The 3D printing ‘revolution’

Dominik Deradjat, Phill Dickens, Simon Ford, Ian Hutchings, Finbarr Livesey, Tim Minshall, Letizia Mortara, Chander Velu.

EPSRC
Pioneering research and skills

Research Councils UK
Digital Economy
Transforming Business and Society

E·S·R·C
ECONOMIC & SOCIAL RESEARCH COUNCIL

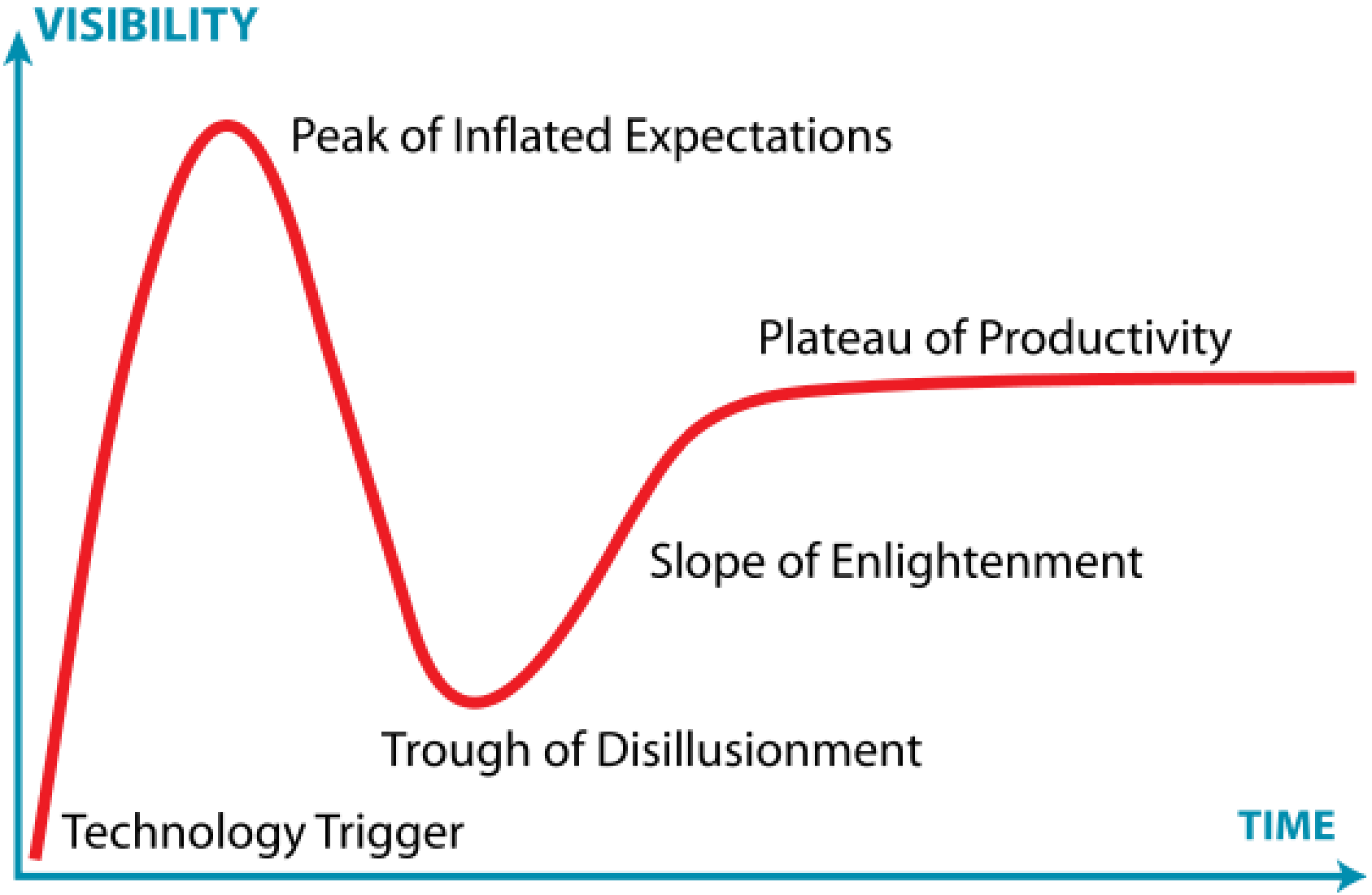
IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

3D printing ‘Bigger than internet’
FT 21.6.12

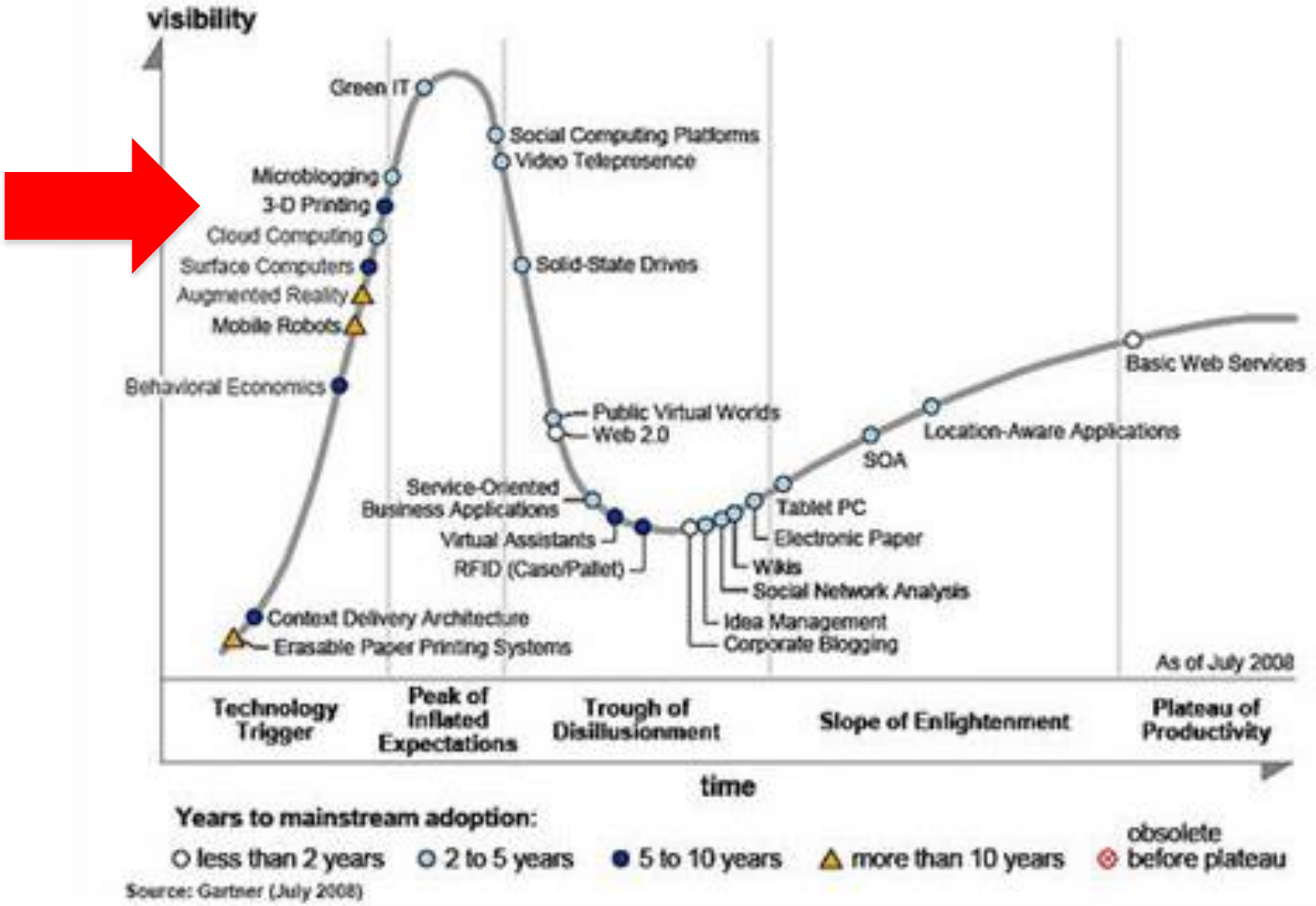
3D printing: ‘The PC all over again?’
Economist 1.12.12

