Digital Economy Strategy Meeting Landscape

4th June 2014

Release 001

Meeting Details:
http://www.well-sorted.org/explore/DESM2014/

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Introduction

The Digital Economy Strategy Meeting took place on 4th of June. The Research Councils UK (RCUK) Digital Economy Theme was seeking to identify new priorities to help shape its future portfolio and strategic direction. The aim of the RCUK Digital Economy Theme is to support research to rapidly realise the transformational impact of digital technologies on aspects of community life, cultural experiences, future society and the economy.

The Theme is administered by the Engineering and Physical Sciences Research Council (EPSRC) with support from Art and Humanities Research Council (AHRC), Economic and Social Research Council (ESRC) and Medical Research Council (MRC) and it was planned that by bringing together many different perspectives we could identity future possibilities and challenges. All of the inputs and discussion emerging from the workshop will be used to inform the future strategic direction and evolution of the theme from early 2016.

The meeting was attended by a wide range of both project members and other stakeholders. One purpose was to collectively generate future scenarios for a '**research landscape**' for this highly interdisciplinary area to help plan for possible activities over the next few years.

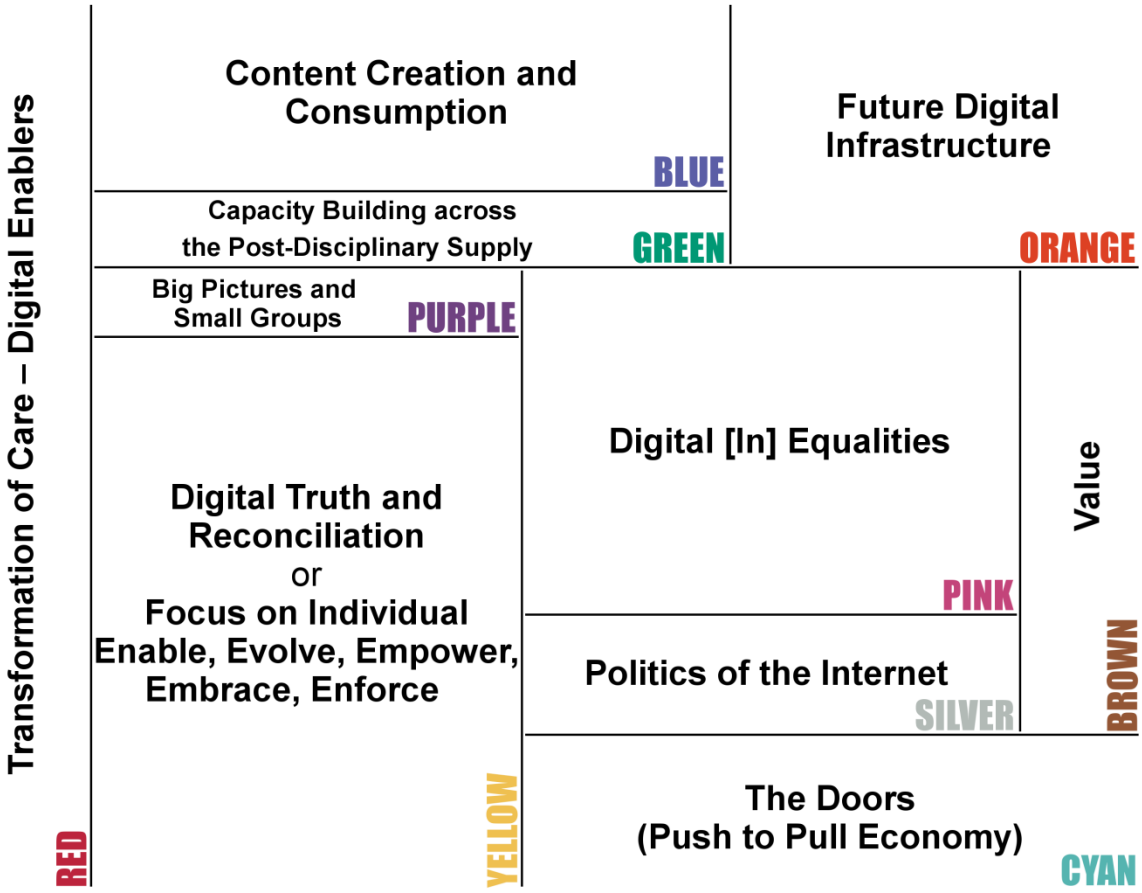
In preparation for the Meeting, delegates were asked to answer the following question:

"What is going to be the main societal, economic or cultural challenge associated with the digital economy space over the next five to ten years?"

After providing their answers delegates were invited to take part in a remote, online study in which they each sorted all of the submitted responses into groups of similar answers. This information was used with the 'Well Sorted' tool to produce the 'average' sorting. The resulting groups of challenges were used to drive breakout sessions which generated the different sections of this document. The process was designed to be transparent, open, and democratic, and to maximise use of delegates' time at the meeting. The following pages describe the Digital Economy Strategy Meeting landscape and potential activities generated by the community.

The ICT methods, clustering algorithms and associated support were provided by the EPSRC funded 'ICT Perspectives' project. We would like to very gratefully acknowledge support from both the RCUK Digital Economy Theme and EPSRC through grants EP/K003542/1 and EP/I038845/1.

