University of Essex

Openly Innovating SMEs?

14th INSME Annual Meeting
INDUSTRY 4.0 FOR SMES' BUSINESS GROWTH

European Parliament , Brussels, Belgium
17th and 18th of May 2018

Jay Mitra
The Venture Academy
Essex Business School
University of Essex
United Kingdom

Image source: disruptionhub.com.hoe.kpmg.com/ceotodaymagazine.com

University of Essex

Industry 4.0 Conundrum

Two questions

1. No need for Small, Medium or Large Firms?

2. Wither small firms?

Possible answer to be found in consideration of:

- What is Open' about Open Innovation/
- The Industry 4.0 Architecture/
- The Link between Open Innovation and Industry 4.0/
- IP Issues/
- Market Makers and SMEs

University of Essex

What's 'Open' in Open Innovation?

- Open' is not the same as 'free'; Generally private: the outcome is "closed".
- Purposive knowledge outflows from many to many
- Absorptive capacity of individual "flow embers"
- Firm-centric theory of innovation associated with strong appropriability

- Both process and outcome are open to all

- 'Open, distributed innovation'
- Emphasis on public good
- nature of innovations,
- 'Open Collaborative innovation': emphasis on low-cost or free production of public good
- Involves lead users, ideation and design contests to social media analysis, hackathons and crowd sourcing tournaments ('broadcastsearch').

Image source: blog.econocom.com/hackermoon.com/cocatalyst.com

University of Essex

What's in the 'Open' Book ?

- Open innovation principles practiced across: High Tech industries: software, electronics, telecom, biotech and pharmaceuticals, Medium to Low Tech: machinery, tooling, chemicals, food and beverages, logistics, fast moving consumer goods and architecture

- Benefits: P*roduct design, new market insights, customer intimacy, and business model* Innovation

- Increasing importance of information and communication technology (ICT) in doing business, both B2B and B2C accelerated open innovation practices.

- Rise of *third-party innovation intermediaries* ('innomediaries') and *platforms*, (or open innovation accelerators (OIAs).

- The *Internet and social software* are key to these OIAs and allow them to operate globally and integrate large numbers of participants (e.g. Diener and Piller,2013).

- Impact: *Macro level* - on national and regional innovation systems , and because of the levers; *Micro level* -incentive and stimulation for positive change by creating new and altering existing innovation ecosystems.



