Roles, relationships and responsibility

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MANUFACTURING IS CHANGING
Rapid changes in the security of supply chains, demographic shifts & technological opportunities leave manufacturing bare, open to risks and responsible for actions: economically, socially and structurally vulnerable in the face of fundamental shifts in what society expects of it

Manufacturing Commission, 2015
MAKERSPACES ARE ONE ASPECT OF THIS CHANGE,
PROMISED FUTURES

one aspect, with some awfully big aspirations pinned on it

“..the Maker Movement Will Solve World’s Health Problems”

“..Maker Movement will emerge as the dominant source of livelihood”
IMPERATIVES v GRAND NARRATIVES

redistributed manufacturing

Manufacturing should:

Humans must:

Technology is:

Makespaces will:

‘Democratise Manufacturing’
‘Everyone a maker’
‘Revitalise communities’
‘Enable sustainable local products’
OUR CONTEXT

‘Future Makespaces’

Not just the spaces—also the surrounding digital platforms, cultures and behaviours that cultivate new ways of collaborating, producing and distributing.

Current capacity, capability & behaviours

Future capacity, capability & behaviours
Because makespaces are already starting to demonstrate the characteristics to enable Redistributed Manufacturing

**WHY?**

- They are public facing centres of production with small scale and low cost tooling.
- Have a culture of online sharing and trading of design and making data
- Have the potential of driving the development of new business models and supply chains
- Real opportunities when Makespaces are linked to local businesses and waste management centres; with people able to cater to their local market and considering and designing the recycling systems when designing products
- Changes to dynamics of work and communities: reskilling or training; local business development
- Implications for industrial and social policy: regulations for recycling and opportunities for community centric production
Defining Redistributed Manufacturing
(re-distri-what? whatiwhat?)
Broad working definition of “Technology, systems and strategies that change the economics and organisation of manufacturing, particularly with regard to location and scale.” (Pearson et al).

Subsequent definitions emphasise ‘localised production’ (Soroka), ‘customisable production units’ (Prendeville), decentralisation (Harrison) regionalisation (Mangier) geographic dispersal (Saki).

The ‘re’ is itself contentious, why not simply distributed manufacturing?
DESIGNING ~ DESIGN DISTRIBUTION ~ ASSEMBLY ~ PACKAGING ~ LOGISTICS ~ PRODUCTION ~ COMPOUNDERS ~ RETAIL?
Our primary question is:

What roles will makespaces play in the future of Redistributed Manufacturing? *

However, there is also a second question:

What value can be created with makespaces involved in Redistributed Manufacturing and who will benefit? *
Possible Futures for Manufacturing in the UK

Inevitable / Potential / Preferable / Desireable / Imperitive
FUTURE PRODUCTION
Desirable not inevitable

“

We are alive at a time when huge systems—industrial, infrastructural—are being remade, and I think it’s our responsibility as we make choices both commercial and civic…to extrapolate forward, and ask ourselves: Is this a system I want to live inside? Is this a system fit for humans?”

Sloan, 2015
So what do we actually do:

Run events, build a network, fund studies and make sense of it all through cross cutting research.
Over 500 members of the network; 103 core members, 93 associate and 776 impact members. Hosted 10 days of symposia in 4 locations, with 50 speakers and 161 participants. 48 institutions and organisations submitted study proposals (some collaboratively). Commissioned 5 25k feasibility studies, 3 expert roundtables with 24 experts, undertaken 5 targetted mini studies, resulting in 7 journal articles and an in progress 5 chapter report outlining an agenda forming research pathway for the EPSRC.
LEVEL 1 - MAKE SPACES
- Culture
- Facilities
- Technology
- Training
- Membership
- Location
- Network

LEVEL 2 - LOCAL NETWORKS
- A Makespaces
- B Waste Management
- C SMEs & Start Ups
- D Retailers
- E Education
- F Local Residents
- G Investors
- H Local Government
- I Light Industry
- J Suppliers
- K Supply Chain

LEVEL 3 - DIGITAL NETWORK
- Online Design Tools
- Wikis
- Product Platforms
- Mass Customisation
- Co-design
- Social Media
- Online Retailers & Shopfronts
- Bureau Services
- Blogs
- CAD Repositories
- Crowd Funding

LEVEL 4 - NATIONAL AND INTERNATIONAL
- Material and Component Manufacturers / Suppliers
- Brands
- NGOs & Government Support
- Policy and Regulation
- Research Centres
- Software and Hardware Providers
RE:FORM  Reimagining Education for the Future Of Redistributed Manufacturing

Partners: Open University & Maklab
Where: Glasgow & Milton Keynes
Keywords: education, skills, collaboration,

