

IoT Relationship between Korea and the Philippines

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Abstract

This paper studies the IoT relationship between Korea and the Philippines to make both nations sustainable with a fusion of literature, art, science, and technology. IoT (Internet-of-Things) is a part of long-term evolution which is improving human lives and content related to green energy harvesting, food, clothes, houses, earth climates and environments, and even the solar system including the galaxy. So this paper is the first pilot study for the creation of the IoT value-chain of industry, economy, and trade between Korean ICT and Philippine ICT businesses.

Keywords: *IoT, Relationship, Korean ICT, Philippines ICT, Fusion, IT-ethics, Literature, Art, Science, Technology*

1. Introduction

Nowadays in our society, humans have had to survive many tragedies and upsetting events. Suddenly, many people have had to die or be injured due to a number of things like the following: 1) natural events such as earthquakes, volcano eruptions, typhoons, droughts, tornados, fires, heat waves, magnetic storms, water shortage, food shortage, clothes shortage and ultra-violet rays; 2) toxic agents such as viruses (ex: zika, ebola), venomous insects, toxin-animal and plants, monstrous animal and plants, body-cancer and disease; 3) technology related problems such as disorder, robot-revolt, bio-chip error, electronic bomb, and computer-virus; 4) political problems such as corruption, political death, imprisonment, betrayal and persecution; 5) global concerns of war, terror, military collision and dispute; 6) and Internet related problems such as shut-down, mal-disconnect, phone-tapping, file-cracking, computer/smart phone-disorder, media-poisoning, voice-phishing, smishing, pharming, DDoS attack and evil-codes, *etc.*

All governments are focused on solving these troubles, including problems and harmful phenomenon with national budget payment or investment but our generous efforts are limited to protecting our quiet lives against these bad things. As an example, IoT (Internet-of-Things) is going to open a new market to all nations, with the exception of the poor nations or areas wherein they are digitally lacking, and not everything is connected to the Internet. People use the Internet for a variety of purposes, such as social media, private browsing, national access, and even for special purposes such as military or environmental wire/wireless communication networks. All enterprises providing network switching, antennas, and cables are developing the new markets related to IoT services and contents. Therefore, the nations of Korea and the Philippines must work together to make our nations sustainable with a fusion of Literature, Art, Science and Technology (LAST).

2. Analysis

1. Infra-technologies to solve these six troubles

On both sides of Big Data and IoT services, there are many economic and social damages and losses due to these six problems we pointed out previously. Including personal trauma, our global troubles or problems are in a personal life, a family life or a society life from birth to death. We and our ancestors have focused so many efforts to solving them from the Renaissance. And from the 21st century, the various kinds of Internet such as super-high speed internet, middle-speed internet, low-speed internet, internet portal services, web services and identification recognized internet have been consumed by people in our Korea-ASEAN FTA (Free Trade Agreement) system and world-wide networks. Therefore, this paper forecasts these enterprises' green-growth to make their marketing products and services innovative during at least the next 20~50 years, with these six problems and needs of its solutions. Therefore humans can reduce the cost and period of solutions with which Infra-technologies are mobile LTE (Long-Term-Evolution) devices, smart IoT sensors, high-definition CCTV (Closed Circuit TV), Q-R Code, RFID (Radio Frequency IDentification) tag, multiple modems of optic, microwave or low-frequency radio links, internet protocol processors, big data analyzers and automatic translated web-services.

2. IoT-ethics to solve these six troubles

Among them, Internet portal and SNS (Social Networking Services) are cyber ethics-tools. After IPv6 address system was started, the number of machines connected to the Internet has been increasing from thousands to billions, while the real-time presentation or displayed scenes are almost consumed via social media. So these people have become users of smart devices operating on platform and networks. Those devices are transferring or playing content such as broadcasting, image, moving picture, e-book, 2D/3D animation, and recorded sound files. Nowadays, in any particular country there are DMB (Digital Multimedia Broadcasting), Cable TV, Satellite TV and Radio, Internet TV and Radio, SMB (Social Media Broadcasting), personal broadcasting, *etc.*

So after 10 years, the amount of knowledge, wisdom, and technology has gone over Yota (1024) Byte to solve these six troubles; however, the basic shortages of water, food, and energy still cannot be solved in this earth. Just the unique solution is to control the population level under the provision level of them. On the other hand, for our survival and sustainability, our government, the UN (United Nations) and all people must develop a new ethics applicable to personal life, public life and national life. IoT-ethics are configured of kindness, regard, humor, contribution and donation operating on various Internets and smart content. Our goodness is true in this world because our human has a smart brain in the body of each man or woman.

