International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Series F
Supplement 3
(09/2016)

SERIES F: NON-TELEPHONE TELECOMMUNICATION SERVICES

Overview of Telecom Finance (Finance 2.0)

ITU-T F-series Recommendations – Supplement 3

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Supplement 3 to ITU-T F-series Recommendations

Overview of Telecom Finance (Finance 2.0)

Summary

Supplement 3 to ITU-T F-series Recommendations presents an overview of Telecom Finance, an enhanced finance which, from the telecom operators' perspective, is referred to as Finance 2.0. This service will enhance the customer experience in the upcoming convergence of telecom services and financial services. It will approach the new generation of financial infrastructure among customer/user, telecom operators, including service provider (SP)/network operator (NO), the financial side, government, etc.

This Supplement addresses a framework of Telecom Finance, including background, basic objectives, general requirements and functionalities, architecture and implementations, etc.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T F Suppl. 3	2016-09-23	2	11.1002/1000/13070

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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This Supplement presents an overview of Telecom Finance, an enhanced finance which, from Telecom Operators' perspective, is referred to as Finance 2.0. This service will enhance the customer experience in the upcoming convergence of telecom services and financial services. It will approach the new generation of financial infrastructure among customer/user, telecom operators, including SP/NO, the financial side, government, etc.

This Supplement addresses a framework of Telecom Finance, including background, basic objectives, general requirements and functionalities, architecture and implementations.

2 References

[ITU-T M.3016.0] Recommendation ITU-T M.3016.0 (2005), *Security for the management plane: Overview*.

[ITU-T M.3016.1] Recommendation ITU-T M.3016.1 (2005), *Security for the management plane: Security requirements*.

[ITU-T M.3016.2] Recommendation ITU-T M.3016.2 (2005), *Security for the management plane: Security services.*

[ITU-T M.3016.3] Recommendation ITU-T M.3016.3 (2005), *Security for the management plane: Security mechanism.*

[ITU-T M.3016.4] Recommendation ITU-T M.3016.4 (2005), *Security for the management plane: Profile proforma.*

[ITU-T X.1252] Recommendation ITU-T X.1252 (2010), *Baseline identity management terms and definitions.*

3 Definitions

This Supplement defines the following terms:

3.1 cash in: A customer can deposit cash in an e-money account by interacting with an organization.

3.2 cash out: A customer can withdraw cash from an e-money account by interacting with an organization.

3.3 G2P finance: Government to people financial activities to care for peoples' lives using the Telecom Finance network. This includes public medical assurance, life assurance, social benefit and government aids.

3.4 eID: Refers to the electronic identity that lawfully identifies citizens in one country.

3.5 e-money: Money that is issued lawful, existing and exchanged electronically, including virtual money. Electronic money can be exchanged isolated from banks and be stored in a handset or a mobile terminal and exchanged electronically among entities such as individuals and businesses.

3.6 e-wallet: Digital wallet that can hold e-money for transactions and could be initiated to hold international money in different currency areas for international transactions.

3.7 finance: Activities of money exchange or money stream among social entities.

3.8 financial services: Money exchange, or money stream for some objectives provided by organizations, such as payment, banking, insurance/assurance, stock exchange, G2P, P2P, etc.

3.9 digital financial services: Financial services that could be digitalized and addressed through ICT technologies.

3.10 identification network: Communication network in Telecom Finance that could provide functions of identification at the user, service and infrastructure levels.

3.11 identification terminal: Communication terminal in Telecom Finance that could provide identification information to be identified.

3.12 mobile banking: Access to all banking services using a mobile phone.

3.13 mobile payment: A payment that is initiated by a mobile phone host using a mobile phone. It includes onsite payment and remote payment.

3.14 P2P finance: Person to person financial activities, such as lending and payment, without the intervention of banks and using a telecom network.

3.15 Telecom Finance: Finance 2.0, which is to provide digital financial services based on telecom network technologies. This includes the traditional financial service (Finance 1.0) and new financial services that meet the new financial requirements in the integrated information service era.