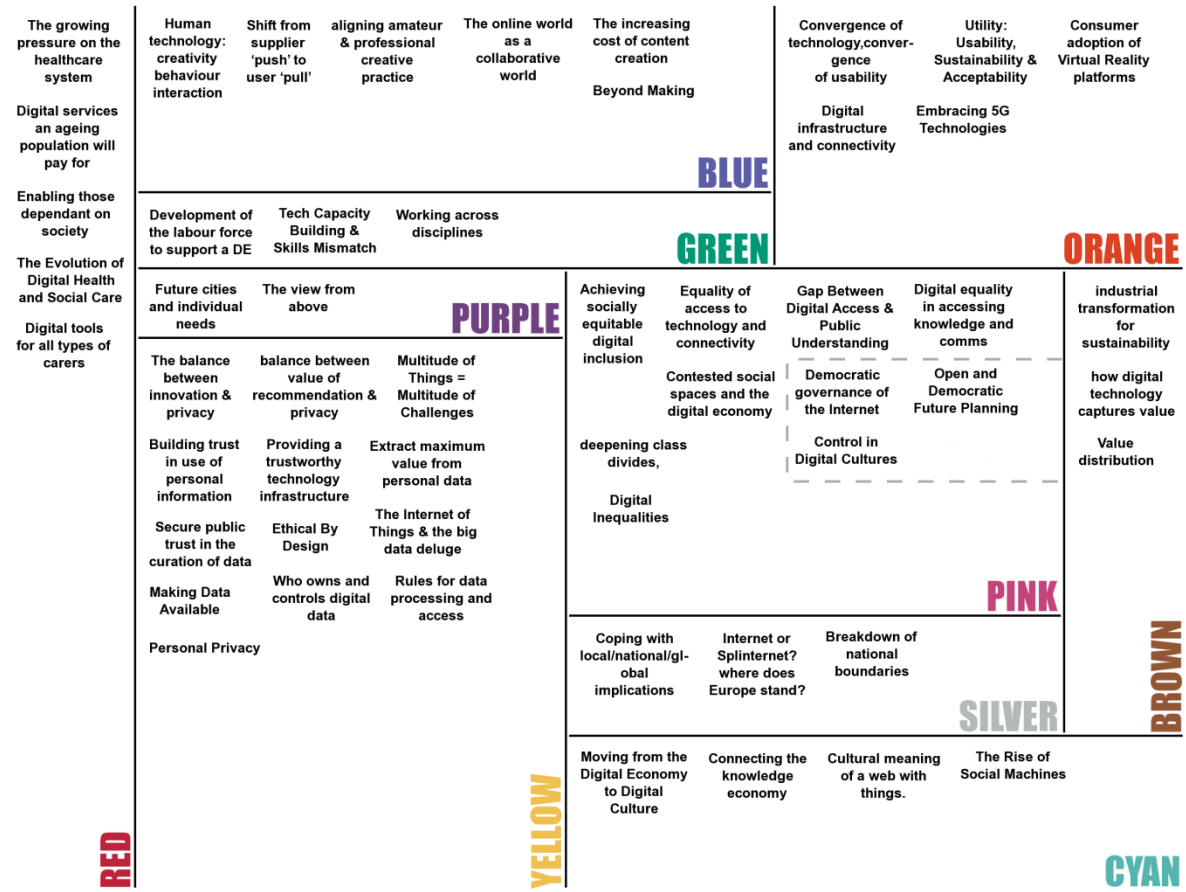
Digital Economy Strategy Meeting Landscape Top-level



This top level diagram gives an overview of Digital Economy research areas developed from the detailed landscape (shown overleaf) generated entirely by crowdsourcing the community. The titles were produced by each group on the day.

Digital Economy Strategy Meeting Landscape Detailed

This level was created by the community before the meeting using simple crowdsourcing techniques.



Delegates chose one of the above groups to join and develop research questions. The output from the groups is shown on the following pages.

An interactive version of this Tree Map, which also includes the longer descriptions, is available here:

http://www.well-sorted.org/explore/DESM2014/

Red: Transformation of Care – Digital Enablers

The Evolution of Digital Health and Social Care	**Digital services an ageing population will pay for**
The growing pressure on the healthcare system	**Enabling those dependant on society**
Digital tools for all types of carers	

Group Members:

Mike Short, Andrew Fowlie, Cees van Berkel, Matthew Willis, Vicente Grau, Richard Egan, Paul Watson

Challenge #1: DE Help to remove traditional obstacles to impact
The time is now for : Health and Wealth; better patient / person – centred care; joined up thinking

Elevator Pitch:	**Why is this a DE Challenge?**
Care & care-costs are not sustainable • Data is a key enabler for change; • Connectivity provides new opportunity; • New integrated approaches need to be explored.	Users : Industry – Food, health, Medical; Care providers; Environmental; Service departments / User Experience; Business / Economics; Healthcare Economics. Multi / inter / cross disciplinary : User / Primary / Secondary / Tertiary care; Social Care / Health care Care plus ICT

Challenge #2: Users – Industry / Provider – New Economies; Expert Opportunities; Efficiencies overcoming skills gap; Access to research / trial data; Benefits

Elevator Pitch:	**Why is this a DE Challenge?**
User : Government Society – Environmental; Open / Interoperable standards; Export / Global re-known; Care Efficiencies; Benefits Family ? What are the incentives User : Person – Improved Care; Lower Cost; Well being; Diagnostic /Early Prevention; Benefits	New users for business model analysis e.g. Insurance, Intl benchmarking Organisational design specialists; Transformation; Scenario builders / modelling

Challenge Question #3: [Nothing Provided]

Elevator Pitch:	**Why is this a DE Challenge?**
We need a digital care service based on better delivery & access to data Open source approaches to aggregated / anonymised data; New approaches to discovery based on crowd sourcing Solutions – making the most of 'big data' and 'little data'	Designers; Data analytics; Security / privacy / trust; "care" devices; Biomedical engineers

Blue: Content Creation & Consumption

Shift from supplier 'push' to user 'pull'	**Beyond Making**
The increasing cost of content creation	**The online world as a collaborative world**
aligning amateur & professional creative practice	**Human technology: creativity behaviour interaction**

Group Members:

Steve Benford, Matt Sansam, Catherine Mulligan, Frank Boyd, Mike Wilson, Stephen Frye, Neil Crockett

Challenge #1: (the pre-amble) The Content Jungle

Elevator Pitch:	**Why is this a DE Challenge?**
In the good old days : - Creation & consumption were separate; Professional and amateurs were separate. Now things are messy - the content jungle. Both people and content follow treacherous paths through this jungle e.g. 1) mash-ups of professional content, 2) amateurs go viral	Impact Partnership Interdisciplinary

