



## We're all innovators now: How users are changing the rules of innovation

**User-led innovation – where users play an active part in the development of new or improved products and services – is exploding. Proliferating digital technologies mean that we're all potential innovators now. New firms based on user innovation are being sold for hundreds of millions of dollars only a few years after being founded.**

**Policymakers remain somewhat sceptical about the importance of user-led innovation. But if the UK is to harness this new wave of invention and creativity, it needs to develop world-leading policy to support it. This means being more aware of the impact of new legislation on user-led innovation, and establishing a policy forum, investment fund and measurement system that are tailored to the specific needs of these new inventors.**

### Users frequently develop new products and services

New or better ideas do not always emerge from formal research and development (R&D) in industry. Users increasingly play an active part in the development of new or improved products and services – generating ideas, identifying needs and designing and building their own solutions.

A 'user' can be an individual, community or even a firm. For example, Boeing is a manufacturer of aircraft, but it is also a user of machine tools.<sup>1</sup> Whereas manufacturers expect to benefit from selling a product or service, users expect to benefit from using it. Users tend to develop more qualitatively new goods and services than traditional manufacturers, who often focus on making incremental improvements to existing products.<sup>2</sup>

### User-led innovation has a rich history in the UK

User-led innovation in the UK is not a recent phenomenon. It has long been recognised that 'common workmen' in the front line of manufacturing operations have been responsible for day-to-day incremental innovation on the shop floor.<sup>3</sup>

More recently, the development of the World Wide Web can be traced to Sir Tim Berners-Lee, and his actions as a user of the fledgling internet in his job at CERN. To a large extent, the video games industry grew out of the user-led innovations of amateur 'bedroom coders'.

### User-led innovation is growing in importance

#### New digital technologies have accelerated user-led innovation

In recent years, the exponential growth of ICT has facilitated widespread access to information, eroded geographical barriers and provided a global platform for collaboration. The growth of the internet has helped create a virtual space for users to connect and gather into online communities.

#### Experts are forming international online communities

Digital technologies permit like-minded individuals, highly skilled computer programmers and knowledge workers to assemble into structured online communities – sharing ideas, expertise, tools and techniques in real time. Such communities have the capability to change whole industries and they increasingly expect to participate in the innovation process.

#### Users have a particularly strong presence in open source software systems and the creative industries

Users have led the growth of open source software systems, such as the Linux operating system, which have helped to re-shape the IT industry.<sup>4</sup> Individuals are permitted access to the source code of a program, contributing to systems development without paying fees or the fear of facing legal action.<sup>5</sup>

1. Von Hippel, E. (November 2004) 'Democratizing innovation: The evolving phenomenon of user innovation.' Available at: [http://in3.dem.ist.utl.pt/master/stpolicy04/files04/2\\_paper9\\_3.pdf](http://in3.dem.ist.utl.pt/master/stpolicy04/files04/2_paper9_3.pdf) [Accessed 30-06-08].

2. This is unsurprising, given that users have greater freedoms to innovate in response to need, whereas manufacturers are constrained by expensive prior investments. Riggs, W. and Von Hippel, E. (1994) Incentives to Innovate and the Sources of Innovation: The Case of Scientific Instruments. 'Research Policy' Vol. 23, No. 4, pp. 459–469.

3. Smith, A. (1776) 'An Inquiry into the Nature and Causes of the Wealth of Nations.' London: Methuen and Co. Book I, Chapter 1, p.20; and Babbage, C. (1832) 'On the Economy of Machinery and Manufactures.' London: C. Knight. Chapter 19, Section 225.

4. Further information on Linux is available at: <http://www.linux.org/> [Accessed 10-07-08].

5. Weber, S. (2004) 'The Success of Open Source.' Cambridge, MA: Harvard University Press.

6. See Appendix A, B, C and D in NESTA (2008) 'The New Inventors: How users are changing the rules of innovation.' London: NESTA.

7. See <http://threadless.com/> [Accessed 07-07-08].

8. Riggs, W. and Von Hippel, E. (1994) Incentives to Innovate and the Sources of Innovation: The Case of Scientific Instruments. 'Research Policy.' Vol. 23, No. 4, pp. 459-469.

9. Red Hat Inc. (2007) 'Annual Report 2007, Financial Results for Fiscal Year 2007.' Raleigh, NC: Red Hat.

10. UNU-MERIT (2006) 'Study on the Economic Impact of Open Source Software on Innovation and the Competitiveness of the Information and Communication Technologies (ICT) Sector in the EU, Final Report.' The Netherlands: UNU-MERIT.