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

ATM	Automatic Teller Machine
B2B	Business to Business
B2C	Business to Customer
B2P	Business to Person
B2G	Business to Government
C2C	Customer to Customer
eID	Electronic Identity
G2P	Government to People
G2B	Government to Business
G2G	Government to Government
ICT	Information and Communication Technology
IdM	Identification Management
NO	Network Operator
P2B	Person to Business
P2G	People to Government
P2P	Person to Person
SMS	Short Messaging System
SP	Service Provider
TMN	Telecommunication Management Network
VIP	Very Important Person

5 Conventions

This Supplement does not use any specific conventions.

6 Introduction

In the integrated information service era, the value of telecom is changing. The traditional value of telecom is for communications, which refers to communicating anytime, anywhere, with anyone. The new value of telecom is changing towards doing anything anytime anywhere, including communication.

With respect to "doing anything", three streams are the very basic factors, information stream, money stream and logistics, where the link between information stream and money stream is tightening. The information stream refers to communication or telecom. The money stream refers to finance. Typical applications that cover telecom and finance are online shopping, mobile payment, mobile banking, online games, etc.

Also, the relationship between telecom and finance is tighter because of business to business (B2B), customer to customer (C2C), business to customer (B2C), real-time payment and tax, virtual bank and government to people (G2P) application in the SP/NO ecosystem today. Online payment, mobile payment and fixed payment, etc., are very initial applications in the telecom finance field.

Telecom exchanges information and finance exchanges money. Convergence of telecom and finance is a kind of new innovation and application across different industries. With this in scope, this Supplement considers how to promote the update and development of finance, how to innovate and develop new service and new technologies across telecom and finance. This is about Telecom Finance, which is a new concept and new field worth of further research.

Today, Telecom Finance is one of the priority requirements for current global telecom operators and customers, especially in underdeveloped and developing countries.

Telecom Finance will take the advantages of telecom and provide a better financial service and capabilities of innovation. Compared to current finance, the advantages of telecom technologies are:

– better coverage
– better interoperability
– better interaction
– better collaboration
– better identification for network, individuals and group
– better security and control
– more mature ecosystem for industry
– greener
– makes our society better.

Because of these advantages, Telecom Finance can provide a more flexible, more innovative and safer financial service in a wider area. To telecom operators, Telecom Finance will be a very important service and a new opportunity for network operations. To traditional finance players, it means not only to provide service in a wider area, but also easier financial services innovation.

7 Background

Current services in the Telecom Finance field, such as mobile payment and mobile banking are provided through the direct interface between public network and terminal, and current financial systems, which is a temporary solution described in Figure 1. This temporary solution needs to be

further considered, including a new financial service support, huge transactions, macro-payment, real-time payment and tax, international roaming, better security, easier to regulate, etc.

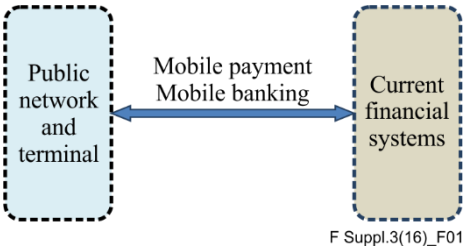

Figure 1 – Provision of current services in Telecom Finance

From the point of view of business, current services in the Telecom Finance field are just starting as there is not yet a large-scale business. Although there are a number of strategic cooperations between telecom and finance, each side does not really enter deeply into the other field. The idea of co-innovation across telecom and finance is not strong, so the win-win large-scale business model is not yet present.

The current functions in the Telecom Finance field are at a very initial phase. Some limited features like mobile payment, mobile banking, handset wallet and limited e-money are available in some special areas such as mobile money. However, this is very positive for the development of Telecom Finance and very helpful to promote the future market and industry.

As for technology in Telecom Finance, some technologies for the identification network are appearing, but these are not yet used in the Telecom Finance field. Currently, technology of Telecom Finance is to some degree empty and needs to be further developed.

As for standardization in these fields, some standards development organizations (SDOs) are developing standards focusing on specific topics such as mobile payment and mobile money.

In one word, the ecosystem of Telecom Finance is, for time being, very basic and at an initial phase of development. However, Telecom Finance will allow more people to access financial services in the future.

8 Basic objectives

The following are the major objectives for Telecom Finance:

– to provide basic financial services or activities
– to provide more secure, real-time, efficient and reliable financial services to meet with the new requirements in the modern information era
– to provide financial services globally to reduce the gaps between city and rural areas, and between developed countries and developing or underdeveloped countries
– to innovate financial services to support new businesses to boom global economy
– to provide better regulation for finance.