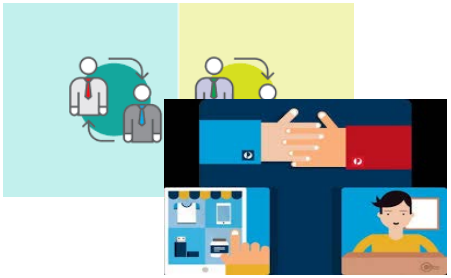


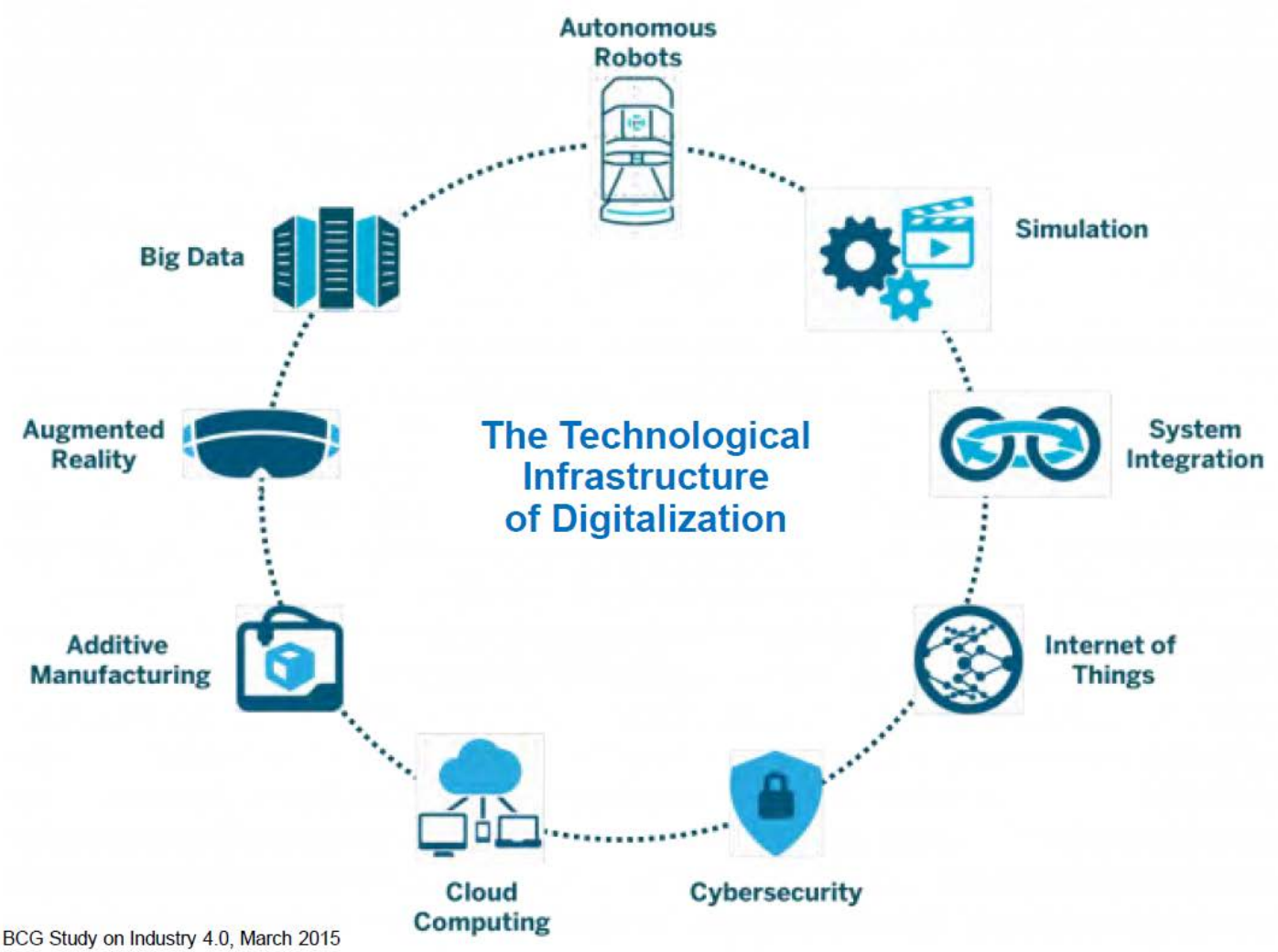




Image source: Z_punkt;/fifteendesign.co.uk/startrack.com.au/innovationmanagement.se/bmtoolbox.net/visualcapitalist.com/A-Cubed software Ltd /pearsonforloyalty.com/sharda.ac.in/adweek.com /sloanreview.mit.edu/worldbusinessincubation,wordpress.com/ec.europa.eu