11. However, the open innovation model, as described by Chesbrough, does not equate exclusively to user-led innovation. Chesbrough, H. (2003) 'Open Innovation: The New Imperative for Creating and Profiting from Technology.' Cambridge, MA: Harvard University Press.

12. Credited to Bill Joy, Sun Microsystems.

13. Dames, M., Robson, D., Smith, M. and Tumilty, T. (2008) Innovation 2.0: Redefining Boundaries Between Producers and Consumers. 'The Journal of The Institute of Telecommunications Professionals.' Vol. 1, Part 2.

14. NESTA (2008) 'The New Inventors: How users are changing the rules of innovation.' London: NESTA.

15. See Appendix A: Video games in NESTA (2008) 'The New Inventors: How users are changing the rules of innovation.' London: NESTA.

16. Stein, J. (2007) 'Conversations among Competitors.' NBER Working Paper No. 13370. Available at: [www.nber.org/papers/w13370](http://www.nber.org/papers/w13370) [Accessed 02-07-08].

17. Gowers, A. (2006) 'Gowers Review of Intellectual Property.' London: HM Treasury.

18. Harhoff, D., Henkel, J. and von Hippel, E. (2003) Profiting from Voluntary Information Spillovers: How Users Benefit by Freely Revealing their Innovations. 'Research Policy.' Vol. 32, No.10, pp. 1753-1769.

19. For example, Creative Commons is a series of model licences that enable users to identify the rights they wish their work to carry. The intention is to increase the number of creative works that are available for others legally to share and reuse. See <http://search.creativecommons.org/> [Accessed 04-07-08].

20. Outlaw innovators, such as hackers and in some cases modders, are those that operate on the boundaries of legality. Flowers, S. (2008) Harnessing the hackers: The emergence and exploitation of Outlaw Innovation. 'Research Policy.' Vol. 37, pp. 177-193.

User innovation is particularly apparent in the video games, music and social networking industries.<sup>6</sup> 'Crowdsourcing' – outsourcing a task originally performed by an employee to an open community – has created commercial value for a number of firms built up to exploit this trend. For example, Threadless.com invites users to submit designs for T-shirts. The online community then vote on their favourites and winning designers are rewarded while the firm profits from sales.<sup>7</sup>

## User-led innovation creates significant commercial value

Historically, users have been the source of some of the most commercially significant and novel products and processes, including in areas such as oil refining (43 per cent), chemical production (70 per cent), sports equipment (58 per cent), and scientific instruments (77 per cent).<sup>8</sup>

In the age of digital technologies, open source software – despite its roots in non-commercial user-led innovation – generates significant revenues for many commercial firms. For example, the American firm Red Hat, one of the world's leading providers of Linux and open source technology, generated revenues of \$341 million in 2007.<sup>9</sup> It has been estimated that open source software now accounts for more than a fifth of the value of the European ICT sector.<sup>10</sup>

## Open business models are best placed to capture the value of user-led innovation<sup>11</sup>

Many firms recognise that 'not all the smart people work for you'.<sup>12</sup> Realising this, they are adapting their business models to capture the value generated from sources of innovation outside of the firm. In some cases, this involves users. New 'open' business models are emerging that seek to collate, harvest and leverage the talents and market insights of those that firms would not – or could not – employ.<sup>13</sup>

## Multinational companies are recognising the value of user-led innovation

Large global firms now invest resources in gaining a better understanding of user needs: analysing their behaviours, encouraging their suggestions (and providing tools to help them engage) and monitoring emerging innovations. This is often now a part of their business strategy, R&D process or product

offering. Firms like IBM and Sun Microsystems participate in many user-led open source projects.<sup>14</sup>

Despite a vibrant digital scene in the UK, it is sometimes difficult for firms to remain in UK ownership. Major American firms in particular have recognised the growth potential of user innovation-based firms, as witnessed in their acquisition strategies. Bebo, started in 2005 and now with 42 million users, was recently sold for £417 million to US internet company AOL. Last.fm was acquired by American broadcaster CBS in 2007 for £140 million.

