

11 | Next Steps for Free Innovation Research and Practice

Free innovation is, as we have seen, an important and growing “grass-roots” innovation process in the household sector of national economies. Free from compensated transactions, it is fundamentally simpler than producer innovation. In this concluding chapter, I propose some specific next steps for those interested in further work on the theory, the policy, and the practice of free innovation. Of course my list of suggestions is simply that: others will certainly have many other excellent ideas.

Proposed Next Steps

As we have seen in this book, the free innovation paradigm provides a novel and generative framework for understanding innovation in the household sector. It, together with the producer innovation paradigm, offers novel and expanded space for innovation theory development, empirical research, policymaking, and practice. In the sections that follow, I discuss some issues and possible new lines of inquiry in each of these domains. In addition, with respect to valuable next steps, readers should note that research on all aspects of the free innovation paradigm is at an early stage. They should therefore consider the theoretical and empirical work presented in each of the preceding chapters as both inviting and requiring further development.

I begin by comparing the research lenses offered by the concepts of free innovation, user innovation, peer production, and open innovation. Researchers of course have a choice of conceptual lenses for their studies, with each most suited to some topics and styles of inquiry. I then focus in on issues and questions related to free innovation only. I begin by proposing steps to improve the measurement of free

innovation, a matter that is very important to further progress. I next suggest steps to incorporate free innovation into microeconomic theory, and also into important components of innovation policy. Then, I suggest how the free innovation paradigm can help us to understand the economics of both open source producer innovation activities, and household sector creative activities beyond innovation, such as “user-generated content” ranging from fan fiction to contributions to Wikipedia.

Finally, I conclude the book by again proposing that it will be very important to seek to understand free innovation and the free innovation paradigm more deeply via further research. Free innovation offers the promise of empowering all of us in the “household sector”—simultaneously enriching our individual lives, increasing social welfare, and improving national economies.

Free Innovation and Related Research “Lenses”

Again recall from chapter 1 that I define a free innovation as one that (1) is developed by consumers at private cost during their unpaid discretionary time, and (2) is not protected by its developers, and so is potentially acquirable by anyone for free. This definition of free innovation is intentionally very restrictive. It dictates that free innovation models and samples must contain *no* compensated transactions of any kind, and that innovation development work be entirely self-rewarded. The purpose of creating this very precise and tight lens is that it excludes many potentially interfering variables, and so enables researchers to more clearly analyze phenomena central to free innovation. Illustrative examples of such phenomena discussed earlier are innovation pioneering by free innovators, and the likely dearth among free innovators of incentives to diffuse.

Of course, much of the world is hybrid, and so will diverge from our definition of free innovation to a smaller or larger extent. This is an opportunity rather than a problem for researchers. One can first isolate and analyze interesting phenomena within the precise lens of free innovation, and then progressively relax constraints in order to draw hybrid cases into consideration. Via progressive relaxations, one can learn whether and to what extent behaviors characteristic of free

innovation endure in hybrids—and whether new behaviors emerge. For example, in some open source software and hardware projects today, contributors are exclusively free household sector innovators. In other projects, some or many contributors are paid by producers to participate. We may use this source of variation to explore the extent to which the addition of paid employees and related producer incentives changes the nature of open source projects and their outputs, with related gains or losses in social welfare.

Other research lenses that bring different aspects of the phenomenon of “non-producer innovation” into clear focus include commons-based peer production, user innovation, and open innovation. Researchers will wish to choose among these concepts and others—or to develop their own—as a function of the study question they address and the focus they prefer.

Commons-based peer production is term coined and brought to research prominence by Benkler (2002, 2006). It describes distributed “production” networks in which large numbers of contributors bring their own resources to an activity. They then work cooperatively, often via the Internet, to generate valuable outputs and reveal them to the commons.

Commons-based peer production shares many elements with free innovation. The most important distinction lies in the parsimony vs. inclusiveness of the two concepts. As I mentioned above, the free innovation lens is tightly constrained. In contrast, the commons-based peer production framework incorporates much more richness and complexity. Thus, while free innovators must be self-rewarding, participants in commons-based peer production need not be: contributors to peer production projects may be either self-rewarding or paid for their work. Similarly, free innovators must not engage in compensated transactions during the course of innovation development and diffusion. In contrast, participants in peer production projects may engage in social and/or monetary transactions, and so incur related transaction costs. As a consequence of its inclusiveness, the commons-based peer production lens can be especially useful for richly descriptive studies of complex real-world situations. For the same reason, application of this lens can make quantitative analysis and modeling more difficult.