‘3D printing [..] has the potential to revolutionize the way we make almost everything’
President Obama, State of the Union Address 2013



www.gartner.com

2008

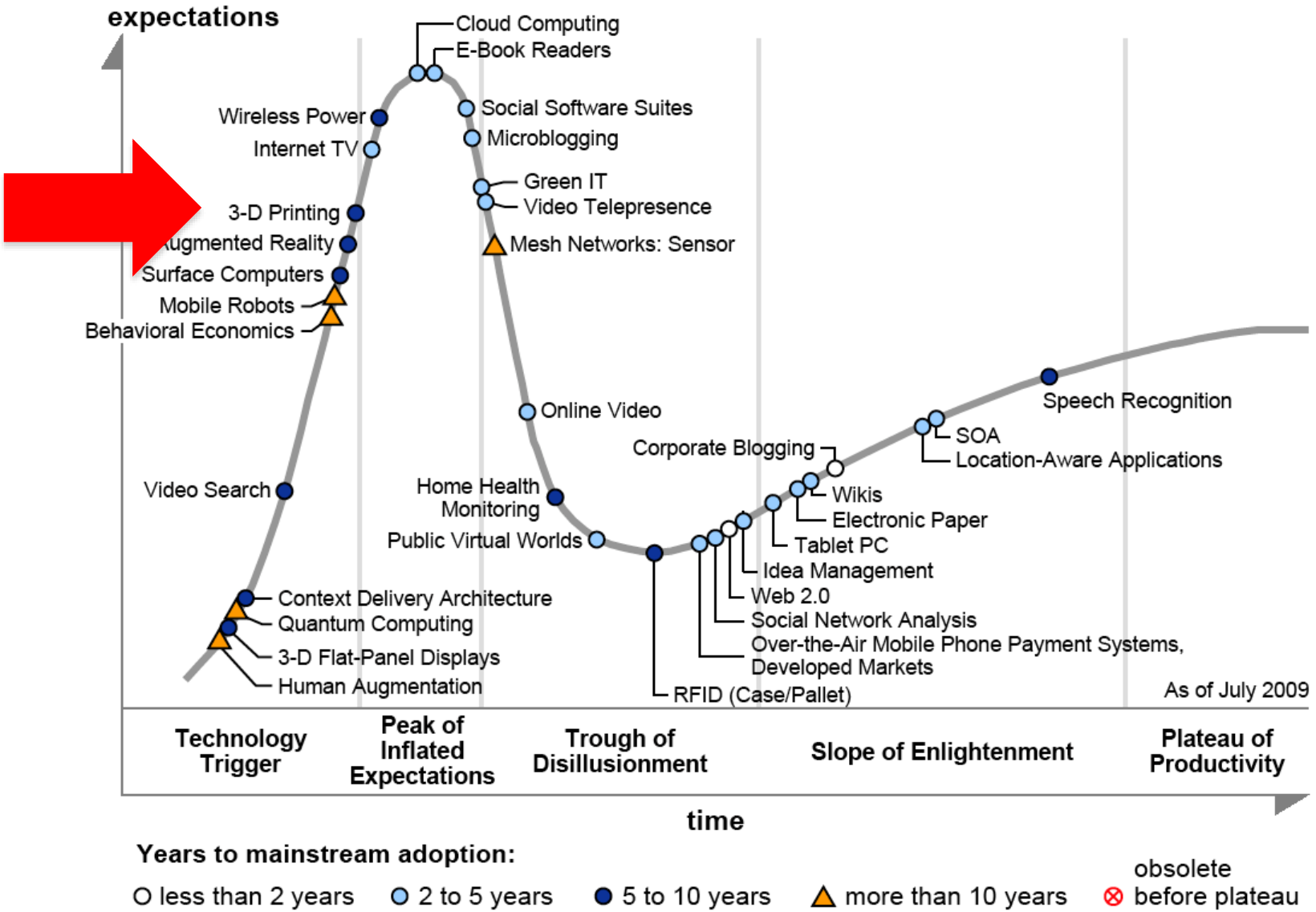


IfM TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

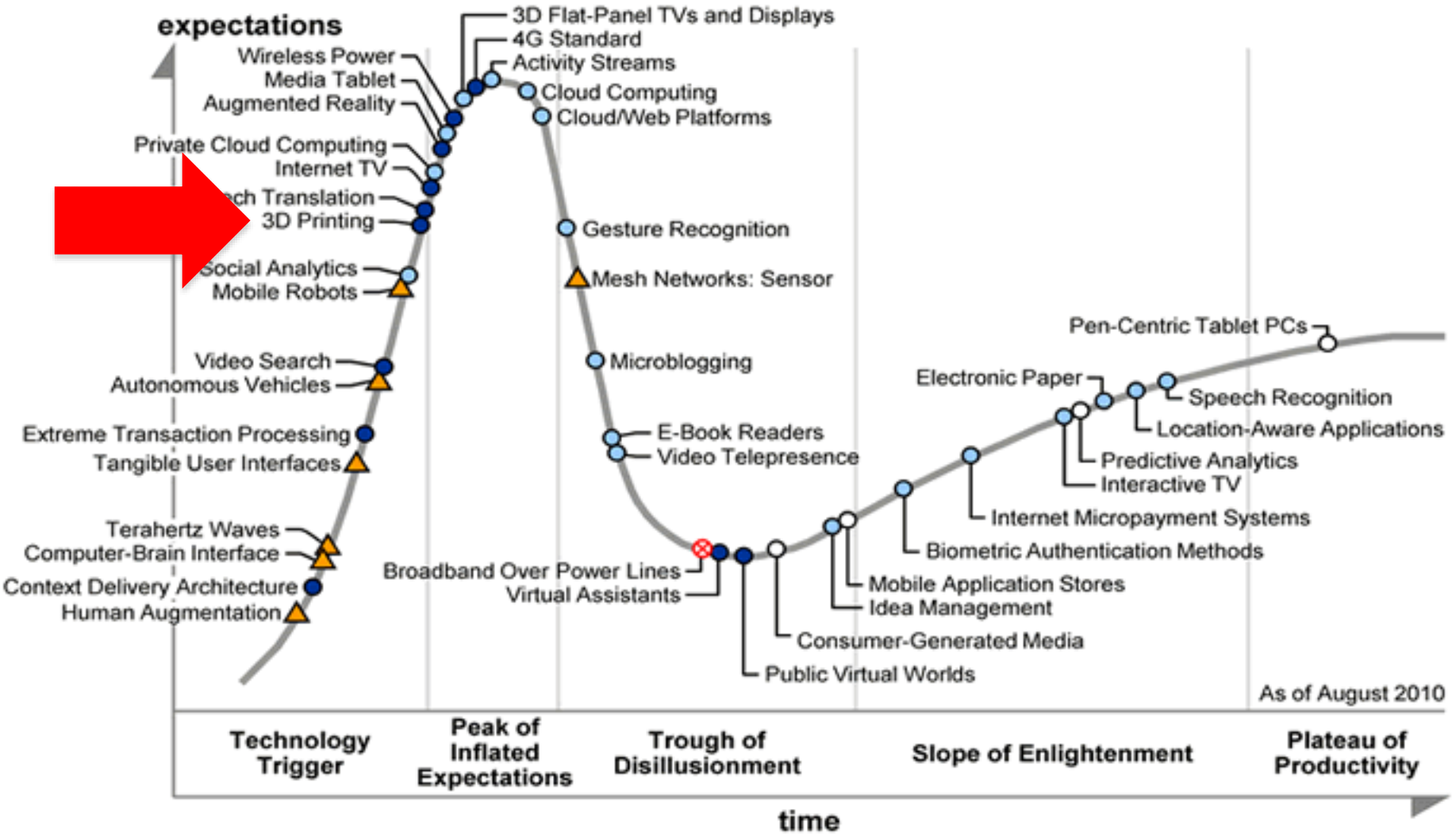
www.gartner.com

2009



