Draft Working Group 2 Report

Proposal for New ITU-T Standardization Activities

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Summary

As part of WG-2 mandates, the FG is expected to provide proposals on new standardization activities for the ITU-T as appropriate. By analyzing the innovations and the root causes of the lack of *effective* participation of the developing countries in the standardization activities, a multi-tiered strategy is proposed to address these issues. It was identified that innovation could be a possible strategic mechanism to assist in bridging this gap, and hence comes the major target behind this FG, which addresses means to bridge the gap from innovations to standards. However, for innovations from developing countries to strive and to overcome the main obstacles that prohibit developing countries from bringing their ICT innovations to the ITU-T the development of successful; there is a tremendous need to propose new standardization activities in the ITU-T. New standardization activities that set the core technological foundations for innovative solutions/technologies/services that have a high socio-economic impact, in addition to establishing sustainable business cases for innovations in developing countries; have the utmost impact on alleviating the root obstacles hindering the effective participation of the developing countries in the standardization activities. This contribution proposes new ITU-T standardization activities that serve as key enablers for developing innovations from developing countries.

1 Scope

This contribution proposes new ITU-T standardization activities that serve as key enablers for developing innovations from developing countries.

2 Introduction

This focus group provides an initial platform for the identification, recognition, and support of innovations – that may benefit from standardization – emerging in developing countries, to be standardized by the ITU-T sector. While this platform (the FG) does have a significant impact on bridging the gap from innovation to standards by the innovations' recognition and identification processes; however so does its ability to provide a venue for the discussion of the development of innovative mechanisms that could eventually lead to the *effective* participation of the developing countries, in the standardization process. The main objective though of this FG is to support the activities of ITU-T Study Groups to further support innovation and close the digital divide [Res.71 of PP-10].

According to the WSIS Declaration of Principles [WSIS Declaration of Principles B6 No. 44], standardization is one of the essential building blocks of the Information Society. It emphasized on the importance of developing and adopting international standards. It also emphasized on the importance of developing open-use, interoperable, non-discriminatory and demand-driven standards that take into account needs of users, and consumers as a basic element for the development and greater diffusion of ICTs.

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Two important concepts must be highlighted in the above declaration principle: the first; is the concept of essentiality of the development of standards, and the importance of the participation of developing economies in the standardization activities. The second; is the concept of demand-driven standards which highlights that standards eventually are created to serve the mass population which uses them.

Initial analysis for the root causes of the standardization gap between developed and developing countries, indicates that the latter neither possess foundational infrastructure industries that could create a strategic target or appeal for their participation; nor do the majority of their mass population have the needs or demand for highly sophisticated top-notch technologies. Hence, the main drivers behind the *effective* participation of developing countries face some difficulties. *Effective* participation of the developing countries refers to their engagement in the standardization activities by submitting contributions that reflects their true interests and concerns; in addition to their participation in the standards development process with proper competences that would eventually enable them from submitting proposals, defending them, and possibly obtaining global consensus.

Further thorough analysis of the root causes behind the lack of *effective* participation of the developing countries in the standardization activities; revealed some key obstacles: lack of technical and financial Competences, lack of Drivers, and lack of Foundational ICT Infrastructure. To overcome these obstacles, a multi-tiered strategy is proposed, where actions related to increasing the competency level on the individual and corporate levels are to be executed. Competency level actions include exposure and training on how to participate in the standardization process, BSG programmes, and amendments in academic curricula to include standardization related studies. Enhancing drivers for the effective participation targets two main dimensions; namely developing means to increase demand for top notch ICT services, and providing industrial incentives to develop national industries in the field of ICT. Finally, actions targeting the enhancement of foundational ICT infrastructure are foreseen to be achieved through the development of national R&D strategies and developing innovation which have the utmost socio-economic impact on the community. Figure 1 illustrates a synopsis of the proposed multi-tiered strategy. It's important to note that some antecedents of some action items belonging to different tiers might be inter-related. For example, the root causes for the lack of demand as part of the drivers tier, might also affect negatively the innovation development action item of the Foundational ICT Infrastructure tier.