However, each of our nations has its people, land, sea, air-space, industry, culture, history, language, traditional fashion, food, houses, economy, finance, currency (money), schools, universities, hospitals, shops, national flag, national flower, fish, animal, plant, national treasure and infrastructure, *etc.* all ethics is useful for their social credit, trust, fidelity, reliability, safety and stability. So every country adopts ethics and law, ordinance, and regulation with morality and religion for sustainability and the future. More importantly, our world-class products of electric and electronic operation, services or contents of information and communication, and broadcasting including software and internet portals are required for ubiquitous-life ethics. Also, IoT devices are connected to every Internet via Gbps networks.

For sustainability in this earth from the 21st to the 51st century, our expert systems and AI (Artificial Intelligence) have been operating on human safety, health, and environmental purification. Therefore, a high-speed IoT network and social networking

services are necessary for our ubiquitous computing lives. Nowadays, Big Data and IoT technology are enhanced to solve huge specific problems such as DDoS attack, voice-phishing, smishing, pharming, computer-virus, evil-code, hacking and personal information protection, etc. The laws of information protection and security are effective for future lives. As shown in this (Figure 1), we can therefore create our new ubitopia (Ubiquitous Utopia) era with an IoT relationship and trade system between Korea and the Philippines in which people can develop literature, art, science, and technology.



Figure 1. Book Cover of the 1st IT-ethic Literature and Art

3. A Case Study

1. Korea ICT in the year 2009

1) Network

On the 7th of July in Korea, DDoS (Distributed Denial of Service) attack was happened. After the accident, a network security company: SECUI.COM launched the new model 'SECUI NXG4000D' and the DDoS business with SAMSUNG Networks. The network business part of SAMSUNG Electronics will sell the L2 security switch as a network protection tool as the brand 'UBIGATE' supplied by HandreamNet Inc. among many companies .

2) Terminal

Nowadays in Korea, the user IT terminal such as a handy-phone, a notebook, a handy-game player, a PMP(Portable Multi-media Player), a MP3 player, an e-book, a car navigator, a wall pad, a bicycle, a vehicle, a robot, and even a high-pass card is protected by a key, a security number, a ID/PW (Password), a RFID, a bar code, a iris cognition, a fingerprint and a face cognition of a user or an owner against a suspicious access or a stealing activity.

3) Software and contents

Nowadays in Korea, the software can't be copied without permission, authorization or license. 29th of July, the Korean PCNC (Presidential Council of National Competitiveness) announced the preparation of 'Invention Capital' = US \$5billion during 5years and the protection of intellectual properties such as software and patents. Our government with the IT law is prohibiting the illegal copies, the illegal imitation and counterfeiting, or the illegal distribution and circulation.

4) Copyrights

Nowadays in Korea, KCC (Korea Copyrights Committee) generated from July in 2009 year after combining the SOCOP (Korea Software Copyrights Committee) is activated on works of arranging the dispute, judgment and estimation, international copyrights cooperation, copyrights R&D (Research& Development), the correction and recommendation for on-line service company and the support of establishing copyrights policy.

By the newly revised 'Korean Copyrights Act', the 'strike-out system' is effective for a Heavy-Up loader showing the illegal copies on some on-line sites and a set of Buyer-seller exchanging the convenient and some commercial benefits because the Korean government has the core tasks of preventing the illegal copies and protecting copyrights.

5) RFID

This RFID tool like a reader and a set of many tags is very useful for detecting the ID of object or product in single mode or dense mode and managing the time/position/producer/broker information with a computer. The traceability server and its clients based on Internet can trace each mobile routine of objects (ex : man, animal, plant, machine, house, building, etc) with the RFID readers and tags.

6) EPC

This EPC (Electronic Product Code) tool is very useful for allocating the unique ID to an object one-by-one and managing the logistics code (ex: bar code, ISBN, serial number, etc.) of EPC protocols with ONS (Object Naming Service), PML (Product Markup Language) and Savant. The RFID and sensor network is cooperating with these DB (Data Base) and information processing systems.