User innovation is sharply focused on the functional relationship that innovators have to an innovation they develop. If the innovator develops an innovation for personal or in-house use, he, she, or it is a user innovator. If the innovator develops the innovation to sell, he, she, or it is a producer innovator (von Hippel 1976, 1988, 2005). The presence or absence of self-rewards and compensated transactions does not play a role in this simple definition. As a consequence, the user innovation lens can include both free innovators and profit-seeking individuals and firms as user innovators. A user innovator firm, for example, would be one that develops a novel process machine for in-house use rather than sale. The firm is indeed a user—but, unlike free innovators, it is also seeking profit from using that machine in its operations.

The user innovation research lens is useful to distinguish between innovators who have first-hand vs. second-hand information regarding needs for a given innovation. Users, whether free innovators or firms, are the generators of need information. In contrast, producers must acquire it, with greater or lesser loss of fidelity, from users. This clear distinction, along with the concept of sticky information (von Hippel 1994), then allows us to understand why users and producers will have different local stocks of sticky information, and so will tend to develop different types of innovations. As a second matter, users, whether individual free innovators or user firms, are likely to care only about their own needs for an innovation, while producers, motivated by sales, must care about broader markets. This distinction can encourage innovation pioneering among all user innovators, as was documented in chapter 4 in the case of free household sector innovators.

Open innovation (Chesbrough 2003) falls squarely within the producer innovation paradigm. This lens is useful to explore and explain why and when a corporate strategy of both acquiring and selling innovative content and intellectual property can increase profits relative to a strategy of relying only on internally developed intellectual property. The term “open” refers to an *organizationally* open producer innovation process rather than to one involving an information commons. In that way open innovation is closely akin to the concept of technology marketplaces (Arora, Fosfori, and Gambardella 2001; Rivette and Kline 1999). With respect to research questions related to free innovation, the

open innovation lens can be useful for exploring producer strategies for profitably linking to that phenomenon.

Measure Free Innovation

In this book, I have striven to characterize and explore free innovation in ways compatible with economic theorizing and analysis. I have done this even though free innovation clearly is not fundamentally or even mostly “about money.” Instead, as studies of free innovators’ motivations have shown, free innovation is most directly “about” a wide range of human interests and values having to do with utility, participation, fun, learning, creativity, altruism, and other important matters associated with “human flourishing” (Fisher 2010; W. von Hippel, Hayward, Baker, Dubbs, and E. von Hippel 2016). Still, in order to conduct analyses that can apply to activities in both the free innovation paradigm and the producer innovation paradigm, economic measures common to both are needed.

Developing ways to measure free innovation that are compatible with economic analysis is not a straightforward task. In free innovation, in sharp contrast with producer innovation, there are no transactions that can be used to document the value of investments made, and outputs created and diffused. Also, in free innovation there are no equivalents to patents as markers of development originality since free innovators do not apply for patents. Still, compatible measures of activities within the two paradigms and paradigm outputs can be devised. In view of the extent and importance of free innovation, work toward this end clearly will be worth the effort. Attempts to assign value to unpriced product flows have already begun, and improvements will doubtless follow. (See, e.g., Brynjolfsson and Oh 2012; Ghosh 1998.)

At present, household sector free innovation is *not measured at all* in official governmental statistics. In part this is because, in line with the traditional Schumpeterian producer-centric assumptions, official efforts to collect data on innovation are largely focused on enterprises in the business sector. In additional part it is because innovations developed by free innovators and made available for free diffusion do not fit the present-day official OECD definition for innovations. Recall from

chapter 1 that, within the OECD: “A common feature of an innovation is that it must have been *implemented*. A new or improved product is implemented when it is introduced on the market” (*Oslo Manual* 2005, paragraph 150). Of course, free innovations are *not* diffused via the market—they are diffused for free and so are not *implemented* in OECD terms. Efforts to correct this problem by revising the official definition of innovation to incorporate a wider range of Internet-enabled diffusion options are needed (Gault 2012).

As long as it exists, the OECD’s “on the market” requirement produces major distortions in measurements of innovation. Most directly, it hides free innovations generated in the household sector from view, because they do not fit the official definition of an innovation. Secondly, it means that free innovations appear in official innovation statistics only if and when producers commercialize them. And at that point they are credited to *producers* as “new products introduced to the market” rather than to their actual, free innovator developers. This clearly misrepresents the sources of innovation. It also results in an overstatement of the productivity of producers’ R&D for consumer products and services. The overstatement is likely to be substantial—several empirical studies have found that from about 50 percent to about 90 percent of major consumer innovations commercialized by producers were in fact initially developed by household sector innovators (Shah 2000; Hiernerth, von Hippel, and Jensen 2014; Oliveira and von Hippel 2011; van der Boor, Oliveira, and Veloso 2014).

