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3D Printing and Intellectual Property Futures - Executive Summary



Research commissioned by the UK Intellectual Property Office and carried out by:
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Executive Summary

This report contains socio-legal research conducted on the relationship between 3D printing and intellectual property (IP) at the current point in time and in potential future scenarios, through the use of horizon-scanning methods in six countries—China, France, India, Russia, Singapore and the UK - to build a rich picture of this issue, comprising both developed and emerging economies.

In conducting this research, we take up the baton from previous UK Intellectual Property Office (IPO) reports on 3D printing and IP (Mendis, Secchi and Reeves 2015). As noted in these previous reports, there is very little empirical research on how the relationship between 3D printing and IP is playing out in practice. In addition, there is very little existing literature or research on 3D printing's trajectory outside of developed Western economies, and how it is interacting with IP in the rest of the world. Our research goes some way to filling this gap, presenting novel insights on developments in Russia and Asia. Furthermore, as the UK reassesses its place in the world post-'Brexit' there is a need for greater awareness about future trade partners outside of the European Union (EU) such as the countries we examine.

In our project, we have collected valuable information 'from the ground' on the past and present of 3D printing and IP in these different countries. Another novelty of our project is the futures projections we led in each place, in order to understand potential trajectories going forward for 3D printing and IP, and to understand the extent to which a harmonised or fragmented global picture can be constructed. Our interdisciplinary, international team, combining legal, business and social scientific regional expertise on 3D printing, has used cutting edge and novel empirical methods in order to pioneer a deeper probing of the ramifications of 3D printing, going further than prior commentary through methodological innovation and an international focus on 3D printing and IP.

While we have created new research filling - to some extent - the gap on 3D printing and IP outside of Western countries, we also acknowledge one of the limitations of our work. The case of BRICS countries may not be representative of all developments in 3D printing and IP outside of Western countries. Indeed, the use of 3D printing is growing in the Middle East and Africa, but due to limitations of scope we were not able to conduct research in these locations. However, in order to build up a fuller picture of 3D printing's implementation globally, and the effect this may have on IP, more research is required in locations outside of the North/West.

This Report is structured in three parts: in Part I we present a summary of illustrative existing literature on 3D printing and IP; in Part II we present our empirical research on 3D printing and IP, including potential future scenarios; and in Part III we finish by outlining our findings, recommendations and conclusions drawn from both parts of our research.

Part I Existing 3D Printing and IP Literature

There is a blossoming body of literature from the business, legal and social sciences disciplines examining various aspects of 3D printing and/or IP. In the business and social science literature, topics including adoption, industrial applications, prosumerism, IP and future forecasting feature. The legal literature review covers each IP right in turn, proposals for new sui generis rights, enforcement, how different industries have engaged with 3D printing and IP issues, and potential future scenarios.

Much of this existing scholarship comes from and focuses on 3D printing and IP in the Global North/West, with limited material on emerging economies and the Global South. Furthermore, the IP literature mainly concerns copyright and patents, with literature on other IP rights less developed.

Part II Empirical 3D Printing and IP Research

In this project we have aimed to get away from the idea that futures—including for IP—are dependent on, or determined by, technologies or that they are simply derived from the ways in which the present is unfolding (Birtchnell and Urry 2016). In our empirical research we have aimed to better understand the potential future direction(s) of 3D printing technologies and what impact this may have for IP.

In order to understand more fully the development of 3D printing in different locations, especially in emerging and non-Western economies, its relationship with IP law and practice, and how this relationship may change in the future, we conducted qualitative focus-group style horizon scanning workshops with experts from the 3D printing ecosystem during 2017 and 2018 in six locations: Moscow (Russia), Roorkee (India), Singapore, Shenzhen (China), Paris (France) and London (UK). The workshops comprised between five and fifteen experts in each location who were selected because of their experience in 3D printing and associated industries and/or IP law and practice. Our aim was to get participants comprising a cross-section of different actors in the 3D printing/IP ecosystem, including across a range of industries.

The horizon scanning format for the workshop was developed by the project team and comprised three parts: the Multi-Level Perspective (MLP) to establish past and present trends and a combination of Ideal Futures scenario constructing and backcasting to scan the horizon. The benefit of the fusion of these methodologies is a multi-dimensional appraisal of foreseeable trends across different countries at different scales.

Part III Recommendations and Conclusion

Our main findings from the horizon scanning workshops comprise the following:

Commonalities across the countries

1. There are a number of similarities across the countries, in particular government policies to stimulate the creation and take-up of new technologies including 3D printing.
2. 3D printing does not appear to be posing fundamental threats to IP in any of the countries examined at this moment in time.
3. IP is far from the only area of law involved with 3D printing, and may not be the most important legal concern for those operating in the 3D printing industry. Medical device regulation, product liability, and health and safety laws may be more important legal considerations for industry actors.
4. But IP is also not unimportant for 3D printing as can be seen from patenting activities, the expiry of patents leading to greater technology dissemination and the possibility of more IP litigation.
5. The relationship between 3D printing and other emerging technologies such as automation, Internet of Things (IoT), artificial intelligence and blockchain is one of cross-fertilisation.

Country-specific issues

6. In Singapore, an ageing population is influencing government policy, and in turn influencing the implementation of 3D printing in medicine through government investment in this area.
7. Political and cultural trends especially in the UK and France seems to be leading to renewed interest in re-invigorating manufacturing within the nation-state and 3D printing is imagined as a technology which can fulfil these promises by achieving onshoring—but it is far from clear that this is realistic given competition from Asian and other Western economies.
8. The projected future outlooks for 3D printing and IP vary quite significantly among the countries examined: the Asian countries and Russia are broadly aligned with a capitalist future outlook, which would likely preserve 'conventional' IP laws and practices. The future outlook for the UK and France diverges from this picture by opening more possibilities for commons-based scenarios which may challenge conventional IP.
9. India remains a possible site for a future large manufacturing paradigm change given pre-existing conditions and significant potential for 3D printing in there. India could be the site of pioneering localised and distributed manufacturing, a model which may be adopted elsewhere especially in other parts of the Global South.

Our Recommendations

1. Developments should continue to be monitored, especially:
 - the extent to which 3D printing is successful in reinvigorating national manufacturing agendas;
 - the practical opportunities 3D printing offers for localised manufacturing in contrast to the current situation of a 'World Factory', containerisation and cyclic consumerism;
 - cultural and political trends;
 - country-to-country and sector-to-sector differences
2. The rise of China, and the potential rise of India into the ranks of developed economies with large middle classes exhibiting a strong showing in innovation, including in 3D printing, should be monitored.
3. We did not find a pressing need for legal reform from representatives of the industries participating in the horizon scanning workshops, including the creative industries, medicine, law, industrial manufacturing and research. Nevertheless, we recommend legal clarification of existing theoretical IP issues exposed by 3D printing. These issues include the subsistence of IP rights, identifying activities which constitute infringement especially secondary infringement and how some exceptions to infringement operate. The limited litigation so far on 3D printing internationally has not been on these topics and accordingly has not provided any clarification.
4. The UK should continue to keep track of any next steps in the EU arising from the European Parliament's Resolution on 3D Printing, and consider aligning any revisions of its own laws with the outcome of this process where this meets domestic objectives.
5. Companies should not be left alone to the task of business model innovation when faced with new forms of digitised technologies such as 3D printing. Instead, Government should work with industry to create transition 'champions' who would help companies understand the arising technological, economic, social and legal issues and rethink their business model to achieve long term competitiveness. Since such issues are only going to become prevalent as 3D printing technologies advances and becomes increasingly adopted, this may well become a critical aspect of industrial policy.

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