ITU-TRCSL Training on
ICTs for promoting Innovation & Entrepreneurship

Social Impact of Increasing ICT Access

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- In modern society ICT is ever-present, with over three billion people having access to internet, with approximately 8 out of 10 internet user's owing a smartphone.

- Internet use continues to grow steadily, at 6.6% globally (3.3% in developed countries, 8.7% in the developing countries).

- Favorably, the gap between the access to internet and mobile coverage has decreased substantially in last fifteen years.

- ICT to become a key stone of everyday life, in which life without some facet of technology most of clerical work and routine cannot be accomplished.

ICT impact almost every sector in daily-life such as:

- Education
- Health
- Disaster Management
- Banking
- E-Commerce/ E-Business
- Agriculture
- Social Media
- E-Government and Civic Engagement
- Energy Consumption / Efficiency

Education

- Massive Open Online Courses (MOOCs), offering large-scale interactive participation and open access through the World Wide Web or other networks, called e-learning or distance education.

- Distance learning are divided into two modes of delivery: Synchronous and Asynchronous learning.

- All participants are present, it resembles traditional classroom. Web conferencing, educational television, .etc. are the example of synchronous leaning.

- Participants access course material flexibly on their own schedules, and are not required to be gather like traditional way. Video and audio recordings, fax, voicemail .etc. is as asynchronous delivery technology

Today's society shows the ever-growing computer-centric lifestyle, which includes the rapid influx of computers in the modern classroom.

- E-learning since its flexible scheduling structure lessens the effects of the many time-constraints imposed by personal commitments and responsibilities.
- Furthermore, there is the potential for increased access to students from diverse geographical, social, cultural, and economic background.

Interactive whiteboard in 2007

- E-learning may be able to help to save considerable amount financially by removing the cost of transportation.

- E-leaning may be able to save students from the economic burden of high-priced course text-books.

- Distance education may enable students who are unable to attend schools setting, due to disability or illness.

- Distance education may provide equal access regardless of socioeconomic status or income, area of residence, gender, race, age or cost per student.

•Health

- E-health is the relatively recent term for healthcare practice supported by electronic processes and communication.

- With ICT, lives of people with disabilities can be improved, allowing them to have a better interaction in society by widening their scope of activities

- Electronic health record: enabling the communication of patient data between different healthcare professionals (GPs, specialists etc.)

- Computerized physician order entry: a means of requesting diagnostics tests and treatments electronically and receivying the results.

- e-Prescribing: access to prescribing option, printing prescriptions to patients and sometimes electronic transmission of prescriptions from doctors to pharmacists.

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- Tele-health involves the distribution of health-related services and information. Distribution is via electronic information and communication technologies. It allows long distance/ clinician contact and care, advice, reminders, education, intervention, monitoring and remote admissions.

- Tele-health include two clinicians discussing a case over video conference; a robotic surgery occurring through remote access; physical therapy done via digital monitoring instruments, live feed and application combination; test being forwarded between facilities for interpretation by higher specialist.

- m-Health is an abbreviation for mobile health. The term m-Health is most commonly used in reference to using mobile communication devices, such as mobile phones, tablet computers and PDAs, as well as wearable devices such as smart watches, for health services, information and data collection.

- The m-Health field has emerged as sub-segment of e-Health, the use of ICT, such as computers, mobiles phones, communications satellites etc. for health service and information.

Malaria Clinic in Tanzania helped by SMS for Life program that uses cell phones to efficiently deliver malaria vaccine

Dengue Activity Tracking System:

- Lahore and its surrounding had been hit in the recent past (2011) by biggest widespread of vector borne disease i.e. Dengue.

- Government of Punjab decided to proactively gear up against the spread of Dengue for coming season through anti-dengue activities.

- For this purpose, In Feb 2012, Punjab Information Technology Board (PITB) devised monitoring mechanism named as "Dengue Activity tracking System" to log all field activities related to prevention & eradication of the dengue, in the real time.

- The monitoring mechanism of "Dengue Activity Tracking System" is Based on real time reporting on portal through GPS enable android based mobile app.

- The mobile app covers multiple activities range from Dengue patient tagging, OVI traps, Debris removal surveillance of Graveyards, Junkyards etc.

- Data stream as submitted via mobile app gets plotted on Google maps in real time as the mobile app captures latitude and longitude along with photographs.