The basic financial services will be supported. These include bank account, banking services including cash in, cash out, saving, loaning, remittance, payment, money transfer service, etc.

Compared to traditional finance, more new features to support new businesses and industries will be innovated and provided through Telecom Finance. Such as:

– e-money will be another choice for money usage and replace traditional money step by step
– support B2B, C2C and B2C business in our society
– support real-time payment and tax

– G2P, micro finance, P2P finance will be supported together with traditional finance. Digital financial services will impact people's lives.

To reduce the gap of global financial service delivering, Telecom Finance could play roles such as:

– Telecom Finance could be a global strategy to support the possibility of global currency

– Telecom Finance will be an integrated financial infrastructure to our modern information society across the world, which is neutral to both telecom and finance sectors.

As a basic capability of Telecom Finance, governments will be able to better regulate finance and anti-corruption. A healthier and safer finance environment will be available.

Today, information and communication technologies (ICTs) are bringing society to an information era. New requirements for financial services are appearing all the time, such as mobile payment, mobile banking, real-time payment and tax collection, e-business, etc. Telecom Finance will be a new generation infrastructure to support these new requirements.

Meanwhile, although half of the global population ca not access the financial services, Telecom Finance will enable the whole global population to access the financial services equally. Financial service coverage will be expanded to the most underdevelopment and developing areas through Telecom Finance technologies.

The following goals of Telecom Finance will be achieved:

– easy, equal and wide access to financial service for most of the population

– faster money flow, e-business promotion to boom global economy

– enhanced functionalities for both telecom and finance

– better financial regulations.

9 Concept of Telecom Finance

Telecom exchanges information. Finance exchanges money. In our information society, money is a kind of information, especially virtual money or e-money. Telecom Finance means money could be exchanged through telecom in the form of e-money. E-money will be an important kind of money coexisting with current paper money. In the future, Telecom Finance will change the traditional mode of exchanging money. Even paper money will be gradually replaced by e-money. Telecom Finance will be a money-exchanging or financial infrastructure.

Telecom Finance could be defined as the provision of financial services through telecom network technology, including the traditional financial service and new financial services that meet the new financial requirements in an integrated information service era.

The definition of Telecom Finance has the following two aspects:

– Telecom Finance, also Internet of money, nicknamed as MoneyNet. With e-money, to link the money from individuals, businesses, banks, etc. through MoneyNet. All money will circulate on MoneyNet, all digital financial activities will be done through MoneyNet. This will better support the cash flow and promote national economy booming;

– the common, important national/global infrastructure, including the features, such as identification network, e-money, payment, banking, assurance, exchange, investment, G2P finance, P2P finance, service security and government regulation. These functions are available to be accessed by anyone anytime anywhere in P2P mode through wireless / wireline telecom technologies. Also, these features will be used by entities or users in SP/NO.

10 Definition of e-money

E-money refers to money that is issued lawful, existing and exchanged electronically. When the money becomes electronic and can be exchanged isolated from banks, e-money can be stored in handsets and exchanged electronically among individuals and businesses.

E-money is very important and could be exchanged in Telecom Finance. E-money should consider the requirements from the following roles:

– national requirements
– bank's requirements
– individuals' requirements
– other organizations.

E-money can circulate independently. E-money should contain at least the following information:

– Money category
– Issuing country
– Agent Bank
– Money value
– Code
– Holder
– Valid date
– Others

11 Architecture of Telecom Finance

There are three levels in the architecture of Telecom Finance: Business players, functions and technologies levels, as shown in Figure 2.

Business players level: The major players of the Telecom Finance service operation is described in this level including individuals, businesses, telecom and financial enterprises, governments, etc. These players are very important to business mode building. Generally, the major business modes in Telecom Finance is B2B or B2C. These two modes are based upon two kinds of values, such as communication network and financial services. Telecom operators will provide the network and benefit from communication services. Financial enterprises will provide better service in a wider area and make revenue, such as banking/loan and payment fees.

Functions level: The major functions include e-money, B2B and B2C interface support, e-wallet, payment, banking, assurance, P2P finance, Tax, G2P and regulations, etc.

