

The Economics of Free Innovation

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Introduction

Ever since Schumpeter (1934) promulgated his theory of economic development, economists, policymakers and business managers have assumed that the dominant mode of innovation is a “producers model.” That is, it has been assumed that most important innovations would originate from producers and be supplied to consumers via goods that were for sale. This view seemed reasonable on the face of it – producers generally serve many users with multiple copies of a single design. Individual users in contrast, depend upon benefits from in-house use of an innovation for returns on their investment. Presumably, therefore, a single producer can afford to invest more in the development of innovations than any single user. From this it follows logically that producer-developed designs should dominate user-developed designs in most parts of the economy.

This long-held view of innovation has, in turn, led to public policies based on a theory of provider inducement. Producers, it is argued, are motivated to innovate by an expected stream of future innovation-related profits. It is assumed that this stream of profits will disappear if anyone can simply copy producers’ innovations. Therefore, producers must be granted subsidies and/or their innovations must be protected by intellectual property rights that give them monopolies for some period of time. (Scotchmer, 2006)

However, the producers’ model is only one mode of innovation. A second, increasingly important model is collaborative user innovation. Under this second model, economically important innovations are developed by users who divide up the tasks (hence the costs) of innovation and then *freely reveal* their results. Participating users’ incentives to innovate take

the form of direct use benefits, as well as enjoyment of and learning from the innovation process itself. Users' incentives to collaborate and share their results are based on: (1) the benefits of gaining access to complementary innovations; (2) learning and enjoyment gained from participation, (3) the desire to influence future techniques and standards, (4) the desire to reciprocate; and (5) the desire for social approval (status, reputation) (Lakhani and Wolf).

As we will see, the collaborative user innovation model is increasingly displacing producer-centered innovation in many domains. This shift is being driven by new technologies, specifically the transition to increasingly digitized and modularized design practices, coupled with the availability of very low-cost, Internet-based communication. These new technologies now make it possible to routinely knit together widely distributed user innovators into effective, fast, collaborative teams that are largely self-organizing.

In this paper we focus on the economics of creating and sharing *designs* for innovations. Designs are the information "recipes" for products, processes and services. The inventive effort and investment required to create an innovative product or service is focused on creating a complete *design* for that product or service. In modern innovation practice, designs are created using a suite of computerized design and test tools, and are stored in digital information files. The information in these files are then converted into actual innovative products or services by feeding the encoded information into other computers that either execute the program (to create information goods or services) or drive the appropriate production equipment (to create tangible goods).

Today, in other words, at the leading edge of practice, innovative designs are pure information goods and so are non-rival. Historically, the situation was more complex, with design and production often being intertwined. For example, a craftsperson might design a

shoe while producing it, and so not encode his design as a separate artifact. To make a copy under these conditions, one might have to study the physical shoe itself, and perhaps also observe the craftsman's production process. Such intertwining of design, product and production information is still the case in some fields today, although it goes against prevailing trends in engineering design. We will discuss such cases at the end of the paper.

In our analyses we consider two independent roles – design user and design producer. We term those who create designs in order to use them *user innovators*, and those who create innovative designs in order to sell them *producer innovators*. User innovators benefit *directly* from their design innovations via in-house use. Producer innovators must sell or license their innovative designs or embed the designs in innovative products or services, in order to recoup the cost of their design effort.

User innovation is increasingly displacing producer innovation, we argue, because groups of users are increasingly innovating collaboratively in open “communities.” Collaborative, open user innovation is not a new phenomenon, but it is *far more pervasive and productive* today than in the past, even the relatively recent past, due to major advances in design and communication technologies. Efficient collaborative user innovation relies on the free revealing of designs in an open information commons with low barriers to access. Because open collaborative user designs are accessible to all comers at relatively low cost, this mode of innovating poses a threat to the design-related profits of producer innovators. Indeed, under some conditions, we find that open, collaborative user innovation will displace producer innovation as the dominant source of new designs.

With respect to public policy, we will argue that the transition from a producer-centered model of innovation to an open, collaborative user-centered model is desirable in terms of social

welfare, and worthy of support by policymakers. In major part, this is due to the free revealing of innovation designs associated with the collaborative user innovation model. Free revealing provides important social welfare advantages relative to the protection of innovations via intellectual property rights long associated with producer innovation. As is well known to economists, intellectual property rights both encourage innovation *and* damage competition by creating temporary monopolies. An alternative system that generates innovations without the need for such monopolies will be improve social welfare, other things being equal.