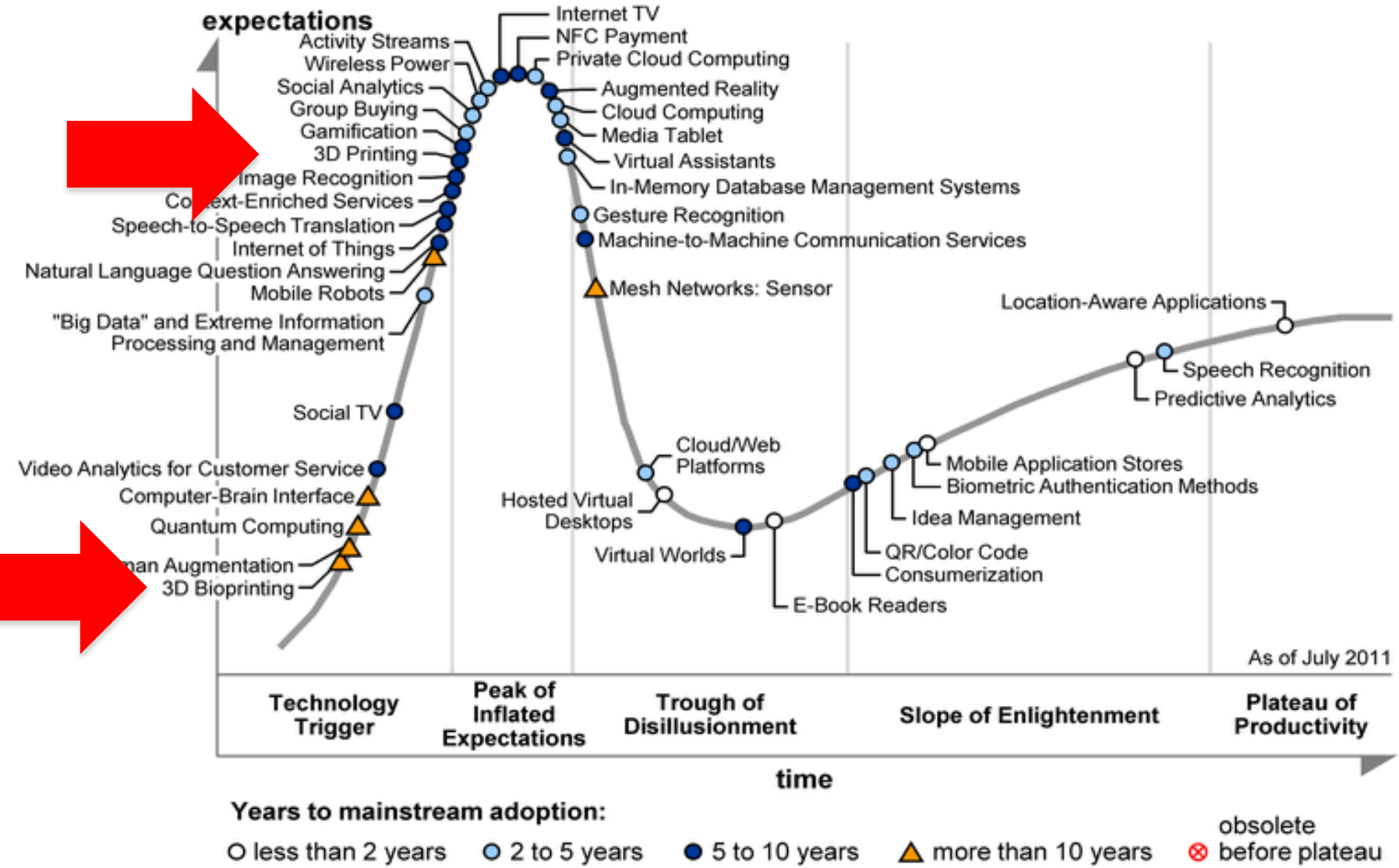
www.gartner.com

2010



www.gartner.com

2011

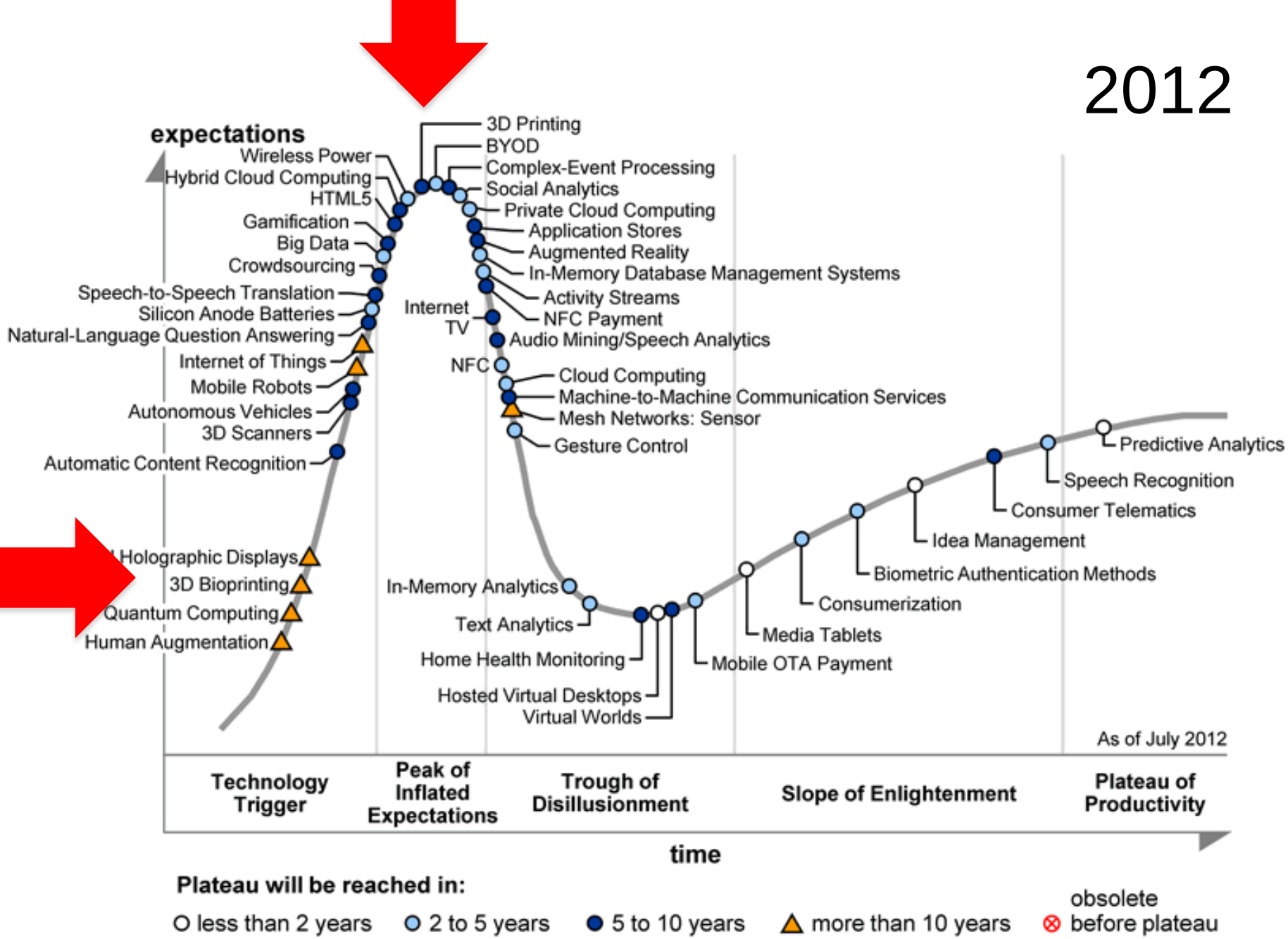


IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