Challenge #2: Navigating the Content Jungle

Elevator Pitch:	**Why is this a DE Challenge?**
We need to give "people" "tools" (technology) to navigate the jungle : Realise range of appropriate values; Recognise ownership; Facilitate new ways of collaborating; Translate between scales.	Economic, Social, Cultural Entertainment Industry, Community, Academics, Creator Tech, Social Sciences, Arts & Humanities, Design & business

Challenge #3: Charting the Content Jungle

Elevator Pitch:	**Why is this a DE Challenge?**
But first we need to explore, understand and chart : Diverse actions, motivations & journeys; Content & people, have long lifetimes while technology is changing rapidly	Economic, Social, Cultural Entertainment Industry, Community, Academics, Creator Tech, Social Sciences, Arts & Humanities, Design & business

Green: Capacity Building across the Post-Disciplinary Supply

Development of the labour force to support a DE **Tech Capacity Building & Skills Mismatch**	**Working across disciplines**

Group Members:
Hazel Hall, Gordon Blair, Catherine Mulligan, Phil Treleaven

Challenge #1: Skills Development for Working in A Digital Economy (Delivery to society)	
Elevator Pitch: Manifesto of the Green Party – Point 1 Digital skills are required at all levels to : Reduce employment; Increase economically active population; Provide equal opportunities; This is more about economy than digital	**Why is this a DE Challenge?** About end-user engagement at all levels of society (from basic digital literacy) Skills development has impact across all themes related to economic development eg healthcare, creative industries, sustainability, communities, - therefore not easily the responsibility of just one relevant council
Challenge #2: Research Structures for Post Disciplinarity	
Elevator Pitch: We are moving from multi/ inter /cross to a post disciplinary world This requires detailed attention to ensure that research structures within universities can accommodate this e.g. ensure societal scientists have adequate analytical skills and measurement of outputs (places to publish?)	**Why is this a DE Challenge?** This is THE DE challenge – Final point
Challenge #3: Research Methods Innovation	
Elevator Pitch: Method innovation is required to create breakthroughs in research and delivery of impact	**Why is this a DE Challenge?** As above!

Orange: Future Digital Infrastructure

Convergence of technology, convergence of usability

Utility: Usability, Sustainability & Acceptability

Digital infrastructure and connectivity

Embracing 5G Technologies

Consumer adoption of Virtual Reality platforms

Group Members:

David Stokes, Eric Yeatman, Kulveer Ranger, Nikos Promos, Alan Brown, Neal Skelton, Frankie Garcia

Challenge #1: Long term requirements for Digital Infrastructure

Elevator Pitch:	**Why is this a DE Challenge?**
There will be massive pressure on holistic digital infrastructures (everything in the eco-system) in next few years. Lots of investment on the technology bot not well understood in terms of Digital Futures, (experience, society / behaviours, business models).	Is the 'E' in D.E User experience is more than usability Essential aspect as all other groups challenges are reliant on the digital infrastructure being determined correctly. Without this, the other group's efforts would not have the underpinning. Silver Group Connection – point 1

Challenge #2: Identifying the economic challenges to establish priorities for digital infrastructure

Elevator Pitch:	**Why is this a DE Challenge?**
We need a deeper understanding of the current state of the digital economy. Is lots of data on DE use but insufficient understanding of the impact of that investment. This drives the requirement, helps ensure UK doesn't lose position; fall behind – UK remains competitive.	DE effectiveness / efficiency / economy is based on ensuring that incremental developments (that are commercial advantages) are replaced by an all-embracing digital infrastructure that satisfies all (i.e. dog wagging the tail instead of tail wagging dog). Co-ordinated structures will ensure that all (users -> commerce) are mutually beneficial. Brown Group Connection – point 2

Challenge #3: What are the possible pathways to the future infrastructure?

Elevator Pitch:	**Why is this a DE Challenge?**
Need to maintain effectiveness of movement by looking at the DE as a whole of the role technology plays in driving that. More experimentation needed to explore a range of pathways based on holistic exemplars. The technology /societal / user people are not co-ordinating or talking with each other -> engage with major stakeholders. Innovation models and commercial models that drive UK industry will be outputs.	Establishing the 'pathways' will encourage the DE to progress in logical steps towards the transition from current ad-hoc developments to a co-ordinated integrated and interspersable digital future using case studies exemplars studies viewing of a) emerging technologies and b) 'blue sky' thinking. Blue Group Connection – point 3

Purple: Big Pictures and Small Groups

Future cities and individual needs **The view from above**

Group Members:

Jeremy Frey, Mike Chantler

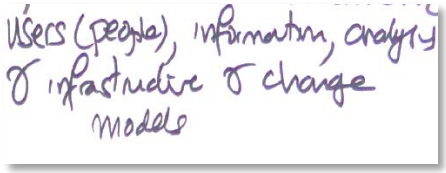
Challenge #1: Big Pictures by, and for, groups (small, large, and individuals)

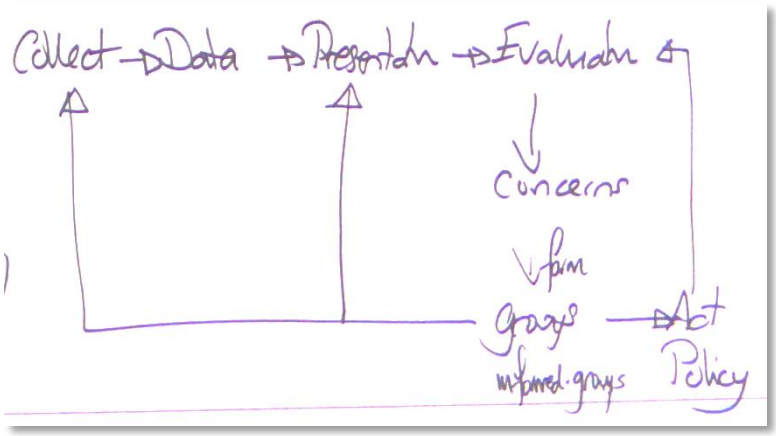
Elevator Pitch:

Informed people power (the digitally enabled 'big society') requires individuals to form or coalesce into interest groups.

