

Identifying Commercially Promising  
User-Developed Products and Product Concepts

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### Abstract

It has been shown that users develop new products which manufacturers can profitably commercialize. In this paper, two types of marketing research methods are proposed for the economical and systematic identification of such user-developed products. In the first, users who have developed new products are induced to screen themselves and bring forward promising products via appropriate manufacturer applied incentives. In the second, manufacturers identify "naturally occurring" indicators of promising user-developed products. Legal issues involved in the acquisition of user-developed products are outlined. Examples and suggestions for further research are provided.

## 1. Introduction

Users have proven to be the developers of most significant new products offered by product manufacturers in some fields and to be at least occasional contributors in others. Thus, users proved to be the developers of most of the new products sampled in two industrial fields (1,2) and appear to have developed at least some consumer products later successfully commercialized. (3) This success record has been accumulated despite a dearth of marketing research methods designed to identify new user-developed products or product concepts (as opposed to user needs) efficiently and systematically. The present paper is intended to begin the task of developing marketing research methods appropriate to this task. As shown in Figure 1, these methods fit into the new product marketing research task sequence after the market to be served has been characterized and before the market potential of prototype products is tested. We begin by presenting two examples. Next, we discuss conditions under which user-developed products should be a valuable source of commercializable new products and product concepts, and then go on to propose and explore methods for identifying and acquiring these.

### Examples of Methods for Identifying and Acquiring User-Developed Products

Examples of methods for identifying and acquiring user-developed products do currently exist, but they are neither common, nor optimized, nor necessarily recognized for what they are. Two examples, one for a consumer product and one for an industrial product, should convey the flavor.

1. The Pillsbury Bake-Off. <sup>(R)</sup> Established in 1949, the Pillsbury Bake-Off is an annual baking contest designed by Pillsbury primarily to publicize existing products.\* Nevertheless, more than 25% of that firm's current line of cake mixes are packaged mix versions of the recipes of two Bake-Off winners. (4) In essence, the Bake-Off operates as follows: Contest categories are announced, each specifying a type of recipe and a type of existing Pillsbury product which the recipe must use as an ingredient in order to qualify for the contest. "Thousands" of contestants send in entries. These are screened down to a few hundred which are deemed sufficiently promising to be prepared and evaluated by Pillsbury home economists. One hundred finalists are then invited to participate in the actual "Bake-Off." Winners in the various categories receive prizes and their recipes are published by Pillsbury.
2. IBM "Installed User Programs". About one-third of the software programs IBM currently leases for use on its medium and large sized computers were developed by outside users of IBM equipment for their own purposes. (5) The process of finding, evaluating and acquiring these programs is managed by an Installed User Program (IUP) Department in IBM. The Department learns of potentially promising programs developed outside IBM either from

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\* The Bake-Off's emphasis on promoting existing products rather than seeking new ones can be seen in entry requirements such as the specification that all submitted recipes should incorporate an existing Pillsbury product in their list of ingredients.

the user-developers themselves or from field representatives of the firm who have observed them at a customer site. Programs judged promising by the Department are referred to the relevant division at IBM for evaluation, each of which applies its own criteria to the task. When a decision is reached to acquire rights to a particular program, an agreement - usually involving a one-time, flat fee payment - is negotiated with the owner.

Conditions Under Which Users Will Develop Products with Commercial Potential For Manufacturers

It has been shown that invention is largely an economic activity which, like other economic activities, is pursued for gain.(6) From this we can reason that firms and individuals will engage in new product development when they find it economically attractive to do so - with users being no exception. Users therefore, can be expected to engage in new product development when their return from using the product is high enough to justify it and they cannot or do not want to get a product manufacturer to develop the product for them. A detailed taxonomy of the "innovation benefit capture mechanisms" which can create such conditions is presented elsewhere (7) for interested readers. For our purposes here, it will be sufficient to illustrate the concept by outlining two common types of situations for which the conditions hold, and in which users can be expected to develop commercially attractive products.