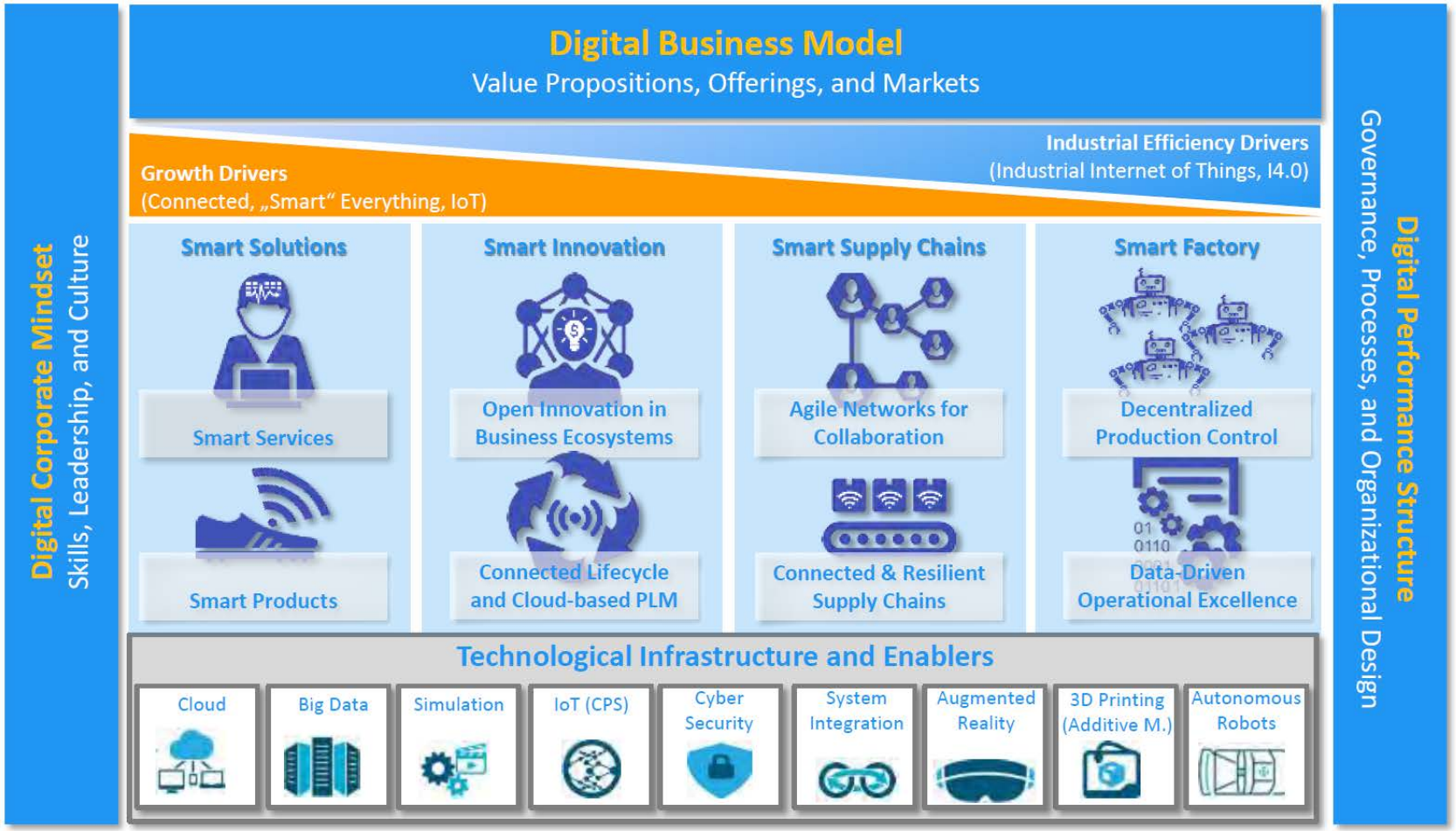
Four pieces of the Industry 4.0 Architecture

