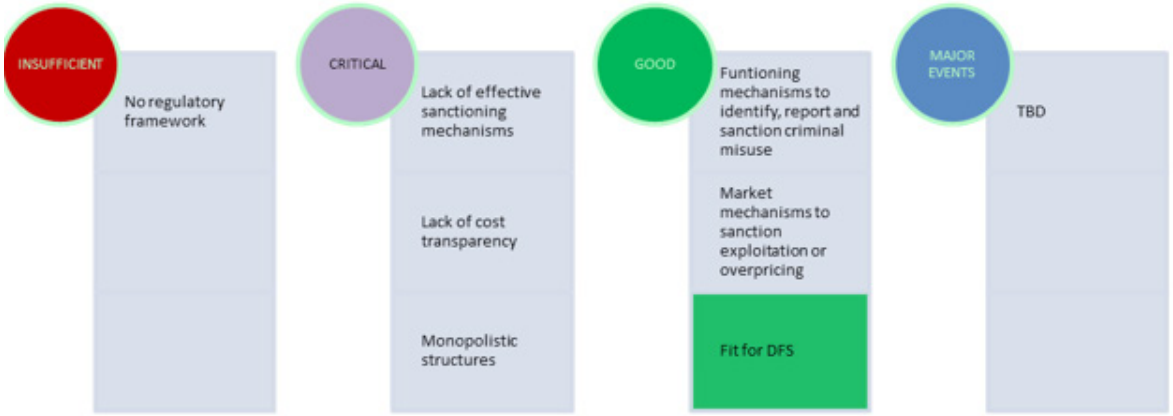


Figure 7: Decision diagram for fitness of a society / government for DFS

3.4 Conclusions related to Digital Financial Services

It is of importance for any further work in the field of QoS / QoE for DFS to get access to more detailed information, such as descriptions of the various DFS offers to see on a technical level, which underlying services in the network are used and which are the technical parameters associated with them, e.g. timer values, timeout events, number of interactions involved in a single financial transaction.

Therefore, it is suggested that telecom regulators collect such information prior to the issue of licenses in order to make their own judgment of the quality of the planned DFS offering.

Such flowchart information should be submitted by regulators to ITU-T SG12, where the experts could start categorizing the different approaches and provide comments and guidance on such implementations.

There are even more issues remaining currently open, which will need further discussions:

- Mobile operators have increasing problems with the huge amount of data traffic in their networks. Therefore, if high speed fixed networks are available, there is a massive trend to use so-called **WIFI offloading**, where data traffic is redirected via WIFI accesses to the internet backbone core. The consequences for DFS seem to be quite unexplored, by now.
- The text displayed in the course of DFS interactions or the accentuation in spoken dialogue systems may be loaded with emotions, which could affect the users' experience of the service (QoE). Emotion detectors could be used to minimize any negative impact from this text and speech material. Currently, Requirements for **emotion detectors in telecommunications** are under study in an ETSI project (STF#504), which will provide a new Technical Specification (ETSI TS 103 296).
- A serious problem (mostly for regulators) are effects which cannot easily be allocated to one of the stakeholders in the DFS process. A prominent example are so-called **early timeouts in the DFS**, which anyone outside the DFS provider would interpret as dropped-calls, i.e. blame the network or blame the terminal or blame the user- in reality it turns out just to be a badly designed flow-of-actions: users still reading instructions on their screens before initiating the next step of a transaction are hit by an invisible timer's timeout action.

Because the field of DFS and its related QoS and QoE aspects is both of high importance and quite complex, **capacity building** is essential. Therefore, it is suggested that the ITU start the development of **online e-learning courses** in this area.

4 Guidance and suggestions

4.1 Use case #1

In this situation, where it is assumed that the end-user has phone with limited capabilities and uses that phone directly for DFS, it is important to make the use of USSD mandatory whenever possible at least for the initial part of the transaction.

Following-up communication with DFS user, like balance statements etc. may be done via SMS, but encryption should also be imposed as well as other mandatory features of SMS, like delivery attempts until confirmation.

- KPIs for USSD are under study.
- KPIs for SMS that should be monitored are the following:
  - SMS service non-accessibility [%]
  - SMS completion failure ratio [%]
  - SMS end-to-end delivery time [s]
  - SMS receive confirmation failure ratio [%]

4.2 Use case #2

In this situation, where it is assumed that either end-users or agents have access to smartphones it is suggested to mandate the use of HTTPS as the only protocol to be used for DFS.

KPIs for HTTPS are not easy to monitor, due to the use of the Secure Socket Layer (SSL) protocol:

- HTTPS Service non accessibility [%]
- HTTPS set-up time [s]

- HTTPS session failure ratio [%]
- HTTPS session time [s]
- HTTPS data transfer cut-off ratio [%]

NOTE: The above implies that the networks are a "uniform bit pipe" which can be characterized with one type of service (e.g. web browsing or upload/download) and the results being extrapolated to the behaviour of other services using the same "carrier (the http protocol level of packet data). This cannot be taken for granted in all cases.

Also, the fact has to be considered that a typical DFS use case needs a couple of round trips for an end to end completion of a transaction.

Of course there is the problem that actual end to end tests for DFS also mean that real money is transferred. However, to establish the necessary level of trust or safety, it needs to be seen how close to the "real thing" tests have actually to be. At least a kind of monitoring, tracking how accurate such extrapolations actually are is suggested.

4.3 Guidance related to mobile networks

This section discusses **possible ranges for target values for selected KPIs**.

NOTE: With an end to end DFS service description available, which would identify the "component services", a somewhat more "integrated" view could be provided. In such a view, target values would be integrated, coming from a "top level" view which can be related to requirements on lower levels.

4.3.1 USSD service non-accessibility [%]

The USSD service non-accessibility is the probability that the end-user cannot access the Unstructured Supplementary Service Data (USSD) when requested while it is offered by display of the network indicator on the UE.

- Target: 2%- 1%- 0.5% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.2 USSD completion failure ratio [%]

Definition under study.

- Target: 1%- 0.5%- 0.1% ? Or even 0% ??

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.3 USSD end-to-end delivery time [s]

Definition under study.

- Target values:
  - 60 sec for 90%, 120 sec for 100%
  - 30 sec for 95%, 90 sec for 100%
  - 10 sec for 98%, 30 sec for 100% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.4 USSD receive confirmation failure ratio [%]

Definition under study.

- Target: 1%- 0.5%- 0.1% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.5 SMS service non-accessibility [%]

The SMS service non-accessibility is the probability that the end-user cannot access the Short Message Service (SMS) when requested while it is offered by display of the network indicator on the UE.

- Target: 2%- 1%- 0.5% ?

4.3.6 SMS completion failure ratio [%]

The SMS completion failure ratio is the ratio of unsuccessfully received and sent messages from one UE to another UE, excluding duplicate received and corrupted messages.

A corrupted SMS is an SMS with at least one bit error in its message part.

- Target: 1%- 0.5%- 0.1% ?

4.3.7 SMS end-to-end delivery time [s]

The SMS end-to-end delivery time is the time period between sending a short message to the network and receiving the very same short message at another UE.

- Target values:
  - 60 sec for 90%, 120 sec for 100%
  - 30 sec for 95%, 90 sec for 100%
  - 10 sec for 98%, 30 sec for 100% ?

4.3.8 SMS receive confirmation failure ratio [%]

The SMS receive confirmation failure ratio is the probability that the receive confirmation for a sent attempt is not received by the originating UE although requested.

- Target: 1%- 0.5%- 0.1% ?

4.3.9 HTTPS Service non accessibility [%]

The HTTPS service non-accessibility ratio is the probability that a subscriber cannot establish a PDP context and access the service successfully.

The packet data protocol (PDP) context is a data structure present in several parts of the mobile network which contains the subscriber's session information when the subscriber has an active session.

- Target: 2%- 1%- 0.5% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.10 HTTPS set-up time [s]

The HTTPS set-up time is the time period needed to access the service successfully, from starting the connection to the point of time when the content is sent or received.

- Target values:
  - 30 sec for 90%, 60 sec for 100%
  - 15 sec for 95%, 30 sec for 100%
  - 8 sec for 98%, 20 sec for 100% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.11 HTTPS session failure ratio [%]

The HTTPS IP-service access ratio is the probability that a subscriber would not be able to establish a TCP/IP connection to the server of a service successfully.

- Target: 2%- 1%- 0.5% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.12 HTTPS session time [s]

The HTTP session time is the time period needed to successfully complete a packet switching data session. It is also called page loading time.

- Target values:
  - 30 sec for 90%, 60 sec for 100%
  - 15 sec for 95%, 30 sec for 100%
  - 8 sec for 98%, 20 sec for 100% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.13 HTTPS data transfer cut-off ratio [%]

The HTTP data transfer cut-off ratio is the proportion of incomplete data transfers and data transfers that were started successfully.

- Target: 2%- 1%- 0.5% ?

NOTE: This KPI and its technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

4.3.14 Integrity of complaint resolution [%]

Ratio of the number of complete and professional resolutions of the contributory causes of a complaint, to the total number of user complaints accepted.

- Target: 2%- 1%- 0.5% ?

4.3.15 Complaint resolution time

Definition under study. Working days or calendar days?

- Target values:
  - 2 days for 90%, 6 days for 100%
  - 1 day for 95%, 3 days for 100%
  - 4 hours for 98%, 2 days for 100% ?

4.3.16 Mean Time to Restore (MTTR)

Definition under study.

- Target: Minutes ?, Hours ?, Days ???

4.4 Guidance related to specific Digital Financial Services implementations

As mentioned in the previous section guidance on specific DFS implementations requires the detailed technical knowledge on the components and technical factors and flow of action of each and every DFS implementation. Regulators are the key stakeholders who are in a position to mandate that such information finds its way into the standardization sphere of the ITU-T.

4.5 KPIs for non-utilization stages

This needs further discussions. There is a huge number of possible KPIs standardized, but the selection and the assessment methodology need to be defined.

4.6 Mystery shopping

Mystery shopping was standard practice by the early 1940s as a way to measure employee integrity. Tools used for mystery shopping assessments range from simple questionnaires to complete audio and video recordings. Mystery shopping can be used in any industry, with the most common venues being retail stores, hotels, movie theatres, restaurants, fast food chains, banks, gas stations, car dealerships, apartments, health clubs and health care facilities.

Since 2010, mystery shopping has become abundant in the medical tourism industry, with healthcare providers and medical facilities using the tool to assess and improve the customer service experience. In the UK mystery shopping is increasingly used to provide feedback on customer services provided by local authorities, and other non-profit organizations such as housing associations and churches.

Mystery shopping is increasingly used to evaluate user experience related to DFS. However, due to the complexity of DFS offerings, the results may be interesting, but also may lack statistical significance:

This needs further discussions and in this context a critical look into crowdsourcing and quality evaluation via social media has to be done.

4.7 Legal entities

If the provider of the DFS implementation and the operator of the physical network are the same legal entity it should be unproblematic for the telecom regulator to impose certain QoS requirements with respect to the DFS "service" offered by such entity.

However, if the provider of the DFS "service" and the physical network operator are distinct and separate legal entities, it might turn out problematic to impose any QoS requirements with regard to the DFS onto the network operator.

Therefore, it is suggested to predominantly only accept DFS "services" offered by the physical network operator.

NOTE: However, the question may be raised whether this is realistic. Up to now, network operators were not even able to successfully establish higher-value services in the entertainment sector (such mobile music or video). On the other hand de-coupling a DFS "service" from the physical network makes it strictly speaking to an OTT "service" provided under best effort conditions, which by their nature withstand technical regulation.

