PLYMOUTH COLLEGE of ART

making FUTURES

Innovation through Craft – from policy to research to impact

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Introduction

Innovation through craft is nothing new. Across material disciplines, craft processes have always driven breakthroughs that have passed into other fields. What David Pye (1968) called 'the workmanship of risk' – the skilled manipulation of material that affords unplanned breakthroughs – is an enduring characteristic of craft that gives it its innovative edge.

Today we see this applied in such diverse fields as digital technology, aerospace and bioscience as well as in examples such as an embroiderer collaborating with a roboticist to develop wearable sensors for medical and sports applications.

Yet, as asserted in this article, insufficient attention is paid to which is the best way to generate collaboration between makers and diverse industries, creating an opportunity cost to the UK economy. Strategic and systematic support would enable the potential for innovation through craft to be realised. KPMG's research for the Crafts Council (KPMG, 2017) analyses the experience of innovation in making and proposes a set of actions to address this gap.

The paper describes the journey from policy positions in relation to craft and innovation, through research findings. It goes on to assess the research and policy impacts of this research and the importance of continuing to seek ways to promote opportunities for innovation through craft.

Innovation through craft

The Crafts Council's innovation programme stimulates innovation by commissioning research reports and curating events, drawing on evidence of cross sector collaboration. The programme showcases innovation through events such as Make:Shift[1], and through interdisciplinary collaborations, for example, the Craft + Tech residencies[2] and Parallel Practices[3].

[1] Make:Shift is a biennial event which explores the importance of craft and innovation to the future of making in a dynamic, thought-provoking and engaging environment. http://www.craftscouncil.org.uk/what-we-do/makeshift/

[2] The Craft + Tech residencies placed makers in technology units to explore the Internet of Things. It was a partnership between Watershed, Bristol's cross art-form venue and producer, in collaboration with i-DAT, the Autonomatic Research Group and supported by the Esmée Fairbairn Foundation. http://www.craftscouncil.org.uk/articles/craft-tech-residencies/

[3] The Parallel Practices programme, a collaboration with King's College London, aimed to demonstrate the mutual benefits and value of collaboration between medical and scientific academics and makers. http://www.craftscouncil.org.uk/what-we-do/parallel-practices/

The Crafts Council's understanding of the diversity of applications for craft skills and its policy commitment to supporting innovation, derive from witnessing the power of innovation in examples such as the following[4]:

> Glass-maker, Matt Durran understood glass slumping techniques better than the industrial glass sector. Collaborating with researchers at the Royal Free Hospital, Matt's work enabled a breakthrough in techniques that lead to the world's first tissue engineered tracheotomy. Matt's breakthrough came because, collaborating with scientists, he approached the problem from a different perspective.
>
> Lauren Bowker trained in chemistry and textiles. She began working as a material innovator, making environment-responsive compounds that would change colour in response to heat, ultra violet rays, friction, moisture, chemicals and air pollution. Commissions from her company, The Unseen, include tracking car aerodynamics for Formula One and, in healthcare, creating bandages and soft devices that monitor patient conditions.
>
> Dr Ellis is one of the UK's leaders in technical textiles. His firm is involved in 'embroidery for engineering' - development of aircraft wing components using carbon fibre to reduce the weight of the wing, laid down using embroidery techniques to optimise the component's structural efficiency. He has also developed a wide range of soft tissue implants, such as embroidered implant systems for spinal disc replacement.

Recent years have witnessed acceleration in collaborative open innovation and a transformation in making, the scale of which is conveyed by the label, 'the fourth industrial revolution'[5]. At the same time, successive UK governments have paid increasing attention to the creative industries' considerable economic contribution of £91.8bn (HM Government 2018 and see also Creative Industries Council 2016, DCMS 2017 and HM Government 2017). 'Fusion' – the combination of creative, technological and enterprise mindsets – has been identified as a key driver for successful businesses. Fusion is enabled by collaboration across sectors, as the examples in the report demonstrate.