Industry 4.0 and its Technology Infrastructure



Source: Aethon.com, Source: BCG Study on Industry 4.0, March 2015

An Industry 4.0 Open Innovation Framework

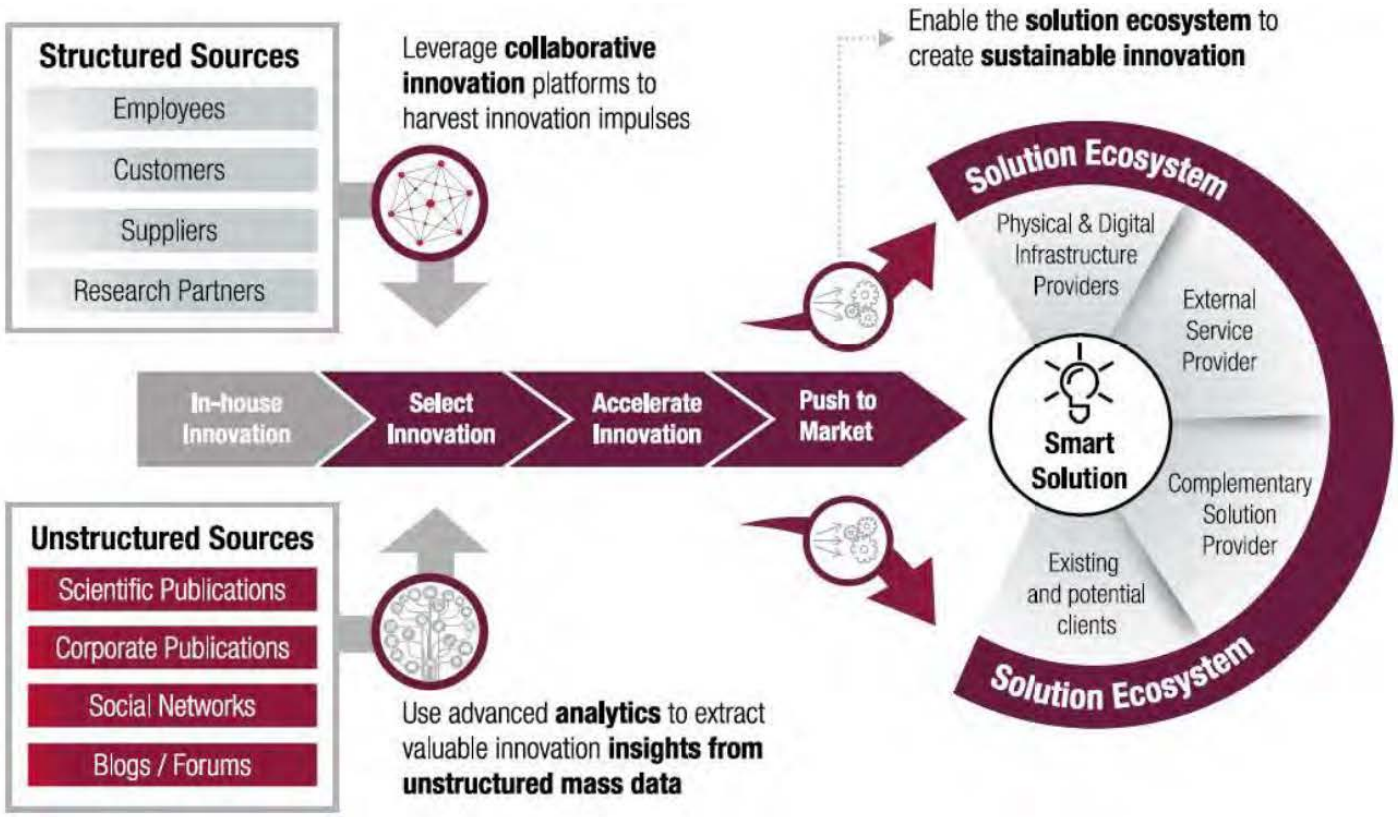


Note:
Non- linearity; Critical Touch and Link Points; Multiplicity of Involvement

Keywords
Smart; Ecosystems; Agility; Collaborative; Decentralised; Excellence

Source: Adapted from, 'Why Industrie 4.0 Demands New Business Models' @masscustom (Frank T. Piller); RWTH Aachen University

The Building Blocks of Industry 4.0 Open Innovation Business Model



Source: Bechtold et al., 2015 / CapGemini Consulting Framework

University of Essex

Industry 4.0 and Open Crowd Wisdom

"Outsourcing act of job traditionally performed by a designated agent (usually an employee) to an undefined, generally large group of people in the form of an open call."

Crowd sourcing can be used to generate ideas, services, or content from a large group of people, usually an online community

Image source: ideascale.com/crowdsource.com/slideshare.net

Where and how does Industry 4.0 Connect with Open Innovation?

Digital Data

Generated by connected machines and mobile devices as well as by customer interfaces, digital data ensures new areas of application like optimizations on the shop floor.

Automation

Artificial intelligence is on the rise; robots and machines work hand in hand with human beings in more and more areas, especially those requesting the intelligent processing of information.

Connectivity

A networked economy powered by smart devices allows for an improved synchronization of processes and real-time reaction as well as acceleration of innovation.