- Individuals cannot form groups, or join groups, unless they have overviews (big pictures) of groups' interests.
- Using and generating 'big pictures' by, and for, small and large interest groups from data helps such groups form and express themselves.
- The challenge is to develop the infrastructure required for such group generation and expression – that would collect, present and evaluate relevant data to enable the group to form and express concerns in a concerted manner in order to affect government or company policy.

Why is this a DE Challenge?





Challenge #2: [Nothing Provided]

[Nothing Provided]

Challenge #3: [Nothing Provided]

[Nothing Provided]

Yellow #1: Digital Truth and Reconciliation (Balancing Privacy, Trust and Value)

Personal Privacy	**Who owns and controls digital data**	**Ethical By Design**
The balance between innovation & privacy	**Rules for data processing and access**	**The Internet of Things & the big data deluge**
Building trust in use of personal information	**Making Data Available**	**Multitude of Things = Multitude of Challenges**
balance between value of recommendation & privacy	**Providing a trustworthy technology infrastructure**	
Secure public trust in the curation of data	**Extract maximum value from personal data**	

Group Members:

Peter Edwards, Angela Sasse, Mark Birkin, Wendy Moncur, Marko Balabanovic

Challenge #1: Enabling Privacy & Trust in Future Practice

Elevator Pitch:
1) Critical problem to solve to allow data ecosystems to evolve in a balanced way (for all stakeholders)
2) "The wobble board of trust" – balancing the needs of competing stakeholders
3) Need to incentivise stakeholders in the correct way
4) Formalising the expectations of different stakeholders and mechanisms to communicate this to users. (Transparency)

Why is this a DE Challenge?
Disciplines : Technology (Comp Sci), Economics, Design, Ethics - Law, Sociology, Psychology
- Needs interdisciplinary perspective (regulatory, tech,…)
Users : Individuals, communities, government, corporates, 3rd sector

Challenge #2: An Ecosystem For Value and Control

Elevator Pitch:
1) Discovering competing value propositions of different stakeholders
2) How does greater control change the value proposition?
3) Different perspectives on values – monetary etc
4) Maximising productivity of the data ecosystem
5) Mechanisms to deliver control over data

Why is this a DE Challenge?
Disciplines : Digital Anthropologists, Social Policy, Business, Computing Science, Design
Users : as above

Challenge #3: Veracity : The 4th 'V' of Big Data

Elevator Pitch:
1) Do we even understand what 'Ground Truth' is in a digital world ?
2) Is deceit desirable ? (To protect individuals…)
3) Subversion (hiding in plain sight)
4) Anonymity, identity & data quality

Why is this a DE Challenge?
Disciplines : Crime / Cyber-Security, Forensics, Mathematics + all of the above
Users : as above

Yellow #2: Focus on Individual - Enable, Evolve, Empower, Embrace, Enforce

Personal Privacy	**Who owns and controls digital data**	**Ethical By Design**
The balance between innovation & privacy	**Rules for data processing and access**	**The Internet of Things & the big data deluge**
Building trust in use of personal information	**Making Data Available**	**Multitude of Things = Multitude of Challenges**
balance between value of recommendation & privacy	**Providing a trustworthy technology infrastructure**	
Secure public trust in the curation of data	**Extract maximum value from personal data**	

Group Members:

Derek McAuley, Linda Chandler, Gabriel Straub, Mark Lycett, Aija Leiponen, Scott Singleton, Vonu Thakuriah

Challenge #1: Empower the Individual

Elevator Pitch: User centred design for comprehensible data services	**Why is this a DE Challenge?** Design / psy / soc / logical / tech has "users" Society challenges

Challenge #2: Challenges in Evolving Privacy

Elevator Pitch: Developing rules of engagement Public / private co-creation Global principles	**Why is this a DE Challenge?** Transition plan Trusted third parties – audit / compliance etc Cultural & social norms Government & commercial

Challenge #3: Enabling Innovation

Elevator Pitch: Open "standards" "principles" that quickly skill-up innovators giving confidence to companies to invest in data	**Why is this a DE Challenge?** BIS / Innovation / Tech . Multi-disc Innovators as Users

Pink: Digital [In] Equalities

Open and Democratic Future Planning	**Digital equality in accessing knowledge and comms**
Democratic governance of the Internet	**Equality of access to technology and connectivity**
Control in Digital Cultures	**Gap Between Digital Access & Public Understanding**
Digital Inequalities	**deepening class divides,**
Achieving socially equitable digital inclusion	**Contested social spaces and the digital economy**

Group Members:

Helen Thornham, Jonathan Culpeper, Allan Sudlow, Gerard Briscoe, Sean Ralph, Jonathan Legh-Smith, Morag Shiach, Lizzie Coles-Kemp, Debi Ashenden, Mike Chantler

Challenge #1: Preferable Futures of Digital [In] Equalities

Elevator Pitch: Success of the Digital Economy will be compromised if we don't address inequalities -> understand the present and intervene in the future	**Why is this a DE Challenge?** Technological, social, cultural, infrastructural, material, legal

Challenge #2: Effective Governance

Elevator Pitch: Identify effective structures of *democratic governance and *digital citizenship * How do we understand these ?	**Why is this a DE Challenge?** Interdependency between technological / social

Challenge #3: Improving Digital Capacity

Elevator Pitch: Leveraging a skillset for empowered citizens [de-bug / code]	**Why is this a DE Challenge?** Understand mapping of digital inequalities and other forms of social inequalities Balance between technological and socio-cultural

Silver: Politics of the Internet

Coping with local/national/global implications **Breakdown of national boundaries**	**Internet or Splinternet? where does Europe stand?**

Group Members:
Anne Alexander, Ian Hargreaves

Challenge #1: Legal Frameworks & Cultures	
Elevator Pitch: Regulatory fragmentation / confusion Investing in understanding Underlying tensions between Internet as comms versus Internet as property	**Why is this a DE Challenge?** Inc. history, law, HCI, sociology, politics, (anything) Citizen / consumer interests in play Evaluate eg Wikipedia; crowd sourcing effects; creative comms value outcomes; evaluate impact of legal framework
Challenge #2: Curbs on Excessive Power	
Elevator Pitch: Massive concentrations of power in status & corporations But world we live in is increasingly uneven & divergent Abuse of market power (Google) Competition authorities struggling to cope	**Why is this a DE Challenge?** Political science, business, ethics, economics, sociology, anthropology Consumer & citizens Citizens concerned with health Shifting terms of trade for Facebook
Challenge #3: Economy & Jobs	
Elevator Pitch: Internet crucial to innovation & productivity and therefore to economic growth. Vital issue for Europe : single digital market	**Why is this a DE Challenge?** Economics, business, technology. Prosperity, political stability. Consumer experience in digital markets.

