CSf CREATIVE SCIENCE FOUNDATION

www.creative-science.org

http://linkd.in/1xUMdJD

Science–Fiction Prototyping and The Technological Singularity

Prof Victor Callaghan
vic@essex.ac.uk

CSf
CREATIVE SCIENCE FOUNDATION

Overview of Talk

*"This talk seeks to introduce **science-fiction prototyping** as a methodology for inspiring, capturing and communicating innovations for scientific, business and societal innovations". To those ends, the **Technological Singularity and a supporting documentary** is introduced as a means to inspire future thinking!*

▸ Section 1 – about CSf & Intel
▸ Section 2 – about SFP (full)
▸ Section 3 – about SFP (micro)
▸ Section 4 – about Singularity film

EX_MACHINA

CSf
CREATIVE SCIENCE FOUNDATION

2

1

About Me

- Professor of Computer Science at Essex University
- Member of Intelligent Environments Group and Digital Lifestyles Centre
- Worked in avionics (aircraft) before joining university system
- Specialist in robotics and artificial intelligence (founded Robotics at Essex in late 80's, IE in late 90's)
- Current research focused on Intelligent Embedded-Agents, End-User Programming, Affective Computing & Mixed Reality.
- Part of organizational team for numerous conferences, workshops, journals

http://victor.callaghan.info

- *Parkland of 200 acres*
- *Royal Charter in 1965*
- *12,240 students*
- *27% post graduates*
- *40% overseas (130 countries)*
- *Ranked 9th in UK for research*
- *Ranked 2nd for student satisfaction*

CREATIVE SCIENCE FOUNDATION

3

CREATIVE SCIENCE FOUNDATION

(intel)

- **Charitable organization founded by Intel in 2010 to promote**:
  - creativity in STEM disciplines
  - Use SF-Prototypes for engagement between companies, academics, schools and the wider public

- **Methodology:**
  - Uses SF-Prototypes (stories) to 1) inspire *creative thinking* for innovation and 2) act as a *shared language* to enable researchers, companies and ordinary people to explore the implications of new technology on people and societies.

- **Social Media**:
  - Web: www.creative-science.org   **www.creative-science.org**

  - Linkedin: http://linkd.in/1xUMdJD   **Linked in**.

CREATIVE SCIENCE FOUNDATION

Creative Science – The Need For Innovation

- **Fear** – All companies fear failure; for small companies that is often related to finance but for large companies, that is often being overtaken by better products or business practices as they struggle to react to the *effects of technology and societal changes*.

- **Examples** – IBM, DEC, Blockbusters, Borders, Kodak, Nokia

- **The Challenge** – How to stay ahead in the innovation race?
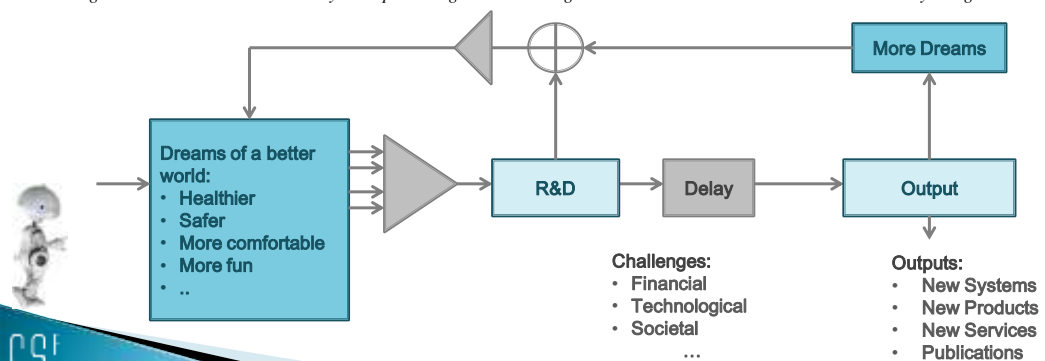
CSF — CREATIVE SCIENCE FOUNDATION

The Creative Science Cycle

*In the beginning we have **dreams of a better world**. We may want the world to be **healthier** - including wearable systems tracking health status. or safer - for example, intelligent vehicles; **more comfortable** - considering intelligent houses adapting users' behaviour. or **more fun**! - considering more interactive games.*

*These **dreams** come together (integrator symbol) and feed the research. Research will produce the output but there can be some delay due to the technological or financial challenges. There are two types of output. On the concrete part, we can have an application, some publications related with it and so on. On the abstract part of the outputs, we have more dreams because we will never be satisfied with what we have! That's why we have advanced from the stone age to where we are now.*

*These **dreams** (as the research outputs) feed our dreams in the beginning. But this time they may need some amplification because according to our research results we may end up thinking that something is not achievable. So the "Creative Science Cycle" goes on.*

Dreams of a better world:
- Healthier
- Safer
- More comfortable
- More fun
- ..