Digital Consumer Access

New intermediaries and data gatherers know customers almost better than they know themselves enabling them to offer full transparency and new kinds of services.

A spatial perspective

focusing on the globalisation of R&D innovation, absorptive capacity and access to resources;

- **A Structural perspective**

highlighting the division of work in innovation, with a strong trend to more R&D outsourcing and alliances;

- **A user perspective**

focusing on user needs, the involvement of lead users and the idea of mass customisation;

- **A supplier perspective**

concentrating on the early involvement of suppliers in the innovation process;

- **A leveraging perspective**

looking at competences and IP to explore and create new markets and new business models;

- **A process perspective**

focusing on outside-in, inside-out and coupled processes of opening up the innovation process;

A tool perspective

centring on the tools to enable customers to make and configure their own product, or to enable companies to integrate problem solvers or idea creators via websites;

- **An institutional perspective**

in which open innovation is seen as a 'private-collective' innovation model in which the "free revealing of inventions, findings, discoveries and knowledge is a defining characteristic" and knowledge spill-overs take place;

- A **cultural perspective**

focusing on the creation of an innovation mind-set and culture that puts also other values than competences and know-how in the centre of innovation.

Source: adapted from Gassman et al, 2010

University of Essex

Industry 4.0 IP issues

Intellectual Property (IP) = most important challenge for Open Innovation).

Key issue is integration of third parties in innovation with potential conflicts about IP ownership Who will own what part of the innovation.

Possible tradeoff between a maximum of innovation provided by the creativeness and input of several parties and attempt to appropriate innovation for one self.

I4.0 Open and connected innovation will need contractual regulation.

Possible framework agreement between the parties define rules for collective innovation engagement and execution

Includes consideration of unbiased evaluation of the contribution of each party involved in the IP.

Added provision on how the IP can be used by each party involved and how each party can benefit from the innovation.

Subject to incentive and/or reward for each party involved, plus the motivation be there to jointly innovate and therefore enjoy the benefits stemming from multiple sources of knowledge.

Source: adapted from Industry 4.0 and open innovation Posted on: Jan 22, 2018 by Stefan Zimmermann; https://atos.net/en/blog/industry-4-0-open-innovation

University of Essex

Some Open Source IP Initiatives

IP Auctions:(Europe's largest auctioneer Ocean Tomo6 started in 2007, and global IP marketplaces such as 'yet2.)

Patent funds (e.g. by Deutsche Bank and Credit Suisse) which buy IP from universities and high-tech ventures and leverage its value through professional management

Emergence of **IP integrators**, IP insurers and even intellectual commons where IP is pooled and shared

Recently, **European RTOs**, notably Dutch TNO, has started to more actively manage and open up itS IP portfolio to start-ups and SMEs

Emergence of large scale **pre-competitive technology collaborations** : Predefined IP-models used to deal with IP ownership of jointly developed technologies, (e.g. so-called fingerprint IP-model used by IMEC or CTMM).

Large companies have opened up to **activate unused IP**. (e.g. IP ventures established by and as part of Microsoft actively partner with start-ups, venture capitalists and government agencies/ IBM's IP Collaborative Innovation Initiative pledging 500 patents to open source communities and launching an open innovation network)

Creative Commons Sharing and reuse of creativity and knowledge through the provision of free legal tools to those who want to encourage reuse under generous, standardized terms and benefit from symbiosis

Source: various - ((Odusanya et al., 2008Chesbrough and Vanhaverbeke, 2011

Image source: pinterest.com/ashidhara.com/ipintegrators.net /cigionline.com

Key Business Architects of Industry 4.0

These are platforms … and these want to become a platform

Based on an idea by Marshall van Alstyne (2015), MIT

University of Essex

Market Players and SMEs

The Question of SMEs

SMEs in low-tech industries have been successful in applying and integrating knowledge from external partners (??!!)