- Anti-Dengue Campaign by

  PITB comprises of four system:

  - Vector Surveillance System

  - Patient Reporting System

  - Dengue Tracking System

  - Health CMS (Complaint

  Management System).
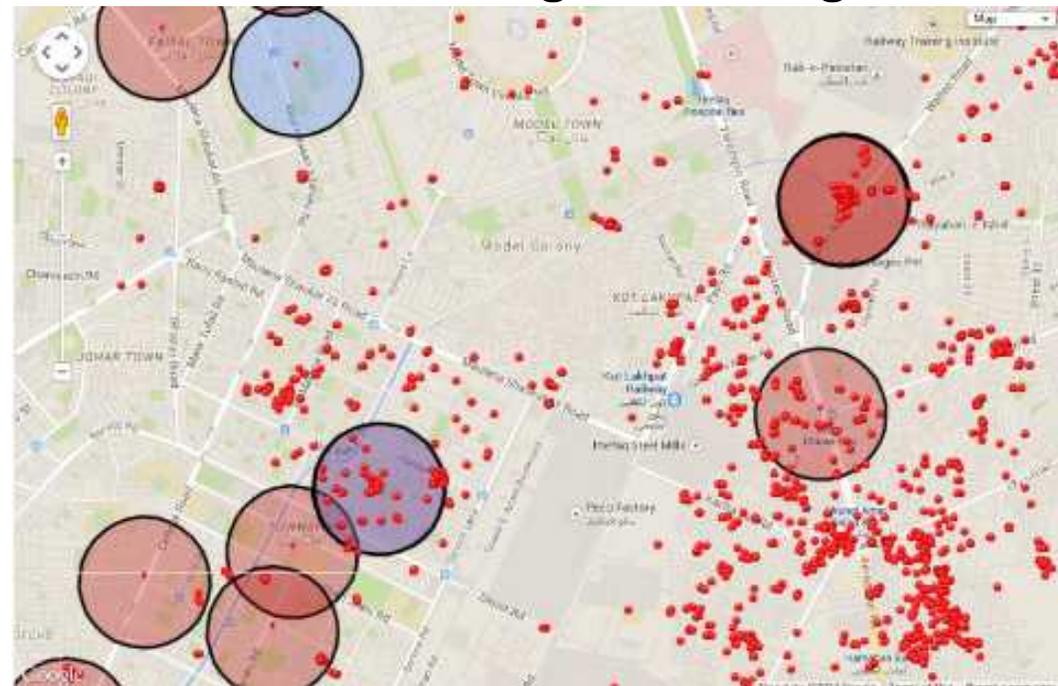
Dengue Control Smartphone app

Disaster Management

- ICT play a significant role in highlighting risk areas, vulnerabilities and potentially affected population by producing geographically referenced analysis through Geographic information system (GIS).

Vulnerability Map without RS/GIS Components

Static information. Mostly analogue and non-interactive

Vulnerability Map with RS/GIS Inputs
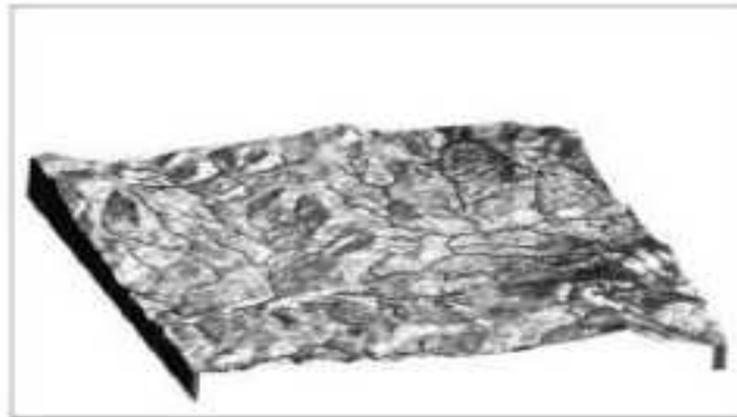
Dymamic information (with cause and effect relationship). Real Perspective Visualization

## Channels used for disaster warning and awareness:

- Radio & Television
- Telephone(Fixed & Mobile)
- Short Message Service
- Cell Broadcasting
- Satellite Radio
- Internet/E-mail

• ICT in disaster preparedness and response:

Rapid Onset Disasters
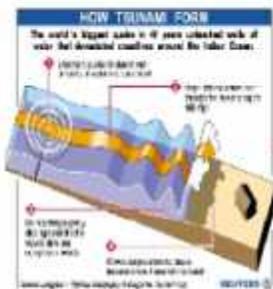
½ hour – 6 hours

Hazard ←——————→ **Disaster**

❏ If > ½ hour disaster warning is not possible
❏ If < 6 hours, it is a different kind of a disaster (drought, epidemic, famine) – needs diverse tools

While ICTs cannot prevent most hazards…
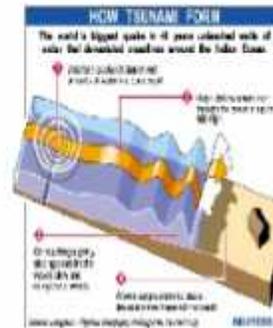
Hazard *Vs.* **Disaster**

Hazard
1. A source of danger;
2. An unknown and unpredictable phenomenon that causes an event to result one way rather than another*

Disaster
1. A state of extreme (usually irremediable) ruin and misfortune;
2. An event resulting in great loss and misfortune*

… they can reduce the risk of disaster

EMIS in Disaster Management:

Emergency Management Information System (EMIS):

- An information system designed to collect analyze, and share information in support of emergency management activities.

- EMIS can be either custom developed or COTS(commercial off the shelf software).

- EMIS for disaster response that provide graphical, real-time information to responders.