Technologies level: With the identification network, general telecom network and terminal, the Telecom Finance service will be implemented via short messaging system (SMS), call centre, protocol/session. The identification network will transfer the information to the Telecom Finance service and guarantee service security. General telecom network and terminals could connect with the identification network and access the Telecom Finance service through a gateway.

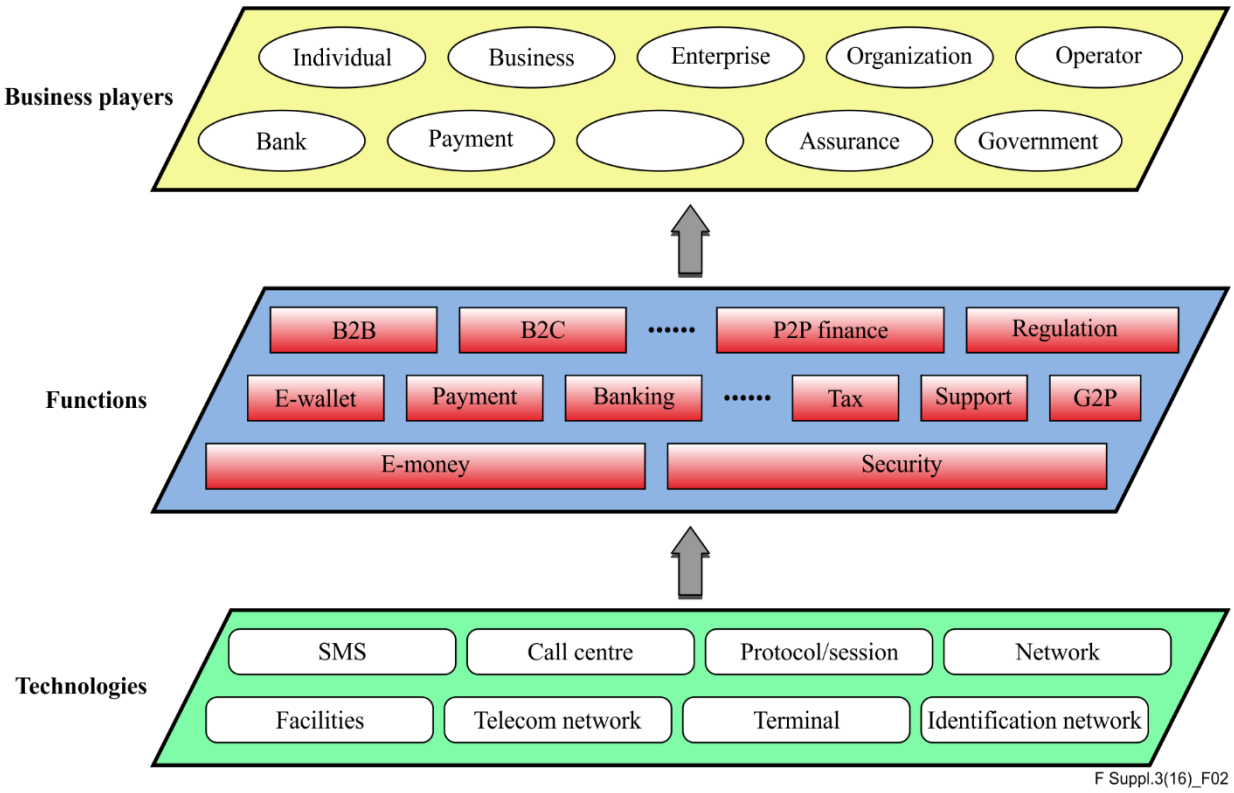

Figure 2 – Architecture of Telecom Finance

In this architecture, e-money and identification network are the core functions.

Security of Telecom Finance is critically important. The identification network and terminals will need to effectively guarantee security and support mobility for Telecom Finance services.

12 Requirements of Telecom Finance

Regarding the new value of telecom, "to do anything anytime anywhere for whoever", the major requirements for Telecom Finance could be able to provide financial services in a wider area and get be more efficient for society.

Compared to the current general major financial services, which are payment, banking, fund, insurance/assurance, stock exchange, tax, etc., new requirements such as B2G, B2P, B2B, P2G, P2B, P2P, G2B, G2P, G2G (X2X, where X represents business/people/government), and micro finance would be supported in the future through Telecom Finance. All business players should have their own concerns about the ecosystem of Telecom Finance.