5 Future Considerations: Top-level view

This section deals with an end-to-end model of DFS. It focuses on the essence for user-related functionality of DFS by providing a top-level view of (selected) DFS use cases.

The term "transaction" is used to describe a single instance of a complete use case from a customer point of view, in accordance to the usage of this term in other fields of QoS standardization[1]. It is noted that in this case the term is also part of the common expression "financial transaction".

The use cases described serve as examples to explain the underlying framework. The underlying model can, however, be easily applied to other use cases which are identified to be relevant in the DFS context.

From the use cases, quality metrics are derived. The key point of the model is that it is, on its topmost level, "technology agnostic". The actual implementation may be in manifold ways, with specific technical characteristics, strengths and weaknesses; these come in in lower levels of the model. The technology agnostic top level makes sure that no "technology-related" allowances are made (such as "discounts" for known technical weaknesses of particular implementations). Also, the model makes sure that new technical developments in realizing DFS do not disrupt existing QoS metrics.

The underlying general principle of the QoS metrics proposed is also to provide the smallest possible number of KPI, with each KPI having a clearly defined relation to user perception. This shall avoid the situation – which can be observed in some KPI sets – that single KPI overlap from their meaning, which can lead to unclear or even contradictory results.

An actual DFS implementation will be using different network- related "services" or functionality. The respective section shows how the use case related top-level view – and its KPI – can be mapped to this technological level of currently existing "carrier services" with respective (mostly already existing) KPI.

The principle of having a small number of strong KPI does not exclude additional KPI with diagnostic or administrative function.

It is recognized that there are several stakeholders with different interests. The respective section – which is also to be seen as an expandable illustration of the underlying concept – describes this view in more detail.

[1] For instance, a transaction for the service „Telephony" would be a call from an A party to a B party, from call setup to a call usage phase to the call hang-up by the A party.

The fact that different stakeholders have different interests also leads to the conclusion that not all of the KPI are of equal importance for all stakeholders. This aspect can provide guidance when it comes to the provision of a legal or regulatory framework to enable or support emergence of DFS.

The final section of this chapter deals with considerations about a practical monitoring of DFS service performance can be implemented. It differentiates between test and measurement in the introduction phase, and continuous quality monitoring in the operational phase of DFS.

5.1 Use cases and related top-level KPI

5.1.1 Transfer of money from A to B

Basic flow of activities

Party A decides to transfer amount X from his account to the account of B.

Key interests of this transfers are:

1 The transfer shall be made with a clear indication of success or failure on both sides within a reasonable time span

2 The success rate of a money transfer shall be high

3 The duration of a transaction shall be reasonably short

4 If the transaction fails, the situations needs to be completely reverted within a reasonably short time span (i.e. no money "lost in limbo")

5 The transaction shall lead to a stable and correct end state for all participants in a reasonably short time span (i.e. all accounts have to be "up to date" as fast as possible)

6 There must be no losses or duplications of money during the transaction (i.e. money not deducted from A's account but appearing on B's account).

NOTE: Not all of these conditions are of equal importance to all stakeholders, e.g. the absence of "money duplications" may not be of interest to end users.

A further differentiation of the use case may come from the question if some kind of proof for the transaction is created, and if yes, in which way. This may be a crucial element if money is paid to serve some duties as e.g. the electricity bill. This may involve another data transaction towards, possibly, a third party to send such a proof, or access to respective services to produce this.

From these requirements, the following end to end KPI can be derived:

– Money Transfer completion rate
– Money Transfer completion time
– Money Transfer False Positive Rate
– Money Transfer False Negative Rate
– Money Transfer Failed Transaction Resolution Rate
– Money Transfer Account Stabilization Success Rate
– Money Transfer Account Stabilization Time
– Money Transfer Loss Rate
– Money Transfer Duplication Rate

NOTE: These KPIs and their technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

This list clearly contains elements which are not primarily related to mobile network behaviour or performance; they also relate to the performance of underlying banking processes and implementations. So, the list can probably be reduced to elements which are assumed to be primarily linked to mobile networks.

There is, however, a connection. If, for example, a connection loss occurs during a transaction consisting of a number of roundtrips estimated to complete a DFS transaction, this may have different results depending on a particular implementation of such banking processes. Therefore, it is assumed that the robustness and stability of such processes against failures which are typical to specific basic services of mobile networks will also have an effect on overall QoS of DFS.

5.2 Technological components of DFS

As outlined in other parts of this document, there are some services and functionalities within existing mobile networks which can be used – with a further selection by available features of mobile devices- to realize DFS.

From the concept of a "pyramid of needs" and assessment of the end to end KPI for DFS, a clear hierarchy of quality requirements can be derived.

The topmost requirement will be the integrity of a transaction. Integrity in DFS is the clear and reliable assessment if a transaction has been successful or not. This is seen as even more important as the overall success rate of an implementation. If a transaction is erroneously assessed as being successful or failed, the objective damage (e.g. to a person's financial condition) will be larger than a case where a transaction has to be repeated due to a detected failure. The same applies to a transaction which is erroneously assessed as unsuccessful, which would result in duplicate transfer due to a repetition of the process.

From a QoE point of view, the situation can be more complex. Assumed there are two implementations, one of them being stable and robust in the sense of low (ideally zero) probability of false positives or negatives, but slow; the other one faster but more sensitive to such errors. Unless the false-assessment error will be quite large, it is likely that in the customer perception, the latter will appears as the "better" one. It follows that in this area, considerations beyond a mere competition according to market rules need to be undertaken.

An end to end approach needs to be taken because the overall robustness of a particular implementation depends on several factors.

Assume that there are two alternatives, one of them requiring N1 roundtrips, each having a time duration of T1, and a success rate per roundtrip of S1; the other one characterized likewise by characteristics N2, T2 and S2. Clearly, there are several interactions with typical network properties. For instance, if the transaction is performed while the actor is moving (e.g. in a public transport vehicle or as a passenger in a car), the change of network conditions during a transaction influences the overall success rate. This links the time scale of motion-related impairments to transaction characteristics. If the typical overall duration of a DFS transaction (T1*N1 and T2*N2) is above the typical time during which network properties show degradations, the probability of failure increases. In a more general view, the overall success rate of a DFS transaction can be expressed as S1N1 and S2N2. So even if an individual success rate per roundtrip of a specific implementation (where the motion profile can be factored in) is lower, the resulting E2E success rate may be higher if the number of roundtrips in this implementation is sufficiently smaller.

The same linkage between characteristics includes the times involved. For instance, if a transaction fails (in a "proper" way, i.e. with correct assessment of the result), the negative impact on QoE will assumedly be smaller if this result is obtained in a shorter period of time, as a follow-up try can be started and completed faster.

5.3 Stakeholders

The following is not meant to be a complete analysis of stakeholder structure and their requirements. The point to be made here is that different stakeholder types exist, and that their concerns and main interests differ. This will have an impact on the relative weighting of particular QoS metrics and therefore on definition of QoE.

End customers

The main interest of end customers will be to have access to DFS at low cost (which also means without the need to spend additional on new mobile devices) and with a high degree of reliability, as financial losses due to service failures will be felt relatively strong, in particular in low-income segments. It is assumed that transaction speed considerations are (as long as transaction times are within certain reasonable limits) of less importance.

Businesses

With assumedly the same basic need for reliable and affordable transaction, at least larger enterprises will have an interest in DFS technologies which allow for efficient processing of recurring or larger scale transactions. It is further assumed that there may be interest in technologies which can be performed from fixed-network equipment (i.e. computers) without excessive cost. This will in turn affect market acceptance of solutions with different ways of interfacing. An example would be access to certain gateways or other network based functions as SMSC.

Network operators

As network operators are, usually, subject to regulation, relevant factors actually can be separated into two categories. The first category are general technical and commercial requirements, such as cost of operation of a particular technology in relation to profits which can be generated. The second category may include cost of noncompliance to legal or regulatory requirements (SLA), or linkages between e.g. licenses and obligations to provide certain services or service properties.

DFS operators

As far as DFS operators are not identical with network operators, they will basically underlie similar conditions as network operators with perhaps other governmental entities responsible to set and enforce the rules under which they operate. Commercially, their market power will probably be large enough as to impose quality standards (SLA) or other market forces to service providers (network operators).

Governments/Regulators

Assumed that the main objective of governments is economic development, their task is to find a balance between “carrot and stick”, i.e. a level of rules and regulations which enable technical evolution, leave DFS operators enough room to run a profitable service, and make sure that cost of DFS services are in an affordable range. For this stakeholder group, assumption is that the main objectives are stable, reliable services in combination with a technology which gives the target segment of the population a sufficiently barrier-free access to DFS.

Furthermore, there are different ways how each of these stakeholder groups have influence on other stakeholders, for instance in rewarding or sanctioning market offerings or, more general, decisions. The crucial point to be made here is that beyond the directly visible first-order effects, second-order interactions exist which do not necessarily have to be weaker, but may work in a “cybernetic” way, i.e. with longer time constants but with likewise or even stronger effects than first-order dependencies.

5.4 QoS Monitoring

In order to secure the necessary quality level of DFS, respective regulatory guidance and comprehensive performance targets need to be established. Basically it would be possible to refer to basic performance measurements of respective carrier services (such as SMS, telephony (for DMTF or IVR) or packet data. Due

to the nature of services implementation this will, however, be a surrogate with considerable risk of predicting actual DFS performance incorrectly.

It is therefore – owing to the importance of DFS – assumed that a better way of monitoring needs to be established. This monitoring should – while being fully aware of practical issues in definition and implementation – use actual use cases, i.e. actual money transfer.

The monitoring is proposed to have multiple forms which cover all of the stages of the technical life cycle of any DFS implementation.

Assessment and Roll-out phase:

End to end performance measurements as professional done by dedicated systems, e.g. under control of regulatory authorities.

Operational phase:

Regular End to end performance measurements as professional done by dedicated systems, e.g. under control of regulatory authorities.

"Test Panel" performance measurements, integrated in selected end user's devices/apps:

For this kind of measurement, a group of end users, selected as to be representative for the general usership, would be recruited and equipped with specially designed DFS clients. This group would, along with doing their "real life" DFS usage, also file additional reports. These reports would then allow responsible entities to constantly assess the performance of DFS in the field.

"Crowdsourced" performance measurements, integrated in end user's devices/apps:

This would be a simple and non-intrusive way to obtain information on DFS performance on a broad scale. Professional systems used would be equipped with functionality to not only measure E2E performance, but also collect diagnostic information allowing to track root causes for poor performance or malfunction of services.

Of course using real use cases creates additional cost. This cost needs to be assessed against the benefits of obtaining real data instead of surrogate data which only can estimates actual service performance. Moreover, it is possible, with little additional effort in planning and implementation, to design processes which optimize such additional cost, such as re-transferring money which has been moved by a DFS usage.