EMIS provide:

- Common operating picture
- Geospatial data visualization
- Linkages or integration with remote sensor data
  - Cameras
  - Aerial photography
- Resource tracking
- Critical infrastructure tracking
- Personnel/ Team Management
  - Duty rosters
  - Sign in logs
- Mission tracking or Action planning

Other tools used in Disaster Management:

Emergency communication system:

ECS is a system (typically, computer-based) that is organized for the primary purpose of supporting one-way and two-way communication.

Audio Public Address System:

A system which can provide audio messages capability, usually consisting of microphone devices, wiring, and speakers installed in public area of buildings.

L.E.D. Electronic Signs:

Uses light-emitting diodes to display messages when connected over a network to an emergency communication system.

Giant voice System:

A system focused on providing auditory messaging capability for large outdoor areas, being able to project voice over large distance.

ICT in disaster recovery:

- Developed by LSF in the aftermath of tsunami.

- Used LAMP (Linux/MySQL/PHP) software stack.

- The main application and problems these software address are:

- Helping to trauma by effectively finding missing persons.

- Coordinating and balancing the distribution of relief organizations in the affected areas and connecting relied groups.

- Registering and tracking all incoming requests fir support and relief up to fulfillment and helping donors connects to requirements.

- Tracking the location and numbers of victims in the various camps and temporary shelters set up all around the affected area.

- Successfully used in 2005 earthquake in Pakistan, Philippines landslides 2006 , and Indonesian earthquake 2006.
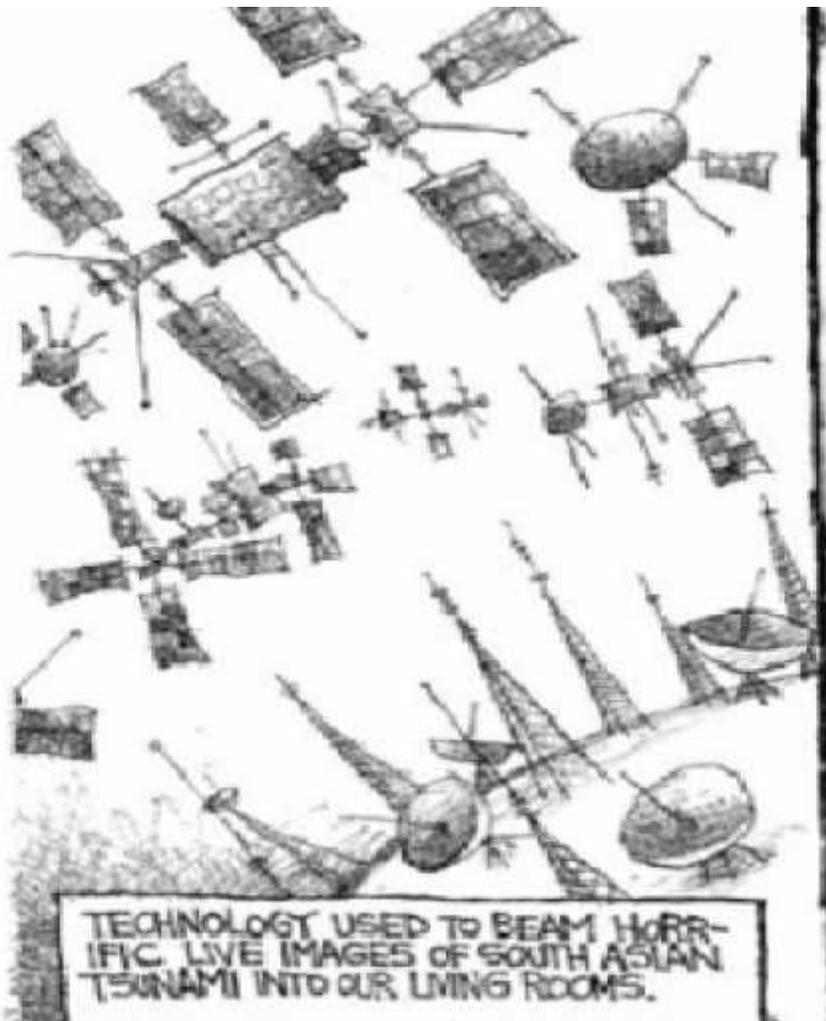
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TECHNOLOGY USED TO BEAM HORR-IFIC LIVE IMAGES OF SOUTH ASIAN TSUNAMI INTO OUR LIVING ROOMS.

TECHNOLOGY USED TO DETECT SOUTH ASIAN TSUNAMI.

Role of ICT in banking industry:

- ICT is helping to improve the banking sector from its previous sluggish state and while improving banking system.

- The ICTs contribution towards banking industry are:

- Online banking/ E-banking

- Mobile banking/M-banking

- SMS banking

Online banking/E-banking:

- Also known as internet banking or virtual banking, is an electric payment system that enables customs to conduct a range of financial transactions.
- Bank customers perform non-transactional tasks through online banking, including

- Viewing account balances
- Viewing recent transactions
- Viewing images of paid cheques
- Ordering cheque books
- Download periodic account
statements
- Download application for
M-banking, E-banking etc.