Innovation is identified as one of the fundamental strategic mechanisms; that is foreseen to assist in bridging the aforementioned gap. And hence, WTSA-12, adopted these concepts through the development of a Resolution that specifically aims at bridging the standardization gap between developed and developing countries [Rev Dubai, 2012, Res. 44], where it resolved that ITU-T, in collaboration with the other Sectors as appropriate, shall develop a programme to: i) assist developing countries in developing methods that facilitate the process of linking innovations to the standardization process; ii) assist developing countries in developing means to align their industrial and innovation national strategies towards the goal of achieving highest impact on their socio-economic ecosystems.

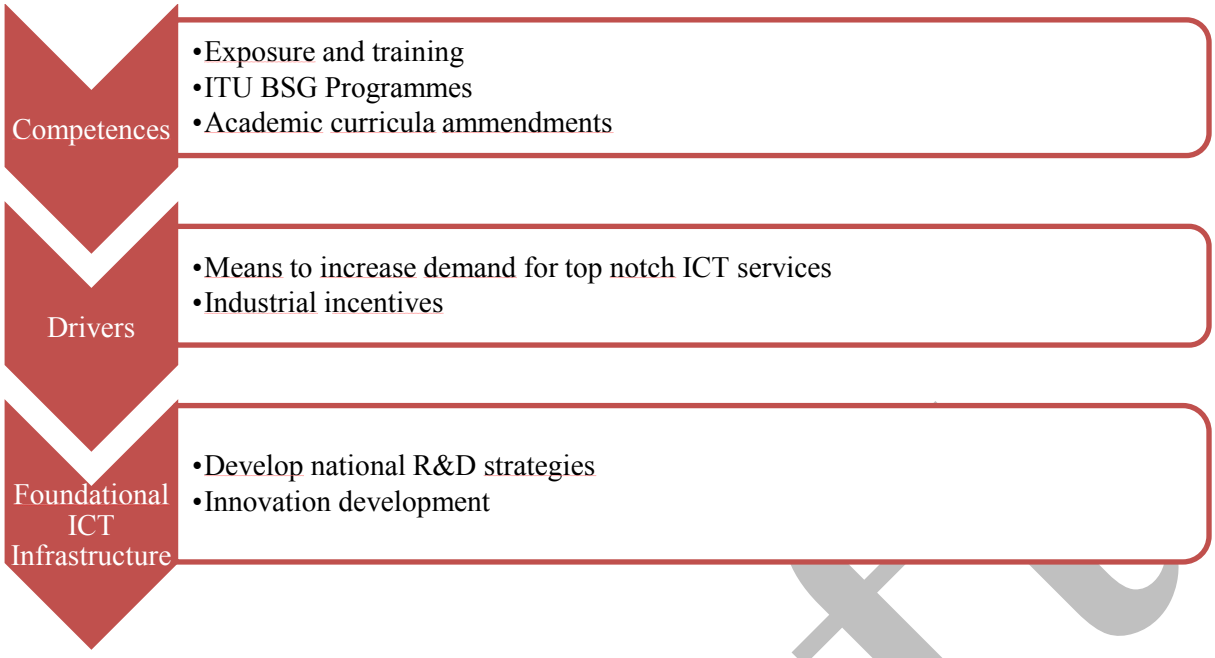

Figure 1 Multi-tiered strategy for addressing the lack of *effective* participation of developing countries in the standardization activities

3 Proposed New ITU-T Standardization Activities

There is a tremendous need to propose new standardization activities in the ITU-T in order to develop innovations from developing countries. Furthermore, to overcome the main obstacles that prohibit developing countries from bringing their ICT innovations to the ITU-T, these new standardization activities must set the core technological foundations for innovative solutions/technologies/services that have a high socio-economic impact in developing countries. Establishing sustainable business cases for innovations also has an utmost impact on alleviating the root obstacles that hinders the effective participation of the developing countries in the standardization activities.

Proposing new standardization activities in the ITU-T does acts as a catalyst for the success of innovations emerging from developing communities, especially in vertical markets like health and transport.

