

# THE CREATIVE INDUSTRIES BRIDGING THE DIGITAL & PHYSICAL WORLDS

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**“Everywhere, people are getting together and, using the Internet, disrupting whatever activities they’re involved in.”**

Pierre Omidyar,  
Founder, eBay Inc.

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## A world of connecting and converging technologies

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This executive summary for our Bridging the Digital & Physical Worlds Beacon Project identifies a number of exciting trends which focus upon new and potentially disruptive business models. Through workshops, desk research and consultations with our wider community, this report highlights how innovative technologies are creating new relationships between the digital and physical worlds.

Enhanced connectivity in our digital age is driving a convergence of content and platforms which facilitates entirely new ways of interacting with objects, environments and people. Digital connectivity and related developments in distribution on the back of new materials and devices are enabling virtual experiences to be accessible on demand, adding layers of information and connectivity to enhance our physical experience.

The distinction between the digital and physical worlds will slowly converge in many areas of life as it becomes possible to create bespoke services and objects locally.

The emergence and reduction in size and cost of 3D printing clearly demonstrates this powerful trend.

These technologies will provide both challenges and opportunities for many industries with new business models emerging based on new ways of creating value for users and consumers. The process of innovating is not merely about new ways of producing physical objects or experience, but also catalysing new ways of collaborating, sharing and creating.

Our shared challenge is to position ourselves to take full advantage offered by these technological developments – both at the business level, in terms of research, and in our wider frameworks supporting creative industry innovation.



Jeremy Davenport  
Deputy Director CI KTN



To read the full report and all supporting documents visit:  
[www.creativeindustriesktn.org](http://www.creativeindustriesktn.org)

# New models, new markets, new makers

We are witnessing emergent technologies and practices that are enabling and empowering people to create whole new value chains that could herald the rebirth of the craft and manufacturing movement for the 21st Century.

The impact of digital technologies and platforms on industries like music, gaming and TV/film has been immense. While the media used and the distribution channels have been the most visible change, the most profound effect has been the process used to create and distribute content.

New processes and philosophies, such as open innovation and crowd sourcing have become more prevalent as technologies and the communities using them have grown and matured. The same drivers, trends and technologies are increasingly being used in industries that produce physical goods. We are witnessing whole new value chains

emerging around these new technologies and new ways of collaborating and sharing ideas and IP. All these drivers are leading to a convergence between the digital and physical worlds and the increasing availability of bespoke services and artefacts that are transform business models across numerous industries.

The most profound element of this rebirth is the concept that 'industrial activity', or 'making things' is becoming democratized. Users are increasingly central to the value chain, not just as a source of sales revenue, but as a source for ideas, solutions, investment and marketing.

This report sets out three key recommendations supported by three key trends that will seek to create and assist sustainable new communities based around artistic and technical collaborations to create new products, artefacts, businesses and value chains. Importantly, these recommendations are aimed at supporting new ventures and micro / small businesses and are focused on the four key stakeholder groups of industry, policy, investor and education.

This report is the culmination of a four-month study that has identified key emergent trends and technologies. These were used to create a series of outline scenarios that were developed and expanded by key stakeholders in workshops across the country, and their input helped to shape the recommendations outlined on the following pages.

# Recommendations: design better connections as much as better products and services

“Eventually everything connects – people, ideas, objects. The quality of the connections is the key to quality per se.”

**Charles Eames,**  
Designer

The opportunities identified within this Beacon Project all require new forms of collaboration between different people, businesses and skill sets. There is a need to foster ever greater and ever wider forms of digital and physical communities that are focused on collaborative commercial ventures.

Simply suggesting and encouraging collaboration is not enough, nor are one off events sufficient by themselves to engender trust and a clear, shared sense of purpose. It requires a long-term commitment and a variety of events, platforms and competitions to encourage such activity. More resources need to be committed to providing the right space, time and facilities to enable parties to establish sufficiently strong links with each other and to develop a shared language and sense of purpose.