Bank customers can transact banking tasks through online banking, include

- Funds transfer

- Paying third parties, including bill payments and third
        party fund transfers

- Investment purchase or sale

- Loan application and transaction, such as repayment of   enrollment

- Credit card application

- Register utility billers and make bill payment

- Financial institution administration

- Management of multiple users having varying levels of authority

- Transaction approval process

Mobile Banking/ M-banking:

- M-banking is a service provided by a bank that allows customers to conduct financial transaction remotely using mobile devices(smart phones or tablet etc.)

- Mobile banking services:

- Account information
  - Mini-statements and checking of account history
  - Alerts on accounts activity or passing of set thresholds

- Monitoring of term deposits

- Access to loan and card statements

- Mutual funds / equity statements

- Insurance policy management

Transaction

- Funds transfers between the customers linked accounts
- Paying third parties, including bill payment and third party fund transfer
- Check remote deposit

Support

- Status of request for credit, including approval and insurance coverage
- Check book and card request
- Exchange of data messages and e-mail, including complaint submission
- ATM location

Future functionalities in mobile banking:

- Common enrichment: Video interaction with agents, advisor.

- Pervasive transaction capabilities: Comprehensive "mobile wallet"

- Customer education: "Test drive" for demos of banking services

- Content monetization: Micro level revenue themes such as music, e-book

   download

- Vertical positioning: Positioning offerings over mobile baking specific industries

- Horizontal positioning: Positioning offerings over mobile banking across all the

 industries

SMS banking:

SMS banking is form of mobile banking. It is a facility used by some banks or other financial institution to send messages (notification and alert messages) to customers, using SMS banking which enable customers to perform some financial transactions.

Push and pull messages:

- Push messages are those that a bank sends out to a customers mobile phone, without the customers initiating a request for the information.

- Typically, a push message could be a mobile marketing message or an alert event which happens in the customers banks account.

- Another type of push message is one-time password(OTPs), OPTs are the latest tool used by financial institution to counter cyber fraud.

- Pull message are initiated by the customer, for obtaining information or performing transaction in the bank account.

Typical push services offered

- Periodic account balance reporting

- Reporting of salary and other credits to the bank account

- Successful or un-successful execution of standing order

- Large value withdrawals on an account

- Large value withdrawals on the ATM

- Large value payment on a credit card or out of country activity on a credit card.

Typical pull service would include

- Account balance enquiry

- Mini statement request

- Electronic bill payment

- Requesting for an ATM card
  or credit card to be suspended

- De-activating a credit or debit card
  or the PIN is known to be compromised

- Foreign currency exchange rate inquiry

Keep track of your transactions 24/7

Receive real-time SMS alerts for transactions conducted on your deposit accounts as well as your Credit card and Debit card.

SMS alerts

- SMS banking usually integrate with a bank's computer and communication system.
- There is only one open source online banking platform supporting mobile banking an SMS payments called cyclos, which is developed to stimulate and empower local banks in development countries.

Cycolos:

Is online banking software for microfinance institution, local banks (in developing countries) and complementary currency system. Cyclos has following functionality

- Online banking tools
- E-commerce platform
- Business directory
- Messaging and notification system
- Call and support-center logging
- Integrated management information system

E-commerce/E-business:

- E-commerce draws on technologies such as mobile commerce, electronic funds transfer internet marketing, online transaction processing, electronic data interchange, inventory management system, and automated data collection system and also typically uses World Wide Web.

- E-commerce businesses may employ all of the following

  - Online shopping web sites for retail sales direct to consumers

- Providing or participating in online marketplaces, which process   third-party business-to-consumers or consumers-to-consumers sales

- Business-to-business buying and selling

- Gathering and using demographic data through web contact and

  social media

- Business-to-business (B2B) electronic data interchange

- Marketing to prospective and established customers by e-mail or fax

- Engaging in pre-tail for launching new products and services

- Online financial exchange for currency exchange or trading purpose

- E-commerce has the capability to integrate all inter and intra- company functions, meaning that the three flows (physical flow, financial flow and information flow) of supply chain also affected by e-commerce.

- E-commerce helps create new jobs opportunities due to information related services, software app and digital products.

Social impact of e-commerce:

For instance, B2B is a rapidly growing business in the world that leads

to lower cost and improves the economic efficiency.

- E-commerce has changed the relative importance of time.

- Prefect competition between the consumer sovereignty and industry will maximize social welfare.

- Nowadays, the transparent and real-time information protects the rights of consumers, because consumer can pick out the portfolio to their own benefit.
- The competitiveness of enterprises will be much obvious than before; consequently, social welfare would be improved by the development of e-commerce.
- Online merchants gather purchase activity and interests of their customers.
- Online merchandise is searchable, which makes it more accessible to shoppers.
- Many online retailers offer a review mechanism, which held shoppers decide on the product to purchase.
- The cost of running a ne-commerce business is very low when compared with physical store

- There is no rent to pay on expensive premises.
- Business processes are simplified and less man-hours are required to run required to run a typical business smoothly
- In the area of law, education, culture and policy, e-commerce will continue to rise in impact, e-commerce will truly take human being into information society.