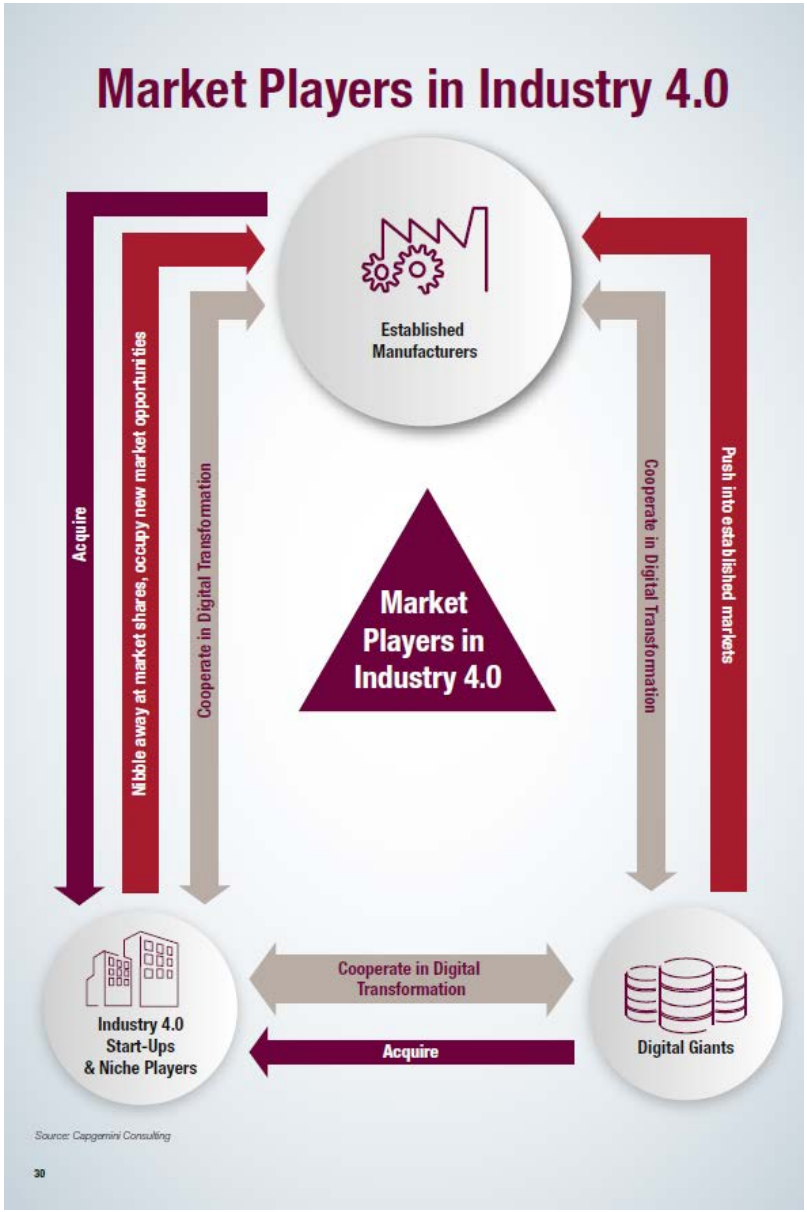
SMEs appear to engage in open innovation rather as a consequence of their search of changing their existing business model and to adapt to new market realities.

Limited technological capabilities and resource constraints and a lack of financial and human resources force SMEs to look outside for innovation partners

Equally same set of constraints impede participation as knowledge partners

Key players likely to start-ups and established niche SMEs

Key mode as part of community of Innovation



Shapeways

3D printing marketplaces and services

oDesk

Digital collaboration platform for teams

oDesk
Changing How the World Works.