TBR (2014) identified craft's value to the UK economy as £3.4bn, of which £2.4bn derives from craft occupations in the non-creative industries (see table 1). The findings prompted questions about the wider application of craft skills in, for example, the automotive, healthcare, construction and textiles industries, where they were also generating significant benefit to the economy.

Table 1: Summary of UK craft GVA in craft industries and occupations

Key craft GVA figures	Total (£m)
Craft Industries	£664
Craft Industries – Micro Businesses	£81
Craft Occupations in Other Creative Industries	£243
Craft Occupations in Non-Creative Industries	£2,410
Craft Economy	**£3,398**

Source: Annual Business Survey 2012 & Business Population Estimates 2012, TBR Ref: W3/S2c

[4] See also Tan, J. and Toomey, A., (2018) for further examples.

[5] A term allegedly coined at the Hamburg Messe, Industry 4.0 integrates technologies from the Internet of Things with other technological advances in production and manufacturing systems.

Working with partners the Knowledge Transfer Network and the University of Brighton, the Crafts Council sought to strengthen the evidence base for how such innovation takes place and to what extent it is effectively supported. The partnership commissioned KPMG (2016) to investigate the processes and impact of innovation through craft and, importantly, the barriers that need to be overcome to achieve its potential economic returns. *Innovation through Craft: Opportunities for growth* was thus motivated by a desire to understand this aspect of the craft economy in greater depth.

What is meant by innovation through craft? Innovation *in* craft draws on evolution of technique, discovery of new materials, and application of new tools. Innovation *through* craft refers to makers facilitating or catalysing innovation elsewhere. It concerns the spill over effects of craft into other industries that are explored in the KPMG study.

KPMG explored the barriers and potential successes of craft innovation through a series of contemporary case studies. These provide deeper insights into the value of craft innovation and collaboration to the UK economy and the challenges craft has faced. Craft was gaining in popularity but facing challenging and uneven support.

KPMG found that innovation through craft is hampered by a lack of understanding of the value of craft innovation and a degree of risk that leads to underinvestment in innovation by individual firms, and underinvestment in craft education and skills. The researchers concluded that innovation through craft currently arises predominantly through coincidental encounters between makers and industries. Yet, the evidence demonstrates how the fusion of craft and technology skills can lead to significant multiplier effects in the GVA accrued to companies further down the supply chain. This is illustrated in a case study of textiles designer Ptolemy Mann, whose collaboration with Johnson Tiles generated benefits to the UK economy as a whole that were 65 times greater than the GVA created by the original partnership.

In order to tackle existing inefficiencies, KPMG advocates for the establishment of more focused investment and strategic support to foster a culture of open innovation and collaboration. The report highlights the need for investment in enhanced activity to showcase and publicise the value of innovation through cross-sector collaboration. Brokerage and co-ordination of business-to-business collaborations between craft experts and businesses from other sectors is vital. Lead bodies in, for example, engineering, technology and manufacturing, could work together to help energise the kind of R&D needed to catalyse more successful businesses.

Our innovation graphic illustrates the dynamic identified by KPMG (figure 1):