R&D → Delay → Output

More Dreams

Challenges:
- Financial
- Technological
- Societal
...

Outputs:
- New Systems
- New Products
- New Services
- Publications
...

Source: Erkan Bostanci, August 2011   6

CSF — CREATIVE SCIENCE FOUNDATION

The (intel) Story

Image from drawing by Paul Rumsey

▸ Intel's 'chip life cycles' occupy about 7–10 years from concept to shipping (and maybe another 15 years of product life)!

▸ How can they specify chips for products & worlds that don't exist yet?
  ◦ Try to extrapolate forward current technology (incremental)?
  ◦ Ask or study customers (generally incremental)
  ◦ Brain-storming (can be more radical and blue-skies!)

▸ The main Intel resource is engineers (but traditional engineering education encourages structured and incremental thought !

▸ Intel came to view that the magic ingredient was imagination

▸ **The Intel solution** – use fictional stories to inject **imaginative leaps** and provide a **rich virtual world** to explore the possible implications of technology on people, societies, and the world … and provide shared language to allow all the stakeholders in the future to engage in dialogue

▸ **'Science'** (or 'Business', politics etc) + **Imaginative Fiction** = *SF-Prototyping*

CREATIVE SCIENCE FOUNDATION

www.creative-science.org
see more detail on http://victor.callaghan.info/history/csf/ **7**

Science Fiction Prototyping

(intel®)

▸ SFP First discussed at IE'07 in Ulm Germany

▸ Method uses peoples imagination to write short fictional stories about the future that is written around an idea you might have for a new product, business or political system – called a **SF-Prototype** (SFP).

▸ SF-Prototype adopts a rich story-based structure that enables it to communicate and test an idea.

▸ SF-Prototypes can be created by anyone to influence the work of those driving change (eg *scientists, politicians, business leaders)*.

▸ Outcomes of SFPs are used to create new kinds of businesses, products, social structures etc

CREATIVE SCIENCE FOUNDATION

4

Intel / CSF Video From CS'11

▸ SFP uses <u>short stories</u> about the future to inject imaginative leaps and provide a <u>shared language</u> for innovation
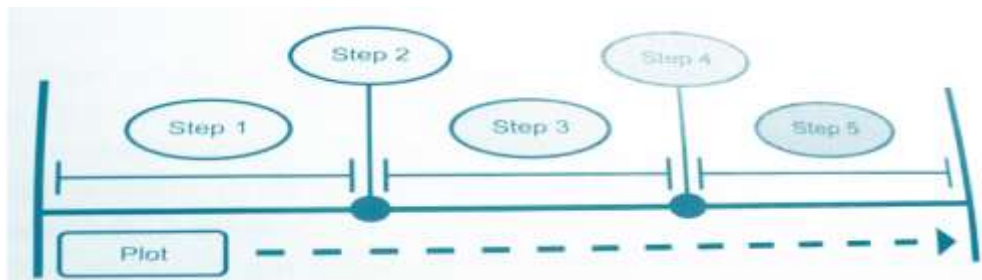
VIDEO INTRODUCING
SCIENCE FICTION
PROTOTYPING

THE TOMORROW PROJECT

CSF
CREATIVE SCIENCE FOUNDATION

9

Johnson's 5 Steps for Writing SFPs

Step 1: Pick Your Science and Build Your World
Step 2: Identify the Scientific Inflection Point
Step 3: Consider ramifications of the Science on People
Step 4: Identify the Human Inflection Point
Step 5: Reflect on what Did We Learn?

http://www.amazon.com/Science-Fiction-Prototyping-Designing-Future/dp/1608456552

CSF
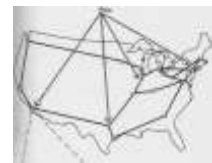CREATIVE SCIENCE FOUNDATION

10

Regular SF-Prototype Structure

- **Typical size** –10-12 pages for full SFPs (or 4-6 pages for short SFPs).
- **Structure**
  - Introduction (half a page)
  - Background work (1-2 pages) discusses your work and how it relates to story (including any references).
  - Fictional Story (9-10 pages) that illustrates describes and tests (exercises) your vision of the technology and usage.
  - Short summary (half to one page, say) that provides an overall comment (reflection).
  - References should be included at the end of the paper.
  - For short SFPs, they would be pro-rata smaller mirrors of the above.