M-commerce/M-business:

- Mobile devices are playing an increasing role in the mix of e-commerce, the phrase mobile commerce was originally coined in 1997, to mean "the delivery of electronic commerce capabilities directly into the consumer hand anywhere, via wireless technology.

- Mobile commerce is worth $230b, with Asia representing almost half of the market, and has been forecast to $700b in 2017.

Percentage of respondents who have made a purchase with a mobile phone in the past 3 months

Country	Percentage
China	59.4
Thailand	51.2
South Korea	47.6
India	47.1
Indonesia	46.7
Taiwan	45.2
Hong Kong	40
Vietnam	34.9
Philippines	32.8
Malaysia	31.5
Singapore	31.4
Australia	24.8
Japan	22.9
New Zealand	15

CELEBRATING
25 YEARS
OF ACHIEVEMENTS
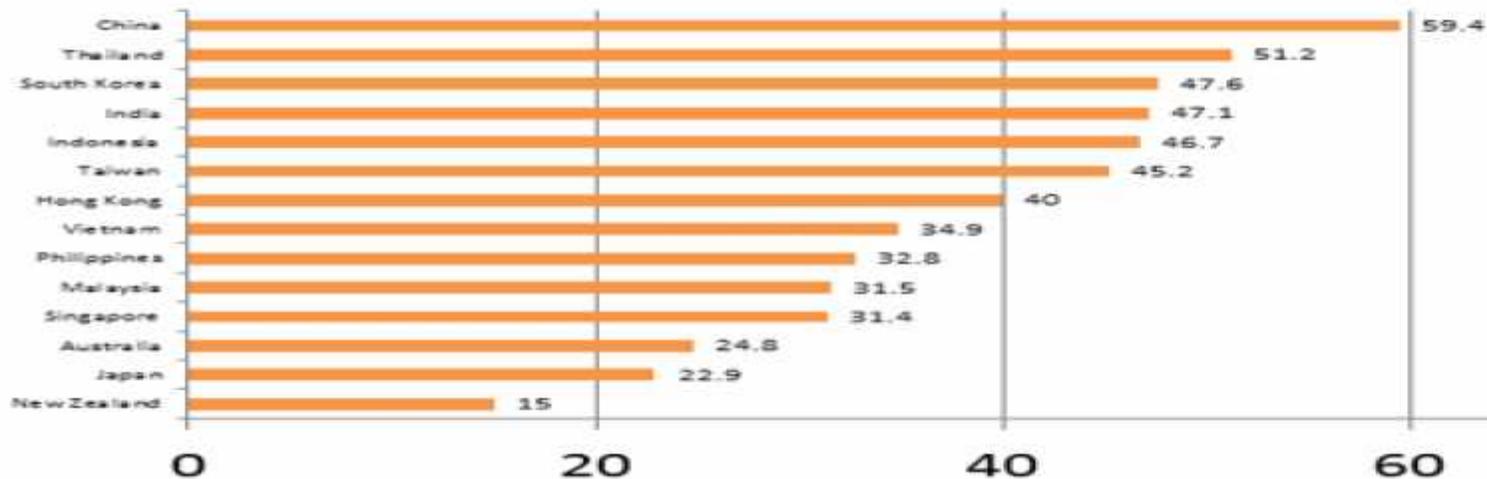
- According to BI Intelligence, in Jan 2013, 29% of mobile user have now a purchase with their phones.

All Numbers In Thousands

BI INTELLIGENCE

	Amazon Sites	eBay	Wal-Mart
Mobile-Only	42,871	21,933	19,276
Mobile+Desktop	42,168	23,440	9,825
Desktop-Only	64,193	45,982	30,146

Thousands (000)