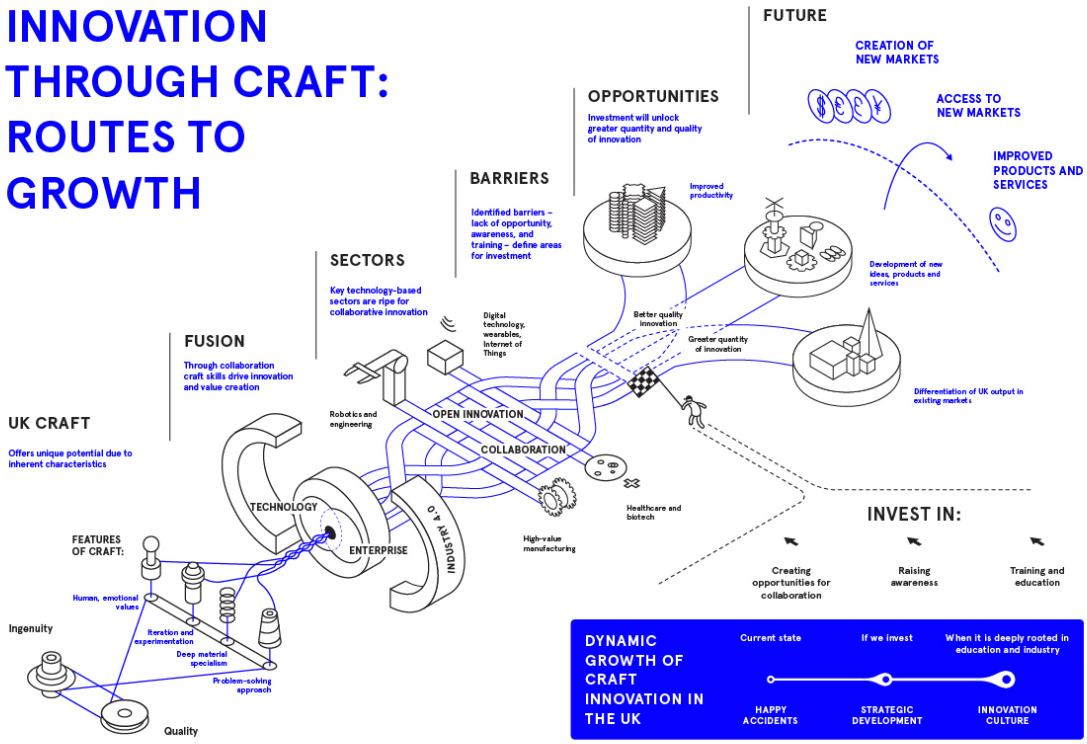

Figure 1: Innovation through Craft: Routes to Growth

The authors note that 'Craft skills and knowledge have a strong economic impact and significant potential to drive further growth and innovation in other sectors, as this report demonstrates.' The potential rewards are great: improved productivity, development of new products and services, and differentiation of UK output, enabling us to access new global markets and reap both social and economic benefits.

Research Impact

The findings from the study have impacted in a number of ways on national and international research, policy and practice, of which the following are examples:

Temeltaş (2017) builds on KPMG's findings in an article in which it is argued that articulated craft knowledge might have significant potential for technological innovation if combined with design knowledge in situations where craftsmen and designers collaborate in industry. Temeltaş asserts that 'collaborative work is influential in terms of transferring this knowledge to a new product' (S3714). He draws on the KPMG case studies to illustrate 'the risk taking and creativity process with innovation where crafts knowledge provides inputs on materials or production methods.' (S3715)

Oakley[6] (2018), in discussion of responses to the commercialisation of a new ceramic print technology, posits that the issue of how craft practitioners, including academics, can effectively influence the digital revolution is

[6] Oakley was an adviser to the partnership which commissioned KPMG.

not unique to the discipline of ceramics. He notes that the underlying issues are often not even identified, let alone tackled, but that KPMG's findings (and see Oakley 2016 for further examples) are an exception to this position.

The impact for the Crafts Council of KPMG's findings has been to fuel greater collaboration, both between the organisation and other research initiatives, and in informing advocacy work to improve support for more systematic approaches to innovation between makers and other industries.

Keen to develop co-produced research outputs through new collaborations across a range of disciplines, the Crafts Council launched a higher education research prospectus (2017a). The initiative generated new dialogue with over thirty institutions about national and international research interests and led to a number of firm research partnerships and proposals that support the innovation agenda.

KPMG's findings gave rise to a deeper understanding of the dynamics of innovation through craft and this directly informed the Crafts Council's response (2017b) to the Industrial Strategy Green Paper (HM Government, 2017). The response highlighted the growing importance of microbusinesses to the economy and how such enterprises should be actively and explicitly encouraged to apply to the Industrial Strategy Challenge Fund. In addition, it drew attention to the need for access to be brokered for craft businesses and other creative industries, to shift the orientation of entrepreneurship programmes in line with the notion of Industry 4.0. If appropriate support is not available to assist the microbusiness sector onto a ladder of growth, this creates an opportunity cost for the UK.