Some Examples: http://dces.essex.ac.uk/Research/iieg/CS2011.htm

CREATIVE SCIENCE FOUNDATION

11

The Past (some earlier ideas!)
(Future Facts: a 1976 book of extrapolations)

- 300 examples of existing work that are extrapolated forward 25 years

- **People Washer Egg** (Sanyo Electric Co) – fifteen minute cycle of warm shower warm shower, ultrasonic washing, whirl water cleaning with small rubber balls to massage skin and muscles & hot air drying – what went wrong!

- **Telenet** – data communication system, used by Pentagon's Advanced Research Projects Agency (ARPA) to link 18 cities – became the Internet!

- **System 80 Learning Machine** (Borg-Warner) – acts like private tutor (two feet square, console containing a record player, screen, row of buttons, and memory bank) – became elearning!

Unlike SFP, this book didn't test these ideas

CREATIVE SCIENCE FOUNDATION

12

Some Examples of SF-Prototypes
(Full Versions)

Example SFP – The 21st Century Robot

▶ The first SFP, "*Nebulous Mechanisms*", written by Brian Johnson & presented at IE'09 in Barcelona based on science-fact paper "*Using Multiple Personas in Service Robots to Improve Exploration Strategies When Mapping New Environments*" (by Egerton, Callaghan, Clarke), presented at IE'08 University of Washington, Seattle.

▶ About a robot called **Jimmy**, and the issues that arose through mimicking the irrational aspects of humans in robots (based on experience of my then PhD student (**Simon**) who went to Malaysia following t girl he loved and the heartbreak that followed!

Example SFP – The 21st Century Robot

- ▸ The Prototyping activity moved "*Jimmy*" (from the "*Nebulous Mechanisms*" SFP) from narratives into real life
- ▸ Intel set up a crowd sourced innovation project to engage the public in design the domestic robot of the future
- ▸ Trossen Robotics sell Jimmy skeleton – $1600)
- ▸ Software (Apps) & Skins design files open source (free)
- ▸ The public customise robot by configuring and designing skins, Apps, functionality and underline stories (SFPS), all of which are shared
- ▸ Ongoing experiment to assess value of open low & high fidelity prototyping for market engagement and product innovation.

CS
CREATIVE SCIENCE FOUNDATION

http://www.21stcenturyrobot.com/
http://www.trossenrobotics.com/HR-OS1   15

Example SFP – Tales from a pod

New Commercial Product

ImmersaVU http://www.immersivedisplay.co.uk/immersavu.php

Based on SFP from CS'2010

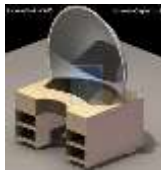SFP's are short stories that describe future products and contexts

iPods were effectively small cocoons; something like a comfortable armchair enclosed within a sound-proof egg-like structure packed with sophisticated but largely invisible technology that included immersive mixed reality and sophisticated AI. When underline participating in a movie (the industry had long dropped the word "watching" which describing these new immersive movies) the immersive reality technology aimed to make the participant feel as though they were truly part of a fictional physical world.

http://dces.essex.ac.uk/Research/iieg/papers/TalesFromAPod(Paper).pdf

16

CS
CREATIVE SCIENCE FOUNDATION

8

Example SFP – Tales from a pod

The Real Product

http://www.immersivedisplay.co.uk/

The SF-Prototype Specification

Additive Technology ePod-4

In this increasingly competitive world, where knowledge determines success, your child deserves the very best education available and that is Addictive Technology's **ePod-4** Pioneering research by Benjamin S. Bloom in the 1980s (and supported by all work since) proved that students who receive one-on-one tuition learn at least an order of magnitude better than grouped students. If you want to give your child the best one-to-one education in the world, give them an Addictive Technology's **ePod-4**