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# Utilise the assets we already have, by learning together

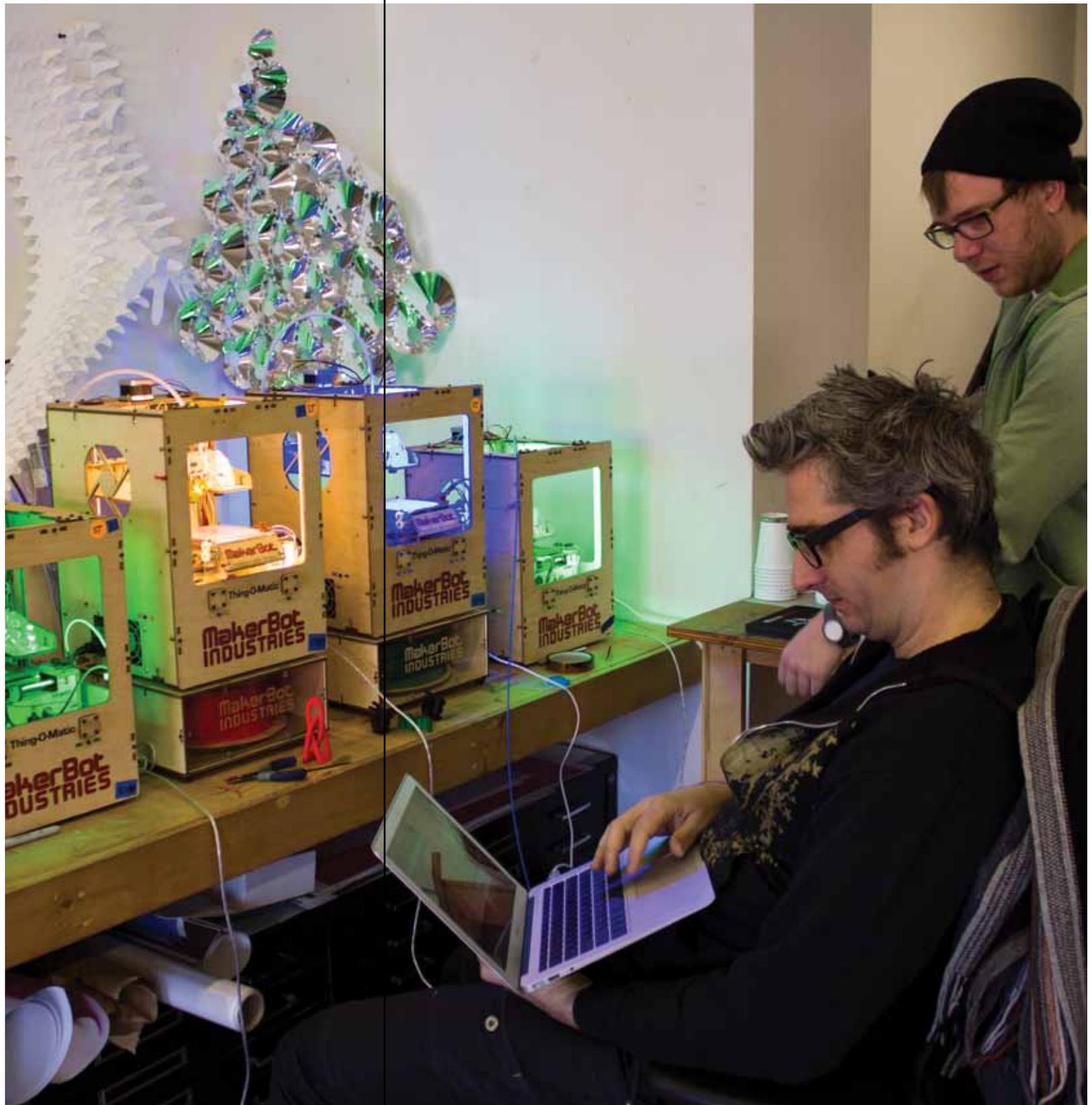
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There are now many exciting examples of innovation spaces – bringing people together across disciplines to learn and innovate together. For example, Fab Labs, established by MIT, are a global open source challenge to create better machines that make things. There are a multitude of similar digital and technical labs and workshops all over the UK. A key challenge is to ensure that such spaces (both physical and virtual) are used to fulfil their potential as a key driver to innovation and collaboration.

There is a potential to foster new communities based around physical spaces that provide creative, development and manufacturing tools. Existing spaces appeal to a technically minded person, often male. A shared challenge is to explore how such spaces can be utilised more effectively and by a wider group of people/disciplines that seek not just to create a better machine, but a better process and value chain.

These spaces need to focus on encouraging multi-skilled communities to share and learn new practices that will unearth commercial opportunities. Like a child's playground, such spaces help to define and catalyse community behaviour as much as provide the tools to manifest the collaboration.