First, consider the situation in which manufacturers are aware of a need but consider the market too small or risky to justify the investment required to develop a responsive product. If, in these circumstances one or more users

need the product enough to justify developing it themselves, they will do so. Later, when some of these products turn out to serve/develop markets which are of commercial interest, manufacturers will find potentially attractive user-developed products exist. Many commercially successful products have evolved in the manner just described. Novel computers, for example, were usually developed and built by users (8) until manufacturers realized the commercial potential of that market. Similarly, teenagers built their own customized light vans for years before auto-makers decided to build such a product commercially.

Second, consider the situation in which user and manufacturer both would find a product commercially attractive enough to justify development - but the user hides the need from the manufacturer and secretly develops the product himself. The user does this because he wants to keep the product exclusively for his own use: He finds this more profitable than inducing a manufacturer to develop the needed product for sale to both him and his competitors. This second situation is also common: It typically occurs when users trace a competitive advantage sufficient to justify product development to their exclusive use of a particular component or process machine. Thus, computer makers will often build the integrated circuits they use rather than allow semiconductor manufacturers to build them to their specifications. Similarly, semiconductor manufacturers usually develop their own novel semiconductor processing equipment.(2) Whenever this situation does exist, the manufacturer is likely to find commercially attractive user-developed products.

#### Methods for Identifying User-Developed Products

User-developed products represent a bargain to product manufacturing firms only when the search plus acquisition cost for these is significantly less than would be spent for in-house development and field test of a product with an

equivalent chance for an equivalent level of commercial success. Since searching costs money - an actual visit to a user innovator's field site logically costs at least as much as a salesman's visit - the viability of the entire process depends on efficient search. In principle, one could make a thorough search by the "brute-force" method of visiting every user. This may in fact be the most efficient method when one has only a few users for a given industrial product, but it clearly fails when one wants to, for example, find a user-developed cake mix and finds one must peer into 100 million ovens to make a thorough search by this method.

Identifying users who have developed commercially promising products is a demanding task primarily because innovating users are self sufficient with respect to their innovation. Having satisfied their own need for the product through in-house development and manufacture activities they have no incentive to make themselves known to potentially interested manufacturers. (Contrast this situation with that of innovating manufacturers or suppliers or users who only partially develop a product they need. All of these must request (9) the assistance of manufacturers and/or the patronage of customers before they themselves can profit from their innovation-related efforts).

The methods for identifying innovating users to be discussed here involve two different types of solution to the problem of low "natural" user incentive to communicate with manufacturers regarding user-developed products. The first involves creating an inducement for innovators to step forward and identify themselves and their innovations; the second involves searching for signals in the environment which the innovator - or the innovation itself - emits "in the natural course of events."

#### Inducing Innovators to Step Forward

The principle involved in inducing innovators who have developed commercially promising products of a given type to step forward and identify themselves to

an interested manufacturer is exactly the same principle as is used in advertising products or services in general. In both cases, one does not know precisely who will be one's "customer." Instead, one knows something of the attributes of the group he is in - e.g. sails, is under 34, etc. - and one transmits an advertisement to that group as economically as one can which contains an inducement which one hopes is appropriate and sufficient to induce him to respond as you specify.

A properly designed search which specifies the need correctly in terms the potential respondent can understand and which provides an appropriate incentive is potentially a very economical device for the identification of user-developed products - because users will efficiently screen themselves at no cost to the manufacturer. Users have an incentive to avoid responding if they do not meet the specifications, because an inappropriate response wastes their own time and resources as well as those of the inquiring manufacturer. Perhaps the prototypical example of such a search strategy is the classified job advertisement. Such an ad is placed in a medium known to be seen by job seekers and broadcasts a precisely specified need (programmer needed with x experience with y languages on z machines) along with an inducement to respond (salary and benefits). Individuals who are interested in the inducement and judge themselves to fit the specified need will then make themselves known to the advertiser in the manner detailed in the ad.