7) USN

This USN tool is very useful for recognizing the sensed information and the situation/status/context meaning and exchanging some integrated information through a remote routine or a high-speed (250Kbps@2.4GHz, 20Kbps@868MHz, 40Kbps @915MHz) Ad-hoc network. This sensor network adapts the broadcasting mode for simultaneous arrivals with star topology and the communicating mode for heterogeneous transactions with mesh topology by using the ZigBee MODEM, the Bluetooth MODEM, the UWB MODEM and the LED VLC MODEM.

8) CCTV with DVR

This tool is very useful for protecting some criminals and detecting the specific evidences with the DVR (Digital Video Recorder) system. The CCTV (Closed Circuit TV) takes a moving picture of the space with light and a general camera or Infrared and the special camera.

9) Digital Forensic

This tool is very useful for recovering some records and digital files from cancelling and erasing in the HDD (Hard Disk Drive), FDD (Floppy Disk Drive), ODD (Optical Disk Drive) including e-mail, e-memo, cyber café or hand-phone SMS (Short Message Service). Sometimes the prosecutor or the policeman uses this tool with expert helpings for solving the difficult or the twisted of criminals.

10) Smart Grid

The new brand SmartGridCity™ owned by the American company ‘Xcel Energy’ is meaningful for the world’s first full-scale pilot because electricity is an essential infrastructure (light, heat, comfort, information, entertainment) of our lives. Nowadays, the challenge of climate change policy will require the significant carbon dioxide emission reductions, the huge capital investment, the long-term technological transformation and the diverse portfolio of resources.

This Smart Grid is a digital and information-age grid so that the power of information has the more precise system design and operation, the improved reliability, the ability to meet customer needs and wants, the more products and services, the reduced emissions and environmental impact. The broadband over power lines providing two-way communications is an integrated energy system which incorporates entire energy pathway from generation to customer.

On the 29th of March in this 2009 year, Yeosoo City in Korea has announced the plan of ‘energy internet system’ to be used for 2012 Yeosoo Expo.

11) AMR

This AMR tool is very useful for measuring the use value of water, electricity or LPG (Liquefied Petroleum Gas)/LNG (Liquefied Natural Gas) with automatic reader and transmitting the digital data to a dedicated company of supply, repair and management with ZigBee MODEM and its antenna system. There is no writing, seeing, error, and body-energy extravagance of a customer or a user.

12) New Power Generator and electric-energy savings

Nowadays in world-wide, all companies and governments are focused on the new electric-power generation such as a (thin/thick-film) solar cell/cell-arrayed panel or a wide solar district, a wind-power district, a bio ethanol plant, a geothermal power plant, a tidal power plant, and a kinetic-electric converter plant in comparison with a hydropower plant, a thermal power plant or a huge nuclear generator plant.