Brown: Value

How digital technology captures value **Value distribution**	**Industrial transformation for sustainability**

Group Members:

Charles Baden-Fuller, Nick Appleyard, Georgina Follett, Richard Adams

Challenge #1: How do Digital Business Models Work?

Elevator Pitch: Organisations (esp SMEs and government) don't have a good understanding of the effect of digital technology on their business models, or the potential of new digital business models, or how to get them established and working	**Why is this a DE Challenge?** Applies to non-digital goods as well as to services + digital goods; It's about the relationship between technology + economics; the engineering faculty & the business school need to talk to each other; A successful business model needs to work for its users; Businesses don't have the expertise or resources to address this alone & can't directly capture the value. This is "knowledge infrastructure"

Challenge #2: How can DE create social + environmental + inclusive in a way that is economically viable sustainable?

Elevator Pitch: Models developed for societal and community value also need to create economic value if they are to be sustainable	**Why is this a DE Challenge?** New digital business models (underpinned by tech) can make this possible eg Digital technology scales better than face-to-face; Brings in a new business sector (3rd sector) into the DE conversation; Complements existing DE activity on social impact; NB "horizons" framework is useful in discussing this

Challenge #3: [Nothing Provided]

Elevator Pitch: [Nothing Provided]	**Why is this a DE Challenge?** Import & Export through DE business models

Cyan: The Doors (Push to Pull Economy)

Connecting the knowledge economy	**Moving from the Digital Economy to Digital Culture**
The Rise of Social Machines	**Cultural meaning of a web with things.**

Group Members:

Steve Brewer, Roger Maull, Brian Longhurst, Jon Dovey, Paul Coulton, David De Roure, James Thomas, Chris Speed, Jon Rogers

Challenge #1: How do we design a web to live in?

Elevator Pitch: As we transition from a push to a pull economy I will get the goods that I want and need when I want and need them. If this was applied to food it could result in a saving of up to 30% in the food chain	**Why is this a DE Challenge?** [Nothing Provided]

Challenge #2: How do we transition to a pull society ?

Elevator Pitch: As we transition from a push to a pull economy we have to understand and articulate the new models that explain these new disruptive technologies and services. What needs to happen so that I can manage my healthcare, my food supply and my transport needs? E.g. windscreen wipes report rain, bus routes adapt to user requests. Dr will call me back because she knows I am ill.	**Why is this a DE Challenge?** [Nothing Provided]

Challenge #3: How do we co-create citizen-led social machines?

Elevator Pitch: As we transition from a push to a pull economy, platforms will be needed to enable communities to collaborate, share and support local and special interest groups. Volunteer and altruistic resources such as citizen science apps where participants build on the core activity. Villages and communities of interest will build new resources and services from vegetable gardens to risky sport insurance funds and 3-d printing	**Why is this a DE Challenge?** [Nothing Provided]

Appendix A - Crowdsourced Terms

Below are all of the (full) research topics crowdsourced from the Digital Economy community.

Group Colour	#	Group Members	Description
Red	1	The Evolution of Digital Health and Social Care	From a health and social care perspective there will be slow change in the adoption of innovative digital advances but more rapid expansion within consumer health markets. A distributed model of health and social care will be underpinned by 24/7 digital
	2	The growing pressure on the healthcare system	Healthcare costs are growing in a non-sustainable way, fuelled by an aging population, the obesity crisis, and the increasing cost of treatments. The solution to this is likely to rely strongly on new technologies.
	3	Digital tools for all types of carers	Governments have spent an inordinate amount of money on the provision of digital tools for statutory health and care and have largely neglected the informal care sector where appropriate digital tools could have a far greater impact
	4	Digital services an ageing population will pay for	Digital technologies can help look after the aging population and reduce the cost burden. The challenge is to find service ideas that 'work' economically because main stream digitial is often free at the point of use and require huge economies of scale.
	5	Enabling those dependant on society	Three major categories of those dependent on society are the sick, the elderly and the unemployed. The DE should seek to fund research that addresses Health sector, accelerates a growing economy and values the pensioner (from active to dependent).
Blue	1	Shift from supplier 'push' to user 'pull'	Users have active role in production of content, no longer passive recipients, but capable of shaping products or services to their own requirements. Shift from standardisation to personalisation with significant implications for business models.
	2	The increasing cost of content creation	Creating content for all types of media is getting more expensive, driven by deeper, more engaging experiences. Areas to address this include: increasing proceduralism, improving content iteration times and enabling emergent and user generated content.
	3	aligning amateur & professional creative practice	Is the fuss about User Generated Content really that important? and if it is, should it not better be treated as complementary to content generated by professionals. Along with this come questions about provenance, IP, monetisation and more.
	4	Beyond Making	How do we enable bottom up maker communities turn prototypes into products
	5	The online world as a collaborative world	The online space is increasingly becoming a space where people collaborate to create ideas, meanings and artefacts, rather than a space to simply share information. Nurturing a global culture of collaboration is an exciting opportunity.
	6	Human technology: creativity behaviour interaction	Place human experience at centre of digital research topics, interdisciplinary science-led and arts-led practice-based collaborative digital research. Needs design thinking, high quality software, psychology, creativity & society.