General requirements from the viewpoint of customers/user experience:

– Simple, easy and efficient for the user, daily finance activities will be executed or done through telecom activities, maybe a financial call or data session
– More accurate, reliable and cost-efficient finances
– Healthier, more secure and safer finances; better protection from risk
– Good privacy and ease of access.

General requirements from the viewpoint of technologies:

– Global and national coverage of financial services with good interoperability.
– Telecom Finance will be an information infrastructure for money circulation.
– Telecom Finance network will link the money or wallet from anyone, any organization as Internet of money or MoneyNet.

– A telecom terminal will be a virtual wallet and credit card. ID card, credit card embedded in phone/terminal can communicate/talk/exchange with each other anytime, anywhere.
– As a complete paperless service, the banking service will be available on personal terminals.
– Accurate identification including network, terminal, address and group identification.
– Integration with legacy financial systems.
– Greener finances.

For individuals:

– Conventional banking services, such as saving money, remittance/money transfer, cashing etc.
– Anytime, anywhere to pay, including:
  • Online payment
  • Mobile payment / handset payment
  • Fixed-terminal payment
  • Remote payment / onsite payment
  • Contact payment / contactless payment.
– Everyone has the capability of C2C payment.
– Access to general personal financial services anytime, anywhere including rural areas and cities.
– A personal held terminal will be an E-wallet.
– P2P financial services.

For businesses:

– Anytime anywhere to do business or make a deal.
– Perform any kind of transaction anytime, anywhere, with anyone.
– B2B, B2C service support
– Payroll management.

For telecom:

– Telecom operation and management.

For finance:

– Financial service and application operation and management.

For governments:

– Tax
– G2P
– Telecom Finance should enhance the finance regulation and promote the economy booming healthily.

For international:

– International roaming
– different currencies support.

Especially for underdeveloped countries and rural areas:

– Micro finance
– Mobile money referring to M-PESA.

13 Functions of Telecom Finance

Functions of Telecom Finance will be classified in two areas: Service and application level and core infrastructure level.

Service and application level functions are the services, applications or capabilities that will be provided to roles in Telecom Finance, such as the people, businesses, organizations, government and other entities.

Core infrastructure level functions will be the capabilities that will be used to support the service and application level functions and other higher level requirements.

Service and application level functions will include the basic ones and others as follows:

1) Basic ones
   - Bank account
   - Money saving
   - Money transferring
   - Cash in / Cash out
   - Payment
   - Loan
   - Remittance

2) Others
   - B2B support
   - B2C support
   - B2G support
   - P2P support
   - P2B support
   - P2G support
   - G2P support
   - G2B support
   - G2G support
   - Credit assessment
   - Real-time tax collection
   - Stock exchange
   - Investment
   - Assurance and insurance
   - Others.

Core infrastructure level functions will include the basic ones and others as follows:

1) Basic ones
   - E-money or mobile money
   - E-wallet for different currency
   - Interface between telecom and finance side
   - Identification network/terminal
   - Network and data security
   - Management of Telecom Finance.

2) Others

- International interoperability and roaming
- Finance information collection
- Risk alarming
- Lawful interception
- Finance policy enforcement and control
- Safe Finance
- Healthy Finance
- Regulation and enforcement.

14 Security

Telecom Finance will provide security service for customer/user protection from different levels, such as:

- Application
- Service
- Infrastructure
- Policy.

Also, Telecom Finance will have different mechanisms to guarantee the security and safety of the users.

Identification mechanism:

- eID deployment to make all the users lawful and trusted
- Network, terminal, address, transactions service identification guarantee lawful transactions
- Physical transactions tracing.

Interaction/Interface mechanism:

- Service interaction processes among payer, payee, bank, etc. guarantee to anti-fraud.
- Double/triple/group confirmation for one transaction to guarantee the transactions will.

Protection mechanism:

- OTA/Over-the-air interface security for data transmission
- Personal key data security
- Offline and online service status switch mechanism
- Transaction status on and off switch mechanism.