2. Future applications of NGN(Next Generation Network)

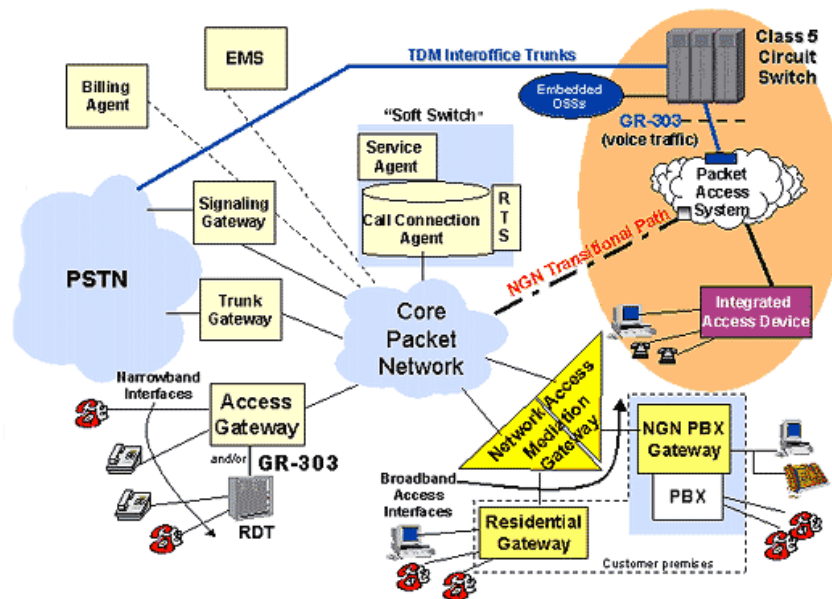


Figure 2. NGN Configuration

As shown as below (Figure 2), NGN PBX gateway supports the interconnections and interoperability by using the soft switch and broadband access interfaces for the contents delivery services such as the 1:1 private telecommunication, N:N teleconferencing, e-Banking, e-Learning, e-Library, e-Commerce, Cyber Open-University, e-Government, e-Procurement, e-Tax, e-Transportation, e-Hospital, e-Mall, e-Department Store, e-Tour, e-Farm, e-Sport Game, e-Broadcasting, e-Multimedia Shop, etc. The future applications of NGN will be present in u-(Ubiquitous) products as followings.

1) u-Robot

This mobile/nomadic/resident u-Robot will have the standing posture and the walking/running posture with a various speed of 0~5Km/h, 5~10Km/h, 10~30Km/h, 30~50Km/h or over 50Km/h). It will have the ubiquitous functions of the sensor system, the electric-supply system, the intelligence system, the mechanical system the security/safety system and the telecommunication network system such as a dwarf humanoid type, a animal-toy type, a life-tool type or a vehicular transformer type.

2) u-Vehicle

These u-vehicle such as a bicycle, a motorcycle, a car, a truck, a train, a ship, an airplane, a tank will have the ubiquitous functions of the sensor system, the self electric-circulation (generation->supply->consuming->regeneration) system, the intelligence system, the mechanical system, the security/safety system and the telecommunication network system. In Europe or Korea, the inside space of a super-high-speed (Max. 300Km/h) train 'KTX' supports the 'Digital Office' facilities with UMTS (Universal Mobile Telecommunication System) of 3G mobile-WCDMA technology and 'Wibro' technology.

3) u-Home

These u-Home models such as a house, an apartment, a villa, a building and a facility will have the ubiquitous characteristics of comfort, calmness, convenience, safety, security, stability, high-speedy, seamless, sensory as an environmental system that should have endurance, reliability, fidelity, non-harmfulness to health, life-cycle and capability even including the optimized 'price and quality' system. In our world including Korea, the future u-home as a good in the market will have the user-oriented interiors, the electronic infrastructures, the optimized demand-supply system of light, clean water and air, electricity and LNG, the automatic monitoring and protection system for a family.

4) u-City

Following enhancement of science, technology and system, a city and a life-environment is also evolved. In the future world including Philippines, all cities will be developed with ubiquitous city model because the digital city, the green city or the eco city is developed now in each nation where the environmental resources are different but peoples are the same properties such as a human or a person.

In Korea, the u-City solutions are provided by cooperation of SI (System Integration) companies and each of City halls like Seoul. Its international standardization is performed by technology experts and business enterprises. In world-wide markets, many u-City solution groups are creating the ubiquitous utopia = 'Ubitopia' (named by Dr. Seung Chang Park in his book) now toward 2030 year.

3. Advantages of NGN development

Nowadays, one person in this global world is connected to other person or peoples on Internet and digital media. In Philippines, Korea or other country, peoples are using information devices having main and subsidiary functions of storage, converting, signal processing, transmission, communication, broadcasting, upload/download, transformation, playing, editing, writing and even recording. In ethic freedom, they are making many businesses to earn money and to get materials necessary for sustaining each of lives. Because NGN is the infrastructure technology of all future networks, the advantages of NGN development are described as followings from economy development to culture activation:

1) Economy development

On the 27th of July in 2009 year, Philippine government of 'Arroyo' president announced the SoNA about Philippine economy development and the related education. In this sentence: 'Mrs. Arroyo said the country cannot have a high quality of life without a good economy, a central principle of her administration.' We can find the deep meaning that requires Philippines to become a nation-wide information society in the near future.

The first advantage of NGN development is economy development with the next MTPDP of 5~10 years because this NGN technology supports and implements the new IT convergence services on a nation-wide society with all evolving networks like Korea. At first, Philippine government like CICT should make the NGN development plan and its monitoring system from the start step to the end step of one cycle even including evaluation and confirmation of technology policy like a hardware system.

2) Industry growth

On this SONA, we can find some sentences about infrastructure development and the Philippine government will invest the national budget into the fields of building, roads, bridges, airports, seaports, and other power, agricultural, and social infrastructure. Today, 98% of all barangays have electricity and 98% of the archipelago have cellular phone signal. 8 out of 10 Filipinos have a cellular phone and there are 70,000,000 cellular phone users out of a population of 92 million in Philippines.