Green	**1**	Development of the labour force to support a DE	A thriving digital economy needs a qualified labour force, but where will this come from in the UK? What can be done to encourage more people to apply for degree courses in tech subjects to develop the necessary skills to support the UK digital economy?
	2	Tech Capacity Building & Skills Mismatch	The Digital Economy offers the prospect of challenging and well paid careers but is facing major skills shortages. For example a shortage of 60,000 Data Scientists over the next 5 years. Social scientists are in great demand but don't have analytic skills
	3	Working across disciplines	The digital economy is fundamentally a cross-disciplinary topic and yet there is a real shortage of people with the skill-sets to operate in this area. This is also a challenge to universities where disciplinary structures remain dominant.
Orange	**1**	Convergence of technology,convergence of usability	Technology moves on so quickly that is a big enough challenge to construct a coherent device or system to sell. Harder is giving multiple systems equivalent ease of use while allowing the user to amplify the benefit of using multiple independent systems.
	2	Utility: Usability, Sustainability & Acceptability	With the increasing scope & range of computational network systems, the ability to support the diversity of interfaces, users and their expectations, sustainably cost effectively, to provide a set of acceptable, compatible interacting utilities.
	3	Digital infrastructure and connectivity	The ability to deliver digital infrastructure that will enable high levels of connectivity and be commercially accessible for all. The successful evolution of public and private services will be dependent upon the enabling power of the network(s).
	4	Embracing 5G Technologies	Embracing this grand challenge from the outset and ensuring that future applications, for whatever purpose or use case, adopt true "clean slate" approaches to architectural and communication strategies is paramount for the future UK digital economy.
	5	Consumer adoption of Virtual Reality platforms	Widespread adoption of high-end consumer-level VR technology will transform the digital entertainment industry, and with it a large part of the digital economy. Obstacles to consumer acceptance of VR, digital goods and virtual economies must be overcome.
Purple	**1**	Future cities and individual needs	There is a need to involve citizens in the evolution and running of the city and its services. As citizens become more connected they expect to have visibility of city services and shape the services that the city provides.
	2	The view from above	In recent years the availability of personal drones / quadcopter has risen. Along with the regulatory restrictions that will follow what are the socio/economic impacts of these devices as people begin to see their cities from above using their own tech?

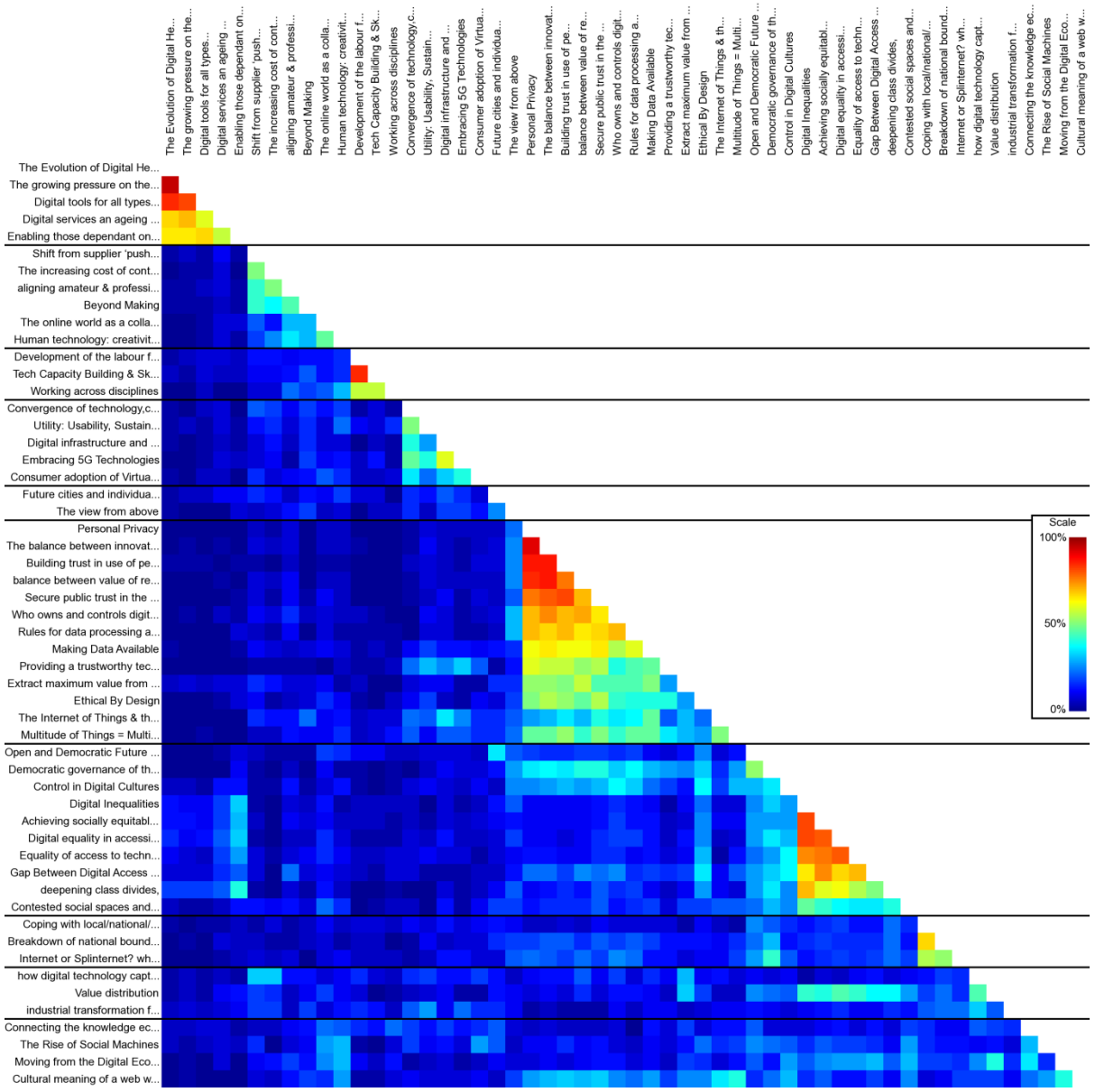
Yellow	1	Personal Privacy	By combining together data from a variety of sources, governments, companies and employers will be able to learn so much about us, our behaviour, and our interactions with others. Do we learn to live with this, or find ways to prevent it?
	2	The balance between innovation & privacy	Finding a culturally acceptable balance between leverging the data held by government & industry for economic & societal benefit, and the rights of the individual to maintain their privacy. Recognising the contradictory behaviour exhibited by most people.
	3	Building trust in use of personal information	Wanton disregard by some for privacy (in both commercial and state sectors is undermining citizen and industry faith in digital economy providers. We need open and transparent privacy verification means (both technical and operationally).
	4	balance between value of recommendation & privacy	How can we find the right balance between the possible value of data based recommendations / predictive models and the need for privacy of those producing / owning the data? Will companies be asked to act paternalistically towards their customers?
	5	Secure public trust in the curation of data	New sources of data regarding behaviour, lifestyles and consumption is potentially of great interest for research on digital societies, but issues relating to e.g. patient data, surveillance and security of financial records threaten to derail this agenda
	6	Who owns and controls digital data	As the IOT arrives the digital footprint of an individual gets ever clearer and larger. Key challenge will be who owns the digital footprint, who can share, who is trusted and what business models can develop and survive.
	7	Rules for data processing and access	Who gets access to personal and other sensitive data and what are the rules around it.
	8	Making Data Available	Many opportunities in Digital Economy will depend on making diverse data from sensors, users, transactions etc. widely and simply accessible to those creating or using applications, while respecting privacy, security and ownership.
	10	Providing a trustworthy technology infrastructure	Successful digital marketplaces and communities need an appropriate level of security but onerous security reduces the benefits to all participants. We need technologies that provide reliable indicators of trustworthy technologies and agents.
	11	Extract maximum value from personal data	Empower citizens to shape their lives & deliver benefits at individual & societal levels - eg. informed, proactive health management means lower NHS costs. Leverage corporate and government interests without violating individual privacy & citizenship
	12	Ethical By Design	How can we create digital economy technologies that are transparent, trusted and open to creative use by millions of citizens?
	13	The Internet of Things & the big data deluge	As more 'things' become part of the Internet of Things, there will be a rapid increase in the amount of data being generated which will also need to be stored, used and protected. This will pose immense challenges in a world already saturated in data.
	14	Multitude of Things = Multitude of Challenges	The growth of internet connected devices associated with people's lives (in the home, transport, urban environment) will create a host of challenges around regulation, data ownership, trust, transparency and control.