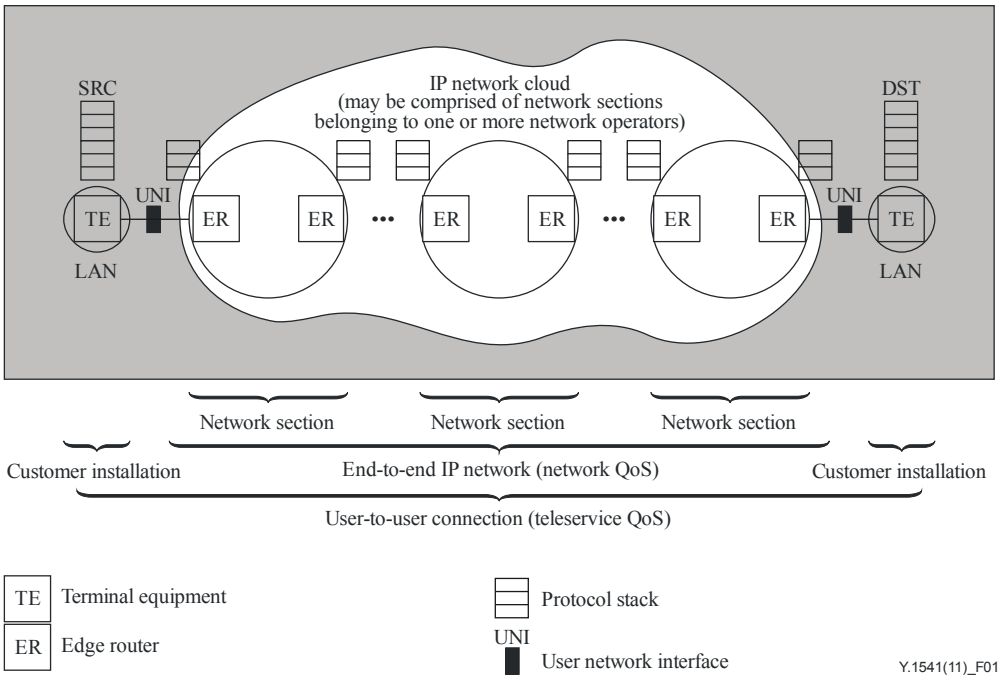
It is therefore proposed to add respective concepts to a DFS implementation strategy. To increase the effectiveness of such concepts, it is recommended to design a pilot phase which shall give insight into practical aspects and provide information to optimize respective operations.

Annex A: Overview of existing standards which are related to DFS

Recommendation ITU-T Y.1541 "Network performance objectives for IP-based services" specifies network IP performance values between User Network Interfaces (UNI) for each of the performance parameters defined in [ITU-T Y.1540]. The specific performance values vary, depending on the network QoS class. This Recommendation defines eight network QoS classes. It applies to international IP network paths (UNI-UNI). The network QoS classes defined here are intended to be the basis of agreements between end-users and network service providers, and between service providers. The classes should continue to be used when static agreements give way to dynamic requests supported by QoS specification protocols.

However, Rec. Y.1541 does only apply to fixed networks.

Figure 8: Reference path from Recommendation ITU-T Y.1541



NOTE – Customer Installation equipment (shaded area) is for illustrative purposes only.

Its counterpart in the mobile environment is 3GPP TS 23107 "Technical Specification Group Services and System Aspects; Quality of Service (QoS) concept and architecture".

When defining the UMTS QoS classes, also referred to as traffic classes, the restrictions and limitations of the air interface have to be taken into account. It is not reasonable to define complex mechanisms as have been in fixed networks due to different error characteristics of the air interface. The QoS mechanisms provided in the cellular network have to be robust and capable of providing reasonable QoS resolution.

There are four different QoS classes in UMTS:

– conversational class;
– streaming class;
– interactive class; and
– background class.

The main distinguishing factor between these QoS classes is how delay sensitive the traffic is.

Conversational class

The most well-known use of this scheme is telephony (e.g. over GSM). But with Internet and multimedia a number of new applications will require this scheme, for example voice over IP and video conferencing tools. Real time conversation is always performed between peers (or groups) of live (human) end-users. This is the only scheme where the required characteristics are strictly given by human perception.

Real time conversation scheme is characterised by that the transfer time shall be low because of the conversational nature of the scheme and at the same time that the time relation (variation) between information entities of the stream shall be preserved in the same way as for real time streams. The maximum transfer delay is given by the human perception of video and audio conversation. Therefore the limit for acceptable transfer delay is very strict, as failure to provide low enough transfer delay will result in unacceptable lack of quality. The transfer delay requirement is therefore both significantly lower and more stringent than the round trip delay of the interactive traffic case.

Real time conversation- fundamental characteristics for QoS:

– preserve time relation (variation) between information entities of the stream;
– Conversational pattern (stringent and low delay).

Streaming class

When the user is looking at (listening to) real time video (audio) the scheme of real time streams applies. The real time data flow is always aiming at a live (human) destination. It is a one way transport. This scheme is characterised by the fact that the time relations (variation) between information entities (i.e. samples, packets) within a flow shall be preserved, although it does not have any requirements on low transfer delay.

The delay variation of the end-to-end flow shall be limited, to preserve the time relation (variation) between information entities of the stream. But as the stream normally is time aligned at the receiving end (in the user equipment), the highest acceptable delay variation over the transmission media is given by the capability of the time alignment function of the application. Acceptable delay variation is thus much greater than the delay variation given by the limits of human perception.

Real time streams- fundamental characteristics for QoS:

– preserve time relation (variation) between information entities of the stream.

NOTE: This shall also be true for data communication even if not in the real time class. In packet data, higher protocol levels (TCP and upwards) guarantees this time relation. Preservation of order is not directly linked to low latency.

Interactive class

When the end-user, that is either a machine or a human, is on line requesting data from remote equipment (e.g. a server), this scheme applies. Examples of human interaction with the remote equipment are: web browsing, data base retrieval, server access. Examples of machines Interaction with remote equipment are: polling for measurement records and automatic data base enquiries (tele-machines).

Interactive traffic is the other classical data communication scheme that on an overall level is characterised by the request response pattern of the end-user. At the message destination there is an entity expecting the message (response) within a certain time. Round trip delay time is therefore one of the key attributes. Another characteristic is that the content of the packets shall be transparently transferred.

Interactive traffic- fundamental characteristics for QoS:

– request response pattern;
– preserve payload content.

Background class

When the end-user, that typically is a computer, sends and receives data-files in the background, this scheme applies. Examples are background delivery of E-mails, SMS, and download of databases and reception of measurement records.

Background traffic is one of the classical data communication schemes that on an overall level is characterised by that the destination is not expecting the data within a certain time. The scheme is thus more or less delivery time insensitive. Another characteristic is that the content of the packets shall be transparently transferred (with low bit error rate).

Background traffic- fundamental characteristics for QoS:

– the destination is not expecting the data within a certain time;

– preserve payload content.

In order to have a specific service transported in the appropriate QoS class, it has to be recognized by the protocol instances to which class it belongs. This is of special importance in cases where new services demand for close to real-time transmission and make use of existing services.

The best example in this context is a financial service which makes use of the SMS service. Without any additional measures taken, the network does not recognize the financial service but only the SMS service and will transmit it in the background class. In consequence the financial service is not being provided with the necessary real-time transmission.

Recommendation ITU-T E.804 “Quality of service aspects for popular services in mobile networks” provides sets of quality of service (QoS) parameters from an end-user's perspective for the operational aspects of mobile communication. As services per se are not standardized, it focuses on popular services, which means commonly or widely used services.

This does not preclude applying the definitions in this Recommendation for other (not widely used) services, if feasible.

It provides QoS parameter (KPI) definitions for mobile services and related trigger points. Furthermore, it discusses all aspects of practical application thereof, including field testing and statistical considerations.

Currently, DFS as a specifically defined end to end service is not included in Recommendation ITU-T E.804. Services on which actual DFS implementations are based – such as SMS or http – are however treated in in broad detail.

Note: SMS is a store and forward service which – without modifications – cannot be used for real-time transactions which will be required for certain transaction types of DFS

Recommendation ITU-T G.1040 “Network contribution to transaction time” provides the definition, description, and examples of the network contribution to transaction time (NCTT) performance metric for short data transactions with relevance to network providers and users. This is a metric derived primarily from the performance characteristics of the user-network interface to user-network interface (UNI-UNI) path, although it also uses limited configuration information from clients and hosts.

This performance metric is intended to be applied in situations where packet network communications are used to complete repetitive data transactions, such as credit card authorization for purchase, and where measurements of the supporting network's performance are available.

The NCTT metric is derived from packet transfer delays and packet loss ratios from client to host and host to client, effectively a round-trip across the network. Measurements will usually supply the needed network characterization.

A typical data transaction takes the form of a packet conversation, where the client identifies itself to a remote host and submits some request for processing on behalf of a user. The host, after assuring the identities and authorization of the client device and user, performs the request and communicates the result. In the case of "short" transactions considered here, the result is a simple confirmation of the request to exchange funds, or an account balance.

The reference path and reference transaction (illustrating a transaction with eight round-trip exchanges) are described in the figures below.

Figure 9: Reference path from Recommendation G.1040

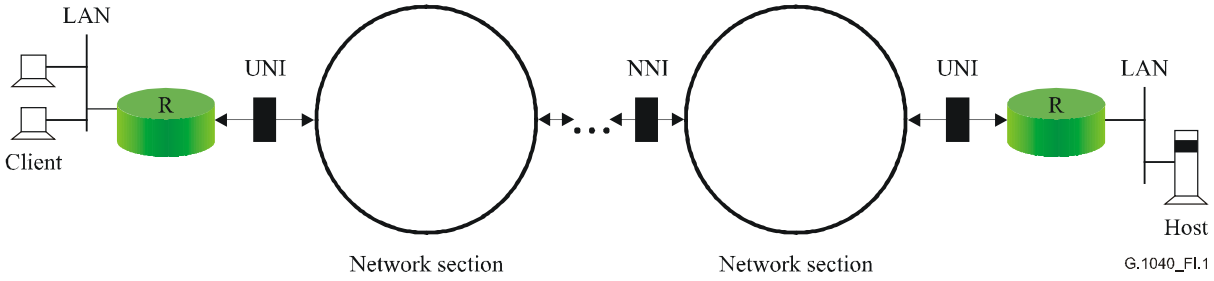
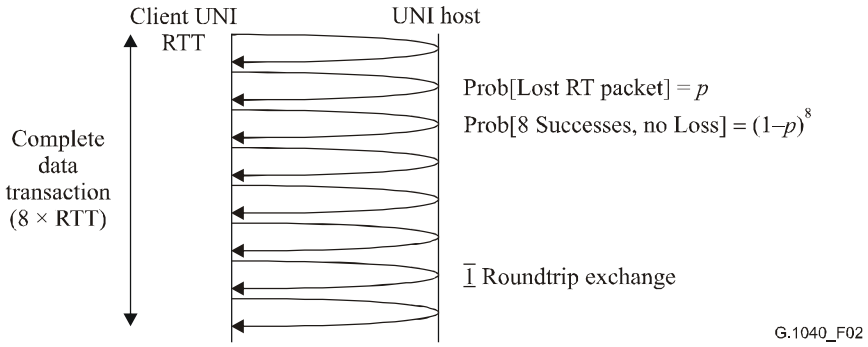


Figure 10: Reference transaction from Recommendation G.1040



Supplement 9 to the ITU-T E.800-series Recommendations "Guidelines on regulatory aspects of QoS" focuses on end-to-end QoS as perceived by the user when using modern mobile and broadband services. The intent here is to assist regulators or administrations who need to achieve desired levels of QoS for one or more information and communications technology (ICT) services under their jurisdiction.

Recommendation ITU-T E.803 "Quality of service parameters for supporting service aspects" lists 88 generic parameters over the product life cycle of ICT services which will enable a regulator, stakeholder or any interested party to select a pertinent number of parameters about the Service Provider (SP) that provide performance data. Performance data on the non-utilization stages of services, in addition to the service specific performance usually dealing with in-use performance, are necessary to enable customers to choose a service provider (SP) most suited to meet their specific quality of service (QoS) requirements.

QoS performance on non-utilization stages can benefit customers, regulators, stakeholders and service providers (SPs) to monitor performance levels for the benefit of the customers and ICT industry. The essential information to be obtained for measurement and reporting of performance levels is illustrated on a selection of parameters. Guidance on presentation of performance results is also provided. Service providers reporting of delivered performance to a recommended procedure will enable comparability among providers.

