

INFORMATION AND COMMUNICATION TECHNOLOGIES (IC)

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A recent report by the McKinsey Global Institute (“Disruptive technologies: Advances that will transform life, business, and the global economy”; May 2013) lists the 12 most disruptive emerging technologies. The top 4 (in terms of potential economic impact) fall clearly into the category of information and communication technologies, while the remaining 8 are enabled, at least in part, by advances in information technology.

Proposals should focus on technology innovations that have major impact, a clear and compelling value proposition, and substantial commercial potential.

It should be stressed that the lists of examples in the subtopics below are non-limiting - they are included only to indicate the types of technical area that fall within the scope of the sub-topics.

IC1. Components and Infrastructure

Innovations that will substantially improve the underlying technical performance, or extend the functionality, of information and communication systems. Examples of relevant technical areas include (but are not limited to) communication signal sources and detectors - optical (lasers, LEDs, photodetectors), RF, or microwave; specialized optical fibers and optoelectronic devices (e.g., for optical amplification, dispersion compensation, or multiplexing); short range and long distance transmission technologies - optical, RF, and microwave; information storage/retrieval devices and subsystems; data transmission protocols; and data processing devices - electronic ICs and quantum devices.

IC2. Information Technology Applications

Applications that will benefit society, with particular emphasis on internet-based applications. Examples of relevant technical areas include (but are not limited to) mobile technology; the “Internet of Things”; cyber-physical systems; automation of knowledge work; cloud computing; cloud-based data management; cloud-based IT services; IT enabled commerce; big data and advanced analytics; data mining and information services; data visualization; predictive systems; social networking applications; neural networks; smart grid applications; smart building management; traffic flow optimization; and remote medical services.

IC3. Security and Privacy

Innovations that will protect networks against attack or failure and/or network users and user data against compromise. Examples of relevant technical areas include (but are not limited to) cyber security; cloud computing security; data loss prevention; information assurance; privacy and data integrity; encryption; key generation and management, key distribution, quantum key distribution; wireless LAN security; access authorization; identity management; and personal authentication (biometrics, multi-factor authentication, etc.).

IC4. Human-System Interaction

Innovations that will enable humans to interact more effectively and efficiently with information systems. Examples of relevant technical areas include (but are not limited to) human-computer/network interfaces; human-machine interfaces; wearable devices - smart watches, smart glasses, intelligent textiles; augmented reality and reality virtualization; voice, language, and gesture recognition; eye tracking; tactile displays; and human identification (biometrics).