In Korea, the industries of information, communication, broadcasting, software, contents and the related experts of consultancy are plentiful for other industries like a body which consists of a top-level brain in a head, a intermediate-level neuron system in a body and a terminal-level sensors in a head and skin including actuators of bone, hand and foot in a body. Like a body growing up, other industries of enterprises, research institutes and universities are growing up with this information industry.

3) Standardization provision

Generally, users or customers of standardized products can get compatibility, good-price of quality and reliability after buying them with money in the abroad or domestic market. That is why the ITU-T, ISO, IEC, IEEE and other standardization organization are active in this globalized world. For NGN products, its economic principle is reflected on new technology development for the future subscribers of IPTV, BcN, DMB, WiMAX, Wibro, Wi-Fi, RFID and USN services.

In Korean government, the KCC promotes all standard technologies and provides all standardized techno-policies to enterprises and consumers with documents and explanation events. Following the policies including law,

ordinance, rules, regulations and standardized specifications, each of many subsidiary organizations, associations, institutes and industries makes an action referred to the correct description and professors in a Korean university teach the contents to their students in curriculum.

4) Education enhancement

On the SONA, 'Arroyo' president said, "Nothing is more sacred or more valuable to enhancing the dignity of every Filipino than a good education. No issue is more to us than education. Our children, the children of our nation are our most precious to us." This NGN technology is requiring the technical education and training for job applicants or university students and the ubiquitous services including NGN operation is going to the future figures.

On the view points of TELOF-TTI or UP (University of the Philippine), the education enhancement should be required for the enhanced specification and the enhanced technology through the related science and technology. In Korea, the 'Hanium' education and training program optimized to requirements of companies have been very effective for students and professors by putting IT mentors to the special courses from 2005 year.

5) Universal IT access

The NGN means the next generation network and is an infrastructure of SOC (Social Overhead Capital) with IPv6 system and USN technology in the Korean IT839 policy. The new NGN technology policy should cover planning, forecasting, developing, promoting, limiting, punishing, recommending, investing, managing, and making the Philippines' NGN standard after referring to de-jure or de-facto International Standard or some other countries because of universal IT access.

Although this coming NGN will show more complicated and more difficult on the side of system architecture, its consumer-valuable services should be simple, safe, stable, seamless, super-high speedy, convenient, comfort, calm, low-noisy, low-heat, low-power and even low-price. So this NGN policy of science and technology should be focused on industrialization, commercialization and standardization. Like concepts of interconnection and interoperability, Philippines' NGN policy needs the international cooperation for developing and supplying its services.

6) Welfare promotion

For getting the best answers of a life to be alive in health and connected from the ancestor to the descendants, everyone should know and treat information for personal welfare and happiness. In a concept of ubiquitous mobile computing technology, NGN solution groups are communicating and exchanging opinions through many seminars, workshops, international conferences and symposiums for perfect QoS of NGN and its missions to deliver all digital contents.

By using or utilizing the digital contents and the bidirectional communications, everyone processes his own information or knowledge for his purpose related to welfare or well-being. If customers buy his ubiquitous IT terminal, device or machine in an off-line shop or e-shop, then he may access its wire connector or wireless antenna to a near component of wire/wireless branch networks in the NGN configuration of any time, any device, any format and any place.

7) Energy savings

Nowadays, we can find easily all electronic components and electric components of the lower and lower power consumption in a market. All

developers working are seeking the design concept of energy savings for the best selling of each product because Green Growth and Weather Agreement were announced for all peoples and all nations in this global world. Especially, all customers in Philippines need the energy-lowest and heat-lowest product.

Green IT service means the lowest of total cost, power-consumption and heat-consumption through new design concept and new certification system for NGN equipments and accessories. The SmartGrid City is focused on the emerging market of electric energy-plants and electricity-supply networks by using or utilizing all information and knowledge generated from the solar cell to the nuclear power generator in the nation-wide area or the province-wide area.

8) People's healthfulness

Seeing the NGN characteristics, we can find some future applications such as u-Hospital, u-Home, u-Healthcare or u-Health by utilizing the information data of monitoring, traceability and record management. The ID/PW and records as information set for a person or persons are very effective and valuable in a health market. Peoples are choosing the better health-information services and the real-time diagnostics transferred to the patient, their family or their friends.