Education:
- Super-Intelligent Artificial Teachers
- Personalised one-to-one tuition (the gold standard)
- Teacher's avatar has visualisation powers that don't exist in physical space
- Available 24 hours a day, 365 days a year
- Learning environment (avatar, surroundings, lessons) can be tailored for each student
- Unwavering attention and happy disposition
- Compelling content combined with contextual delivery
- Teachers available in different cultures, ages, sexes and form

Technology
- Free-Will 3 © - Quantum processor (upgradable)
- My-Mind 1.2 © - Evolving Persona Engine (customizable)
- Flame 5 © - EmotionWare
- Get Real 8.2 © - Mixed Reality Cocoon
- Real-Touch © iSkin & Haptics
- Ghost 4.1 © – 3D Imaging & Audio
- SentiNet © - Knowledge Engine

Addictive Technology, Zizhu Science Park, No. 880 Zi Xing Road, Minhang, Shanghai 200241, China

CS' CREATIVE SCIENCE FOUNDATION

17

Example SFP – Tales from a pod

▸ The production version of the ImmersaVU used in blended reality research

VIDEO SHOWING MIXED_REALITY DEMONSTRATION OF REALISATION OF TALES OF THE POD SFP

www.FortiTo.com   http://www.immersivedisplay.co.uk/immersavu.php

CS' CREATIVE SCIENCE FOUNDATION

18

Example SFP – Song of Iliad

http://dces.essex.ac.uk/Research/iieg/papers(2011)/CS11_Kymalainen(8).pdf

*** BEST PAPERS AWARD CS'11 ***

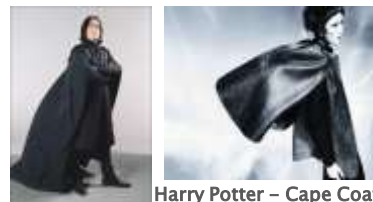▸ Tiina Kymalainen's (Aalto University) 'experience *design-driven science fiction prototyping framework*'
▸ Unifies four activities: early ecological studies, co-design, proof-of-concept prototyping phase, and SFP.
▸ Produced a Design Artefact that communicates the potential of research into a therapeutic music "performance space" for children around the globe.
▸ Encapsulates the human-driven design approach (exploiting emotion-driven design to create highly personified products.

CSf CREATIVE SCIENCE FOUNDATION

19

Example SFP – Existing Fiction & Non-Science

▸ Ping Zheng's (Canterbury Christ Church University) use of existing fiction and non-science innovations
▸ Sunfed Fashion – top selling professional women's fashion-wear, in China
▸ Quote from the President of Sunfed Fashion "*Science fiction works are our never-ending source of new ideas to keep up with customer's demand... the ability to identify and generalise ideas from science fiction is critical as not all SFP works but you need to know what customers expect and what can be used to transform these 'fictional imaginations' into a tangible product.*"

Harry Potter – Cape Coat

Frankanstein – the monster's long coat

CSf CREATIVE SCIENCE FOUNDATION

20

Some Examples of SF-Prototypes
(Micro Versions)

21

Micro-Fiction

6 Word

▸ **"For sale: baby shoes, never worn "** – Ernest Hemingway (who, according to science fiction writer Arthur C. Clarke, bet he could write a complete story in just 6 words starting this genre!).

▸ – – – – – – – – – – – – –

"Lie detector eyeglasses perfected: Civilization collapses." – *Richard Powers*

▸ **"TIME MACHINE REACHES FUTURE!!! – nobody there "** – *Harry Harrison*

▸ No agreed specification; Range from 6 to 1000 words; **Popular size 25–30, words** (text message size!).

▸ Similarities to *fables, parables, anecdotes, sayings, proverbs* and *maxims*

▸ English speaking world called *micro-fiction, nano-fiction, flash-fiction, sudden-fiction* or *postcard-fiction*

▸ Around the world called *microrrelato* or *ficcione* (Latin-America); *nouvelles* (France); *minute-long* or *smoke-long* (China); *Haibun* (Japan)

▸ Technology based – *Mobile-phone* (Ketai) fiction (160 characters ~30 words);'*Twitter Lit*' (140 characters ~25 words)

This is the style Micro-SFPs adopt

▸ Examples can be found at
  ○ *Wired* (6-word) -http://www.wired.com/wired/archive/14.11/sixwords.html
  ○ *Espresso Stories* (25 words) - http://espressostories.com
  ○ *Micro-SFPs* (Twitter-size) - http://www.creative-science.org/activities/microsfp/