Providing these new standardization activities, agreed at the global level involving stakeholders from the innovation ecosystems and vertical market communities, would provide cost-effective platforms, which can easily be deployed in hardware and/or software, with diversity in vendors and across different sectors. These proposed standardization activities can be classified into three main areas of activities as follows:

3.1 Area 1: Information Security Standardization Activities

Information Security is one underlying foundational aspect that is necessary for the development of innovations, especially in developing countries. The scope of Information Security is comprised of five main services; namely, Authentication & Access-Control, Confidentiality, Fidelity, Availability, and Non-Repudiation. Every service is considered essential for a specific type of applications/services.

As presented in the previous section, two main drivers could be identified for the *effective* participation of the developing countries in the standardization process:

a) Industrial incentives and drivers: Governments may target to secure their strategic industrial position globally, and one possible means to achieve that is through the standardization process. However that necessitates the presence of strong foundational infrastructure industries that

would eventually generate technologies to be standardized; a task while not impossible, however requires a substantial amount of investments; that needs to be secured on the mid-to-long terms.

b) Demand: Demand stimulation policies have a huge impact on the development of the industry in many economies. Demand is affected by many parameters; of most important are the levels of illiteracy, affordability of the services provisioned, purchasing power parity, and the availability of e-content that is adequate for distribution. The problem with e-content availability lies in two main issues:
   i. the availability of the content itself: we find developing countries rich with culture and ethnics which provides very rich content wise material
   ii. Content digitization: the process of content digitization is a fundamental step in e-content creation, and hence in the whole process of creating suitable content that fits the taste of a certain population. That in turn is reflected on the demand for specific application/services. It's worth noting that this is a very costly process.
   iii. Copyright protection: this step is essential for the protection of the content to be created. Since the whole process of content creation and digitization is very costly; it is hence extremely important to secure these investments by utilizing Digital Rights Management (DRM) systems and copyright protection systems. DRM systems in addition provide services against tampering with the content after its production, which provide excellent mechanisms for the authorities to combat against fraud and other malicious attempts on the content/services provided.

It is thus evident that Information Security is of tremendous importance on the whole processes of demand, and industry stimulation; which furthermore stimulate the required drivers behind the *effective* participation of the developing countries in the standardization process.

SG-17 is currently the lead SG on security, identity management (IdM), and on languages and description techniques. SG-17 Responsible for studies relating to security including cybersecurity, countering spam and identity management. Also responsible for the application of open system communications including directory and object identifiers, and for technical languages, the method for their usage and other issues related to the software aspects of telecommunication systems.

There are some lacking aspects in the standardization activities inside the ITU-T, related to security, which can be alleviated by the introduction of new Questions, and the amendment of the scope of SG 17, For example, study items related to Digital Rights Management (DRM) systems, Watermarking technologies, Fidelity, and Availability is proposed to be added to the list of Questions currently under study by SG-17. An account of SG-17 scope and questions under study in addition to the proposed new standardization activities are presented in the following subsections.

3.1.1 Study Group 17 on Security

This section presents a detailed report on the scope of SG-17 and its current questions under study in addition to proposed new questions related to Digital Rights Management (DRM) systems, Watermarking technologies, and eMoney.

3.1.2 Scope (Study Period 2013 – 2016)

Currently this SG is responsible for building confidence and security in the use of Information and Communication Technologies (ICTs). This includes studies relating to cybersecurity, security management, countering spam and identity management. It also includes security architecture and framework, protection of personally identifiable information, and security of applications and services for the Internet of Things, smart grid, smartphone, IPTV, web services, social network, cloud computing, mobile financial system, and telebiometrics. Also responsible for the application of open system communications including directory and object identifiers, and for technical languages, the method for their usage and other issues related to the software aspects of telecommunication systems, and for conformance testing to improve quality of Recommendations.

3.1.3 Lead Study Group Roles

- security
- identity management (IdM)
- languages and description techniques

3.1.4 Current Questions under Study

QUESTIONS	TITLE
Q1/17	Telecommunication/ICT security coordination
Q2/17	Security architecture and framework
Q3/17	Telecommunication information security management
Q4/17	Cybersecurity
Q5/17	Countering spam by technical means
Q6/17	Security aspects of ubiquitous telecommunication services
Q7/17	Secure application services
Q8/17	Cloud computing security
Q9/17	Telebiometrics
Q10/17	Identity management architecture and mechanisms
Q11/17	Generic technologies to support secure applications
Q12/17	Formal languages for telecommunication software and testing

3.1.5 Proposed New Standardization Activities

The following Questions are proposed to be prepared for approval for updating the list of Questions under study by SG-17.