All digital contents related to healthfulness should be transmitted and received between doctors and patients with their peoples via the super-high speed NGN and its WiMAX/Wi-Fi/WLAN/UMTS/4G mobile networks. So there should be ultra-broadband of spectrum in frequency and ultra high-quality MODEM and CODEC. The NGN equipments should be certified by IS system.

9) Environment recovery

In Philippines, there are lots of environmental problems such as the dirty sea, beach or river and the polluted air of roads and lots of wastes on around buildings. However, the Philippine government has focused on agriculture and tourism of weighted industries to earn lots of foreign dollars or moneys for Filipinos. Information of dirt, pollution or toxin acids can be found by RFID/USN and Tele-monitoring systems including measuring of special chemical parameters in automatic process.

In Korea, as an example, Kwater Corporation has performed the water management of nation-wide area including many rivers and dams by using the information systems gathering the real-time data of digital TB storage via the dedicated wireless or wire networks. The NGN equipments should process the huge traffic or the small traffic of pollution information in automatic methodology. Nowadays, it is necessary to recover our environment cleanly every where every time.

10) Culture activation

The digital contents such as UCC (User Creation Contents), PCC (Professional Creation Contents) or TCC (Teacher Creation Contents) are treated by foreigners or peoples as cultural elements which they should understand or digest their familiar or unfamiliar culture. There are many types or styles in Philippine culture including online game, voices of music song, scene of music video, audio books or home shopping program via cable TV media.

In Korean NGN service, BcN contents are designed or produced by concepts of bidirectional data and multi-media broadcasting including uni-cast or multi-cast mode. The new IPTV culture and new mobile IPTV or T-DMB culture are recognized freshly by visitors or foreigners in Korea. So the NGN can make activation of Philippine culture in unique mode and lots of peoples can enjoy their culture of various features with many terminals of information.

4. Disadvantages of NGN development

In the other hand, there are five disadvantages of NGN development but Philippine government and peoples can cancel or solve the problems or harmfulness for long time (about 5~10 years) of the next MTPDP period beyond 2011. As I point, the 1st is a phenomenon of digital divide between a ubiquitous city and a general country. The 2nd is a kind of ICT reverse functions like information criminals, security accidents, hacking, cracking, spamming, evil code, computer-virus, anti-reply, voice phishing, cyber-gang, suicide, illegal copy, DDoS, etc. The 3rd is a phenomenon of economic deviation of consuming and income. The 4th is a phenomenon of investment overload on infidelity and unbalance. The 5th is a phenomenon of network complexity and bit-error diffusion on the systems.

4. Conclusion

In this paper, we studied an effective direction and smart lives with IoT evolution. For smart civilization and human life sustainability, the new lawful direction of IoT-ethics is to modify the existed laws, or to create new IoT laws. The new social direction of it is to create some periodic movements and more informative broadcasting programs. Its new technical direction is to make systems smart and optimized for reliability, stability, safety, fidelity, and economy. Therefore the Korean government, industries, universities, research institutes, army and KITELA can give the Philippines each of their poems and literature, arts, knowledge, technologies, and experiences through some transfer contracts whenever the Philippines wants to receive them.

Through a case study, this paper has considered the Philippine NGN policy for the better future. As I found your budget and nature disaster even including pollution of air, water and streets, your government needs huge fund of money for developing new Philippines during the next MTPDP. But only the small budget and the industry coordination rights of Philippine governments can develop NGN services if your government utilizes international aids or funds as well as Korean cases.

An IoT relationship is needed for our ICGHIT and added programs such as meeting, seminars, workshops, symposia, forums, education, exercises, concerts, exhibitions, publications, press, broadcasting, movies, drama, music albums, galleries, etc., so Korea and the Philippines can make a delightful future for people of smart cultures and ethic lives based on IoT technology. From July 2016 year to June 2025 year (10 full years) as our 1st active step of ubitopia consensus, this paper proposes that we open a fusion event by having a brand-new KP-LAST (Korea-Philippines Literature, Art, Science and Technology) concert in Manila.

Acknowledgments

This "IoT relationship" IT-ethics text-book in Korean Version was published and contributed for ubitizen societies and start of international IT-ethics movement during the 18th of December, year 2015.

The case study for NGN between Korea and the Philippines is referred to the consultancy performed by Dr. Seung Chang Park in the year 2009.

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