Annex B: Underlying functionalities of DFS applications

Table B.1: Summary of technologies for use case #1

Technique	Main features	Disadvantages	Advantages
SMS	Store-and-forward alphanumerical messages	Not real-time	Globally available Interconnection ok
IVR	Interaction with user by artificial or recorded voice, voice recognition and/or DTMF	Requires good speech quality transmission	Real-time
DTMF	Simple keypad operation	Limited character set	Real-time
USSD	Alphanumerical messages	Requires USSD Gateways	Real-time

Table B.2: Summary of technologies for use case #2

Technique	Main features	Disadvantages	Advantages
SMS	Store-and-forward alphanumerical messages	Not real-time	Globally available Interconnection ok
IVR	Interaction with user by artificial or recorded voice, voice recognition and/or DTMF	Requires good speech quality transmission	Real-time
DTMF	Simple keypad operation	Limited character set	Real-time
USSD	Alphanumerical messages	Requires USSD Gateways	Real-time
WAP	Simple web browser	Limited set of functions	Available on some phones even if they do not support http
HTTP	Standard web browser	Unsecure	Internet-like access
HTTPS	Safe web browser	Complex	Encrypted, not even subject to traffic shaping

B.1 Use Case #1

From a pragmatic point of view it is assumed that the Focus Group DFS (FG-DFS) focusses on DFS applications that can be run using simple mobile feature phones (low-end mobile phones which are limited in capabilities in contrast to modern smartphones). Therefore we assume in the following that financial services requiring ftp, http or browser based transactions can be safely excluded from the discussion in this section.

B.1.1 Short Message Service (SMS)

SMS is used to send text messages to and from mobile phones, fax machines and /or IP addresses. The messages can typically be up to 160 characters in length, though some services use 5-bit mode, which supports 224 characters. SMS was originally created for phones that use GSM (Global System for Mobile) communication, but now all the major cell phone systems support it. Once a message is sent, it is received by a Short Message Service Center (SMSC), which must then get it to the appropriate mobile device.

To do this, the SMSC sends a SMS Request to the home location register (HLR) to find the roaming customer. Once the HLR receives the request, it will respond to the SMSC with the subscriber's status: 1) inactive or active 2) where subscriber is roaming.

If the response is "inactive", then the SMSC will hold onto the message for a period of time. When the subscriber accesses his device, the HLR sends a SMS Notification to the SMSC, and the SMSC will attempt delivery.

The SMSC transfers the message in a Short Message Delivery Point to Point format to the serving system. The system pages the device, and if it responds, the message gets delivered.

The SMSC receives verification that the message was received by the end user, then categorizes the message as "sent" and will not attempt to send again.

SMS falls into the group of the so-called store-and-forward services and is normally being transported in the background class according to 3GPP TS 23107. As a consequence, parameters like SMS delivery time or SMS response time depend very much on the traffic load of the mobile network and cannot be guaranteed.

B.1.2 Interactive Voice Response (IVR)

Interactive voice response (IVR) is a technology that allows a computer to interact with human users through the use of voice and DTMF tones input via keypad.

In telecommunications, IVR allows customers to interact with a company's host system via a telephone keypad or by speech recognition, after which they can service their own inquiries by following the IVR dialogue. IVR systems can respond with pre-recorded or dynamically generated audio to further direct users on how to proceed. IVR applications can be used to control almost any function where the interface can be broken down into a series of simple interactions.

B.1.3 Dual Tone Multi Frequency (DTMF) signalling

The DTMF system uses a set of eight audio frequencies transmitted in pairs to represent 16 signals, represented by the ten digits, the letters A to D, and the symbols # and * as described in Recommendation ITU-T Q.23. Detailed requirements for DTMF are specified in ETSI ES 201 235. As the signals are audible tones in the voice frequency range, they can be transmitted like speech signals. Originally used to dial the number of the remote terminal, it became a common method to transmit small amounts of data.

In packet based networks there are 3 common ways of sending DTMF:

- SIP INFO packets as described in IETF RFC 2976
- As specially marked events in the RTP stream – as described in IETF RFC 2833
- Inband as normal audio tones in the RTP stream with no special coding or markers

For mobile networks 3GPP TS23014 describes how DTMF signals are supported. A message based signalling system is used across the 3GPP system air interface. Inband transmission is not possible. That means that in mobile communication the originating mobile terminal is directly creating the relevant messages when the keys are pressed by the user during a call.

B.1.4 Unstructured Supplementary Service Data (USSD) – both push and pull services

Unstructured Supplementary Service Data (USSD) is a protocol used by mobile terminals to communicate with the network of the mobile operator.

USSD messages are up to 182 alphanumeric characters in length. 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.

Messages sent over USSD are not standardized:

Normally, USSD is used in the format *nnn# as part of configuring the phone on the network. In order to transfer text messages via USSD to another mobile network, a special USSD gateway is required which mobile operators not normally provide.

USSD is sometimes used in conjunction with SMS. The user sends a request to the network via USSD, and the network replies within the same USSD session with an acknowledgement of receipt.

Subsequently, one or more mobile terminated SMS messages communicate the status and/or results of the initial request. In such cases, SMS is used to "push" a reply or updates to the handset when the network is ready to send them. In contrast, USSD is used for command-and-control only.

All mobile phones of phase II or later have USSD capability.

USSD is generally associated with real-time or instant messaging services. There is no store-and-forward capability, as is typical of other short-message protocols like SMS.

USSD is specified in GSM 02.90 and in GSM 03.90.

USSD Modes:

- Mobile-initiated: USSD/ PULL or USSD/ P2P
  when the user dials a code from mobile terminal
- Network-initiated: USSD/ PUSH or USSD/A2P
  when the user receives a push message from the network

USSD can be used e.g. for prepaid callback service, mobile-money services, location-based content services, menu-based information services, and as part of configuring the phone on the network.

B.2 Use Case #2

In addition to use case #1, the following underlying techniques can be taken into account. Even basic smart phones will provide services based on these techniques.

B.2.1 WAP

Wireless Application Protocol (WAP) is a technical standard for accessing information over a mobile wireless network. A WAP browser is a web browser for mobile devices such as mobile phones that uses the protocol.

WAPs that use displays and access the Internet run what are called microbrowsers-browsers with small file sizes that can accommodate the low memory constraints of handheld devices and the low-bandwidthconstraints of a wireless-handheld network.

Although WAP supports HTML and XML, the WML language (an XML application) is specifically devised for small screens and one-hand navigation without a keyboard. WML is scalable from two-line text displays up through graphic screens found on items such as smart phones and communicators. WAP also supports WMLScript. It is similar to JavaScript, but makes minimal demands on memory and CPU power because it does not contain many of the unnecessary functions found in other scripting languages.

B.2.2 HTTP

The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web. Hypertext is structured text that uses logical links (hyperlinks) between nodes containing text. HTTP is the protocol to exchange or transfer hypertext.

HTTP functions as a request-response protocol in the client-server computing model. A web browser, for example, may be the client and an application running on a computer hosting a web site may be the server. The client submits an HTTP request message to the server. The server, which provides resources such as HTML files and other content, or performs other functions on behalf of the client, returns a response message to the client. The response contains completion status information about the request and may also contain requested content in its message body.

B.2.3 HTTPS

HTTPS (also called HTTP over TLS, [1] [2] HTTP over SSL, [3] and HTTP Secure [4] [5]) is a protocol for secure communication over a computer network which is widely used on the Internet. HTTPS consists of communication over Hypertext Transfer Protocol (HTTP) within a connection encrypted by Transport Layer Security or its predecessor, Secure Sockets Layer. The main motivation for HTTPS is authentication of the visited website and to protect the privacy and integrity of the exchanged data.

In its popular deployment on the internet, HTTPS provides authentication of the website and associated web server with which one is communicating, which protects against man-in-the-middle attacks. Additionally, it provides bidirectional encryption of communications between a client and server, which protects against eavesdropping and tampering with and/or forging the contents of the communication.

Annex C: Selection of a set of KPIs appropriate for DFS

Traditionally, the ITU does neither specify a specific set of KPI nor does the ITU specify target values. The technical and economic conditions are too different in different regions or even in different countries of the same region to make it all the same.

Therefore, it is an important task for the stakeholders involved in DFS (regulators, service providers and user organizations) to enter into a process of the selecting an appropriate set of KPIs that fits the local situation.

This selection could reflect the local market characteristics, customer's preferences and requirements. The number of parameters may be chosen to be manageable both for reporting and for practical application. Where local market characteristics require different sets of parameters for different customer sectors this may be reflected in the choice of parameters.

Guidance on the process can be found in Supplement 9 to the ITU-T E.800-series Recommendations.

This section discusses several areas from which KPIs might be selected.

C.1 KPIs for non-utilization stages

For digital financial services it is crucial to set KPI for interactions between the user and the service provider outside the actual usage of the service. Due to the nature of DFS it would obviously be beneficial if in addition to the telecom regulator (and the DFS SP) the related regulator for the banking sector is involved in the selection of these KPIs. The following stages need to be taken into account:

- Preliminary information on ICT services
- Contractual matters between ICT service providers and customers
- Provision of services
- Service alteration
- Technical upgrade of ICT services
- Documentation of services (operational instructions)
- Technical support provided by service provider
- Commercial support provided by service provider
- Complaint management
- Repair services
- Charging and billing
- Network/Service management by customer
- Cessation of service

Further details and guidance can be found in Recommendation ITU-T E.803.

C.2 Technical KPIs

This section points to technical KPIs that can be used against the four techniques discussed in this paper: SMS, IVR, DTMF and USSD. It is important to understand that a specific DFS service offer may make use of a combination of these four techniques. In such a case KPIs for each of the techniques should be taken into account.

Example:A DFS transaction could be initiated using USSD/PULL and afterwards be concluded with SMS status report etc.

NOTE: For the following subclauses, a cross-reference table would be helpful. However, it requires detailed information on the way a DFS service is using these underlying services. Also a description of the role of the respective basic technology in a DFS transaction is missing (or a reference to a new section, as suggested). Example: A DFS transaction is made of a couple of usages of some basic services of functions. For those functions, KPI definitions may exist. With the current structure, there is no information how far a DFS implementation is covered. For example: DTMF. A DFS transaction based on DTMF needs a connection set-up (telephony? Currently not covered; telephony is again treated by existing standards e.g. TS 102 250/E.804).

C.2.1 SMS

The following is a non-exhaustive list of technical KPIs which may be applied for SMS:

- Recommendation ITU-T E.804 (subclause 7.4.4):
  - SMS service non-accessibility [%]
  - SMS access delay [s]
  - SMS completion failure ratio [%]
  - SMS end-to-end delivery time [s]
  - SMS receive confirmation failure ratio [%]
  - SMS receive confirmation time [s]
  - SMS consumed confirmation failure ratio [%]
  - SMS consumed confirmation time [s]
- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- 3GPP TS 23107
  - Traffic class

C.2.2 IVR

The following is a non-exhaustive list of technical KPIs which may be applied for IVR:

- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- Recommendation ITU-T P.863
  - Perceptual objective listening quality assessment
- No Recommendation currently available
  - Intellegibility, voice recognition

C.2.3 DTMF

The following is a non-exhaustive list of technical KPIs which may be applied for DTMF:

- ES 201 235
  - DTMF characteristics
- Recommendation ITU-T G.1040

  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- 3GPP TS23014
  - DTMF transport over the radio network

C.2.4 USSD

The following is a non-exhaustive list of technical KPIs which may be applied for USSD:

NOTE: These KPIs and their technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)

C.2.5 WAP

The following is a non-exhaustive list of technical KPIs which may be applied for WAP:

- Recommendation ITU-T E.804 (subclause 7.3.11):
  - WAP activation failure ratio
  - WAP activation time
  - WAP (page) IP access failure ratio [%]
  - WAP (page) IP access set-up time [s]
  - WAP (page) session failure ratio [%]
  - WAP (page) session time [s]
  - WAP (page) request failure ratio [%]
  - WAP (page) request time [s]
  - WAP (page) mean data rate [kbit/s]
  - WAP (page) data transfer cut-off ratio [%]
  - WAP (page) data transfer time [s]
- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- 3GPP TS 23107
  - Traffic class

C.2.6 HTTP

The following is a non-exhaustive list of technical KPIs which may be applied for HTTP:

- Recommendation ITU-T E.804 (subclause 7.3.8):
  - HTTP Service non-accessibility [%]
  - HTTP set-up time [s]

  - HTTP IP-service access failure ratio [%]
  - HTTP IP-service set-up time [s]
  - HTTP session failure ratio [%]
  - HTTP session time [s]
  - HTTP mean data rate [kbit/s]
  - HTTP data transfer cut-off ratio [%]
- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- 3GPP TS 23107
  - Traffic class

C.2.7 HTTPS

To be defined.