QUESTIONS	TITLE
Q13/17	Digital Rights Management (DRM) systems
Q14/17	Cognitive Radio systems security

1. Q13/17 - Digital Rights Management (DRM) systems

Motivation:

Information Security is one underlying foundational aspect that is necessary for the development of innovations, especially in developing countries. The scope of Information Security is comprised of five main services; namely, Authentication & Access-Control, Confidentiality, Fidelity, Availability, and Non-Repudiation. Every service is considered essential for a specific type of applications/services.

Recent studies have identified a fundamental cause for the standardization gap between developed and developing countries; that's the lack of *effective* participation of the developing countries in the standardization process. One major driver behind the stimulation of *effectiveness* property in developing countries' participation is manifested in demand stimulation technologies and policies.

Demand stimulation policies have a huge impact on the development of the industry in many economies. Demand is affected by many parameters like the levels of illiteracy, affordability of the services provisioned, purchasing power parity, and the availability of e-content which adequate for distribution. However fundamental and necessary technologies that help in the sustainability of the e-content availability business models are needed. Accordingly this Question assists in covering this gap which acts towards developing standards related to copyright protection. Copyright protection systems are essential for the protection of the content that will be created and distributed to its intended audience. Since the process of content creation and digitization is very costly; it is hence extremely important to secure these investments by utilizing Digital Rights Management (DRM) systems and copyright protection systems. DRM systems in addition provide services against tampering with the content after its production, which provide excellent mechanisms for the authorities to combat against fraud and other malicious attempts on the content/services provided.

Question:

Study items to be considered include, but are not limited to:

- What are the copyright protection ecosystems, and value chain that affects and/or is affected by underlying telecommunication infrastructure?
- How should content developers and content producers secure their content, and maintain secured content distribution networks to protect their content against tampering?
- What possible architectures of DRM systems that can be used to secure the licensing, distribution, and playback of digital content on consumer equipments?
- What are the specifications of DRM systems that can be used to secure the licensing, distribution, and playback of digital content on consumer equipments?
- What are the security requirements that content, content distribution systems and architectures; telecommunication operators need to consider in the design, development and sharing of best practices in the copyright protection ecosystems?

Tasks:

Tasks include, but are not limited to:

- Develop Recommendations identifying the architecture as well as detailed specifications of DRM systems for content protection, playback, and distribution

2. Q14/17 - Cognitive Radio systems security

Motivation:

Cognitive radio offers the promise of intelligent radios that can learn from and adapt to their environment in order to satisfy some goals. Introducing artificial intelligence techniques in radio systems allow cognitive radios to achieve the best spectrum utilization. Techniques like machine learning, and reasoning algorithms allow the radio from autonomously take decision with minimal supervision. The applications of cognitive radio are very promising. Reports and studies indicate their applicability in Public Protection and Disaster Relief (PPDR) use cases in addition to Dynamic Spectrum Access (DSA) scenarios. However, several issues arise before the complete adoption of such systems. Spectrum management as well as spectrum sharing in cognitive radio systems proves to be prone to possible types of attacks. Amongst the most important are Primary User Emulation (PUE) attacks which are found to be effective in DSA environments. In such environments, a primary user owns is licensed, and accordingly protected for its operation and use of a particular frequency band. When primary users are idle, secondary devices can opportunistically use the available spectrum under a condition that their operation is not to affect the operation of primary users in any way. Frequency sensors are usually used to detect the appearance of a primary user in a specific band. An attacker emulating a primary user waveform could fool other peer secondary

terminals in deciding to vacate the band of operation in favor of its presence. This gives the adversary an unrivaled access to the frequency band. This Question studies the possible security threats present in cognitive radio environments in addition to the possible security architectures, protocols, and solutions needed to mitigate them.

Question:

Study items to be considered include, but are not limited to:

- What are the different security threats facing cognitive radio systems deployment in DSA use cases?
- What are the different security threats facing cognitive radio systems deployment in PPDR use cases?
- What are the possible forms of attacks found in cognitive radio architectures that might compromise its intended purpose of operation?
- What are the best radio architecture that mitigate the security threats of cognitive radio terminals?
- What are the protocols or protocol amendments needed to mitigate the possible attacks found in different cognitive radio use cases?