■ Desktop-Only ■ Mobile+Desktop ■ Mobile-Only
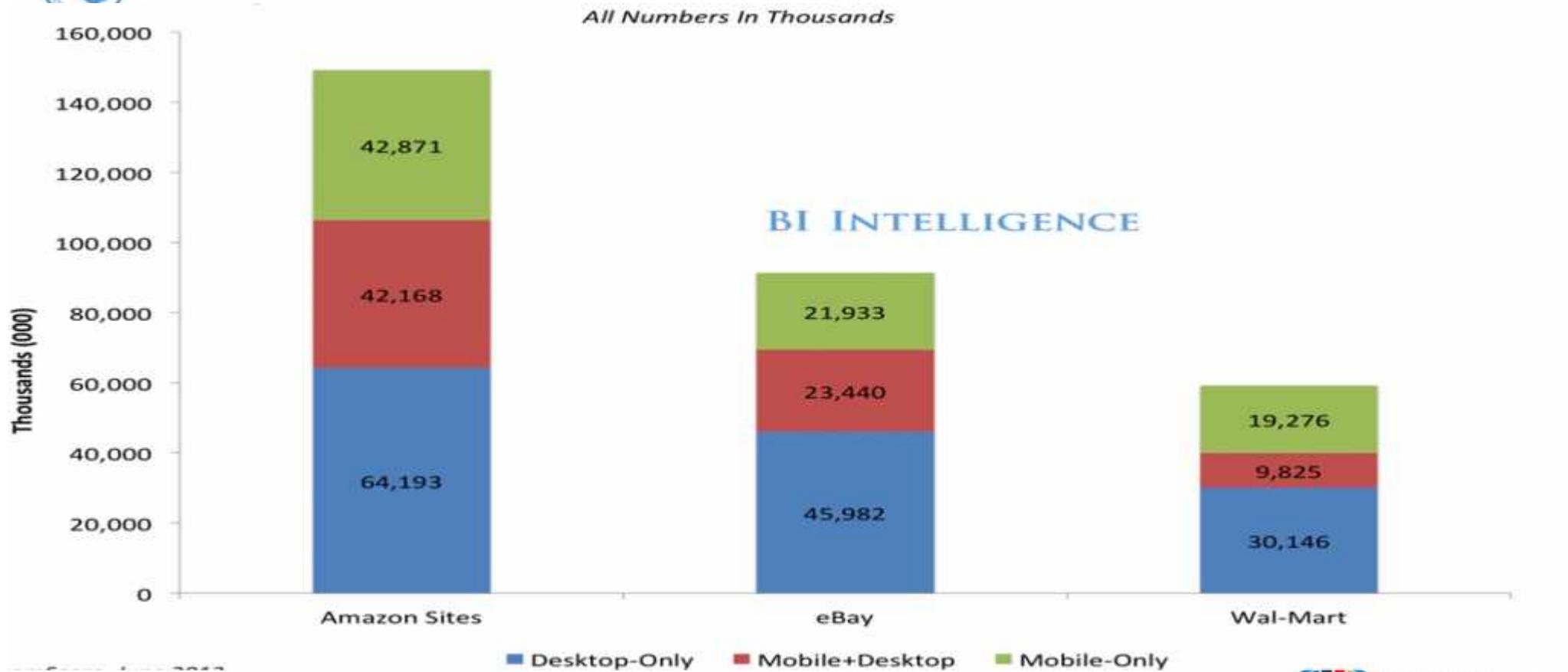
Consumers can use many form of payment in mobile commerce, including

- Contactless payment for in- person transaction through a mobile phone(such as Apple pay or Android pay).

- Premium-rate telephone numbers which apply charges to the consumer's long-distance bill.

- Mobile-operator billing allows charges to be added to the consumers mobile telephone bill, including deduction to pre-paid calling plans.

- Some providers allow credit cards to be stored in a phone's SIM card or source element.

- Some providers are starting to use host card emulation, or HCE (e.g. Google Wallet and Soft-card).

- Some providers store credit card or debit card information in the cloud; usually in tokenized.

- With tokenized, payment verification, and authorization are still required , but payment card numbers don't need to be stored, entered, or transmitted from the mobile devices.

- Micropayment services.

- Stored-value cards, often with mobile-device application stores or music stores(e.g. iTunes).

•Agriculture:

- Farmers in the developing countries, through smartphone can easily access the national and international market.

- There are also smartphone apps which gives information about your crops and irrigation system remotely.

- In livestock farming, cattle-breeding now includes scientific cross breeding techniques that produce cattle with great improved fertility.

Agriculture is developing innovative way to use ICTs in the rural domain, with primary focus on agriculture

Source: FAO, ITU

E-agriculture:

Global Positioning System (GPS):

- In agriculture, the use of GPS provides benefit in geo-fencing, map making, and surveying.

- GPS price dropped over the years, making it more popular for civilian use.

- In Kenya, the solution to prevent an elephant bull from destroying crops was to with a device that send a text message when it cross the geo-fence and the authorized are alerted whenever it is near the farm.