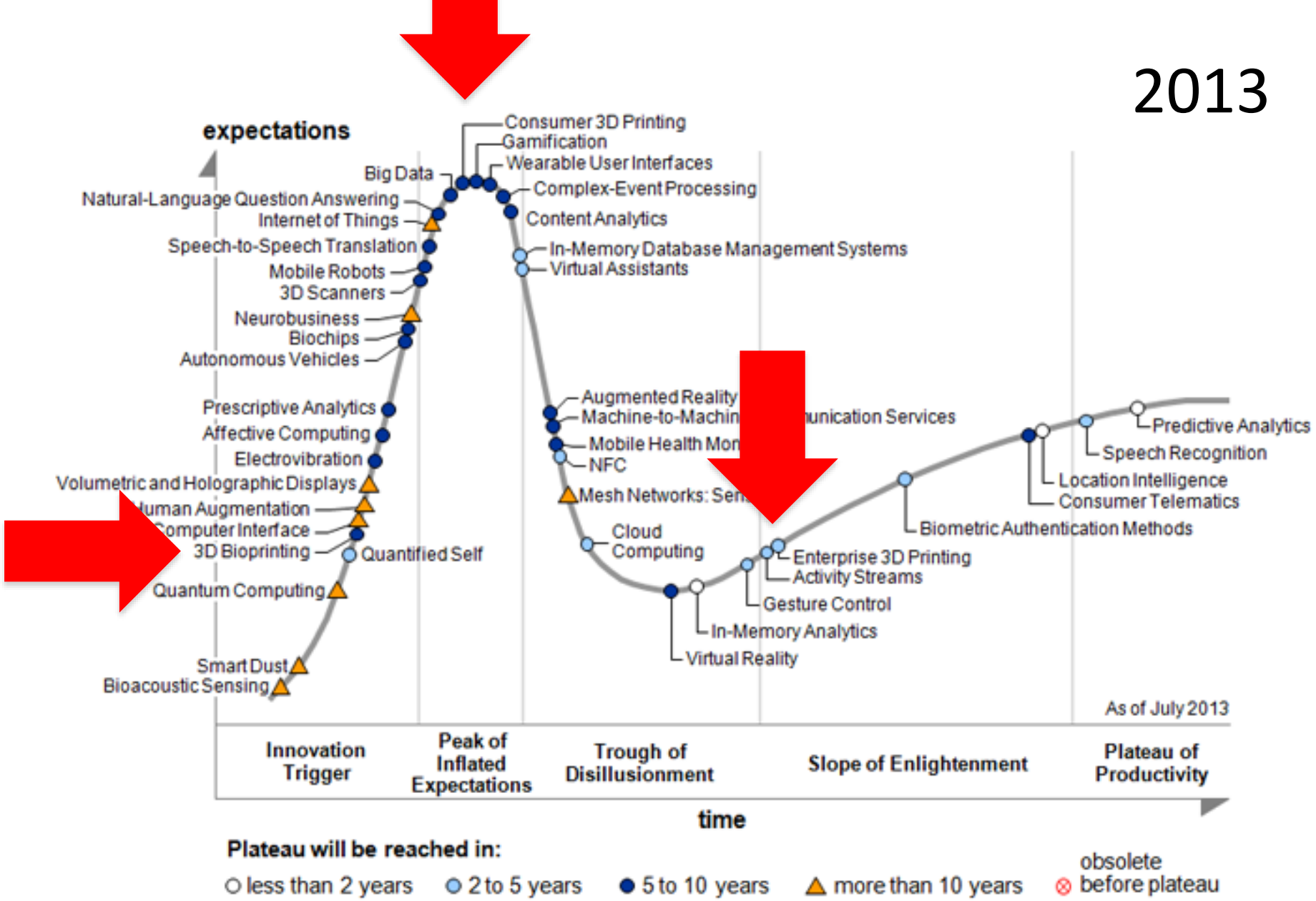
www.gartner.com

2012



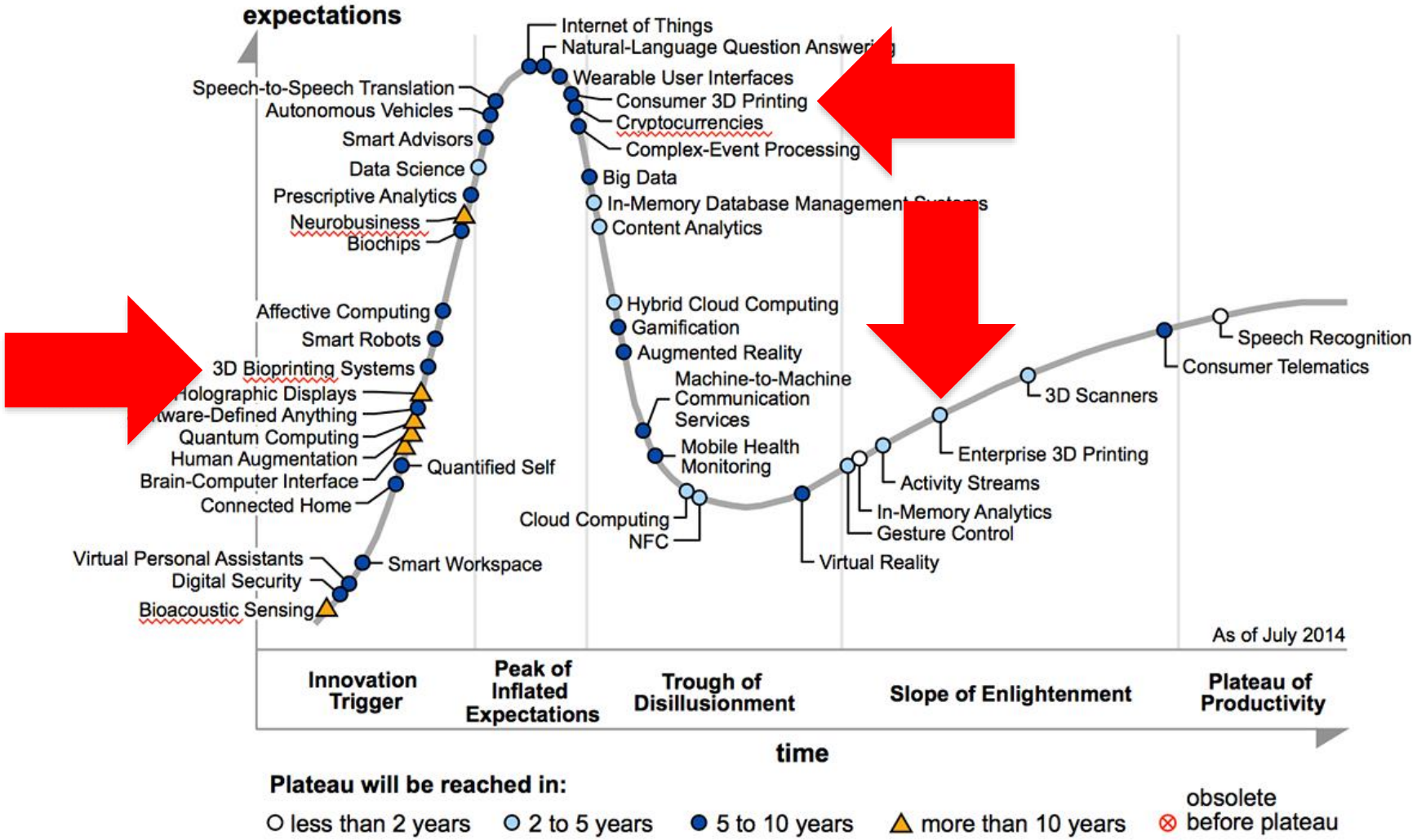
www.gartner.com

2013



[Gartner's 2013 Hype Cycle for Emerging Technology]