To date, and in the absence of official statistics collected by governments, statistics on free innovation have been collected by ad hoc empirical studies such as those discussed in this book. What is needed in addition, of course, is collection of rich data on innovation in the household sector on a regular basis. This will enable researchers to accumulate time-series data needed for many research purposes, ranging from studies of how free innovation is evolving, to studies of how it is affected by various conditions and interventions.

Social surveys of household sector innovators and surveys of producers both have a role in collecting the information needed for such work. Social surveys can be used to directly ask individuals in the household sector about their free innovation and their entrepreneurial innovation activities, the inputs they expended, and the outputs they created.

Social surveys can also be used to collect the “free innovators’ side of the story” with respect to any diffusion of their innovations to both peers and producers. To get producers’ complementary side of the story, governmental surveys of enterprises can be modified to ask about the incidence of and the value of adopting designs from free innovators. Initial experiments in this direction have been conducted by adding experimental questions to Community Innovation Surveys (CIS) in both Finland and Switzerland. These experiments demonstrate that valuable information on free innovation can be collected via the CIS.

Specifically, responses to the experimental questions added to the Finland CIS have shown that producers do indeed adopt customer designs as the basis for new commercial products, and that this can be important for their success in the marketplace (Kuusisto, Niemi, and Gault 2014). Some 6.1 percent of Finnish firms focused on consumer products in the 2014 Finnish CIS report that totally new product designs by end consumers are of medium or high importance to their product development. In addition, 8.7 percent of those firms report that modifications to their products by end consumers are of medium and high importance to them (Statistics Finland 2016, appendix tables 6 and 7). Analysis of the Swiss CIS experimental question findings further document the advantages to producers of a division of labor between free innovators and producers (Wörter, Trantopoulos, von Hippel, and von Krogh 2016.)

Incorporate Free Innovation into Microeconomic Theory

Despite the large and growing importance of free innovation in the household sector, free innovation has not yet been incorporated into standard microeconomic thinking. In part this is because statistical data series on free innovation do not exist yet. In part it is because, absent compelling data or other reasons, researchers with an interest in innovation may be quite satisfied to work within the traditional producer innovation paradigm, ignoring the important and growing levels of innovation in the household sector of national economies. After all, the Schumpeterian framework does fit a substantial portion of innovation development activity. Further, scholarly findings and data accumulated over many decades have made the producer paradigm an ever

richer and more convivial environment for the conduct of normal science.

Expanding innovation research and research questions to include the free innovation paradigm offers very interesting new spaces for novel and enriched economic theories of innovation. Several illustrative examples have been initially explored in this book. In chapter 4, I explained why free innovators tend to pioneer new applications and markets, with producers following later. In chapter 5, I explored a market failure likely to reduce the diffusion of free innovations. In chapters 3 and 6, I discussed the potentially fruitful concept of a division of labor between free innovators and producer innovators. My colleagues and I have also shown that free innovation has positive effects on social welfare, and generally also on producers' profits, relative to a world in which only producers innovate.

Strikingly from the research perspective, my colleagues and I have documented that innovation activities in the free innovation paradigm do not require intellectual property rights to be viable. This finding can open the way to rethinking a central feature of microeconomic models of innovation: the assumption that private investments in innovation must be protected by systems of intellectual property rights. The argument underlying this assumption is that producers' profits from innovation investments will disappear if anyone can simply copy their innovations, and so producers must be granted exclusive control over their innovations for some period of time. (See Machlup and Penrose 1950; Teece 1986; Gallini and Scotchmer 2002.)

We now see that, even if producers do require intellectual property rights to protect and profit from their *own* investments in innovation design, adoption of free designs from free innovators requires much less producer investment—and so perhaps much less protection, too. This would be a welcome option to explore because, as is well known, intellectual property rights are a devil's bargain from society's point of view. At the same time as they (putatively) enhance producers' incentives to innovate, they also create deadweight losses for society by enabling monopoly pricing. Patents also disrupt the efficient forward movement of fields as owners of intellectual property place tollbooths astride promising pathways to further research and development (Murray and Stern 2007; Bessen and Maskin 2009; Murray, Aghion,

Dewatripont, Kolev, and Stern 2009; Dosi, Marengo, and Pasquali 2006; Merges and Nelson 1994). Efforts to ease these negative effects have a long history (e.g., Hall and Harhoff 2004). However, the inbuilt conflicts between social goals and producer goals with respect to intellectual property are fundamental, and problems will predictably fester.