“RE:FORM explores the role future makespaces could play in working with academia to provide training to support the employment needs of redistributed manufacturing."
Circular Makespaces

Partners: Sustain RCA
Where: London
Keywords: practices, tools, sustainability, knowledge

"This research uncovers triggers for circular practices to become embedded within Makespaces, informing principles of redistributed manufacturing and considering the implications of scaling existing working practices in Makespaces."
Indie Manufacturing

Partners: Liverpool John Moores University, DOES Liverpool, UK Makerbelt network
Where: Liverpool and the North West
Keywords: supply chain, mapping, product design

“This project maps the manufacturer’s around Liverpool and the north, aiming to take an IoT product developed in a makespace in Liverpool and manufacture 250 units through a more local supply chain.”
Material Makespaces

Partners: University of Oxford, Fab Lab London, Wevolver, Ethical Filament Foundation
Where: London & Oxford
Keywords: material, local variables, standards, data

"This project uses open source hardware and digital networks to generate and capture data about materials. Testing the feasibility of a digital commons of material knowledge and embedding a culture of testing materials and localizing material flows in a makespace."
Re-mantle and make

Partners: Glasgow School of Art, Kalopsia Collective, GSA Makerspace, JohnstonsofElgin, KnockandoWoollenMill, Muirhead Leather
Where: Glasgow, Edinburgh, Forres
Keywords: waste, circular economy.

“Re-mantle and Make’ is an approach for repurposing waste within the textile sector by utilising future makespaces. Identifying a more circular approach to textile design practice and production through integration into local manufacturing supply and waste chains, alongside informing and evaluating the design education curriculum.”
The impact of Makespaces: local socio-economic processes associated with makerspaces
- Centre for Regional Economic Development (CRED)

Distributed manufacturers in cities- a biodiversity study
- Liz Corbin

Futuring with Regional manufacturing data – how can it enable more sustainable manufacturing futures?
- Makeworks & Open Work

Relationship mapping of makerspaces and manufacturers
- Jimmy Tidey

Grey matter of open making; regulation and standards
- Dark Matter Labs
Mapping and intervening in complex systems
- Michael Wilson, Empire Logistics

Platform Cooperativism and Redistributed Manufacturing - A roundtable discussion with Trebor Scholz.

Transition Design & Redistributed Manufacturing
- Cameron Tonkinwise, Carnegie Mellon

Evidence based speculative production futures
- Scott Smith

Future Makespaces – concluding roundtable with spaces
REDISTRIBUTING WHAT?
MEANS OF PRODUCTION
physical, non-human inputs’ tools, factories, infrastructure natural resources and raw materials

MODES OF PRODUCTION
the way of producing human labour power [also ‘means’ ^] technologies, knowledge, materials, cooperative work relations

CONSEQUENCES
the affect of the process’ capital accumulation, value extraction, waste, environmental impacts, social impacts.

RELATIONSHIPS
to and around goods consumers > prosumer’ commons, property, ownership, obligations, stewardship,

TYPOLOGY OF DISTRIBUTION
typologies of ownership, risk, reward

What is being distributed differently and what could be?

Means, modes, consequences & relationships
Who designs
Where are decisions made about what is procured or commissioned
How are designs licensed
Who manufactures components
Where does design happen
Where are the primary materials sourced from
Where does assembly happen
Where does packaging happen
Where does primary production happen
Where does the secondary production happen
Who does the labour
Where does the exchange or purchase happen
Where does the remanufacturer happen
What is outsourced and to where
Where can repair services be accessed
Who is responsible for the material stewardship
Where does value extracted from this process accumulate?
Who bears the risk in producing this product
Who benefits from the exchange or purchase of the product
Who benefits from the IP or designs generated by this product
Where are the negative consequences of production felt on the supply/design chain
Who has access to information about supply chain
Where does the data about customers/users accumulate
Who manages the custodianship of the product over time
What rights does the user have to modify the product
What is the organisational structure

end user | designer | prosumer | retailer | manufacturer
centrally | proximate to end user | offshore | onshore | outsourced | proximate to resources
peer-to-peer | peer-to-business-to-peer | business-to-peer | business-to-consumer
renting | borrowing | lending | buying | giving | exchanging | swapping | sharing.
intermediary | closed | paid | open | sharealike |
worker | organisation | customer | state | third party | NGO
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GENERATING FUTURE DISTRIBUTIONS
playing with possibilities

... a [furniture] company, that distributes final mile delivery and assembly to the [end user] but maintains a [centralised] management of the supply chain & [non-proximate] primary material sourcing.