22

Writing a µSFP

▸ Technologists like the idea of Twitter / Mobile Phone sized fiction (140 /160 characters – about 25 words)

▸ **Simple writing procedure**
  ◦ Start by identifying the technology, process or service
  ◦ Identify a character (try use a very short person name)
  ◦ Then create at plot (events that make up the story – should include an inflection point)
  ◦ Start big, then reduce it to <140 characters / 25 words

CS^F CREATIVE SCIENCE FOUNDATION

23

Working With Schools (promoting the thinking process)

The World By 2048?

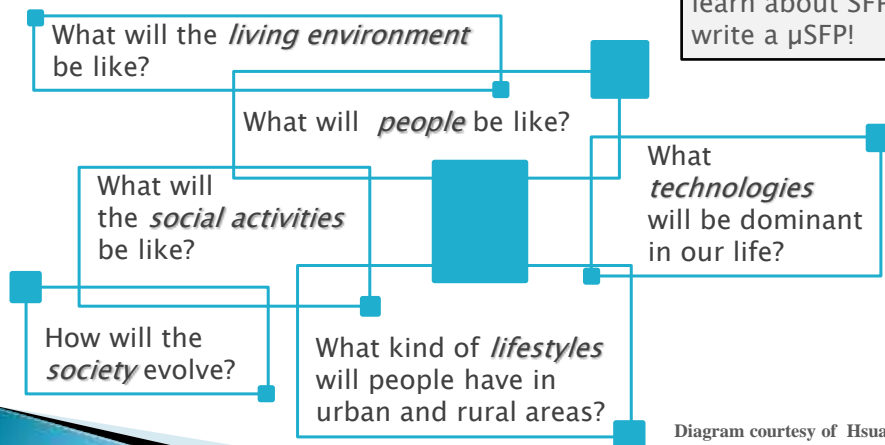| See Example of schoolchildren's SFPs overleaf | School Children (aged around 16) had one hour to learn about SFP and write a µSFP! |

What will the *living environment* be like?

What will *people* be like?

What will the *social activities* be like?

What *technologies* will be dominant in our life?

How will the *society* evolve?

What kind of *lifestyles* will people have in urban and rural areas?

Diagram courtesy of Hsuan-Yi Wu

CS^F CREATIVE SCIENCE FOUNDATION

24

µSFP Examples (text sized, from school children

▸ *Jack fall asleep in the sun. His smart sun protection sensor woke him up with an alarm & soft vibration. He avoids sun strokes!*

▸ *Amy can't diet but her bracelet helps stop her eating a naughty treat over a salad. It clamps tight on her wrist & shocks her.*

▸ *OMG where did u get ur coat from? It was the only one left in the store. But I can duplicate it 4 u. Thank u so much.*

▸ *With my new eFridge I can have my cake & my stay at home. I come home 2 a full stock of food & no court orders for a drunkard.*

New Creatives, Essex, 2014

▸ *I'll just pop off to get some sushi. Bob established a wormhole link to Japan and vanished.*

http://www.creative-science.org/activities/microsfp/

CSf CREATIVE SCIENCE FOUNDATION

25

µSFP Examples: 100 words

▸ *Yawning, kicking, grasping for air, a new-born child has entered the world. Its parents trace the child's fingers in awe. It curls its toes in a great big yawn when OH NO! Gently clenching the baby's foot, they realize its fate! Pes Planus; the child has flat feet! The couple lament its future ridden with annoying foot pain, back stiffness and knee weakness, but wait! A super maker appears and produces shoes, the cloth material morphs to its feet and tightens while mechanical rollers in the sole mould an arch for the feet. With regular wear success is here!* (99 words) – Elizabeth

New York Maker 2014

  ◦ Author's Comment: By the time people realise they have flat feet problems, it is too late to create an arch. The bones are set. However, the cartilage and bones of an infant are malleable, thus the potential for arch creation exists.