For the current purposes the same KPI as for HTTP apply (as in user perception there is no difference). However, it should be noted that HTTPS is treated (and routed) in a different way than HTTP by many network operators.

Basically, the test cases for HTTPS can be the same as for HTTP (upload, download, web browsing). Therefore, the set of KPI as defined in Recommendation ITU-T E.804 can be used. However, the technical events on IP level, used there as the primary example are not applicable as these may not be accessible due to encryption. Therefore, equivalent events on higher protocol levels (up to the application level) need to be used, which may require additional validation.

NOTE: These KPIs and their technical basis are currently not standardized and therefore cannot be assessed in a comparative manner.

- Recommendation ITU-T G.1040
  - Network contribution to total transaction time (in case the network is not packet based, the principles laid out in G.1040 can be applied in analogy)
- 3GPP TS 23107
  - Traffic class

III Review of DFS User Agreements in Africa: A Consumer Protection Perspective

About this report

This report was prepared by Sarah Ombija for the ITU Focus Group on Digital Financial Services (DFS). The report was edited by Jami Solli and David Medine and was reviewed by the Consumer Experience and Protection Working Group.

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Executive summary

The success of Digital Financial Services (DFS) in developing countries and its contribution to increasing financial access to previously unserved and underserved populations is indisputable. Even though the exponential growth of DFS is praiseworthy, it has caused a number of spill-over effects, some of which are not so laudable. In this regard, one key area that is worthy of examination relates to the consumer experience with user agreements. User agreements are standard form contracts which spell out the terms and conditions of use, and quite a few are unduly burdensome for consumers. Others may actually cause direct harm to consumers.

This report explains the findings from an analysis of DFS user agreements in nine African countries and attempts to understand the overall consumer experience and whether or not there is a disconnect between contract provisions and the legal and regulatory provisions governing DFS. It highlights key findings, and makes a number of recommendations for action by the appropriate regulator in the various markets examined. Countries need to take these considerations into account as they continue to nurture their DFS markets so as to safeguard customers from harmful practices and ensure trust in the market.

The summary of findings below indicates that consumers face a number of challenges as they use DFS, including:

i. Lengthy contracts: Some contracts run quite long, which discourages consumers from reading them. Findings from behavioural science further support this conclusion. Consequently, this throws doubt as to whether there is truly *a meeting of the minds* when consumers enter into user agreements with providers.

ii. Fees and charges associated with transactions, including for money transfers, bill payments, interest on loans, and USSD charges for transactions are not always stated in the agreements. Thus, consumers may not be aware of the cost of services prior to entering these binding arrangements.

iii. Language barriers: Contracts are predominantly in English, which is not spoken by a large number of the populations at issue. Furthermore, these contracts often use complex legal language and consequently even those consumers who are fluent in English may still fail to understand the true implications of the provisions.

iv. Providers stipulate a number of obligations towards customers in these agreements. Areas such as fraud and funds protection are of concern. Of the agreements reviewed, only 50 per cent of agreements outlined specific obligations related to fraud and funds protection. Moreover, the customer must notify the provider as a pre-condition for providers to address incidences of fraud, when consumers may not be in the best position to identify a fraud.

v. Over 80 per cent of contracts contain clauses permitting providers to share information with third parties, such as credit reference bureaus, provider agents and subsidiaries, and also “for reasonable commercial purposes related to the provision of services”. This is quite vague and may give providers overbroad license to share consumer data, which raises privacy concerns. Management of privacy and data protection is further complicated by the lack of specific data protection legislation in the jurisdictions reviewed. Consumers have to rely on provisions contained in various pieces of legislation that do not comprehensively protect them.

vi. Half of the contracts included clauses requiring consumers to indemnity providers for legal fees incurred in pursuing a legal matter related to their offer of service to the consumer. Such clauses could result in customers avoiding pursuing redress, even where they have a valid complaint, for fear that they may accrue legal fees that they cannot afford.

vii. Clauses governing a change of terms and conditions by providers can be problematic, such as those that result in customers being legally required to accept terms and conditions that are retroactively introduced, whether they have read and agreed to these new terms or not.

The contracts reviewed provide a useful snapshot of practices in the area of DFS user agreements and it is possible that the findings may not apply across the board in the various jurisdictions. However, regulators and policy makers would do well to carry out a more detailed analysis, looking at a greater number of contracts and potentially conducting consumer surveys in order to establish whether the issues highlighted

are indeed representative of the challenges consumers are encountering in their respective markets. If they are encountering these challenges, the recommendations detailed in the report will be a useful starting point for revamping the DFS landscape.

In addition to the contract specific concerns highlighted above, an examination of the country legal frameworks revealed that in some instances, laws/regulations might need greater specificity in order to ensure that consumers are better protected. It was observed that in instances where providers may not be directly flouting laws or regulations, the existing provisions as framed have the net effect of causing consumer harm. For example, with regard to provisions requiring transparency of fees and charges: Often the law will state that providers need to make consumers aware of the fees prior to signing on to contracts or purchasing services, but the provisions do not specially require that this should be stipulated in the user agreement itself. As such, a provider may technically be complying, as they make this information available in another location (on their website for instance), but customers may not be able to access these sources, especially those who do not have access to the Internet. This means that they are not informed of the associated charges at the point where they accept contract terms and conditions.

Overall, in order to ensure improved consumer experience as they navigate the DFS landscape, we need to have:

- User agreements that are consumer friendly in terms of language, length of contracts, and transparency of provisions.
- Greater scrutiny by regulators of these provider agreements. They might look at how providers word their obligations to ensure that consumers are not facing undue burdens and they might also generally analyse agreements to ensure key areas of consumer protection are captured in the agreement.
- Legislative amendments, as required, to improve protection for DFS consumers.
- Consumer education and awareness to help them understand their legal rights and how to navigate redress when those rights are violated.

1 Introduction

The delivery of financial services through digital means has been lauded as a key ingredient for the rise in financial inclusion numbers in many developing countries. Through this avenue, products and services such as money transfer, credit, and insurance have become much more accessible to previously under-served populations. As a prerequisite to enjoying these services, consumers are required to enter into contracts with the relevant DFS providers in their markets. However, in some cases, these agreements may contain provisions that are unfair or perilous for customers, putting them at risk of significant economic loss. More specifically, contract clauses are sometimes: (1) unclear or difficult to understand, especially as they are usually written in complex or technical language; (2) too onerous; (3) very lengthy; (4) have crucial terms missing; and (5) in contravention of legislation or regulation. However, not all contract clauses are of concern. Some agreements do try to incorporate provisions that protect consumers.

A total of 18 contracts were selected from 9 countries in Africa, namely: Ghana, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe.

These contracts were analysed along the following main themes:

- Language of agreement/transparency of communications
- Provider obligations
- Consumer obligations
- Dispute resolution/recourse.

This report summarises findings on these specific themes, across the 9 countries where contracts were reviewed.

As part of the country-specific analysis, we have also set off in boxes examples of contract provisions which appear to be in conflict with domestic legislation/regulation. While this analysis addresses potential compliance issues, we caution that the final word on the legality of a contract clause must be decided by the appropriate courts.

2 Key highlights

The country-specific analyses revealed some good practices and areas of concern, as discussed below.

2.1 Language of agreement & transparency of communications

The language used in all the contracts is English, which is not universally spoken in each country. In addition, given literacy rates in some of the countries, which providers could be expected to know, significant portions of the population will be unable to read the provisions. Even where the agreements can be read, given the frequent use of complex legal language, the true implications of the agreements may not be fully understood. See Box 1 for sample clauses from user agreements which may be considered in conflict with domestic legal and regulatory requirements.

Another challenge that was identified by the review was regarding the length of contracts. A majority of the agreements are several pages long. Studies from behavioural science demonstrate that consumers will not read lengthy agreements. This raises the question whether there is truly a meeting of the minds when customers enter into these agreements.

Fees and charges associated with transactions, including for money transfers, bill payment, interest on loans, and USSD charges for transactions, are sometimes not disclosed in the agreements. Instead, customers are referred to provider tariffs on websites or to publications that are available from other sources, including at

provider branches, customer care centres and agent outlets. A scan of a number of provider websites makes clear that additional details on product offers and other terms are often not contained in the contracts but instead in other places. See also Box 2 for sample user agreements deemed suspect with regard to a failure to transparently communicate prices.

The net result is that consumers may not be aware of the costs of services and other important contract terms and it may not be possible for them to discover what those terms are by accessing sources like websites, particularly for those who use Short Message Service (SMS), Unstructured Supplementary Service Data (USSD) or for those who do not have access to the Internet.

In addition to the above, it was also observed that providers do not always disclose the consequences of default for credit products; yet, this is a key term that customers should be made aware of *before* they accept a loan facility.

Box 1: Language & transparency of communications

Malawi & Uganda

• **Malawi, Consumer Protection Act (2003)**

26-(1) Standard form contracts or agreements shall (b) be drafted in the official language and in characters readable at single sight by any normal sighted person: and

(c) where the contract is entered into locally, have a written translation into the national local language and shall be read and explained to an illiterate, blind, mute and similarly disabled consumer in a language he understands.

27(3) For the purposes of this section, an unfair consumer contract means a contract which (e) if in case of a written consumer contract, if the contract is expressed in a language not ordinarily understood by the consumer.

• **Uganda, Financial Consumer Protection Guidelines** issued by the Bank of Uganda to address the needs of illiterate consumers-

Guideline 8(1) e) states that "where a consumer is unable to understand written information, explain orally to the consumer the written information";

Guideline 8(1) f) "ensure that where an oral explanation in paragraph 8(1)(d) and (e) has been provided to the consumer, the consumer shall have a third party to countersign as evidence that an oral explanation has been given to the consumer";

Comment:

The contracts available in both Malawi and Uganda were in English and it could therefore be argued that they are not written in a language comprehensible to all customers, particularly those who are illiterate. Also for DFS products, it is unclear whether oral explanations are being provided to illiterate and disabled consumers.

Box 2: Fees and charges

Uganda: The Mobile Money Regulations 12 (b) – At mobile money account opening, the consumer shall obtain a copy of the agreement with the service provider. The agreement shall be explained by the agent clearly and in plain language. The terms and conditions provided by the mobile money service provider shall highlight to the consumer the relevant fees, charges, penalties and any other consumer liabilities or obligations in the use of mobile money services. The mobile money customers should be able to access the service fees chargeable from their phones.

Comment:

The agreements reviewed (Utl M-sente and MTN Uganda) did not highlight to the consumer the fees, charges, and penalties.