Cassantec

Predictive maintenance solutions

CASSANTEC
THE PROGNOSTICS COMPANY

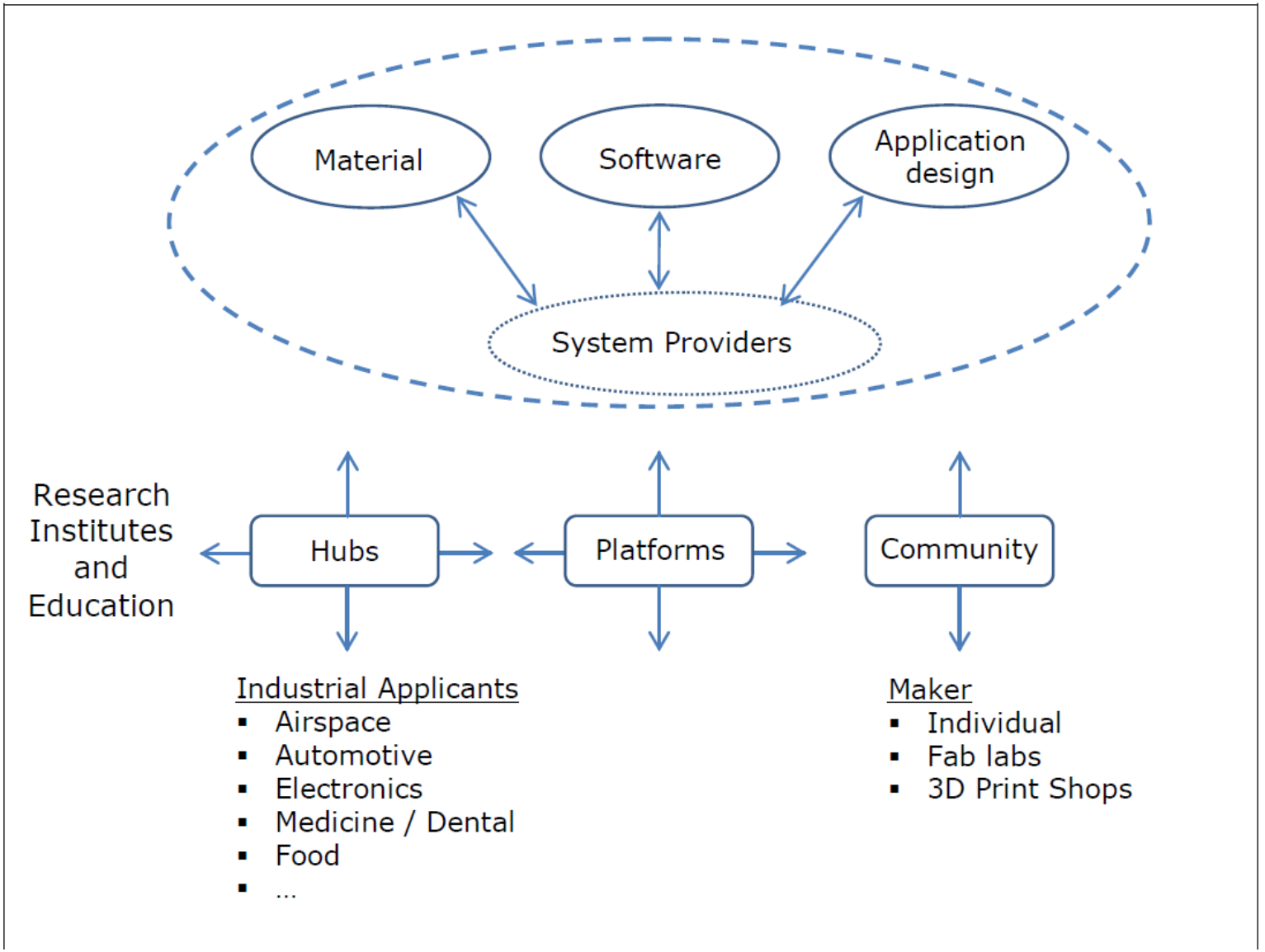
Blue Yonder

Comprehensive predictive analytics methods enabled automated c making

blue yonder

Image source:shapeways.com/change.org/supplychainit.com/slideshare

Key Actors in the Additive Manufacturing Chain



Source: Directorate-General for Internal Policies Policy Dept. Economic and Scientific Policy

University of Essex

Contact

Jay Mitra
Professor of Business Enterprise and Innovation

Essex Business School
University of Essex,
Wivenhoe Park
Colchester C04 3SQ
Essex
UK

M: +44 (0) 7801552469
T: +44 (0) 1206 874859
M: +44 (0) 7801552469
E: jmitra@essex.ac.uk
E (personal): jaymitrauniverse@hotmail.com