We can recognise and identify some key current players and some possible future trends and patterns
MEANS OF PRODUCTION
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TYPOLOGY OF DISTRIBUTION

Trends, patterns, risks

a shift of where risk, responsibility & benefit falls on
a supply chain and on whom
our collective naivety as to how production in general is distributed is becoming a hindrance in imagining, designing, prototyping and testing a better distribution of production.

This applies to Platform Coops as much as any other collaborative economy intervention.
“We are so ignorant of the complexity of goods around us that anything beyond assembling a puzzle or an Ikea furniture can be hastily baptized as a DIY achievement.” Peter Troxler
THE MAKER AESTHETIC TO MASS MARKET GAP

It is not enough to create a demographically limited social revolution that enables the elite, the empowered and the well resourced to make ‘good’ decisions about products.
Who (in makespaces) is making products for a world beyond mass-production?
WHO BENEFITS?
OFFSHORING, COLLECTIVE NAIVITY AND WICKED PROBLEMS
GOING BEYOND A TRICKLE DOWN APPROACH TO THE CIRCULAR ECONOMY IS NECESSARY (OBVIOUSLY)
An inclusive future circular economy must escape the bounds of the corporate and effect the everyday practice and design decision making of actors at a range of scales of production.
FUTURE FACTORIES?
The impact of makerspaces goes beyond their own capacity, but also requires them to be accessible, permeable and networked both in terms of knowing their locality but also connecting globally to other likeminded spaces and companies.
Local 3D printing

Find a 3D printing service and get your parts in 48 hours.

Get instant quote  See how it works

999,885 parts produced  48 hours avg. turnaround time  6,033 services online
NEW TYPES OF FUTURE INFRASTRUCTURE - NOT JUST MAKERSPACES; WAREHOUSES, BROKERS, STANDARDS...
Make Works Extension
Making sense of redistributed manufacturing products, tools and services
The core criteria a project or product must exhibit in order to be analysed within this typology:

- Can be distributed or locally made at scale - not just one offs or none distributable

- Incorporates variables based on end user need, place or supply chain risks - responsive design

- Able to utilise a range of scales, sites and paces of production - not mono-site batch or mass production.
DIY/DIWO production:
Digitally distributed mono manufacturing:
Full Stack Redistributed Manufacturing:
Propositional Objects:
The core variables that seem to indicate where projects sit within this typology are:

MAKING SENSE OF REDISTRIBUTIVE PRODUCTS AND PRACTICE

**Infrastructure** - the infrastructure they make use of and its availability

**Prior Knowledge** - the prior knowledge and skills they require to obtain or produce

**Materials** - the bill of materials and whether that is limited or complex

**Risk** - how risk and quality assurance is managed

**Disruption** - level of influence on mainstream retail expectations or supply chains

**Engagement** - who is engaged and what is the effect on their experience & relationship to the product and its production.
Scales to assess where a project sits in relation to core variables.

**METRICS FOR MAKING SENSE**

**Infrastructure** - the infrastructure they make use of and its availability
1 Domestic > 5 industrial new investment

**Prior Knowledge** - the prior knowledge and skills they require to obtain or produce
1 No prior knowledge or literacies > 5 advanced specialised skills

**Materials** - the bill of materials and whether that is limited or complex
1 Mono > 5 complex

**Risk** - how risk and quality assurance is managed
1 Production is at own risk > 5 full institutional risk, standards and actuary infrastructure in place

**Disruption** - level of influence on mainstream retail expectations or supply chains
1 novel practice - 5 mainstream practice
In the process of distributing production, other things will also get distributed.
CLOSING REFLECTIONS
To enable RDM as a design and distribution strategy to scale and become the new normal we need to establish:

1) ways of ‘knowing’ and capturing data on existing production infrastructure and material availability in a given locality

2) ways of integrating and optimizing existing infrastructure to allow for the an RDM approach across a range of product types

3) designed experiences around purchasing and stewardship of emerging RDM product types and new user literacies. and

4) clear and evidenced metrics on the differing consequences of these approaches & distributions.
The characteristics of makerspaces and the functions and roles they have evolved have (sometimes inadvertently) allowed them to become places that hold knowledge of available production facilities and materials.

This has enabled makerspaces initially to hold roles as incubators and test beds of RDM practice, co-constructing it as a concept and practice.

However, the continuation of this practice will require makespaces to evolve and keep pace with the emerging RDM economy.
Designing for redistributed manufacturing is an applied challenge that requires new aptitudes', awareness and skills ...

In the future production visibility and traceability will become expected alongside end user agency which could enable lower consequence design choices but also the potential for increased opacity of the algorithms that it is built on.
PRACTICING RESPONSIBLE FUTURING
Thank you

Roles, relationships and responsibility

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