AAA Mechanism:

- Authorization
- Authentication (Fingerprint, face recognition)
- Accounting
- Access

Other Mechanism:

- Risk alarm
- Risk Prevention
- Active anti-risk
- Active customer/user protection

15 Technology implementation of Telecom Finance

Telecom Finance is a convergence technology between telecom and finance. Advantages of telecom technologies will be merged in finance, such as safer communication, better identification, stronger computation, more flexible interaction, more security/anti-fraud, better regulation, etc. From aspects of technologies, Telecom Finance is a neutral technology.

Technical implementation of Telecom Finance is described in Figure 3. Inside the implementation block, there are four modules, such as identification terminal, telecom identification network, service systems and management and regulation. There is an interface between the Telecom Finance implementation block and current financial systems to execute the current financial services. At the same time, public network and terminals can also access Telecom Finance services through an interface.

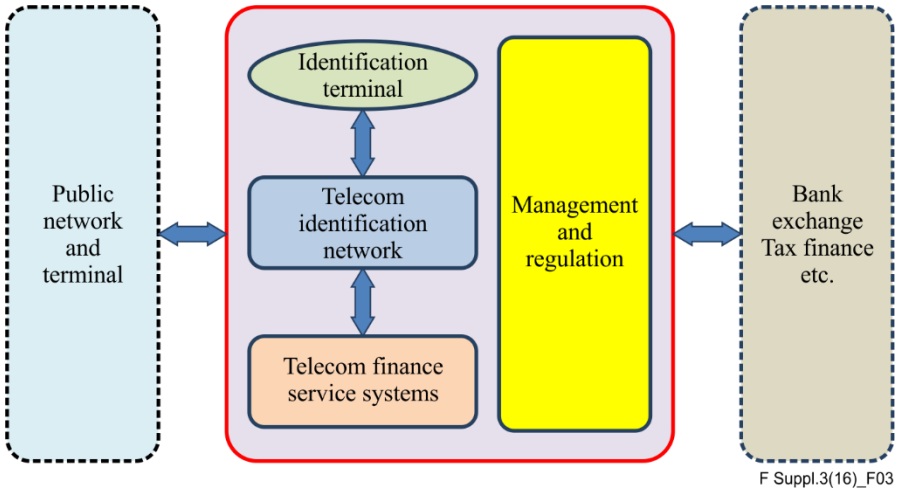

Figure 3 – Technical implementation of Telecom Finance

Telecom identification network and identification terminals providing the networking and identification features for Telecom Finance. Identification here means the capability to identify any objects and guarantee the security of Telecom Finance. The details are:

– Physical level identification
  - Physical position and address
  - Machine code
  - Physical port/card, physical connection
– Network level identification
  - Network address/IPV6, connection/route
  - Terminal, signalling
– Service/application level identification
  - Service
  - Application
  - Process
  - SP/NO interface
– Users identification
  - Individual/business/SP
  - Enterprise/organization

- eID/IdM

The major processes for the Telecom Finance service are as follows:

– Service applying

– Service using
  - Service initialization
  - Service session
  - Service action
  - Result confirmation
  - Exception
  - Service confirmation
  - Service end

16 Contrast between traditional finance and Telecom Finance

According to the lifecycle of money, channel of money circulation and financial services provided, Traditional Finance is defined as Finance 1.0, and Telecom Finance could be described as Finance 2.0. Current Finance would be especially taken as Finance 1.1 or dynamic developing phase, such as Internet finance and initial mobile payment, etc.

The following table compares traditional finance and Telecom Finance.

Table 1 – Comparison of traditional finance and Telecom Finance

Items	Traditional finance (1.0)	Telecom Finance (2.0)
Paper money needed	Yes	No
ATM needed	Yes	No
Credit card needed	Yes	No
Service hall needed	Yes	No
Virtual bank support	No	Yes
Area coverage	Limited	Telecom class coverage
Population coverage	Less than 50%	Over 90%
Interaction	Fixed, Limited	Enhanced
Interoperability	Limited	No limitation
P2P/G2P Support	No	Yes
Cost	High	Low
Security	Normal	High
Efficiency	Low	High
Decentralized currency support	No	Yes
Regulation	Not easy	Easy
Green	Normal	Very green

17 Scenarios for Telecom Finance

Some scenarios are:

Telecom Finance service for poor people in rural areas, in which populations are bigger than in cities, could be offered with a phone or bank account. The phone number and bank account could be linked

together through Telecom Finance. The financial service should be available to every family in rural areas through phone call. If Telecom Finance service can cooperate with logistics locally in rural areas, these families should be able to save, loan and get cash through phone calls. Further, if the Telecom Finance solution can cover the sales of agriculture products and materials, it should not only provide financial services for farmers, but also develop economy in rural areas. From this aspect, Telecom Finance is the key way to solve the problems for farmer families in rural areas.