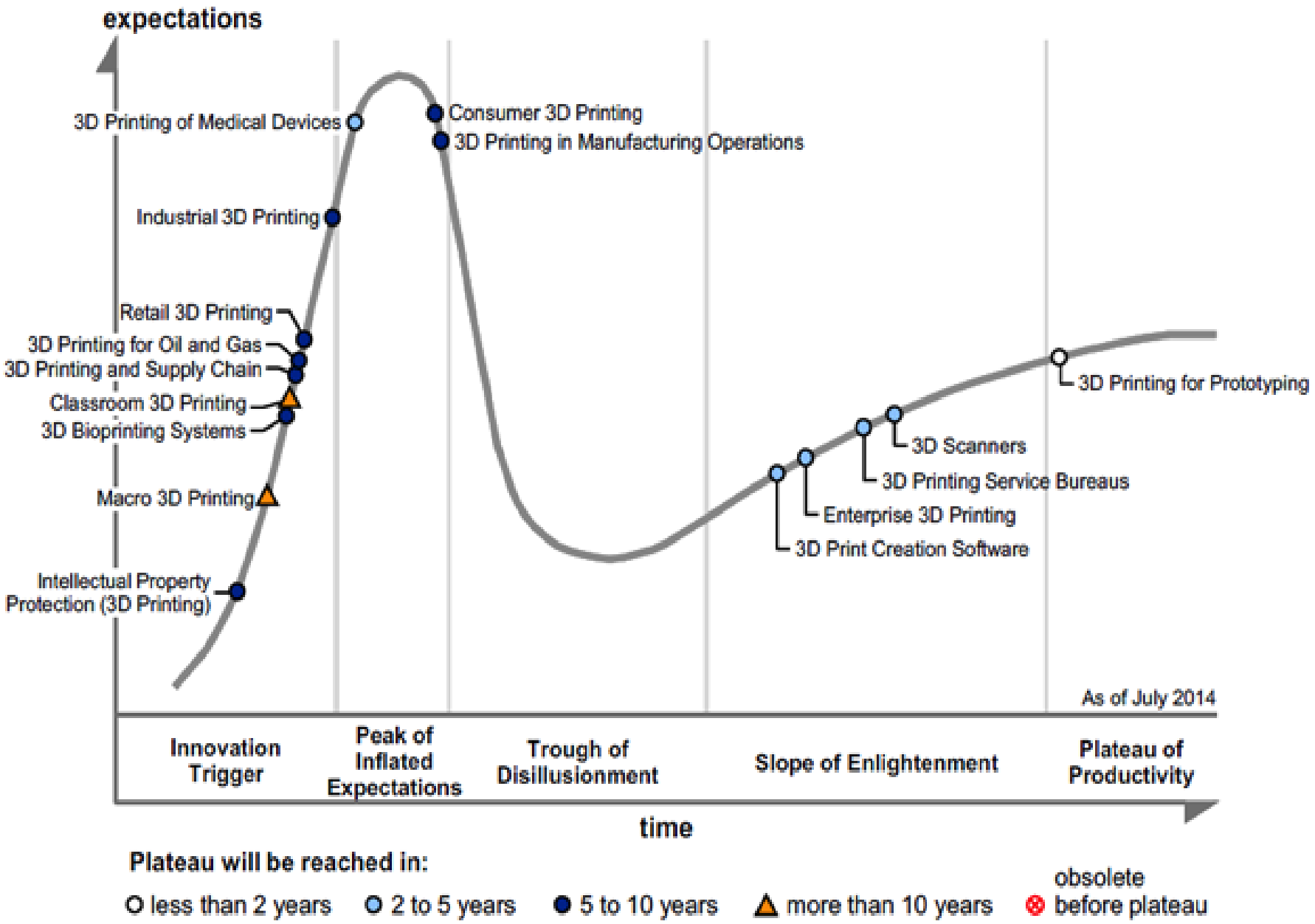
2014



IfM MANAGEMENT TECHNOLOGY POLICY

www.gartner.com

UNIVERSITY OF CAMBRIDGE



http://www.gartner.com/

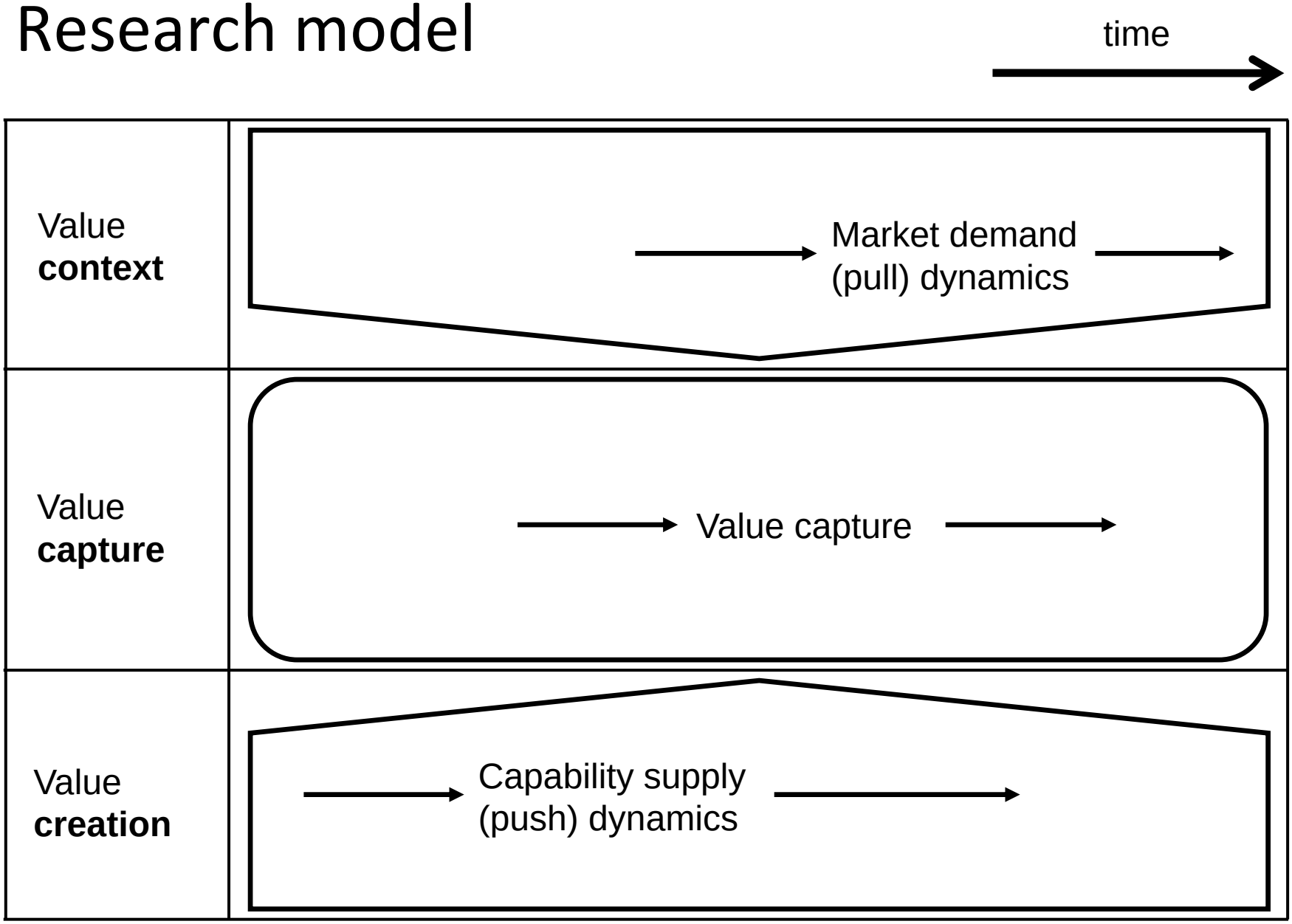
Three projects

1. ‘Bit by Bit’: Capturing value from 3D printing
2. 3D printing-enabled re-distributed manufacturing
3. UK National Strategy for Additive Manufacturing / 3D Printing

Three projects

1. **‘Bit by Bit’: Capturing value from 3D printing**
2. 3D printing-enabled re-distributed manufacturing
3. UK National Strategy for Additive Manufacturing / 3D Printing

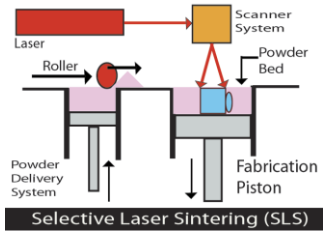
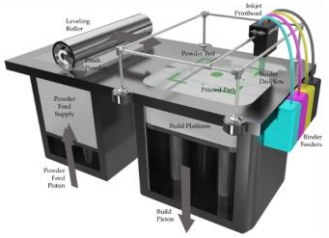
Research model