In the instance of identifying user-developed products, the finding discussed earlier - that users will innovate "if and as it pays" - allows one to identify and focus information and incentives toward the categories of users most likely to have developed new products of any given type. Thus, user benefit considerations would suggest to a firm interested in identifying user-

developed mass production grinding equipment that it might be productive to begin the search by identifying categories of user firms for which quality mass production grinding is essential - razor blade and ball bearing firms perhaps. Similarly, it is logical that IBM would choose IBM customers as a likely source of IBM-compatible software, and that it would use its marketing force as an economical means of reaching this subset of computer users. Note that the highest need users are not necessarily within a searching firm's own customer base. Thus a manufacturer of fasteners used by auto companies might well determine that the users with the highest need for reliable fasteners are aerospace firms. Note further that one can refine one's search as a function of particular product attributes. Thus while the auto fastener manufacturer mentioned previously would be well advised to look to aerospace firms for more reliable fasteners, he might more usefully explore toy making firms if he is interested in user-developed fasteners emphasizing low cost.

Once one has identified the users one wishes to contact and an economical means of reaching them, one has to select an appropriate inducement sufficient to bring developers of promising user-developed products to step forward. A direct financial reward is often an appropriate inducement in the case of individual (usually consumer) user-innovators. Thus, Pillsbury offers cash awards to the winners of its Bake-Off. In the instance of products developed by user-developed firms, however, designing an appropriate inducement is not always so simple. Any offer of payment to a group or individual in the user firm which happens to be cognizant of a promising user-developed product would obviously be unacceptable: At the same time, any offer of payment to the firm as a whole might not motivate the individuals one wants to reach. The solution involves understanding what would motivate a particular group of user-innovators and understanding the form in which they can accept it. Thus, Technicon, in a search for commercially promising instruments which might be developed by researchers at universities and other institutions offered the inducement of a research

grant in an advertisement directed to that community. (10)

Some firms who currently find themselves the unwilling recipients of many unsolicited product ideas - almost all of them inappropriate - might well be appalled at the idea of actually advertising to receive more of the same. I would argue that if they do not specify their needs by advertising or some other means, it is only logical that they would receive new product inputs which are largely inappropriate to those (unstated) needs. How could it be otherwise? Further, in the absence of need specifications, innovating users who value their resources will logically be unlikely to make contact because they have no reason to think you want what they have: In contrast, people who do not value their resources might well make contact. Thus, careful specification of needs is likely to improve the quality of user-developed products submitted as well as make them more appropriate.

#### Searching for Existing Innovation-Related Signals

In the category of method described above, a manufacturer interested in user-developed products takes on the task of broadcasting need plus reward information to a user community in order to induce a signal from promising user-innovators. This task - and the small or large associated expense - can be avoided if and when user-innovators are already generating signals for some purpose of their own which an interested manufacturer can adapt to the task of economically identifying promising user-developed products. Two examples will convey the concept:

- A manufacturer of scientific instruments wants to identify promising user-developed products. He could advertise - but he notes that the developers of instruments already have a strong incentive to report their work promptly in the scientific journals. Isolation of the most commercially promising user-developed instruments can also be

achieved via data contained in such journals: Many users will quickly replicate instruments they find promising and will report this fact - along with the application they found the instrument promising for - in scientific articles describing their own research. In today's world of computerized data bases, all such references can be quickly and economically identified.

- A manufacturer of a complex form of industrial sewing machine wants to identify user-developed solutions to a machine failure problem which is painfully common in the field - but which he has been unable to replicate and solve in his lab. Since each failure involves a broken part which must be replaced with a new one supplied by the manufacturer, the manufacturer insightfully notes that any user who has in fact successfully solved the problem will as a consequence order fewer of this particular repair part. A scan of computerized order data identifies a few users who do in fact show an abrupt drop in orders of the part at issue, and contact with these show that some had indeed solved the problem in a way useful to the manufacturer.