GPS Receivers

Geographic information system (GIS):
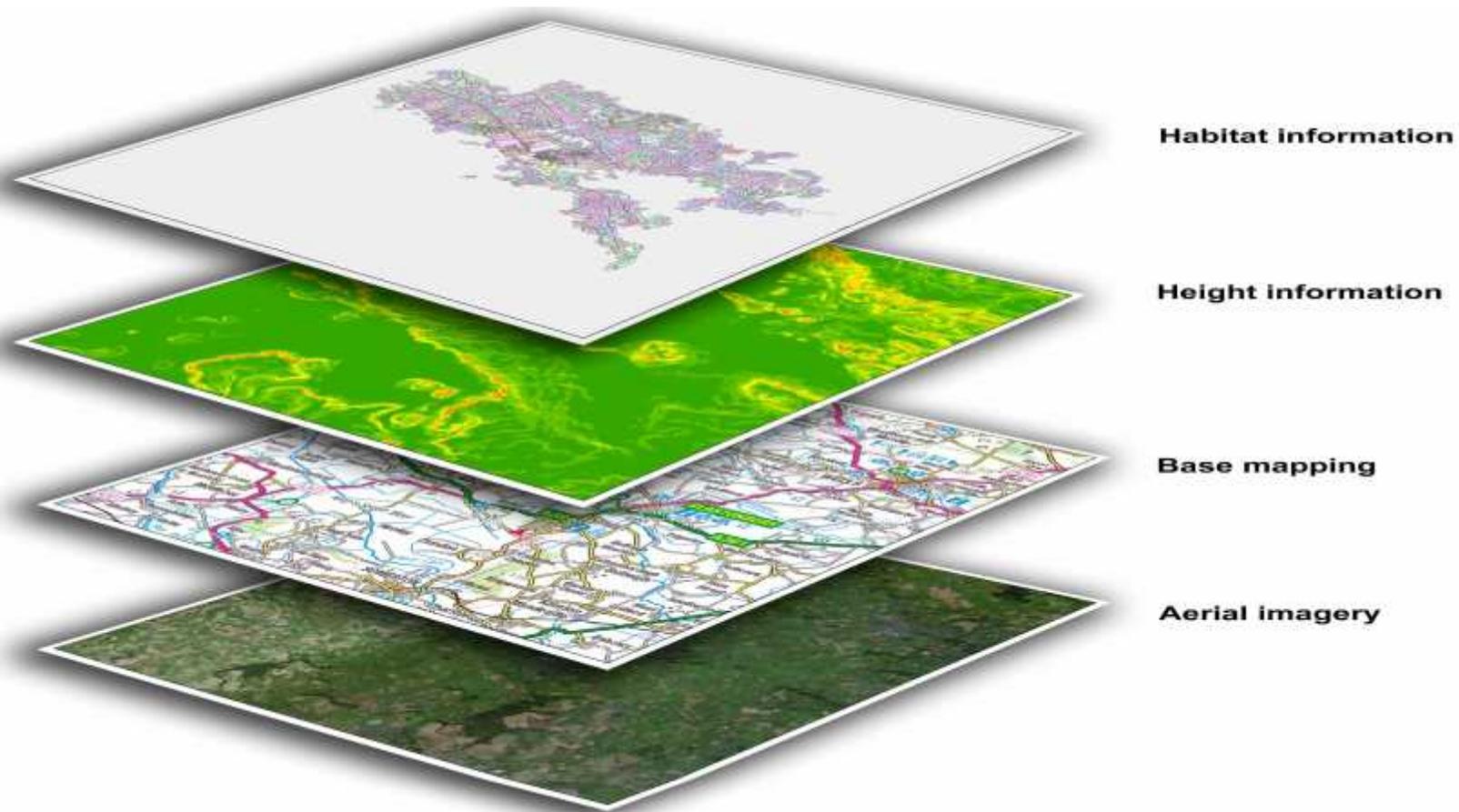
- GIS are extensively used in agriculture, especially in precision farming.

- Land is mapped digitally, and pertinent geodetic such as topography and contours are combined with other statistical data for easier analysis of the soil.

- GIS is used in decision making such as what to plant and where to plant using historical data and sampling.

Automatic milking system:

- These system are computer controlled stand alone system that milk the dairy cattle without human labor.

- The complete automation of the milking process is controlled by an agriculture robot, a complex herd management software, and specialized computer.

DeLaval milking station

- Farmers can also improve herd management by using the data gathered by computer.

- By analyzing the effect of various animal feeds on milk yield, farmer may adjust accordingly to obtain optimal milk yields.

- Automatic milking eliminates the farmer from the actual milking process, allowing for more time for supervision of the farm and the herd.

- **Radio-frequency identification (RFID):**
- Malaysia's Ministry of Agriculture introduce a livestock- tracking program, to track the estimated 80,000 cattle all across the country.
- Each cattle is tagged with RFID technology for identification, bearer's location, name of breeder, sex, and dates of movement.
- RFID will also help producers meet the dietary standards by halal market.

Agricultural drones:

- Agricultural drones are drones applied to farming in order to help increase crop production and monitor crop growth.

- Through the use advanced sensors and digital imaging, farmers are able to use these drones to help them gather a richer picture of their field.

- Information gathered from such source may prove useful in improving crop yields and farm efficiency.

There are currently two types of views provided to the farmer through drone:

- A bird eye view; this particular view can reveal many issues such as irrigation problems, soil variation, and of course, pest and fungal Infestations.

- The second view known as multispectral images; these images are used to show an infrared view as well as a visual spectrum view .

- When these views are combined, famer is able to see the difference between healthy and unhealthy plants.

- **Agricultural robots:**
  - The main area of application of robots in agriculture is at the harvesting stage.
  - Emerging application of robots in agriculture include weed control, planting seeds, harvesting, environmental monitoring and soil analysis.
  - Fruit picking robots, driverless tractor/ sprayer, and sheep shearing robots are to replace human labor.

- Robots can be used for other horticultural tasks such as pruning, weeding, spraying and monitoring.
- Robots can also be used in livestock application (livestock robotics) such as automatic milking, washing and castrating.

Autonomous Agricultural Robot

Social Media:

- ICT has brought the world together through social networking sits.
- ICT has made researching information easier, as information can found by looking over internet.
- Content creation provides networked individual opportunities to reach wider audience.
- Moreover, it can affect their social standing and gain political support.

