Innovation Themes Futurist Database

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- Food and nutrition
  - Research
    - Individualised nutrition
      - Epigenomics and nutrigenomics could impact the future food/beverage business
  - Functional Food
    - Should medicine and food stay strictly separated?
    - Nutrition for healthy aging as future market
      - Enhancement food as new business area and legal challenge
  - Food Production
    - Energy efficiency becomes important for food industry
    - How to combine food production and energy generation?
    - Urban farming and high-rise farming as the future of farming?
    - Lab grown meat enables meat without the use of animals
    - How to grow food in outer space?
- Defence/Security
  - Weapons/Soldiers
    - Less-than lethal/non-lethal weapons - a new market?
    - Will HET come from out the military?
    - What will the future soldier be like and what may be the implications?
    - Electromagnetic pulse weapons ("E-bombs") as new major threat for human civilisation?
  - Security/Surveillance
    - Dual-use technology as business advantage or security risk?
    - Will future safety only be assured by Mutually Assured Permanent & Pervasive Surveillance (MAPPS)
    - Should we invest in "existential risk" prevention?
    - DIY and biohackers, a security threat?
    - Can there still be anonymity?
    - Do people have the right to privacy if privacy could mean a place for developing threats for society?
    - How realistic is neurtechnology fop defence?
    - Should brainscans be used in court?
    - Should brainscans be used for security scanning?
    - Is privacy within the internet principally possible?
    - How could nanotechnology risk assessment and findings impact business and trust?
  - AI/Robotics/ICT
    - AI-based surveillance data analysis for more security?
    - Military robots have advantages but also cause ELSI concerns
    - Will robots be better than humans in warfare?
    - Needs for security technology drive the development of AI development
    - How can the internet be made safe against attacks?
- Space
  - Research
    - How can space technologies and "earth technologies" be brought together?
    - What is the human future in outer space?
    - Can science and technology help discovering extraterrestrial life?
  - Communication/Safety
    - How much space is left in geostationary orbit?
    - What if GPS satellites fail?
    - Should we invest in asteroid defence technologies
    - How dangerous is space junk?
  - Resources/Business
    - Mining resources in outer space?
    - Japan and US show interest in space-based solar
    - Space tourism - big future business?
- Health/Medicine/"beyond therapy"
  - Data/ICT
    - The dissemination and storage of medical data can improve therapy but also raises privacy issues
    - Hospitals are getting digital
  - Society
    - Number of patients with dementia double every 20 years, causes problems for social security and the workforce
    - Should unhealthy lifestyle choices (e.g. smoking, obesity, unhealthy eating) be taken into account for decisions regarding medical insurance, treatment costs and available treatments?
    - Life extension could have profound impact on pension and social security systems
    - Unhealthy aging could have profound impact on pension and social security systems
  - Therapies/Medication
    - Gene therapy could revolutionise medicine in the future
    - Neurotechnology could become an important business aiming at the elderly, enhancement and life-style medication
    - Tissue engineering and organ printing instead of conventional organ donation
    - Artificial blood might become better than natural blood and could impact doping and enhancement debates
    - Smart prosthetics and implants enable constant monitoring of a patient but may also pose security/privacy risks
    - Retinal implants are commercially available
    - Targeted drug delivery could reduce side effects in future medication
  - Research
    - Neuroscience, brain research and neurotechnology gets supported to counter age-related diseases but can also lead to enhancement drugs and nootropics
    - The definitions of beginning and end of life get blurry as science and technology advances
    - Brain health as major future R&D area
    - The distinction between therapy, prevention and enhancement becomes blurry
    - Brain Researchers Open Door to Editing Memory
    - Longevity, life extension and healthy aging are getting a major research field
- Convergence
  - Is interdisciplinatity possible and what are the requirements for its promotion?
  - How real is the NBIC convergence and what could be the implications?
  - How realistic is the concept of the "acceleration of technological progress" (technological singularity")
  - Will the "singularity" start in China?