Tasks:

Tasks include, but are not limited to:

Develop Recommendations identifying the architecture, protocols for mitigating security hazards in cognitive radio system deployments

3.2 Area 2: Machine Intelligence related standardization activities

Machine Intelligence is the foundational technologies that will impact the ICT systems and devices for next 50 years. It is evident that by the introduction of every new Generation of ICT systems/applications; intelligence (Machine Intelligence) is constantly being pushed towards the edge of the network. Convergence of devices and the progress of smart devices only highlight the beginning of a new era of ICT systems and services where machines would be able to think for themselves, take decisions and actions with the slightest possible intervention from the end-user.

Innovations emerging from the developing countries indeed cover aspects and problems which are related to core scientific disciplines. However, quite a major portion of these innovations does target vertical markets; which eventually depend on underlying systems/hardware for being smart and intelligent. Hence, standardizing Machine Intelligence algorithms and protocols, will definitely assist solution/systems developers in developing more viable business cases; by providing cost-effective platforms, which can easily be deployed in hardware and/or software, across different sectors. A common example of the impact of Machine Intelligence on the very recent and possible future developments of technologies could be illustrated by the Cognitive Radio Case Study illustrated in Exhibit 1 and Exhibit 2.

Exhibit 1: Case Study on Cognitive Radio and its dependency on Machine Intelligence

Case Study: Cognitive Radio and its dependency on Machine Intelligence

Chronologically speaking, in the 1999 paper that first used the term "Cognitive Radio", Joseph Mitola III defined a cognitive radio as: "A radio that employs model based reasoning to achieve a specified level of competence in radio-related domains."

In his 2000 doctoral dissertation, Mitola further identifies an important aspect of his CR concept, known as knowledge representation. Knowledge in CR is contained within a modeling language such as Radio Knowledge Representation Language (RKRL).

In November 2003, the IEEE USA offered the following definition to aid the FCC in its efforts to define cognitive radio: "A radio frequency transmitter/receiver that is designed to intelligently detect whether a particular segment of the radio spectrum is currently in use, and to jump into (and out of, as necessary) the temporarily-unused spectrum very rapidly, without interfering with the transmissions of other authorized users."

In February 2005, Haykin gives a comprehensive definition for CR focusing on three on-line cognitive tasks, namely, radio-scene analysis, channel identification, and transmit-power control and dynamic spectrum management. He defines CR as: "An intelligent wireless communication system that is aware of its surrounding environment (i.e., outside world), and uses the methodology of understanding-by building to learn from the environment and adapt its internal states to statistical variations in the incoming RF stimuli by making corresponding changes in certain operating parameters (e.g., transmit-power, carrier-frequency, and modulation strategy) in real-time, with two primary objectives in mind: highly reliable communications whenever and wherever needed; and efficient utilization of the radio spectrum."

Haykin clearly identified six aspects, which he considered core, to his definition: awareness, intelligence, learning, adaptivity, reliability, and efficiency.

By September 2009, under the framework of World Radiocommunication Conference 2012 Agenda item 1.19, "to consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution 956 (WRC-07)", ITU-R Working Party 1B has developed definitions of Software Defined Radio (SDR) and Cognitive Radio System (CRS) to assist in the conduct of studies and related preparations for the second session of the Conference Preparatory Meeting for WRC-12.

And finally in a recent publication by the author it was illustrated that cognition as we understand it includes – among others – some fundamental tasks like learning, adaptation, and intelligence. Intelligence through an intelligent agent is foreseen as an implicit mandatory component of a CR.

Exhibit 2: Case Study on Cognitive Radio and its dependency on Machine Intelligence Discussion

Discussion

CR are finally formulated as QUESTION ITU-R 241-2/5, titled "Cognitive radio systems in the mobile service" which tackles the concept of CR from a very limited perspective, nevertheless; the concept of cognition even from the linguistic perspective includes activities related to the faculty of knowing with all the underlying implications of knowledge representation and inference based on that knowledge.