2.2 Provider obligations

Some contracts state obligations that providers owe to consumers including: Fraud and funds protection; data protection and privacy, including when customer information is shared with third parties; procedures for reversal of erroneous transactions; and whether consumers are given advance notice of changes to contract terms. The following is a discussion of how often such obligations are stated and, when they are, what is provided.

2.2.1 Fraud and funds protection

Consumers often lose money through fraudulent activity perpetrated by third parties or even by provider employees or agents. The contracts were examined to establish whether they incorporated provider obligations with regard to fraud and funds protection.

Figure 1: Fraud & funds protection

As demonstrated in the chart, only half of the agreements stipulated specific obligations relating to fraud and funds protection. Examples of such provisions include providers suspending services or closing accounts where they suspect or become aware of fraudulent activity in relation to a customer's account.

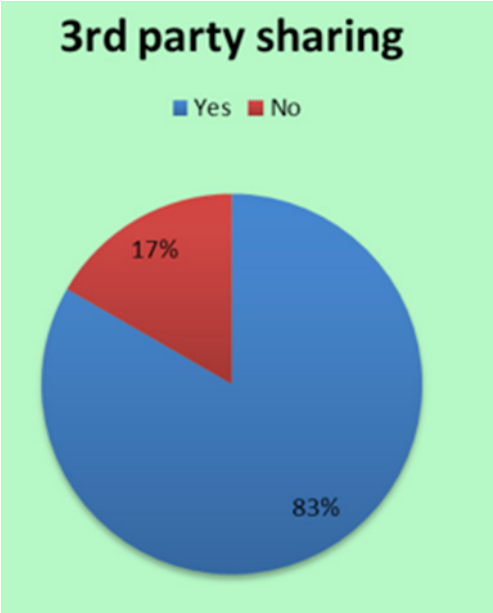
Notification by customers is a crucial precondition for providers to address cases of fraud. Agreements specify, for instance, that customers will be held responsible for transactions conducted without their authorisation unless they bring this fact to the attention of the provider. Even where customers provide notice of fraud, provider obligations only kick in after they receive such notices, with a disclaimer of liability for any losses or damages suffered by customers prior to such notifications.

2.2.2 Third party sharing

Data privacy and protection is another key area of concern. The results from the review show that 83 per cent of the contracts reviewed had clauses that permit the provider to share information with third parties, such as credit reference bureaus, law enforcement agencies (both domestic and international), regulators, provider agents, lawyers, auditors, and subsidiaries.

Sharing of customers' personal information is also permitted in some cases "for reasonable commercial purposes related to the provision of services". This very vague phrasing may give providers room to share with undisclosed categories of third parties, raising customer privacy concerns.

Figure 2: 3rd party sharing



Third party sharing is especially a concern because providers in some jurisdictions have sold sensitive customer personal information, including financial information.

Management of issues of privacy and data protection by customers is further complicated because many countries on the African continent lack specific data protection legislation. As a result, customers in a majority of these countries have to rely on provisions contained in various pieces of legislation that may not comprehensively protect them. See also Box 3, which is an example of a clause from a user agreement that may fall short of legal requirements in the jurisdiction.

Box 3: Data protection

Uganda: Mobile Money Regulations, Regulation 12(c) Data protection-

(i) A mobile money service provider, as well as its agents, shall uphold privacy and confidentiality of customer information and data;

(ii) The conditions under which customer information and data will be kept shall be disclosed before the customer enters into agreement with the mobile money service provider.

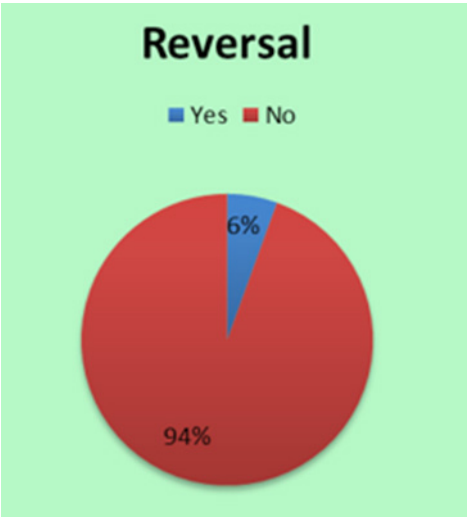
Comment:

Contracts reviewed (Utl M-sente and MTN Uganda) did not include affirmations that providers would keep customer information confidential/protected, nor to with which entities consumer data would be shared.

2.2.3 Reversal of transactions

Human error can result in customers making mistakes when they are effecting transactions. Yet, only 6 per cent of the contracts reviewed had a clause advising customers about whether and how they could reverse erroneous transactions. Some contracts provide that the customer could reverse transactions in the case of payments to the wrong person, as long as the other party had not yet withdrawn the amount in question. The problem is that fraudulent actors may promptly cash out, leaving no recourse for victimized customers who can ill-afford to bear such loses.

Figure 3: Reversal

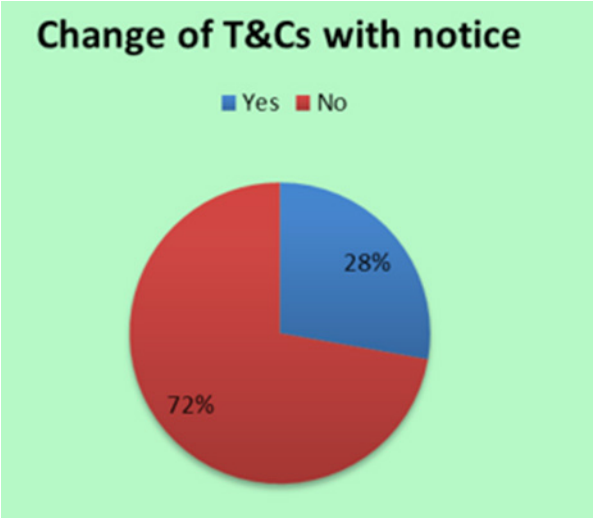


2.2.4 Variations of contract terms

Providers often reserve the right to modify terms and conditions, including those relating to fees and costs, after the initial acceptance of terms by a customer.

As shown in Figure 4, for a significant majority of the contracts reviewed, 72 per cent, there was no clause stating that customers would be given prior notice of a change of terms. This large percentage is of concern as it suggests that many providers may be introducing contract changes that customers are not aware of, which could be eroding consumer rights or protections that were available in the original contracts, and which might have caused customers to not enter the contracts if they had been disclosed in the first place.

Figure 4: Change of T&Cs with notice



In certain provider contracts, customers are asked to accept the possibility that there will be changes in advance, even as they clearly would not know the nature of such changes at the time they agree to be bound by the contract. Other contracts make the customer responsible for checking provider websites regularly in order to look out for any new changes, which would clearly be burdensome, especially if notice that changes have been made has not been given to the customer. This leaves customers being legally required to accept terms and conditions that are subsequently introduced, whether they have read and agreed to them or not.

See Box 4 for an example of a user agreement in Tanzania which may be deemed inconsistent with the spirit of domestic law on the issue of notifying the consumer of a change in the terms and conditions.

Box 4: Changes to terms and conditions

Tanzania Legal & Regulatory Provision: E-Money Regulations 2015, section 44:

(1) An electronic money issuer shall display and disclose charges and fees for its services to its customers and any changes thereof.

(2) An electronic money issuer shall notify its customers the fees and charges before imposing such fees or charges.

(3) The notice to customer shall-

(a) be delivered through electronic media and displays in a conspicuous place at the electronic money issuer's offices and agents outlets;

Comment:

The regulations require changes relating to fees to be notified to customers before these are imposed. In the contracts reviewed, there was no mention of the provider giving prior notice to the customer. In fact, for example, the Tigo Pesa clause provides at clause 4.2 that *Tigo reserves the right to vary the charges and tariffs at its discretion and without notice to the Subscriber.*

2.3 Consumer obligations

2.3.1 PIN security

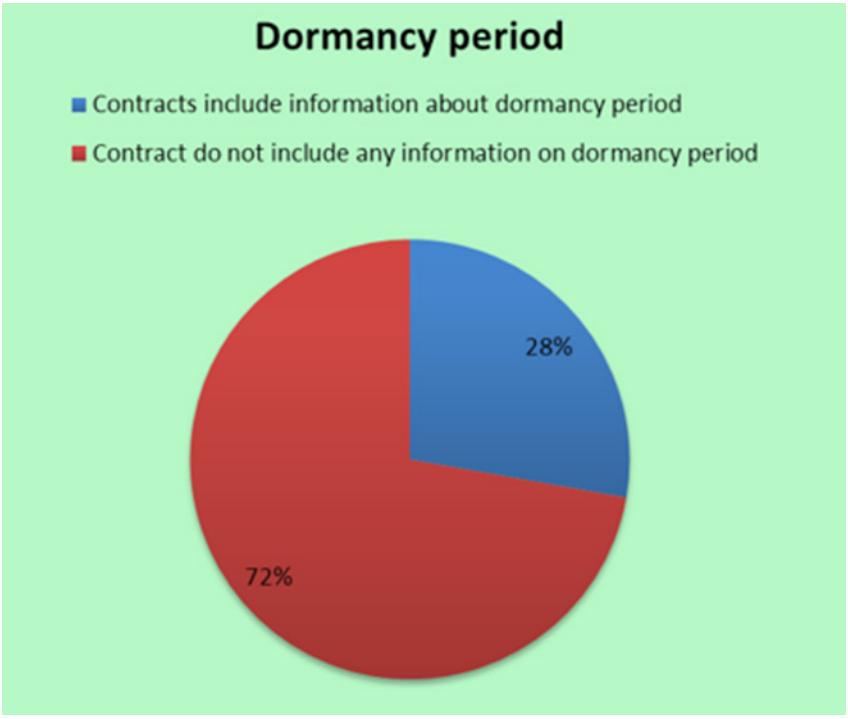
A majority of the provider contracts (61 per cent) stipulate that customers should keep their PIN securely. Further, provider contracts state that all transactions are presumed to have been generated by the consumer if instructions come from their phone number and the correct PIN is entered. Some contracts even caution customers not to disclose their PIN to provider employees at customer care centres or to provider agents at outlets.

Figure 5: PIN safety

2.3.2 Dormant accounts

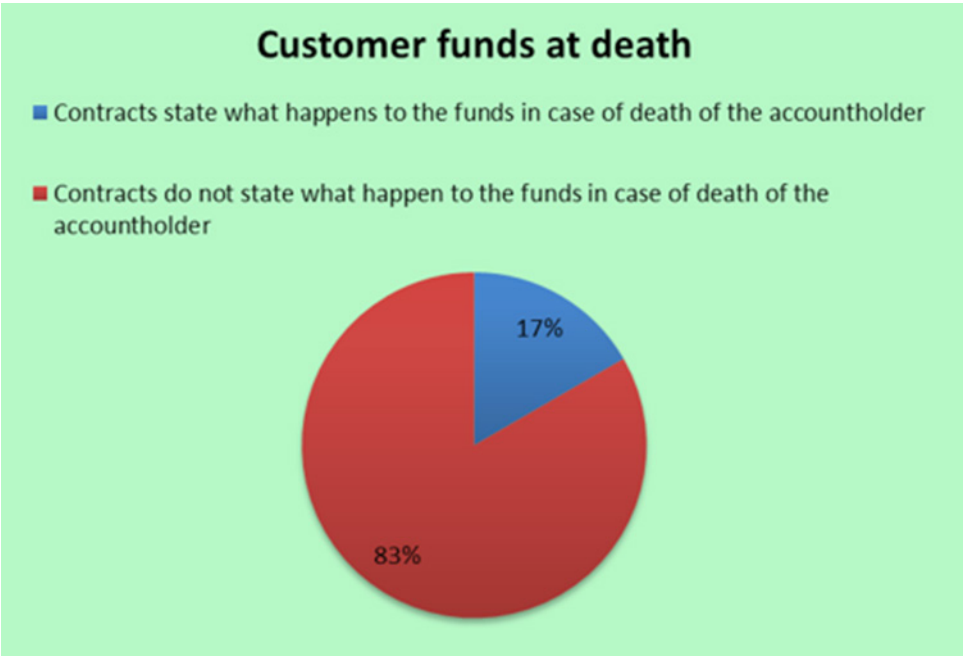
In some jurisdictions, such as Kenya and Tanzania, the law requires that funds be paid to the government if an account has been dormant for a specified period of time, in some cases five years. Yet, provisions relating to management of dormant accounts were only present in 28 per cent of the contracts reviewed, with providers employing varying definitions of dormancy. In the event of inactivity in such accounts, funds may be transferred into a trust or holding account and customers have a right to claim their balances. In fact, in Kenya, Nigeria, Tanzania, Uganda, and Zambia, regardless of whether the account is active or considered dormant, the mobile money funds must be held in a trust or escrow type account by law. However, if the customer requests the funds prior to the law requiring that the funds escheat to the state, then the credit balances should be paid to the customer upon presentation of proper identification. Otherwise, those funds may be lost or subject to a government claims process.