Social media and Arab Spring:

- The influence of social media on political activism during the Arab Spring has, however, been much debated.

- Protests tool place both in states with a very high level of internet usage (such as Bahrain with 88% of its population online in 2011).

- Researcher have shown how collective intelligence, dynamics of crowd in participatory systems such as social media, have immense power to support a collective action- such as foment a political change.

Arab Spring

Protesters in Tunis (January 2011)

•Social Media in Business:

- Social media enables you to reach markets you may not otherwise have access to for virtually no cost, other than in time & effort.

- Ask questions and obtain instant feedback from customers, peers & prospects.

- It creates an audit trail of online activity, which is crucial for testimonials and referrals and as a permanent reference point.

- People are more likely to use forums and FAQs on websites than contact a call center.

- The potential to increase your following-only 15% of local business fans are in the same place (Roost)-you can reach a vast audience-go VIRAL.

- Social media marketing is possibly the most cost-efficient part of an advertising strategy.

- Creating a voice for your company through these platforms is important in humanizing your company.

•Social Media in Education:

- Online Learning

- Course Assignments

- Collaborative Learning

- Personal Learning Network (PLN)

- Integrating Real World Applications into Teaching

Kahoot:

- An easy tool for tests.

- You or your student can easily create your own quizzes.

- There are million of public quizzes you can use or edit them.

Kahoot!

Game pin

Enter

•Effects on youth communication:

- Social media has affected the way youth communicate, by introducing new forms of language.

- The commonly known "LOL" abbreviation for "Laugh out loud", "BAE" stand for "before anyone else", "YOLO" means "you only live once".

- Social media alters the way we understand each other.

- Social media has allowed for mass cultural exchange and intercultural communication.

- The emergence of social media platforms collided different cultures and their communication methods together, forcing them to to realign in order to communicate with ease with other cultures.

•E-government/ Civic engagement:

- E-government refers to utilization of ICTs, and other web based technology to improve and/or enhance on the efficiency and effectiveness of service delivery in the public sector.

- E-government promote and improves broad stakeholders contribution to national and community development, as well as deepen the governance process.

- Government operation are supported by web-based services, specifically the internet, to facilitate the communication between the government and its citizens.

- **Delivery models and activities of e-government:**

  The primary delivery models of e-government can be divided into:

- Government-to-citizen (G2C) approaches such as setting up websites where citizens can download form, government information, etc.

- In this model, G2C model applies the strategy of customer relationship management (CRM) with business concept.

- BY managing citizen relationship, government can provide the needed products and services fulfill the needs of the citizen.

- In US, the NPR(National Partnership for Reinventing Government) has been implemented from 1993.

- Government-to-business (G2B)

- Government-to-government (G2G)

- Government-to-employs (G2E)

- Within each of these interaction domains, four kinds of activities take places:

- Pushing information over internet, .e.g. regulatory services, general holidays, public hearing schedules, issue briefs, notification, etc.

- Two-way communication between the agency and the citizen, a business, or another government agency.

- Conducting transactions, e.g.: lodging tax return, applying for services and grants.

- Governance, e.g.: To enable the citizen transition from passive information access to active citizen participation by:

- Informing the citizen

- Representing the citizen

- Encouraging the citizen to vote

- Consulting the citizen

The ultimate goal of the e-government is to be able to offer an increased portfolio of public services to citizens in an efficient and cost effective manner:

- E-government allows for government transparency, government allows the public to be informed about what the government is working on as well as the policies the are trying to implement.

- E-government is an easy way for the public to be more involved in political campaigns. It could increase voter awareness, which could lead to an increase in citizen participation in elections.

Energy Consumption/ Efficiency:

- Is the goal to reduce the amount of energy required to provide products and services.

- Insulating a house allows to use less heating and cooling energy to achieve and maintain a comfortable temperature.

- Modern appliances, such as ovens, stoves, dishwashers, dryers, use significantly less energy than older appliances.

- Current efficient refrigerators use 40% less energy than conventional models did in 2001.

- Following this, if all households in Europe changed their more than ten-year-old appliances into new ones, 20 billion KWh of electricity would be saved annually, hence reducing CO_2 emissions by almost 18 billion kg.

- Building are an important field for energy efficiency improvement around the world because of their role as a major energy consumer.

- A building's location and surroundings play a key role in regulating its temperature and illumination E.g. trees, landscaping, and hills can provide shade and block wind.

- In cooler climates, designing northern hemisphere buildings with south facing windows and southern hemisphere buildings with north facing window increases the amount of sun (ultimately heat energy) entering the building, minimizing energy use, by maximizing passive solar heating.

- Energy efficient building design can include the use of low Passive infra Reds(PIRs) to switch-off-lighting when area are unoccupied such as toilet, corridors or even office area out-of-hours.

- A deep energy retrofit is a whole-building analysis and construction process that uses to achieve much larger energy saving than conventional energy retrofits.

- A deep energy retrofit typically results in energy savings of 30% or more, The Empire State Building is one of the best example which gain gold Leadership in Energy and Environmental Design (LEED) rating in Sep 2011.