Recent research illustrates the use of Artificial Intelligence (AI) algorithms in major parts of the CR; which provide a live example on the necessity of Machine Intelligence standardization activities in the ITU-T even though the technology itself is being considered from the perspective of its implications at the ITU Radio Sector.

The area of Machine Intelligence is much diversified. It covers areas like Supervised and Unsupervised Learning, Classification and Clustering, Heuristics and Meta-Heuristics, Inference, knowledge Representation, and Case-Based Reasoning.

It is evident that the dependency of ICT systems and services on Machine Intelligence will continue to grow in the future. Due to its foreseen impact, a possible way of moving forward is to create a new Study Group on Machine Intelligence covering areas like Supervised and Unsupervised Learning, Classification and Clustering, Heuristics and Meta-Heuristics, Inference, knowledge Representation, and Case-Based Reasoning; with the possibility of conducting studies related to the Internet of Things or rather the Internet of Intelligent Things (IoIT); by merging the current ITU-T activities related to the IoT into such a SG. A detailed report on the establishment of a new SG on Machine Intelligence and the Internet of Intelligent Things, including its scope and preliminary list of study questions is to be presented in Annex 2 in subsequent FG meetings.

3.3 Area 3: Innovation to Standardization Impact Studies

Resolution 44 [Rev Dubai, 2012, Res. 44] instructs the TSB Director to carry out the necessary studies on the role of innovation management and innovation stimulation programmes on bridging the standardization gap between the developed and developing countries.

Traditionally, national policymakers have been long interested in promoting technological innovation due to its expected impact on the economic conditions and overall quality of life of their nation's citizens. National policies were generally directed towards enabling a healthy ecosystem for innovation through either offering incentives for the industry or by removing obstacles hindering the development of startup businesses and new industries.

Globally, policies to encourage innovation by the industry included; amongst others, government funding for Research and Development (R&D), tax credits or other benefits like deducting R&D expenses, subsidies, and incubation programs. However, even though governments and administrations have put efforts to stimulate innovations and provide benefits for the industry, there are questions on the degree of effectiveness of policies to stimulating investment at companies in the industry, given their fiscal cost to taxpayers, and the extent (real impact) of the company innovation, as induced by these policies, on the broader economic growth.

While the effectiveness of innovation policies on the economic and well-fare of the state are not questionable, it is however sought to complement these policies by an international collaborative innovation stimulating framework that would ultimately spur national innovation, while reduce the burden costs of state budgets directed to stimulating innovation. The collaborative framework is conducted by the establishment of an "Innovation Panel" that will aid the stimulation of innovation in member states, with minimal burden on the state budget. In addition, it will help provide a

sustainable and attractive ecosystem for scientists and entrepreneurs that will eventually spur their innovations and creativity.

In terms of policy, it is a well-established result that market economies normally do not generate a socially optimal volume of knowledge creation, innovation and entrepreneurship. However, there is no consensus concerning what institutional frameworks and policy measures that might generate such a social optimum given the imperfections in both the economic and the political markets. This has not stopped policy-makers from launching a large number of institutional changes and policy measures to stimulate knowledge creation, innovation and entrepreneurship. Nevertheless, the number of carefully carried through policy evaluations is limited, and hence there is knowledge gap regarding which policies are effective and justify its costs. This "Innovation Panel" is one major vehicle that could serve to conduct such evaluations to assist the community in identifying and analyzing the best strategies and policies that can stimulate knowledge creation and innovation, and help bridge the standardization gap in reference to Res. 44 WTSA-12. The following subsections present the ToR foreseen for the ICT Innovation Panel together with its foreseen structure. This innovating new mechanism does enable the ITU-T from applying a pull strategy for innovations occurring in developing countries rather than the currently apparently dominating push strategy in which technologies are being pushed into developing economies and efforts are being endeavored to motivate and assist developing countries in actively contributing in the standardization process. Activities related to the study of different possible innovation stimulation programs that could assist developing countries in bridging the Standardization Gap could also be a possible future action item mandated by this panel.

3.3.1 ICT Innovation Panel

This section introduces the ICT Innovation Panel, highlighting its main functions, and deliverables, and relationship to other related ITU-T vehicles like FG Innovation.