Figure 6: Dormancy period



Customer death: Although several contracts discussed dormancy and subsequent treatment of the funds left on the account, 83 per cent of all the contracts reviewed did not address what happens to funds in the event of the death of a customer. Therefore, it is unclear how heirs and estate executors can access these funds after the death of the account owner. One way to handle this could be to allow accounts to be held jointly with a right of survivorship, or for the account opener to name a beneficiary on the account if this is permitted under local law.

Figure 7: Customer funds at death



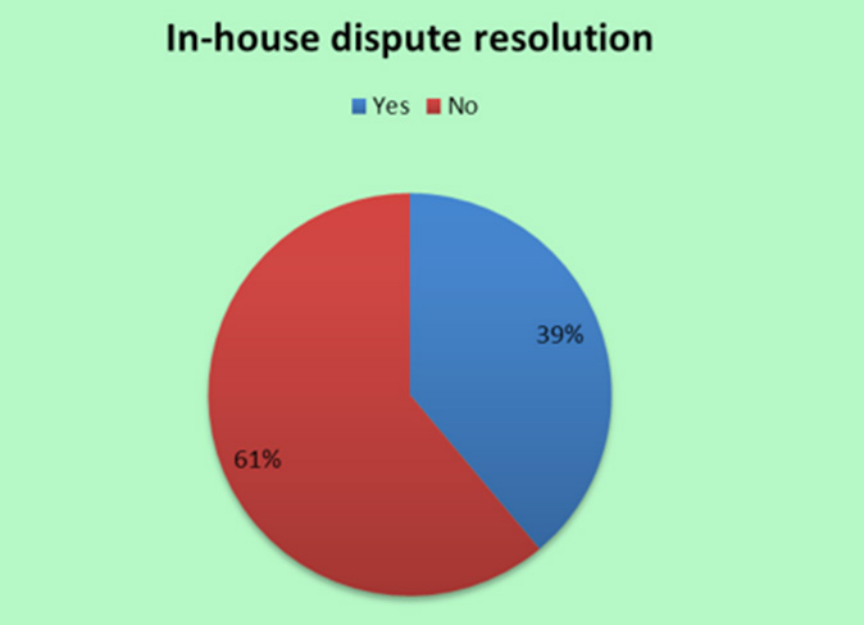
2.4 Complaints handling

2.4.1 In-house dispute resolution

Recourse mechanisms can build consumer trust in the system if they operate efficiently and respond to consumer concerns and problems (Chapman & Mazer 2013). From the contract review, provider contracts described an in-house dispute resolution mechanism in only 39 per cent of the agreements. This means that for the most part, customers will not know how to go about resolving disputes. As a result, customers may unnecessarily accept loses or burden government agencies with complaints that could have been resolved more efficiently and promptly directly with the provider.

See Box 5 for an example of contract clauses related to complaints handling which may not adhere to the legal and regulatory requirements in Uganda and Nigeria.

Figure 8: In-house dispute resolution



Box 5: Complaints handling

Uganda Mobile Money Regulations

Under Section 12(d) *Complaints handling and consumer recourse*, mobile money service providers shall ensure that appropriate and effective procedures for receiving, considering and responding to complaints are put in place. The complaints handling procedure shall ensure that:

(iii) A dedicated toll free telephone line for complaint resolution is provided;

Nigeria, Consumer Protection Framework:

2.7.1 Complaints Channels- Financial institutions shall have multiple channels (including electronic and non-electronic channels) for consumers to lodge complaints. Examples of complaints channels may include provision of dedicated email addresses, telephone numbers, help desk, web chat etc. Such channels shall be toll-free, easily accessible and available to consumers or their agents at all times.

Comment:

• In Uganda, for the contracts reviewed, one provider, MTN-Uganda, provided a helpline number but did not specify whether or not it is toll-free.

• In Nigeria, for the contracts reviewed, the Teasy Mobile agreement provided for a customer service hotline, but did not state whether it is toll-free. When in doubt, consumers are unlikely to use the hotline for fear of incurring charges. On the other hand, the Stanbic Mobile Money contract did not mention a customer hotline at all.

• While the laws do not specifically require contractual disclosures regarding complaint handling, it would be beneficial to consumers if they did.

2.4.2 Mandatory arbitration

A small number of contracts (17 per cent) make arbitration the mandatory mode for addressing customer disputes. In a number of jurisdictions, this is an unfair contract term.

Arbitration and other alternative dispute resolution mechanisms are increasingly becoming the preferred means for resolving disputes in some developing countries, as they generally take a much shorter time to conclude at less expense in comparison to court-centred legal redress. However, the concern is that some consumers cannot effectively take advantage of this option because a distant location, such as the capital city, is designated as the arbitration venue. In one contract that was reviewed, the arbitration venue was a city in another country altogether. Such provisions serve to effectively restrict consumer access to avenues that might otherwise provide a quick and easy method for dispute resolution. See Box 6 for examples of problematic arbitration clauses.

Figure 9: Mandatory arbitration

Box 6: Mandatory arbitration

Kenya Legal & Regulatory Provision: Consumer Protection Act section 88 (1)

Any term or acknowledgment in a consumer agreement or a related agreement that requires or has the effect of requiring that disputes arising out of the consumer agreement be submitted to arbitration is invalid insofar as it prevents a consumer from exercising a right to commence an action in the High Court given under this Act.

Comment:

The contracts reviewed in Kenya (M-PESA & M-Shwari) mandate arbitration: the language "shall be referred to Arbitration" is employed. If the contract drafter intended to offer arbitration only as a first option, then it should be specified and clearly explained that arbitration is available as one option to resolve consumer disputes, in addition to the judicial mechanisms available. There is a risk that unqualified arbitration language could mislead consumers regarding their rights.

2.4.3 Legal fees indemnity

Half of the provider contracts reviewed contain a clause requiring the consumer to indemnify the provider for any legal fees incurred in pursuing a legal matter related to their offer of service to the consumer. This clause is written so broadly as to cover the providers' own legal costs for defending itself against a potentially valid consumer complaint. Thus, consumers, presuming they understand the meaning of the indemnity clauses, could be required to pay the legal fees of the provider even if the consumer had a founded complaint: this is a lose-lose scenario for the consumer and a barrier to accessing justice.

Such provisions are unfair to consumers, especially those from low-income backgrounds, as they may shy away from instituting legal proceedings against providers on account of a fear of fees that they could accrue as a consequence.

Figure 10: Legal fees indemnity

A note on third party digital lenders

Another noteworthy concern relates to the rise of third party digital lenders who offer loans to customers via mobile phone applications. Because they are not banks or mobile network operators (MNOs), they may fall outside of current regulatory frameworks that apply to traditional lenders and, therefore, could take advantage of this regulatory gap to engage in conduct that could be detrimental to consumers. For instance, this may mean that these digital lenders are exempt from prohibitions on including unfair or risky contract clauses in contracts.

3 Conclusions and recommendations

Consumer contracts that were reviewed present a number of challenges as discussed above. The following recommendations are made to address the identified risk areas:

1) Language & transparency of communications:
   a. Local language contracts should be provided, especially where there is one major language spoken in a jurisdiction besides English, e.g., in East Africa, Swahili is often stipulated as a second national language.
   b. Alternative formats, such as Braille, large print, and oral disclosures should be available for customers who are illiterate or have disabilities, e.g., blindness.
   c. The first page of agreements given to customers or a separate cover page should highlight and summarize key contract terms, e.g., charges/fees, complaint handling process, PIN security, fraud and funds protection, consequences of default, and dormancy period.
2) Provider obligations
   a. Providers should be required to include a term in the contract requiring that customers be notified of all changes to contract terms before they take effect.
   b. There should be as many channels for providing customer contractual notifications as possible – especially including the mechanisms through which customers interact with the provider, such as SMS channels and agent outlets, in addition to websites and newspapers.
   c. Providers should be required to include clauses on data privacy and protection in contracts, such as what customer information is being collected, how it will be used, whether and under what circumstances it will be disclosed to third parties including legal/regulatory requirements, the matters about which customers can exercise choice regarding their information and how they can exercise such choice, data security measures that have been employed, and customers' ability to access and correct their records.
3) Consumer obligations:
   a. Take reasonable steps to avoid entering into contracts with customers who are not legally eligible to contract, such as due to age or infirmity, and, where applicable law permits minors to enter into credit arrangements, providers should make sure that parents/guardians have authority to terminate such agreements and potentially have to co-sign or at least provide their consent to the agreement.
   b. With regard to DFS products, consumers should be encouraged to take the time to read and understand terms and conditions prior to accepting them. Where communications devices used by customers do not easily permit disclosures, and instead refer to websites, creative methods should be employed to educate consumers about the terms of agreements to avoid situations in which they accept but are unaware of terms that are detrimental.
   c. Providers should limit or end the use of outside links/URLs in agreements.

4) Dispute resolution:
   a. Call centre numbers should be stated in the contract and it should be clear whether or not calls to them are toll free.
   b. In-house dispute resolution mechanisms should be described.
   c. Venue for arbitration - customers should be allowed to commence arbitration proceedings from locations convenient to where they reside.
   d. Legal fees - clauses requiring the provider to be indemnified for legal fees should be removed to enable low-income customers to effectively access recourse mechanisms.
5) Contracts should be as complete as possible: In some contracts, customers are asked to make reference to other documents with regard to specific terms. Any other documents should be readily available to the consumer, such as by being attached to the contract.
6) Contracts should clearly indicate the instances in which the consumer is liable for his or her own loss of funds due to fraud (e.g., not keeping PIN private).
7) Contracts should clearly indicate whether funds reversals are possible and, if so, the protocol for reversing a transaction.
8) Contracts should indicate whether the provider has a policy on funds dormancy and indicate what the procedure is to avoid loss of funds due to dormancy or the death of the account holder (e.g., noting a next of kin on the account as holding right of survivorship).