Signals exist in many cases, but it requires a creative effort to think of what they might be - and then some empirical work to see if a signal is in fact useful. For example, individual consumers who develop commercially promising "do-it-yourself" tools might proudly make themselves known in the "readers suggest" columns of home handyman journals - or they might not. A few calls to the editors of such columns would probably tell the tale.

When a "natural" signal does exist, further thinking must be done to decide whether to base one's search strategy on that signal and/or whether it is in net more cost effective to induce a signal tailor-made to one's own

purpose. Sometimes naturally occurring signals are driven by such strong inducements that it would be hard to generate an effective 'tailored' inducement if that inducement ran in any way counter to the naturally occurring one. For example, the incentives for scientific priority driving academic scientists are so strong it is hard to imagine a counter inducement which could induce them to delay publishing their results - even if such publication vitiated the patent protection available to potentially interested manufacturers. Similarly, the benefit user-developers of process machinery may get from keeping their innovation secret from competitors may be so large that a manufacturer could not economically offer an inducement large enough to induce that user-innovator to reveal his development.

#### Acquiring User-Developed Products and Product Concepts

Obviously, not all user-developed products identified by the methods just discussed will have sufficient commercial promise to interest a manufacturer. Therefore, likely candidate products should receive the same careful marketing scrutiny which marketing texts prescribe for product prototypes developed in the manufacturer's own laboratories. It is important to note that this analysis may often reveal that the manufacturer would be best served by adopting only some aspects of the user-developed product - loosely termed here the 'product concept.'

Manufacturers may often wish to only partially adopt user-developed products simply because users' and manufacturers' requirements for essentially the same new product often differ in detail - and users have developed the product to meet their requirements only. Thus a cake mix manufacturer may want to adopt the flavor, texture, and visual characteristics of a new user-developed cake, but will also want to modify the specifics of the user recipe so as to lessen manufacturing costs, increase shelf life, etc. Conversely, of course, when the detailed product requirements of user and manufacturer are quite similar, the manu-

facturer can obtain a product suitable for his purposes by simply adopting the user-developed product unchanged. Such has been found to often be the case in, for example, some categories of user-developed process machinery.

When a manufacturer decides that he does want to commercialize all of or aspects of a user-developed product he next turns to the second and final marketing research task unique to dealing with products developed outside his own firm - product acquisition. As we will explore, - users and manufacturers will often both benefit from the commercialization of user-developed technology, and the basis for transfer under conditions of mutual cooperation therefore is frequently present. If this possibility is to be realized, however, it is important for both user and manufacturer to be familiar with their respective legal rights with regard to an innovation, so that negotiation can proceed on a realistic basis.

Society's legal protection for innovators tries to steer a course between two conflicting objectives. On the other hand, it wants to give innovators enough protection from would-be imitators to make investment in innovation pay. On the other hand, once an innovation has been developed, maximum social benefit is obtained by allowing all comers free access to it so that it is exploited as widely and fully as possible. One can easily see the inherent conflict in these two objectives by a simple example: If an innovator benefits from a process innovation by charging a 5% royalty to those who would use it, he insures that those for whom it produces a return of 5% or less will not adopt it, with a consequent loss of benefit potentially available from that innovation. Perhaps because of the mixed economic consequences of providing protection to innovators society has provided only two imperfectly functioning legal mechanisms - patents and trade secrets - which innovators may use to protect their innovations from would-be imitators.

In essence, the federal patent system offers an innovator the temporary legal right to prevent others from using his patented knowledge and/or to charge for its use. In exchange for this privilege, society attempts to insure that any interested imitators get free and convenient access to the patented knowledge by requiring that the innovator publish it in the patent in a manner usable by anyone ordinarily skilled in the art.