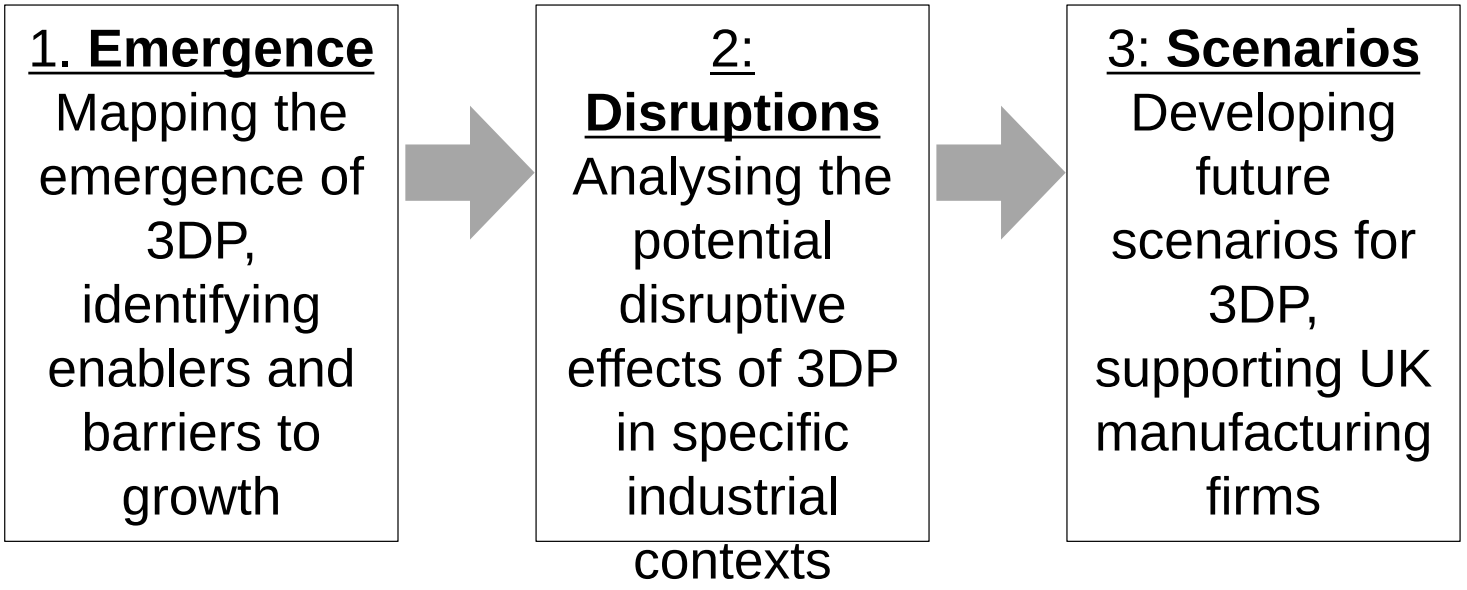
Phaal, R., E. O'Sullivan, M. Routley, S. Ford and D. Probert (2011). "A framework for mapping industrial emergence." Technological Forecasting and Social Change 78(2): 217-230.

Structuring the big issues

time →

Value **context**	bsi.  
Value **capture**	    shapeways e-Manufacturing Solutions MakerBot INDUSTRIES
Value **creation**	 

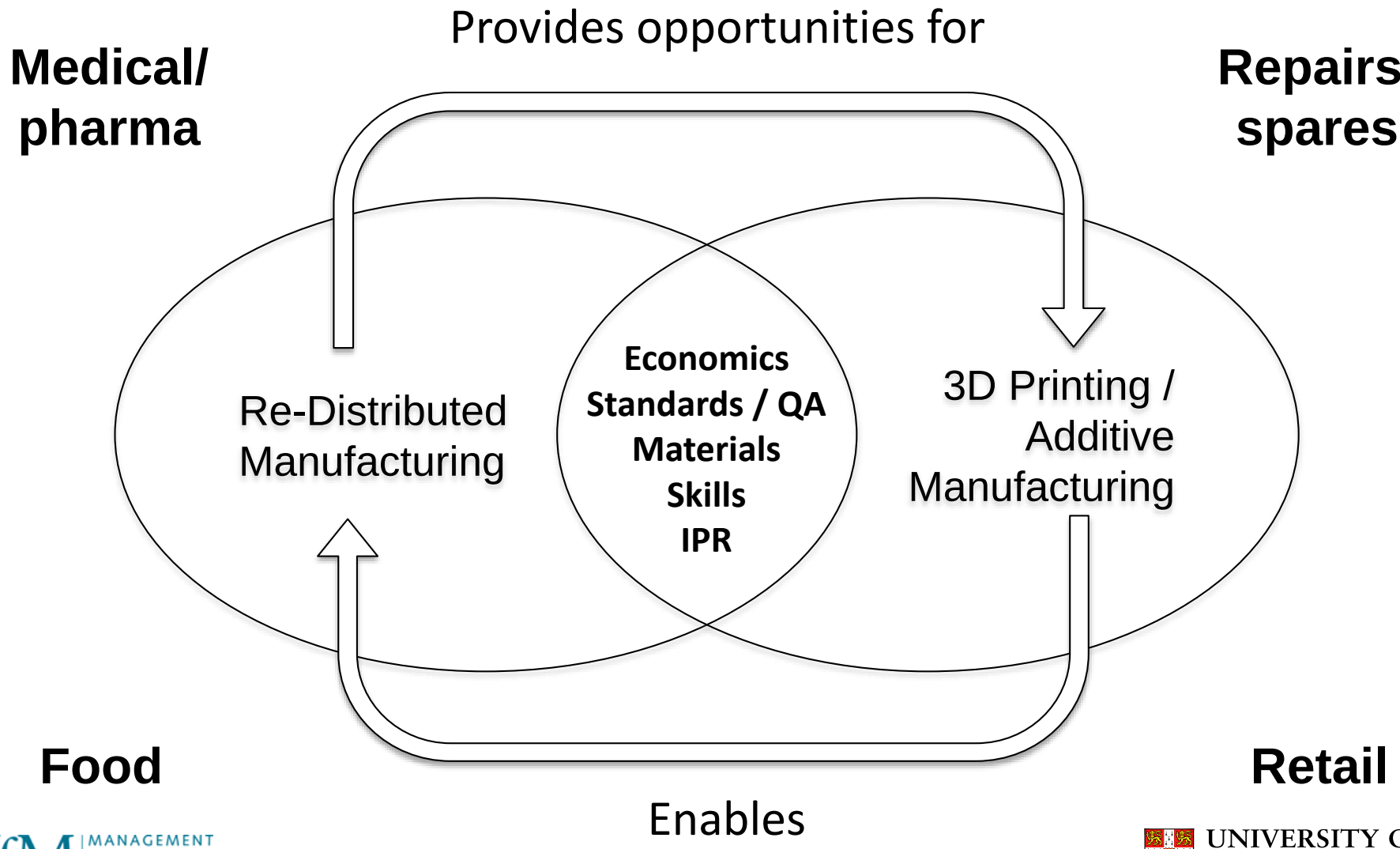
Looking backwards and forwards



Three projects

1. ‘Bit by Bit’: Capturing value from 3D printing
2. **3D printing-enabled re-distributed manufacturing**
3. UK National Strategy for Additive Manufacturing / 3D Printing

3DP-RDM: Defining the Research Agenda for 3D printing-enabled re-distributed manufacturing