- Business/Economy
  - New Business
    - Genetic sequencing becomes big business
    - Crowdsourcing for innovation
    - Futuristic business and firms dedicate themselves to life-extension/"immortality" research, the development of strong AI, human enhancement technologies, synthetic biology,
  - Scarcity
    - Rare earth metals are driving the eco-economy and ICT, but they are getting increasingly scarce which could lead to conflicts and technological slowdown
    - Food around the world is likely to become scarcer and more expensive
  - DIY/Open Source
    - 3D printing gets open source - will people manufacture their products
    - Synthetic biology start-ups aim at producing customised DNA parts and developing open source customised medication
    - What impact could the growing DIY movement (DIY programming, biotechnology, HET etc.) have on business, safety and society?
    - DIY economy
- AI/ICT
  - AI/Robotics
    - Military robots are reality which raises ethical and legal questions
    - Japan and Korea: the robotic nations?
    - Scientists worry machines may Outsmart man
    - Artificial Intelligence will be designed to search and identify images, could also impact security and surveillance devices
    - Robots are getting increasingly more human-like abilities, thus already raising questions about their future status
    - The rise of home robots leads to new legal questions (e.g. about reliability)
    - Supercomputer are getting increasingly powerful and cheaper and more widely available
  - AI/Neurotech
    - Human brain serves as model for AI development
    - Abilities of simple insect brains are more sophisticated than though and could lead to new ways in Artificial Intelligence
    - Human brain could be replicated in 10 years (i.e. around 2020) which could have profound impacts on medicine, AI, legal issues and ethics
  - ICT/Computing
    - Light as the future universal tool?
    - Will the future of computing be optical?
    - DNA computing may be the successor of silicon based devices
    - Ubiquitous monitoring paired with automatic analysis raises new questions over security and privacy
- Energy/Environment
  - Energy generation
    - Body energy for powering electronics?
    - Space-based solar gets interest from Japan and US
    - Is the future a hydrogen economy?
    - Is the future a solar economy?
    - Nuclear fusion gets encouragement and setbacks - is it worth to invest?
    - Alternative propulsion for airplanes could be feasible
    - Artificial fossil fuels may fuel the future
    - Converting CO2 into fuel could solve 2 problems and open business opportunity
    - Electronic cars are getting better and open business opportunity
  - Energy Management
    - Smart and eco-friendly cities on the rise around the world
    - Energy efficiency gets increasingly important for computer chip manufacturing
    - Energy decentralisation could impact current energy distribution business and conceots
    - Artificial Intelligence could help save energy and improved distribution
  - Environment
    - Nanotechnology good or bad for the environment?
    - GMO good or bad for the environment?
    - Bioethanol and biofuel worse for the environment than expected?
    - Carbon capture and storage causes controversy over short term benefits and long term risks
    - Controversies over climate change make rational evaluation difficult
- Bionics
  - Cyborg-Tech
    - Animal robots on the rise for civilian and military purposes
    - Cyborg insects are being developed as next generation spying devices
    - Body energy can be harvested to power implants
  - Biomimicry
    - Self assembly becomes a emerging form of production and could impact today's manufacturing methods
    - Artificial animal noses are better in sniffing out dangerous goods
    - Bionics gets interesting as new engineering principle for more sustainable developments
    - Self-organisation as future paradigm for engineering and production?
    - Bionic design could lead to energy efficiency
    - Robotics gets much inspired by biology
- Biotech
  - Regenerative Medicine/Tissue Engineering
    - Tissue engineering and stem cell technologies are already getting interesting for business
    - What do replaceable organs, tissue engineering and regenerative medicine mean for the future of physical degeneration, death and the associated social order?
    - Stem cell technologies still hope for future medicine despite ethical controversies and scientific setbacks
    - In-vitro meat could get commercialised until 2015
    - 3D bioprinters are getting commercialised
    - Tissue engineering and organ printing could replace the need for conventional organ transplantations
    - Regenerative medicine could shape the future of therapies
  - Research
    - Could in-vitro testing replace animal tests?
    - Different approaches to cancer detection and treatment could increase the survival rate significantly
  - Genetics
    - Genetic sequencing gets increasingly cheaper and faster and could soon be widely applied, creating new business opportunities and legal/ethical questions
    - Synthetic biology opens up new chances and controversies
    - Gene therapy could cure illnesses but also open the way for redesigning humans
    - DNA evidence and biometric data can be faked which may impact the future of criminology