## User-led innovation challenges traditional innovation assumptions

### User innovators tend to be interest-driven

Whereas firms are motivated by profit, users tend to be driven by their interests. Often individuals are passionate and willing to devote time and energy to their area of interest. User communities frequently create huge archives of information for members and provide advice, support, software toolkits and educational resources for novices. In some cases, this entrepreneurial activity has led to new business start-ups, such as firms like FXpansion and Splash Damage.<sup>15</sup>

### Traditional intellectual property concerns may be set aside

Sometimes, users find it impractical<sup>16</sup> or too costly<sup>17</sup> to protect the intellectual property (IP) that embodies their innovation. More often, however, user innovators tend to view traditional IP concerns as less important, indeed they may even be set aside entirely. Open sharing or 'free-revealing' of ideas is commonplace.<sup>18</sup>

There are now a series of mechanisms, sometimes referred to as copyleft, designed to prevent later restrictions on copying, developing and distributing original work, so protecting innovations from being directly appropriated by firms.<sup>19</sup> Copyleft may also help harness and exploit the innovations of pariah or 'outlaw' users.<sup>20</sup>

## Users are changing the rules of innovation

### User-led innovation ranges from giving feedback and support, to creating entirely new products, services and systems

- Forums for users to exchange knowledge and provide feedback help firms iterate their products.
- Some business models are structured around the practice of users generating and sharing content, such as Facebook or YouTube.
- In other cases, users are increasingly making minor and major modifications to existing products, re-engineering their functionality and improving performance.<sup>21</sup> The creativity of users to recombine existing products into new forms is a hallmark of user innovation, such as mashups.<sup>22</sup>
- At the highest level of innovation, users effectively become manufacturers, creating novel systems, products or services.

### Firms are embracing user innovation in many different ways

Aspects of the business models of firms like Bebo and Lego depend on acquiring and commercialising the IP emerging from user-generated ideas. MySpace and *Second Life* are building products around user content and provide an architecture for users to upload and share content. Firms like Nokia provide software toolkits to encourage more users to innovate.<sup>23</sup>

In certain advanced technical areas, firms may provide product components or open up their product architecture to encourage users to develop their own ideas.<sup>24</sup> Increasingly, users and user communities are not just a wellspring of inventive ideas, they are also being recruited to help design or develop next generation products and services.

### User-led innovation is blurring traditional firm/user boundaries

The clear divisions that used to exist between suppliers and users, firms and consumers, or firms and their suppliers are becoming increasingly blurred: we're all (potential) innovators now.<sup>25</sup>

## UK policy has only just begun to recognise the value of user innovators

### *Innovation Nation* recognises but does not support user-led innovation

User-led innovation has emerged under the radar of government and has largely occurred despite official policy, not because of it. To date, the role of the individual in initiating or shaping innovations in ideas, behaviours, products and services has been largely overlooked.

Until the 2008 DIUS White Paper, *Innovation Nation*,<sup>26</sup> user-led innovation was absent from UK policy. However, while it is a recurring theme in the White Paper, there is no explicit policy framework specifically targeted at promoting or removing barriers to user-led innovation. Nor is user-led innovation policy part of the EU Lisbon Agenda, although there is growing pressure for formal recognition.<sup>27</sup>

### UK policy suffers from a linear model 'hangover'

In the traditional linear (or 'pipeline') model of innovation, formal R&D leads to new discoveries that are incorporated into a new product or process before being marketed to consumers. Undoubtedly, policy discussion is complicated by the nature of user-led innovation; it is diffuse and distributed, not readily uniform or necessarily domestic.

However, an implicit bias in favour of traditional manufacturers and producers may disadvantage valuable user activity within the innovation system. While UK policy discussions remain locked into only a narrow segment of innovation activity, the impact of users will remain largely hidden.

### Across Europe, Governments have begun to support user-led innovation

The Danish Government is funding £10 million per year (2007 to 2010) to support new projects and a research centre intended to drive up levels of user-led innovation in the private and public sectors.<sup>28</sup> A number of other countries are advancing research programmes to build up their evidence base.<sup>29</sup>

21. 'Ideas harvesting' and user-testing programmes are an important and embedded element of the contemporary video games development environment. Miles, I. and Green, L. (2008) 'Hidden Innovation in the Creative Industries.' London: NESTA.

22. For further information on mashups, see Kelley, M. (April 2008) 'Web 2.0 Mashups and Niche Aggregators.' Available at: <http://oreilly.com/catalog/9780596514006/> [Accessed 03-07-08].

23. Nokia Sports Tracker is designed to let runners and cyclists take advantage of the global positioning capability included in some Nokia models. More than 1 million people downloaded the program and used it for sports the developers never dreamed of. Business Week Special Report (April 30, 2008) 'How Nokia Users Drive Innovation.' Available at: [www.businessweek.com/globalbiz/content/apr2008/gb20080430\\_764271.htm?chan=globalbiz\\_europe-index+page\\_top+stories](http://www.businessweek.com/globalbiz/content/apr2008/gb20080430_764271.htm?chan=globalbiz_europe-index+page_top+stories) [Accessed 07-07-08].

24. For example, Microsoft now runs competitions for user-created games for its Xbox 360 video game console and has created a free game development toolkit to encourage users to build new games.