Annex 1: DFS Contracts Reviewed

Country	Terms & Conditions reviewed	Review date	Links
Kenya	M-pesa (Safaricom)	10/08/2016	https://www.safaricom.co.ke/images/Downloads/Terms_and_Conditions/CUSTOMER_TERMS_March_2012.pdf
	M-shwari (CBA/Safaricom)	11/08/2016	http://www.safaricom.co.ke/images/Downloads/Terms_and_Conditions/M-SHWARI_TERMS_AND_CONDITIONS.pdf
Ghana	Airtel Money Bosea	12/08/2016	http://africa.airtel.com/wps/wcm/connect/africarevamp/ghana/airtel_money/home/business/terms-and-conditions
	Tigo Cash	15/08/2016	https://www.tigo.com.gh/tigocash/terms
Malawi	Easybank online	25/08/2016	https://www.nbs.mw/index.php/2015-10-22-13-36-29/aboutus/terms-and-conditions
	Airtel Money	25/08/2016	http://africa.airtel.com/wps/wcm/connect/AfricaRevamp/Malawi/Airtel_Money/Home/Personal/Terms-and-Conditions
Nigeria	Teasy Mobile	16/08/2016	http://teasymobilemoney.com/terms-conditions/
	Stanbic Mobile Money	17/08/2016	https://web.909wallet.com/Home/Terms
South Africa	GetBucks	18/08/2016	https://za.getbucks.com/terms
	WeChat Wallet	18/08/2016	https://wechat.co.za/wechat-wallet-user-agreement/

Country	Terms & Conditions reviewed	Review date	Links
Tanzania	Tigo Pesa	22/08/2016	https://www.tigo.co.tz/terms-and-conditions
	Timiza (Jumo)	22/08/2016	https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwj6vebn6cfRAhVpAcAKHVtDBt4QFggkMAA&url=http%3A%2F%2Fafrica.airtel.com%2Fwps%2Fwcm%2Fconnect%2F9105e6db-d3a7-4591-b7fa-25ea008c05f5%2FTIMIZA%2BCash%2BLoan%2BTerms%2Band%2BConditions.pdf%3FMOD%3DAJPERES%26attachment%3Dtrue%26id%3D1452503154305&usg=AFQjCNFOYcWPifvlr_qPesuvDycsQXugVQ&sig2=mTSFuTumHx5fpynrp3LTeQ
Uganda	Utl-M-Sente	23/08/2016	http://www.utl.co.ug/wp-content/uploads/2012/04/UTL_SIM_Registration_Form.pdf
	MTN- Uganda	23/08/2016	https://www.mtn.co.ug/Mobile%20Money/How%20to%20use/Documents/MTN-Mobile-Money-Consumer-Terms.pdf
Zambia	MTN Kongola (Jumo)	24/08/2016	http://tc.jumo.world/mzmc
	Airtel Money	24/08/2016	http://africa.airtel.com/wps/wcm/connect/AfricaRevamp/Zambia/AirtelMoney/Terms+of+Use
Zimbabwe	Steward Bank	19/08/2016	https://www.stewardbank.co.zw/customer-service/contacts/mobile-banking-terms-and-conditions
	EcoCash	19/08/2016	https://www.econet.co.zw/ecocash/customer-terms-and-conditions

Annex 2: Summary of findings

i. Language of agreement/transparency of communications

Country	Name of T&Cs reviewed	Is the language of user agreement English	Is the language itself simple and easy to read if you speak English?	Are costs, fees, or schedules of fees (or links to this) evident in the agreement	If this is a credit product, is collateral taken?	Are consequences of default for credit products clearly spelled out?	Are there any limitations on cash withdrawals?
Kenya	M-pesa (Safaricom)	Yes	No*	No	N/A	N/A	Yes
	M-shwari (CBA/Safaricom)	Yes	No*	No	Yes	Yes	Yes
Ghana	Airtel Money Bosea	Yes	No*	No	Yes	Yes	Yes
	Tigo Cash	Yes	No*	No	N/A	N/A	No*
Malawi	Easybank online	Yes	No*	No	N/A	N/A	Yes
	Airtel Money	Yes	No*	No	N/A	N/A	No*
Nigeria	Teasy Mobile	Yes	No*	No	N/A	N/A	Yes
	Stanbic Mobile Money	Yes	No*	No	N/A	N/A	No*
South Africa	GetBucks	Yes	No*	No	No*	No*	No*
	WeChat Wallet	Yes	No*	No	N/A	No*	No*
Tanzania	Tigo Pesa	Yes	No*	No	N/A	N/A	Yes
	Jumo-- Timiza Wakala	Yes	No*	No	No*	Yes	No*

Country	Name of T&Cs reviewed	Is the language of user agreement English	Is the language itself simple and easy to read if you speak English?	Are costs, fees, or schedules of fees (or links to this) evident in the agreement	If this is a credit product, is collateral taken?	Are consequences of default for credit products clearly spelled out?	Are there any limitations on cash withdrawals?
Uganda	Utl-M-Sente	Yes	No*	No	N/A	N/A	No*
	MTN- Uganda	Yes	No*	No	N/A	N/A	No*
Zambia	MTN Kongola (Jumo)	Yes	No*	No	No*	Yes	No*
	Airtel Money	Yes	No*	No	N/A	N/A	No*
Zimbabwe	Steward Bank	Yes	No*	No	N/A	N/A	No*
	EcoCash	Yes	No*	No	N/A	N/A	Yes
Note: Explanatory text related to asterisks in the different columns			No*– Those with low literacy levels may find it difficult to understand the language used		*No – contract is silent N/A – mobile money product	*No – contract is silent N/A – mobile money product	*No – contract is silent

ii. Provider obligations

Country	Name of T&Cs reviewed	Does the agreement state that the provider has any obligations with regard to fraud/ funds protection	Does the agreement state that the provider has any obligations protection or privacy of client information?	Does the agreement state that the user's financial information will be shared with a credit bureau or third party?	Is there a means to reverse a transaction in the event of user error?	Can the provider change the terms and conditions, including costs?	If the provider can change the terms and conditions, including costs, must notice be provided to the customer?
Kenya	M-pesa (Safaricom)	No	Yes	Yes	Yes	Yes	No
	M-shwari (CBA/ Safaricom)	No	No	Yes	No	No	No*
Ghana	Airtel Money Bosea	Yes	No	Yes	No	Yes	No
	Tigo Cash	No	No	Yes	No	No	No
Malawi	Easybank online	Yes	No	Yes	No	Yes	Yes
	Airtel Money	Yes	No	Yes	No	Yes	No
Nigeria	Teasy Mobile	Yes	No	Yes	No	Yes	No
	Stanbic Mobile Money	No	No	Yes	No	Yes	No
South Africa	GetBucks	No	Yes	Yes	No	Yes	Yes*
	WeChat Wallet	Yes	Yes	Yes	No	Yes	Yes
Tanzania	Tigo Pesa	No	Yes	Yes	No	Yes	No
	Jumo-- Timiza Wakala	No	No	Yes	No	Yes	No

Country	Name of T&Cs reviewed	Does the agreement state that the provider has any obligations with regard to fraud/ funds protection	Does the agreement state that the provider has any obligations protection or privacy of client information?	Does the agreement state that the user's financial information will be shared with a credit bureau or third party?	Is there a means to reverse a transaction in the event of user error?	Can the provider change the terms and conditions, including costs?	If the provider can change the terms and conditions, including costs, must notice be provided to the customer?
Uganda	Utl-M-Sente	No	No	No	No	No	No
	MTN- Uganda	Yes	No	No	No	Yes	No*
Zambia	MTN Kongola (Jumo)	No	No	Yes	No	Yes	No*
	Airtel Money	Yes	Yes	Yes	No	Yes	No*
Zimbabwe	Steward Bank	Yes	No	No	No	Yes	Yes
	EcoCash	Yes	Yes	Yes	No	Yes	Yes

iii. Consumer requirements

Country	Name of T&Cs reviewed	Does agreement state consumer needs to be a certain age?	Do the T&Cs specify PIN safety requirements?	Do T&Cs specify when funds become dormant?	Do T&Cs specify what happens to dormant funds?	Do T&Cs specify what happens to their funds when a customer dies?
Kenya	M-pesa (Safaricom)	Yes	Yes	Yes	Yes	Yes
	M-shwari (CBA/Safaricom)	Yes	No	No	No	No
Ghana	Airtel Money Bosea	Yes	Yes	No	No	No
	Tigo Cash	No	Yes	No	Yes	No
Malawi	Easybank online	No	Yes	No	No	No
	Airtel Money	No	Yes	No	Yes	No
Nigeria	Teasy Mobile	Yes	Yes	Yes	Yes	Yes
	Stanbic Mobile Money	Yes	Yes	No	No	No
South Africa	GetBucks	No*	No	No	No	No
	WeChat Wallet	No*	Yes	No	No	No
Tanzania	Tigo Pesa	Yes	No	Yes	Yes	No
	Jumo-- Timiza Wakala	Yes	Yes	No	No	No
Uganda	Utl-M-Sente	No	No	Yes	Yes	No
	MTN- Uganda	Yes	No	No	Yes	No
	EcoCash	Yes	Yes	Yes	No	Yes

Country	Name of T&Cs reviewed	Does agreement state consumer needs to be a certain age?	Do the T&Cs specify PIN safety requirements?	Do T&Cs specify when funds become dormant?	Do T&Cs specify what happens to dormant funds?	Do T&Cs specify what happens to their funds when a customer dies?
Zambia	MTN Kongola (Jumo)	Yes	Yes	No	No	No
	Airtel Money	Yes	No	No	Yes	No
Zimbabwe	Steward Bank	Yes	No	No	No	No

iv. Complaints, dispute resolution

Country	Name of T&Cs reviewed	Does the contract indicate what the in house complaints procedure is for resolution of disputes?	Does the contract state that there is customer service hot line?	Is there a charge to call the customer service hot line?	Is the capital city selected as the venue for resolution of disputes that cannot be resolved in house?	Does the agreement limit consumer's access to the judicial system?	Is there a mandatory arbitration clause?	Does the provider seek indemnification for provider's legal fees?
Kenya	M-pesa (Safaricom)	Yes	Yes	Not stated	Yes	No	Yes	No
	M-shwari (CBA/ Safaricom)	Yes	Yes	Not stated	Yes	No	Yes	Yes
Ghana	Airtel Money Bosea	Yes	Yes	Not stated	No*	No	No	Yes
	Tigo Cash	No	Yes	Not stated	No	No	No	No
Malawi	Easybank online	Yes	Yes	Not stated	No	No	No	No
	Airtel Money	No	Yes	Not stated	No	No	No	Yes
Nigeria	Teasy Mobile	Yes	Yes	Not stated	Yes	No	No	Yes
	Stanbic Mobile Money	No	No*	Not stated	No	No	No	Yes
South Africa	GetBucks	No	No	Not stated	No	No	No	No
	WeChat Wallet	Yes	Yes	Not stated	No	No	No	Yes
Tanzania	Tigo Pesa	No	Yes	Not stated	No	No	No	No
	Jumo-- Timiza Wakala	No	No	N/A	No	No	No	No
	EcoCash	No	No*	Not stated	No	No	No	Yes

Country	Name of T&Cs reviewed	Does the contract indicate what the in house complaints procedure is for resolution of disputes?	Does the contract state that there is customer service hot line?	Is there a charge to call the customer service hot line?	Is the capital city selected as the venue for resolution of disputes that cannot be resolved in house?	Does the agreement limit consumer's access to the judicial system?	Is there a mandatory arbitration clause?	Does the provider seek indemnification for provider's legal fees?
Uganda	Utl-M-Sente	No	Yes	No	No	No	No	No
	MTN-- Uganda	Yes	Yes	Yes	Yes	No	Yes	Yes
Zambia	MTN Kongola (Jumo)	No	No	N/A	No	No	No	No
	Airtel Money	No	No	N/A	No	No	No	Yes
Zimbabwe	Steward Bank	No	No*	No	No	No	No	No

Note: N/A – as there is no mention of a hotline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