The Industrial Strategy also offers an excellent opportunity to Government to support craft innovation by aligning the ambitions of education and industrial policy. Conditions for craft education and training must improve in order to strengthen the future of making and to invest in those industries that depend on the skills it develops. From school, to further and higher education or apprenticeships, a sustainable model, in which participation rates in creative subjects are increasing, is essential to educate and train current and future makers[7].

The subsequent launch of the Arts and Humanities Research Council's Creative Industries Clusters Programme, funded through the Industrial Strategy Challenge Fund, offers an opportunity to build directly on KPMG's and TBR's research findings and experience of interdisciplinary collaborations. The Programme scope document confirms,

> "At the heart of this Programme is the desire to create an environment that enables microbusinesses, SMEs and large enterprises to partner with academic researchers to develop new products, services and experiences…"[8]

and,

> "Investments will focus on early-stage, risk-taking research and development where funding is often difficult to obtain."[9]

KPMG's findings have informed the Crafts Council's partnership with higher education institutions in four stage two proposals to this fund, one of which has the Innovation through Craft: Routes to Growth model (see figure 1 above) as a central concept in its proposals[10].

[7] See Crafts Council, 2016
[8] AHRC, 2017, p8
[9] Ibid. p8

In addition to informing further research and policy frameworks, KPMG's findings underpinned the Crafts Council's Make:Shift innovation conference in November 2016[11] and are shaping the national development agency's programmes and its advocacy work with Innovate UK and the Creative Industries Council. The findings also prompted invitations to present findings to parliament at a design and technology event hosted by the All Parliamentary Group for Design and Innovation and to officials working on the craft economy. Internationally, findings were recently presented to the Salone del Mobile[12] in Milan, to the Centre for Craft, Creativity and Design, Asheville, North Carolina and the University of North Carolina, and to the Calvert Forum in Siberia.

Conclusions

As demonstrated in this article, the Crafts Council's evidence base and advocacy work in support of innovation through craft have informed international research and the national policy agenda. It is heartening to see that craft now features in the literature as a growing contributor to the UK economy and as a catalyst for innovation. The Crafts Council and their partners' engagement with KPMG in the pursuit of a deeper understanding of this dynamic now needs to translate into systematic support to foster an innovation culture and to realise its contribution to materials knowledge, technological understanding and, above all, to the economy.

References

AHRC (2017) Arts and Humanities Research Council's Creative Industries Clusters Programme Scope Document. AHRC.

Crafts Council (2017a). Growing research excellence in craft: Higher Education Research Prospectus. London: Crafts Council.

Crafts Council (2017b). Industrial strategy green paper: Crafts Council submission. London: Crafts Council.

Creative Industries Council (2016) Create Together. London: Creative Industries Council.

DCMS (2017) Sectors Economic Estimates 2016, GVA Report.

HM Government (2017) Building our Industrial Strategy: green paper. London: The Stationery Office.

HM Government (2018) The Creative Industries Sector Deal. London: The Stationery Office.

Tan, J. and Toomey, A., (2018) Crafttech: Hybrid Frameworks for Smart Photonic Materials. Hong Kong Polytechnic University and Royal College of Art.

KPMG (2016) Innovation Through Craft: Opportunities for growth. London: Crafts Council.

Oakley, P. (2018) 'Creating a Brighter Future? Responses to the commercialisation of a new ceramic print technology. Making Futures, Vol.5. ISSN 2042-1664.

Pye, D., (1968) The Nature and Art of Workmanship. Cambridge: Cambridge University Press

TBR (2014) Measuring the Craft Economy. London: Crafts Council.

TBR (2016) Studying Craft 16. London: Crafts Council.

Temeltaş, H. (2017) Collaboration and exchange between "Craftsman" and "Designer": Symbiosis towards Product Innovation in The Design Journal, An International Journal for All Aspects of Design, Volume 20, 2017

[10] 22 bids have been selected to proceed at stage two, following 65 stage one submissions. Final approval will be given to eight partnerships in summer 2018.

[11] See note 1 above.

[12] See https://www.youtube.com/watch?v=MVdnOJogJjU 12.30 mins