Where is he?!! She was exasperated as he always wanders off at these fairs. He tugged at her shirt. Hi Mom, Bee found me. I hate it when it stings me, especially since I was right there (pointing at the booth). Following it back to you is like the walk of shame. Anyway are we next in line? (58 words) – Sayuri

  ◦ Author's Comment: Product "Bee with me" is a tiny flying object (like a bee) that will search for someone. Once found it will buzz wildly or offer a nip to catch the persons attention so that the person will follow it back to where

http://www.creative-science.org/activities/maker14/

CSf CREATIVE SCIENCE FOUNDATION

26

μSFP Examples (text sized, IE'14 Conf Attendees

Tiina Kymäläinen
receiving μSFP prize

IE'14 Shanghai

▸ I have traced down all your respires: infant cries, juvenile smiles, elderly sights. Now you are (all) gone – leaving me to carry on and wonder why. – By Tiina Kymäläinen, VTT Technical Research Centre *(Author's comment: This micro-SFP was inspired by a literature finding for the intention awareness research: G.E.M Anscombe has argued in her 1957 work "intention" that intentional action is coextensive with action of which one could ask "why were you doing that?")*

▸ Jimmy reflected in his mirror. A boy, eternal family and futures shone back. Memories of loved ones lived on within; dreaming, growing, guiding, and happily unaware. – By Simon Egerton, Monash University, Malaysia. *(Author's comment: Our brains contain one of the most powerful simulators we know. Most of us uncontrollably experience this when we dream. Vivid dreams show us that our memories are perfect enough to model the world, including people, realistically simulating both into new situations. What if this ability was part of Jimmy's irrational AI? What if Jimmy could consciously access this simulator? What might his memories of us become? Might they/we turn on a real consciousness within him?)*

CS' CREATIVE SCIENCE FOUNDATION

27

The Technological Singularity

CS' CREATIVE SCIENCE FOUNDATION

28

Long Term Thinking

The hundred-year problem

▸ Adam Greenfield (2006) suggested that the failure to realise Mark Weiser's full vision for Ubiquitous computing was because "*It's a technical, social, ethical and political challenge of extraordinary subtlety and difficulty resistant to comprehensive solutions in anything like near-term*"

The Technological Singularity

▸ *…. the moment machine intelligence exceeds human intelligence* (around **2050** according to Kurzweil)

▸ … Might be brought to fruition as outcome of *whole brain emulation*, *transhumanism* or an *intelligence explosion!*

CSf CREATIVE SCIENCE FOUNDATION

29

µSFP Examples (25 words on the Singularity)

▸ **Whole Brian Emulation** – *Zoe, you've been my life-long friend on SentiBook; today the news feed reports most social network friends don't exits, are you real?* (22 words, 133 characters)
  ◦ Imagines point where AI has ability to masquerade as people, either openly or surreptitiously opening up intriguing, if disturbing consequences for human society and relationships.

▸ **Transhumasim** – *Tom, this morning mend the cooker, take the kids to play land & go to work. Yes, dear we will do that!* (21 words, 101 characters)
  ◦ Raises possibility that spare-part replacement might not just lead to creating single clones of people but multiple identical clones (three in this case allowing John at least three times the amount of work.

▸ **Intelligence Explosion** – *Jane's sleepy eyes said it all, another smart home with a viral-intelligence infection, call the singularity exorcists!* (17 words, 119 characters)
  ◦ explores possibility intelligent environments may be susceptible to super-intelligent viral agents that migrate, evolve and mutate and take on a form of evolving sentient ghost-like presences

http://victor.callaghan.info/publications/2014_CS14(Micro-Futures).pdf

CSf CREATIVE SCIENCE FOUNDATION

30

The Singularity Film

- Doug Wollens, an independent film maker based in San-Francisco
- Interviewed some *25 leading singularity thinkers* give their view including *Ray Kurzweil* (the main advocate) & *Leon Panetta* (US Secretary of Defence)

  http://thesingularityfilm.com/

Film debates the question that *as we become more machine-like, and machines more like us, will we sacrifice our humanity to gain something greater*?

The Singularity Film Screening

Doug Wolens

SCREENING OF DOUG WOLENS "THE SINGULARITY"
http://thesingularityfilm.com/

Discussion

33

Summary

‣ SFPs provide a tool to capture, test communicate ideas about the future.

‣ Can be small (25 words, μSFP) or large (6 pages+).

‣ Ideas can come from existing research, fiction or from peoples imagination!

‣ Outcomes can be new services, products, businesses or socio-political structures.
- - - - - - - - - - -
‣ The Technological Singularity film acts as a lens on one possible and a reason to join the debate!

34