3.3.2 Definition

The ICT Innovation Panel, hereafter the Panel is a vehicle inside the ITU-T which reviews, assesses, and produces political, economical, technical and social innovation stimulation policies and strategies to be employed by the members affiliated to the ITU.

3.3.3 Terms of Reference (ToR)

The Panel ToR has several items that would eventually assist it in promoting global collaborative innovation and assist in bridging the standardization gap as well as bridging innovations to standardization. The main items are:

Item 1- Identify, analyze and study the best policies and practices that enable the development of sustainable innovations which produces maximum benefits for societies.

Item 2- Identify the criteria of sustainable innovations, which have the most impact on societies, and foreseen to be of utmost impact on the welfare and prosperity of humanity.

Item 3- Provide assistance to ITU members in how to introduce their innovations into the standardization process by providing assistance to formulating new Questions, and building case studies in relation to their introduced innovations. The Panel acts like an incubator for developing standards to newly developed innovative products and solutions, i.e. it acts like a standardization incubator.

Item 4- Conduct studies related to the role of innovation management in developing economies and bridging the standardization gap in addition to the potential maximization of investment returns related to innovation management policies and strategies.

Item 5- Produce an annual scientific report on policy means to stimulate innovation, and possible governmental tools that could be used to bridge the gap between technological development and standardization.

Item 6- Produce policy recommendations for its constituent members to adopt specific policies that help in the development of innovation solutions and services.

3.3.4 Expected Deliverables

The Panel is expected to produce the following deliverables:

1. Policy *Guidelines* and *Recommendations* that advise the ITU on promoting standards that stimulate global innovations specifically those which have a profound impact on the socio-economic indicators on economies.
2. Policy *Guidelines* and *Recommendations* for the ITU members to adopt innovations stimulating policies and innovation to standardization procedures that aims at bridging the standardization gap
3. Promote critical success standardization activities, defined as standardization activities that are necessary for the development of innovative products, solutions, and services, e.g. Digital Rights Management (DRM) systems for e-content development and watermarking technologies for copyright protection. Standardizing these technologies will help promote the proliferation of e-content in the member states, promoting the demand side in developing and developed countries.
4. Annual scientific report on policy means to stimulate innovation and methods to assess the socio-economic impacts of innovations in societies.

3.3.5 Relationship to FG Innovation

The ITU-T FG Innovation is expected to report on successful cases of ICT Innovations in different economic sectors from various geographical areas which may benefit from standardization in ITU-T (Innovations Report) in addition to preparing proposals on new standardization activities for ITU-T, as appropriate.

The Panel on the other side complements the work conducted in the FG by producing *Guidelines* and *Recommendations* both to the ITU and its members in relation to innovation management and its effective role in bridging the standardization gap between developed and developing countries in accordance to Resolution 44 of WTSA 12.

In addition, the Panel is foreseen to be a permanent vehicle that extends the work of the FG beyond its current mandates and objectives.

3.3.6 Panel Structure

The Panel is comprised of two committees as follows:

1. Technology Committee

The Technology Committee is responsible of tracking strategic innovative technologies that could be of significant impact on societies and economies. It is also responsible of developing a list of recommended technologies and solutions that best meets societies' needs and produces the maximum socio-economic returns. The Committee will be engaged in relevant Panel ToR items.

2. Policy Committee

The Policy Committee is responsible of developing harmonized policy recommendations and guidelines to facilitate and promote the application of Technology Committee's recommended technologies and solutions, in addition to develop a consensus on how to standardize the newly developed innovative solutions. The Committee will be engaged in relevant Panel ToR items.

3.4 Area 4: Mobile Money Transfer and Mobile Payments Standardization Related Activities

TSB has prepared two draft Technology Watch reports on Innovations in Mobile Money [Innovation-I-40] identifying key standardization activities in the mobile money area as well as areas where ITU-T Study Groups could play a role. Study group 13 (Future Networks) has been identified as a relevant SG for this activity. SG 12 has developed two Recommendations related to securing mobile financial services, namely Recommendation ITU-T Y.2740, and Recommendation ITU-T Y.2741. On the other hand, the report indicated that SG 2 is currently working on the development of a Recommendation on Telecom Finance, which will provide an overview of mobile money services from the operators' perspective to enhance the customer experiences in telecom service and all eMoney services.