**Interactive Parametrics Workshop with Studio Mode and MakerBot, New York. Photograph by Marius Watz, Flickr.**



# Trust & security need to be built with better uses of existing IP frameworks

Most of the current activities, networks and outputs identified in this project operate under a loose IP framework of creative commons license or as deliberately open source projects. While this has helped the existing community to share and develop, there is an urgent need to establish new forms of IPR that support multi-layered, multi-party agreements, and most importantly, are financially accessible to individuals and SMEs.

This is not just about the creation of new forms of IP, but how tools such as metadata could be used to ensure clear and protectable 'IP trails' within a multi-party development programme. Similarly, digital platforms allow access to metadata and content that could create secure community identities and a corresponding risk profile of the collaborators.

“Long accepted business models are being blown apart; the Internet is radically reshaping consumer attitudes and behaviour and legal frameworks are not keeping pace. These are critical issues for a strong creative and knowledge economy in the 21st century.”

**Dame Lynne Brindley,  
CEO, British Library**

# Trends: New business opportunities driven by new industries and markets

The recommendations are based on three key trends identified by the Beacon Project. They are driving people and businesses to connect, collaborate, fund, prototype, manufacture and sell their designs without the sponsorship or support of established manufacturing or retail businesses.

The ethos of such systems stem from the hacker movement established in the university computer labs in the 1970s & 80s, where collaborators shared problems and solutions. This ethos was maintained in the software world, and continues today, best exemplified by the success of Linux and subsequently

Android. The same influences are beginning to shape the worlds of manufacturing and design and subsequently, innovation.

Open innovation is now a widely used process encompassing crowd sourcing and IP licensing. Open manufacturing is perhaps the latest iteration of this trend, where disparate communities and teams collaboratively create new cars.

Such innovations are redefining the nature of economic activity, the industries they serve, and the businesses that populate them.



**The Glif, an iPhone tripod mount that doubles as a stand, produced by Tom Gerhardt and Dan Provost by utilising Shapeways, an on-demand 3D printing company, and Kickstarter, a website for crowd-funding creative projects.**

**Image: Matthew Pearce (MattsMacintosh), Flickr**

# The New Value Chain

More and more markets are driven by the end users and consumers, where they are central to the conception, development and production of customised solutions for niche markets.

Open innovation changes the nature of value chains from linear progression, to a more collaborative, and circular progression of value.

While this is well established in many industries, from gaming to OS development, and in manufacturing, from aircraft to consumer electronics, the real change that will occur is that the user will become manufacturer, funder and co-designer.

There are hundreds of digital and physical communities who share their technical knowledge, problems and solutions with each other. Websites like Instructables and the multitude of hacker spaces in the UK are populated by people looking to 'play' with technologies, processes, devices and materials – repurposing them to better suit their own needs.

What is exciting about such activity is that the tools needed to manifest, market, and distribute a solution in almost any material are now within the reach of a single person or a group of amateurs. Yet such activities are, on the whole, still the preserve of men who have a background in technology.

“We are seeing the emergence of an economy of the people, by the people, for the people.”

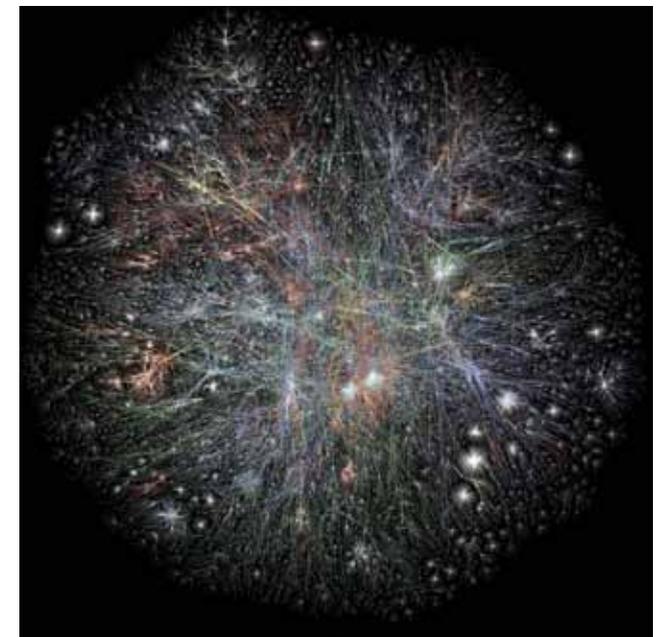
**C.K. Prahalad,**  
Author, *The Future of Competition*

# The Market of 1 to 7 Billion

New global communities are being formed around digital development and manifestation tools that radically reduce the volumes and finance required for successful market launch, while also allowing access to a global market.