1. Topic: *Priority topic #1*

2. Group participant

3. Background and research interest

Name *Interests* | *Name* *Interests* | *Name* *Interests* | *Name* *Interests* | *Name* *Interests* | 6

4. Areas of research need and possible research questions

RQ5 *RQ2* *RQ1* *RN1* *RN3* *RN5* *RQ4* *RQ3* *RQ7* *RQ6* *RN4* *RN2*

5a. Feasibility study idea #1

What? *Why?* *How?*

5b. Feasibility study idea #2

What? *Why?* *How?*

5c. Feasibility study idea #3

What? *Why?* *How?*

6. Priority rank 1 / 2 / 3 | Priority rank 1 / 2 / 3 | Priority rank 1 / 2 / 3

IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

34 proposals > 4 funded

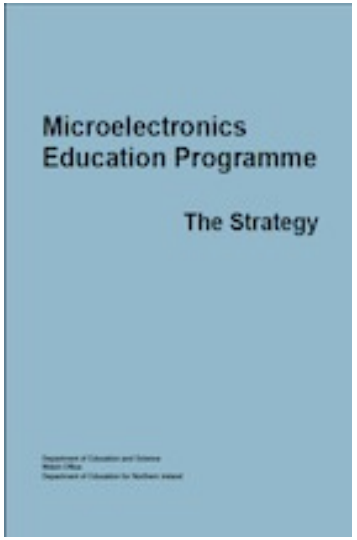
- **Investigating the Impact of CAD Data Transfer Standards for 3DP-RDM** – Dr Eujin Pei, Brunel University
- **OPTIMOS PRIME: Organising Production Technology Into MOst Responsive States – 3D PRInt Machine Enabled Networks** – Prof. Duncan McFarlane, University of Cambridge, and Edinburgh University
- **The enabling role of 3DP in redistributed manufacturing: A total cost model** – Dr Martin Baumers, University of Nottingham, and University of Oxford
- **Redistributing Material Supply Chains for 3D printing** – Dr Matthias Holweg, University of Oxford

Three projects

1. ‘Bit by Bit’: Capturing value from 3D printing
2. 3D printing-enabled re-distributed manufacturing
3. **UK National Strategy for Additive Manufacturing / 3D Printing**

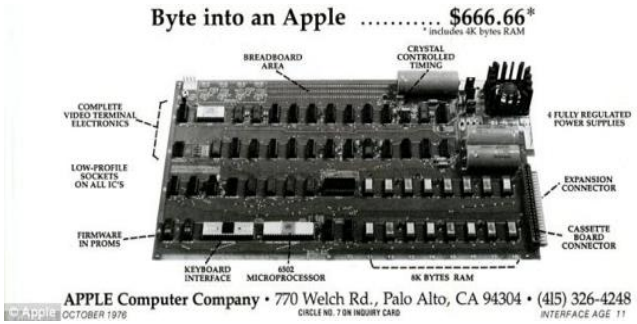
Images: http://www.computerhistory.org/; oldcomputers.net; Konstantin Lanzet; Evan-Amos; Apple Inc.

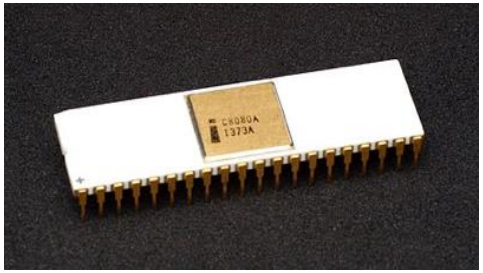
Lessons from the past



"[..] the personal computer will fall flat on its face in business"

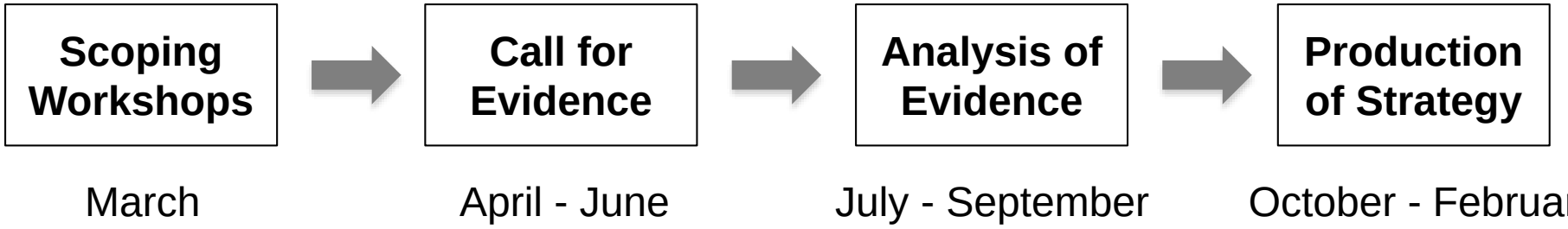
Ken Olsen, Digital Equipment Corporation





Images: http://www.computerhistory.org/; oldcomputers.net; Konstantin Lanzet; Evan-Amos; Apple Inc.

UNIVERSITY OF CAMBRIDGE


Scoping Workshops
Call for Evidence
Analysis of Evidence
Production of Strategy
March
April - June
July - September
October - February

IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

Emerging issues

- **Education**
  - Industry uptake
  - Skills required
  - STEM awareness
- **Materials**
  - Quality, availability
- **Processes**
  - RP-RM, Hybrid, Scale-up
- **Finance**
  - Support for experimentation / scale-up
- **IP/Liability**

www.amnationalstrategy.uk

UK National Strategy for Additive Manufacturing / 3D Printing

LATEST NEWS | STRATEGY DEVELOPMENT PROCESS | HOW TO SUBMIT YOUR EVIDENCE | SCOPING WORKSHOPS | STEERING GROUP

Latest News

The Call for Evidence to support the development of a UK National Strategy for Additive Manufacturing / 3D Printing is now open. To learn more about how the strategy is being developed, click here. To view the different options for submitting evidence, click here. The deadline for submission of initial evidence is 15th June 2015.

If you have any queries regarding this Call for Evidence, please email evidence@amnationalstrategy.uk.

Tweets Follow

Scott Leslie 9h
@tinkerology
At US hub: New factory with 100 printers, only 3 employees | Impact Lab - impactlab.net/2015/05/11/new… #3dprinting #AdditiveManufacturing
Retweeted by DigitalFabrication
Expand

Jonny Williamson 11h
@Jonny_Will_28
.@ArupGroup photograph reveals future potential of #AdditiveManufacturing @TheManufacturer - bit.ly/1L1z0pW pic.twitter.com/LbTBlMZliU
Retweeted by DigitalFabrication

IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

Three projects

1. ‘Bit by Bit’: Capturing value from 3D printing
2. 3D printing-enabled re-distributed manufacturing
3. UK National Strategy for Additive Manufacturing / 3D Printing

www.dfab.info