A rethinking of the need for and effects of intellectual property rights should be based on an improved empirical understanding of where such rights are actually effective today. Sometimes patent rights do not exist in practice even when legally granted. Thus, biomedical researchers in universities and governmental and nonprofit institutions have been found to routinely ignore the legal rights of patent holders whose claims might impede their research (Walsh, Cho, and Cohen 2005). Contrastingly, many innovation types that are not legally protectable, and so assumed by economists to be freely available, are actually protected from potential free adopters by social means rather than legal means. For example, accomplished chefs cannot legally protect exclusive rights to the novel and economically important recipes they develop and practice in public—recipes are not patentable or copyrightable subject matter. However, these recipes are effectively protected nonetheless by community enforcement of anti-copying norms within communities of expert chefs (Fauchart and von Hippel 2008; King and Verona 2014).

Novel Policymaking for Free Innovation

The basic justification for public policy interventions to support innovation is to increase social welfare. Gambardella, Raasch, and I (2016) have made the case that social welfare increases when there is a division of labor between free innovation and producer innovation. Novel policies related to both development and diffusion of free innovations could be useful to support a transition to this improved condition.

Clearly, policy initiatives to support free innovation can include measures to reduce free innovators' development costs. These could include public funding of the development of open standards for the exchange of design information among free developers. Also, and

analogous to the R&D subsidies provided to producers by government, support could be given to upgrading physical facilities used by free innovators, such as makerspaces (also sometimes called fab labs or hackerspaces) equipped with sophisticated tools that are beyond the means of most individual free innovators (Svensson and Hartmann 2016). Other infrastructure improvements could include support for the development of “big data” methods to identify, collect, and organize open public data on consumers’ unmet needs. The net result would likely be an increase in both the number and the average social value of innovation opportunities worked upon by free innovators.

Recall from chapter 5 that free innovators are unlikely to have incentives to invest sufficiently in diffusing their innovations for free. Policy initiatives to support and reduce the costs to free innovators of the diffusion of their designs might help to reduce this investment shortfall. For example, free, easy-to-use public repositories of design information could serve this purpose. Such repositories should feature open documentation standards. In the absence of a strong push for open standards, proprietary repositories of free design information are likely to emerge, each tied to the proprietary standards of the sponsoring producer.

Gambardella, Raasch, and von Hippel (2016) explain that policy measures supporting *producers’* investments in supporting innovation development by free innovations should be designed to distinguish carefully between investments that complement free innovation and those that substitute for it. Public incentives for corporate R&D unambiguously raise welfare if they induce firms to invest in activities that are synergistic with free innovation. However, if public incentives instead support producer R&D that substitutes for innovative work that free innovation would do, the net effect can be to redistribute welfare from free innovators to firms, and perhaps also to lower aggregate social welfare.

Viable opportunities for free innovators are continuously increasing, due to technological trends that have been discussed. Accordingly, the appropriate division of labor between free innovators and producer innovators must continuously be updated. As an illustration, consider that patients and clinicians, during the course of regular medical practice, regularly discover new applications for drugs no longer under patent (DeMonaco, Ali, and von Hippel 2006). Producers, very reasonably,

see no profit in investing in clinical trials to document the effectiveness of such new applications without the availability of monopoly rights. A producer-centered solution to this problem would be to grant pharmaceutical firms additional monopoly rights to new applications in such cases (Roin 2013). A free innovator-centered solution, in contrast, would be to support patients' and clinicians' capability to design and carry out clinical trials independent of producers. As was noted in chapter 10, the practicality of that route has been demonstrated in a trial of potential therapies for ALS (Wicks, Vaughan, Massagli, and Heywood 2011).

Extending Free Innovation Paradigm Insights beyond Innovative Content

Unpaid individuals in the household sector produce many socially valuable free information outputs in addition to innovation. Examples include collection, assessment, and diffusion of news by on-the-spot amateur observers (Benkler 2006), research and writing related to free contributions to Wikipedia, and the creation and free distribution of "fan fiction" by communities of unpaid amateur writers (Jenkins 2008; Jenkins, Ford, and Green 2013). These specific forms of non-innovative creative output from the household sector, and many others as well, are often collectively referred to as "user generated content" (UGC) or "user created content" (UCC). An OECD study defines "user generated content" as "i) content made publicly available over the Internet, ii) which reflects a 'certain amount of creative effort', and iii) which is 'created outside of professional routines and practices'" (Wunsch-Vincent and Vickery 2007, 4).