Pink	1	Open and Democratic Future Planning	Fully engaged participation of large numbers of experts, for open and transparent development of structured foresight, horizon scanning, and strategy development activities (covering governmental, business, NGO, and academic sectors)
	2	Democratic governance of the Internet	Large corporations and states have initiated regimes of pervasive surveillance and personal data collection which are shaping the Internet today. How will we deal with the consequences for democracy?
	3	Control in Digital Cultures	As digital technology becomes integrated with every aspect of the human experience who will be in control, i.e. as we become cyborgs who will control are digital limbs. How do we ensure that which is to be enabling does not become disabling/degenerative.
	4	Digital Inequalities	Citizenship and cultural engagement will increasingly require digital literacy, but there is no current strategy that effectively challenges the ways that the digital economy tends to reinforce existing inequalities and exclude the already disadvantaged.
	5	Achieving socially equitable digital inclusion	An individual's ability to expand and diversify their social networks is an essential skill for social and economic mobility. Understanding this skill in the era of digital services and communication is key for an effective digital economy.
	6	Digital equality in accessing knowledge and comms	How can we ensure the benefits of the technological age are equally beneficial to society as a whole, can we remove the market economy from a provision that should be a fundamental point of access to knowledge for all, exclusion should not be an option.
	7	Equality of access to technology and connectivity	The problem encompasses access to technology both in terms of owning technology and being able to use technology. At the other end of the scale it encompasses the social context in which technology is used and whether this supports or inhibits access.
	8	Gap Between Digital Access & Public Understanding	Access to information online supports wider contributions to the digital economy, but there is a gap between access & understanding. True digital inclusion equates to a quality & clarity of online information to inform better public use of digital assets.
	9	deepening class divides,	the introduction of the universal credit system, coupled with enforced mobility of certain populations are two outcomes of a number of digital and economic policies and practices that will have a lasting impact on British culture.
	10	Contested social spaces and the digital economy	Digital media promote social cohesion and the exchange of ideas. But businesses steal the attention of customers; radical groups insinuate ideologies; individuals suffer cyberbullying. These increasingly prevalent negative phenomena are little understood.

Silver	1	Coping with local/national/global implications	How will we manage challenges posed by the disproportionate distribution/use of digital economy structures in local, national and international contexts (including how new technologies are introduced and then interact/interoperable with legacy systems?
	2	Breakdown of national boundaries	Increasing power of multinational internet giants plus diversity of approaches to privacy, censorship and regulation across rapidly growing economies such as China, India and Brazil rapidly erodes influence of smaller democratic states and their citizens
	3	Internet or Splinternet? where does Europe stand?	The Open Internet has many enemies: some are deeply rooted and explicit (eg China) some more subtlly confused (Europe). How do we resolve trade-offs between the perspectives of social liberalism (privacy etc) and economic liberalism (innovation/growth)?
Brown	1	how digital technology captures value	understanding which business models capture value effectively will influence wealth and health and what gets consumed - money drives most things - technology is both 4mobilized by better business models but also influences the business model system
	2	Value distribution	who will get the value that created in the digital economy - in short will the 'rich get richer' and the 'poor get poorer' following on from Pikkety's research on returns to capital and labour
	3	industrial transformation for sustainability	digital technologies are transforming basic industrial structures that have defined our global economy for at least 50 years. How do we effectively apply digital in the dramatic reduction of CO2, and in creation of equity - rather than fuel consumerism?
Cyan	1	Connecting the knowledge economy	The digital economy is really morphing into the knowledge economy in the sense that the technology - digital or analogue - is only part of the equation. This emergent interconnecte economic model is a social machine where people and communities matter too
	2	The Rise of Social Machines	Increasingly citizens will participate in the digital world, by Web but predominantly by app and the Internet of Things supplementing physical with digital. With this democratisation and empowerment comes the easy creation of new social process at scale.
	3	Moving from the Digital Economy to Digital Culture	Economists are increasingly recognising the significance of culture (e.g. identities, norms and values). It is necessary to consider how real cultural change can be effected in an unequal and unhealthy digital society using new theories of economics.
	4	Cultural meaning of a web with things.	When all our things are connected to the web, how will we know what data is being collected and how it is being used? This requires understanding of how to design for the cultural meaning of things that read, write and execute data on our daily lives.