The emergence of devices, platforms and machines that can economically manufacture clothing, artefacts and devices for an individual or a small group of individuals is heralding the redefinition of what determines economies of scale. In other words, it is redefining the nature of business.

A single end user can become a market. Individuals can exchange information and value more widely than ever before. Digital platforms are breaking down barriers between people, businesses and markets enabling local and global markets to become interconnected and allow solutions to be provided from anywhere to anyone on the planet.



Map of the Internet,  
[www.opte.org](http://www.opte.org)

# The New Creative Industries

As markets and industries change, so do the nature of the businesses and organisations that populate them. Whole new value chains and markets require new businesses and business models to serve them.

New digital platforms such as social media and manifestation technologies such as 3D printing mean that the barriers to becoming part of a value chain have been lowered. The hardware and software used to create designs and content of all kinds have become cheaper (and free) and the required expertise has been correspondingly lowered.

The market, already well populated, is becoming saturated. To some, this means a decrease in quality, for others, a greater ability to access a talent pool suitable to their needs, it is the democratisation of design.

Correspondingly, complex new systems such as BIM and advanced 3D CAD systems are migrating into all encompassing lifecycle management tools that can govern service, maintenance and sustainability performance of an environment or an artefact. Such systems allow skilled designers to be responsible for a wider impact, where their designs directly impact a complete specification and lifecycle management system.



3D printed jewellery

# Exploiting the opportunities

The trends, innovations and recommendations identified in this Beacon Project suggest that there are emergent opportunities for organisations, communities and individuals to redefine their markets, value chains and industries. Specifically, through the development of new products and services and critically, through new relationships across supply and innovation chains and end users/consumers.

All of the opportunities are driven by practices and services enabled by collaboration, whether it be open innovation or more traditional vertical value chain innovation.

The potential impact of such opportunities is dependant upon the desire by industry to adopt such practices, itself based on awareness and understanding of the

platforms, services and the associated commercial opportunities.

The recommendations seek to build platforms, communities and networks that will help to create partnerships and businesses that will utilise existing innovations and create new revenue streams, IP and businesses. Such networks will need support to help embed such behaviour and practices.

While the focus of the project itself was on the blurring boundaries between the digital and physical worlds, the key recommendations are focused on the potentially transformational innovations taking place in this area, and how to best apply such innovations to enhance business opportunities that affect both the creative industries and the wider UK economy.

The Creative Industries Knowledge Transfer Network accelerates innovation among the UK's creative businesses by delivering valuable insights into technology trends and developments, promoting funding and collaboration opportunities and turning visions of the future into business success. We are creating a unique place for innovators to meet, share ideas and shape the future.



This report is part of a series of **Beacon Projects** that will examine some of the big challenges and opportunities faced by the creative industries in relation to technology focused innovation.

The full **Bridging the Digital and Physical Worlds** Report, including expert interviews and online survey, can be read and downloaded at [creativeindustriesktn.org](http://creativeindustriesktn.org)

#### Published Beacon Reports

Unlocking Knowledge Transfer  
Future of Digital Content  
Exploiting Digital Tools  
Sustainability  
IP and Open Source  
Bridging the Digital and Physical Worlds

#### Current live Beacon Projects

Creative Consumers

The Bridging the Digital and Physical Worlds Beacon Report was conducted by TheAlloy, the experience-led design consultancy.

The Creative Industries KTN is funded by the Technology Strategy Board, the government's innovation agency. Its work supports the aims and objectives of the Technology Strategy Board's Creative Industries strategy report.

#### Technology Strategy Board

Driving Innovation

The Creative Industries KTN was established by a consortium led by the University of the Arts London. The other partners are Imperial College, London, RIBA and TIGA.



“Beyond reality as we know it lie other realms enabled by the advent of digital technology... abounding with possibilities for companies and people.”

Joe Pine,  
Author, *Infinite Possibility: Creating Customer Value on the Digital Frontier*