I propose that the activities and economic considerations involved in generating and diffusing UCC can be quite well described by the free innovation paradigm. After all, UCC, like free innovation, is generally developed by unpaid individuals motivated by self-reward and working in their discretionary time, and is generally not protected from free adoption by its developers.

Upon reflection, the usefulness of the free innovation paradigm for describing creative activities and outputs in the household sector beyond innovation will not be surprising. Many of the unique

behaviors and the difficult policy choices associated with the producer innovation paradigm spring from producers' needs to capture monopoly profits from sales to gain private returns from their private investments in innovation. In contrast, innovation development within the free innovation paradigm is self-rewarded and therefore viable even if the outputs are diffused "for free." This also applies to non-innovative user-generated content produced with self-reward as a motivation and given away.

To illustrate the similarities, consider the writing and free distribution of "fan fiction" by unpaid, self-rewarded writers in the household sector. Writers of fan fiction generally base their works on the books of well-known authors. These "derivative works" are illegal under copyright law, but are nonetheless created and widely distributed for free by authors of fan fiction (Jenkins 2008). Individuals in the household sector who build upon the "platform" or "toolkit" inadvertently offered by copyrighted works create the same economic interaction effects with publishers that were discussed in chapters 6 and 7 with respect to interactions between free innovators and producers. Today, commercial publishers and popular authors are increasingly understanding that fan fiction is a commercially valuable free complement to their intellectual property, and so increasingly seek to support fan fiction rather than suppress it (Arai and Kinukawa 2014). Consumers of fan fiction prove to be avid buyers of the commercial works upon which fan fiction works are based. Indeed, fan fiction appears to expand the market for published fiction—to be a valuable free complement for producers. Further, just as designs created by free innovation are sometimes commercialized, fan fiction can be a source of commercially valuable writings and of new authors for commercial publishers (Jenkins, Ford, and Green 2013). In net, it appears that the economic interactions between the free fan fiction writers and commercial fiction producers are very similar to those described by Gambardella, Raasch, and von Hippel (2016) in the case of interactions between innovators operating within the free innovation and producer innovation paradigms.

Diffusion failures characteristic of the free innovation paradigm (described in chapter 5) can also affect user created content made available for free. For example, it has been found that many Wikipedia contributors, motivated by self-reward, choose to write on topics

of personal interest rather than on topics of demonstrably stronger interest to larger numbers of Wikipedia readers. Thus, if a self-rewarded contributor of articles to Wikipedia is passionate about orchids, an article on orchids it will be—even if most Wikipedia readers would greatly prefer an additional article on plumbing. This pattern was confirmed by Warncke-Wang, Ranjan, Terveen, and Hecht (2015), who analyzed Wikipedia editions in four languages and found extensive misalignment between production and consumption in all of them.

I suggest that it will be very useful to explore how the principles of and practices within the free innovation paradigm can be extended beyond innovation to explain and support a wide range of personally and socially valuable development work in the household sector. Again, as many authors cited in this book make clear, free innovation in particular, and free creative activity in general, enhance both social welfare and many individuals' lives via such personally valued dimensions of experience such as self-expression and competence (Fisher 2010; Benkler 2006).

In this book I have sought to integrate new theory and new research findings, developed together with valued colleagues during the past few years, into the framework of a “free innovation paradigm.” I have positioned the free innovation paradigm both as a challenge to the adequacy of the Schumpeterian innovation paradigm and as a useful complement. Both paradigms describe important innovation processes, with the free paradigm codifying important phenomena in the household sector that the producer innovation paradigm does not incorporate.

Recall that by proposing and describing the free innovation paradigm, I by no means claim that research needed to support it is complete. Indeed, I claim precisely the opposite. A new paradigm is most useful when understandings of newly observed phenomena are emergent and when ideas regarding a possible underlying unifying structure are needed to help guide the new research (Kuhn 1962). This is the role that I hope the free innovation paradigm described in this book will play. If it is successful, it will usefully frame and support important research questions and findings not encompassed by the

existing Schumpeterian producer-centered paradigm, and so provide an improved platform for further advances in innovation research, policymaking, and practice.

The free innovation paradigm also, as a description of “democratized” household sector innovation practice, will help us expand our understanding of our personal freedoms and potential for creative action. By exploring more deeply what free innovation is and can become, we can more effectively support its growth and development—and thereby our own.

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