25. NESTA (2008) 'The New Inventors: How users are changing the rules of innovation.' London: NESTA.

26. DIUS (2008) 'Innovation Nation'. London: DIUS.

27. Lewis, W. and Mettler, A. (2007) 'Consumers and Competition: Unlocking Europe's Drivers of Productivity.' Lisbon Council Policy Brief, Vol.2, No.2. They encourage European policymakers to shift their attention from the protection of economic incumbents to empowering users, in light of the increasingly important role that they play in modern economies.

28. For more information on the Danish Programme for User-Driven Innovation, see [www.deaca.dk/userdriveninnovation](http://www.deaca.dk/userdriveninnovation)

29. Finland, Sweden, Canada and Australia have begun initiatives to collect data on user-led innovation. NESTA (2008) 'The New Inventors: How users are changing the rules of innovation.' London: NESTA.

## The UK should develop world-leading policy for user-led innovation

User-led innovation will continue to increase in magnitude and value as the number of skilled workers continues to grow, firms further adapt their business models to capture user innovations, and the determination and creativity of users flourish alongside the ubiquity of high-speed internet connections.

The UK must find ways to ensure it facilitates, not blocks, this changing face of innovation. While it is for individual firms and organisations to consider how best to harness user-led innovation, government also has a role to play in creating the optimal conditions in which it can flourish.

### Government should avoid the potential chilling effect of existing and new legislation

While it will always be important for innovators to be able to legally protect their innovations, for user innovators, existing IP law may act as a brake on their creativity. Many of the most significant user innovations have occurred when the IP system has not attempted to configure<sup>30</sup> or resist<sup>31</sup> user experimentation.

Government should take forward the proposals from the Gowers Review for looser, more relaxed applications of copyright.<sup>32</sup> There should also be recognition of the difference between the creative or malicious use of toolkits.

### Formal representation and voice for users requires a User Innovation Forum

The role of users as a source of innovation is not reflected in the composition of existing government initiatives to promote innovation,<sup>33</sup> perpetuating policy biases. For government to better understand user-led innovation and the impact of legislation on it, it should hear directly from innovative firms and communities that harness user-led innovation. The UK government should establish a User Innovation Forum.

### Create a pilot scheme for funding user innovation projects

As user innovators tend to set aside IP rights, investment is normally hard to obtain. A pilot scheme, primarily through the Technology Strategy Board, should fund private and public sector projects with clear user-led activity.

## The R&D Tax Credit should explicitly encompass user-led innovation

Many firms are unsure if the R&D Tax Credit encompasses extended or distributed R&D that engages users and user communities. Current guidelines for firms do not mention users as potential innovators. Government and HM Revenue & Customs should clarify that relevant activities (those that seek to 'resolve scientific or technological uncertainty') involving users – or supporting users to innovate – are eligible for the R&D Tax Credit.

## More complete metrics to map the role and impact of user-led innovation

Current innovation metrics largely ignore the role of users and much activity is hidden. New metrics should be developed that better measure user innovation. In addition to NESTA's work in leading the development of a new Innovation Index for the UK,<sup>34</sup> government should benchmark UK performance and policies against other countries. More broadly, greater evidence is required on the dynamics of user innovation within the UK economy and the social dynamics of user communities.

### What is NESTA doing?

NESTA Connect develops programmes designed to encourage people to connect across organisations, places and disciplines. Supporting and developing unusual combinations helps generate new ideas and new perspectives on old problems. As part of Connect's corporate open innovation strand, NESTA is working with Virgin Atlantic to come up with new ways of incorporating a wide range of users into the production of new products and services.

30. Flowers, S. (2008) *Harnessing the hackers: The emergence and exploitation of Outlaw Innovation*. 'Research Policy' Vol. 37, pp.177–193.

31. Kline, R. (2003) *Resisting consumer technology in rural America: the telephone and electrification*. In: Oudshoorn, N. and Pinch, T. (Eds.) (2003) 'How Users Matter. The Co-Construction of Users and Technologies.' Cambridge, MA: MIT Press.

32. Gowers, A. (2006) 'Gowers Review of Intellectual Property.' London: HM Treasury.

33. Such as the Technology Strategy Board's Knowledge Transfer Partnerships/Networks, or Government business forums such as The Prime Minister's 'Business Council for Britain', established last autumn. See Number 10, 'PM Announces Make-Up of New Business Council.' (No date). Available at: [www.number10.gov.uk/output/Page12224.asp](http://www.number10.gov.uk/output/Page12224.asp) [Accessed 07-07-08].

34. For further information on the Innovation Index, see [www.innovationindex.org.uk](http://www.innovationindex.org.uk)