Appendix B – Similarity Data

Each delegate was asked to sort the terms shown in Appendix A into groups using a web application. All of these groupings' data were then used to produce the similarity matrix shown below. Clustering was performed on this matrix in order to get 10 groups.

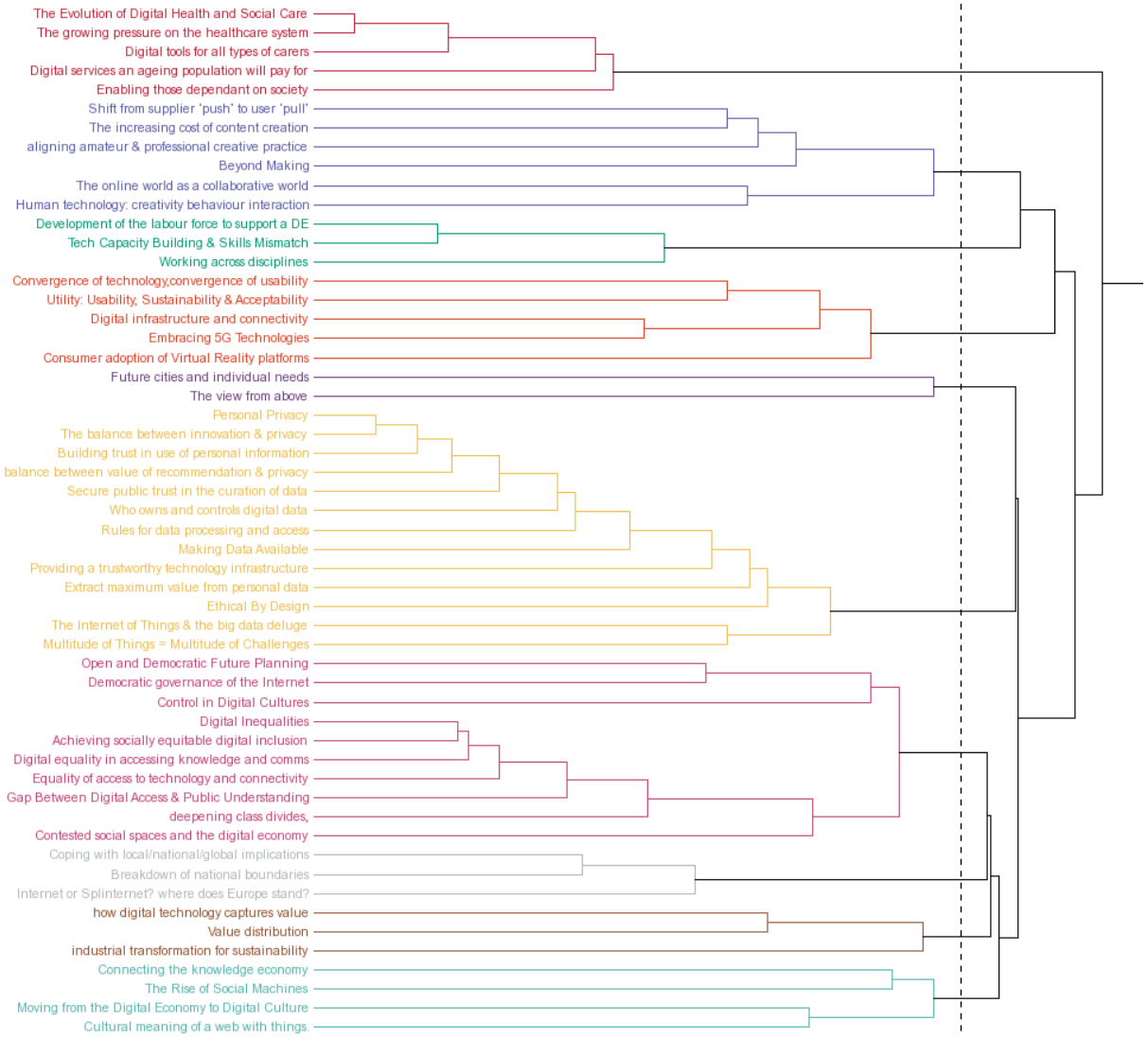


Clusters were generated using the Average Linkage Cluster Analysis algorithm.

Appendix C - Dendrogram

A dendrogram (a type of tree diagram useful for displaying hierarchical clustering data) of the similarity matrix data shown above is provided below.

It allows interested readers to examine how close (or distant) the average participant thought that groups of terms were from each other. The closer two topics on the left join, the more similar participants thought they were.



Appendix D - Meeting Agenda

10:00-10:30 – Registration – Tea and Coffee Available

10:30-11:10 – Introductory Presentations

- What has the Theme achieved so far?
- What's next?
- Agenda and plans for the day

11:10-12:00 – Breakout Session – Tea and Coffee Available

- Group discussion of areas to define the three main challenges.

12:00-12:20 – Plenary Session

- Reporting by each group of main findings

12:20-13:30 – Lunch

13:30-14:20 – Breakout Session

- Constructing elevator pitches, articulating why this is a DE challenge and the impacts that could be felt if these challenges are addressed.

14:20-14:40 – Break – Tea and Coffee Available

14:40-15:30 – Breakout Session

15:30-16:00 – Plenary Session

16:00 – Close