Telecom Finance services in cities:

1) E-money: E-money can be easy for customers to consume in cities. People can transfer e-money to anyone as they wish. E-money can be used to take the bus, play online games or by SP/NO entities.
2) B2B and B2C applications: With e-money and support of B2B and B2C interfaces in Telecom Finance, users of Telecom Finance can have payment in their terminal. Traditional financial services do not update their technology and service to meet with new payment requirements in the information network today.
3) Virtual bank: Based upon the identification and terminal in Telecom Finance, traditional banks could be virtually implemented in personal terminals. It will be unnecessary to wait for a banking service in a long queue on site. Moreover, no business hall will be needed, and it is paperless and completely personalized.
4) Regulation of Telecom Finance: With e-money, wealth should be only digital and be under the operation of the Telecom Finance network. So, it is much easier to control the currency in one country and society. The same happens with tax. Even corruption will be limited to a high degree because money in Telecom Finance is transparent.
5) Real time payment and tax.

In one word, Telecom Finance can strongly support better quality financial services and innovate new financial services and make cash flow faster to promote economy. Telecom Finance should be a very important infrastructure once it has been deployed.

18 Roadmap for Telecom Finance

Figure 4 shows the roadmap of Telecom Finance that would guide the study and standardization of Telecom Finance as follows:

1) Overview of Telecom Finance (Finance 2.0)
2) Architecture of Telecom Finance
3) Requirements of Telecom Finance
4) Functions of Telecom Finance
    a) Financial entity identifier
    b) Financial services and activities
5) E-Money/E-Wallet
6) Identification communication infrastructure
    a) Identification network
    b) Identification terminal
    c) Interface
7) Security
8) Management.

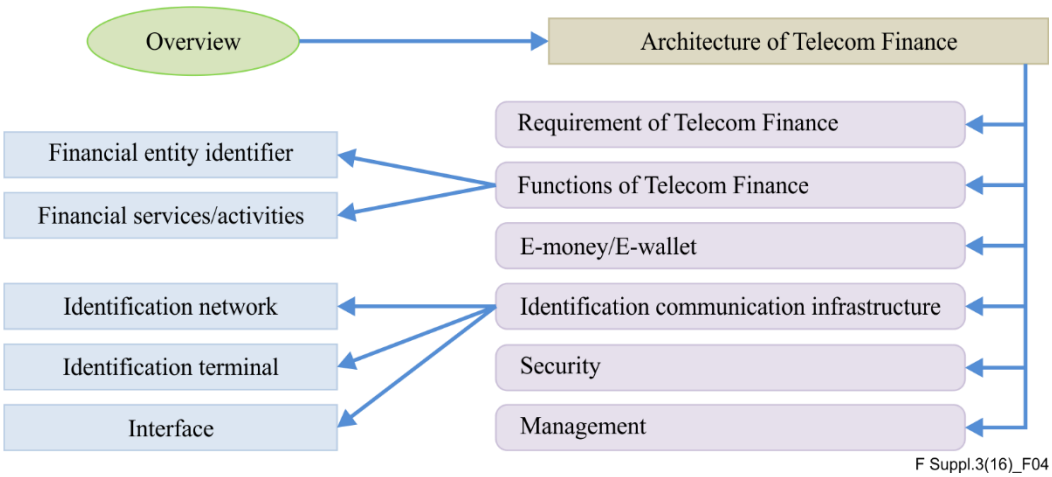

Figure 4 – Roadmap for Telecom Finance

19 Summary

It is necessary to fusion telecom and financial complementary advantages and build a future global infrastructure of Telecom Finance based on e-money and identification network technologies.

Through Telecom Finance, efforts are needed to reduce the gap between cities and rural areas, development and developing countries. Telecom Finance should be a very important strategy for global development in order to provide financial services in rural areas, to update the financial services in cities and to promote a boom global economy.

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Printed in Switzerland
Geneva, 2017