The type of product which a patent grant is designed to protect is severely limited. Protection is offered only to explicitly described technical means to achieving a useful end - given that the means is of sufficient novelty and usefulness to be legally deemed an invention. Thus, patents cannot be used to protect valuable products which do not include a technical aspect deemed sufficiently novel to constitute invention. Therefore, patent protection may not apply to the user-developed product - or the particular aspect of that product - which a manufacturer is interested in. Even if it does, however, and even if the product at issue is in fact patented - both user and manufacturer should be aware that the real-world protection patents afford is often quite imperfect for several reasons. First, U.S. patent law places the burden of detecting and prosecuting an infringement on the patentee. Thus, the practical benefits of a patent are often only realizable if one is willing to expend considerable time and money in their defense. Second, patents - determined administratively to be valid before issue under the U.S. Patent System - are more often than not found to be not valid and/or not infringed by U.S. courts when brought before them. (11) Because of these constraints plus the likelihood that imitators can "invent around" the particular means protected by the patent, innovators do not appear to rely very much on patent protection in most technical fields. (12)

In contrast to the patent system's protection of publicly available knowledge, users can attempt to protect products they develop from interested imitators by keeping their knowledge secret. The possessor of such a trade secret has an indefinite period of exclusive use of his invention or discovery. State trade secret legislation allows him to keep the information entirely secret or to make legally binding contracts with others in which the secret is revealed in exchange for a fee or other consideration and a commitment to keep the information secret. A trade secret possessor may take legal steps to prevent its use by others if they can be shown to have discovered the secret through unfair and dishonest means such as theft or breach of a contract promising to keep it secret. Note, however, that the possessor has no property rights in the secret knowledge itself. If an manufacturer discovers the secret by legal means such as reverse engineering, the innovator has no recourse.

Protection via trade secrecy law is an option only for innovations which can in fact be kept secret. In practice, therefore, trade secrets have proven to be effective only with regard to product innovations incorporating various technological barriers to analysis, or with regard to process innovations which can be hidden from public view. Even here, however, protection is in practice imperfect. In some industries, notably semiconductors, certain companies specialize in circumventing the technical barriers to imitation erected by innovators, analyzing and reverse engineering the innovative product and then selling the innovator's hard-won knowledge to interested imitators. Sometimes secret process innovations will also be discoverable by analyzing the chemical or mechanical traces left in the manufactured product output (we find traces of x solvent in the plastic so they must have developed x process; the mold marks left on the product indicate a novel mold was used of construction z)

or by noticing unusual inputs to the factor containing the secret process (why are they buying so much platinum?). More often, however, such process secrets are eventually revealed by people who shared in the secret of the innovating company and then left. If such breaches of confidence can be traced and proven, the innovating company can use and enjoin the resulting imitation, but often the evidence is not so clear.

It is important to determine the actual level and type of legal protection an innovator enjoys in each instance in which a manufacturer is considering commercializing all of or aspects of a user-developed product. A timely assessment can help both parties identify and plan against any potential legal problems. This is especially important since a fear of legal problems seems to induce many firms to avoid even considering outside new product ideas - especially those submitted by individual consumers. (In fact it is true that even unsolicited suggestions from individual consumers can be seen by the courts as having the status and protection of trade secrets. (13) On the other hand, it is also true that appropriate legal steps taken in advance can allow a firm to examine such consumer suggestions without legal jeopardy. For example, a phrase in the entry blank to the Pillsbury Bake-Off provides that company with protection it deems adequate.)

Of course, more than legal rights are involved in a decision of how to proceed with commercialization of user-developed product. Although legal analysis will often show that a manufacturer may proceed without getting permission from the user or paying him - or even informing him - a manufacturer will find that industrial users especially will usually welcome the manufacturing interest in commercializing the product they have developed and be willing to assist his efforts by transferring engineering drawings and such without compensation. Upon reflection, this cooperative attitude is easy to

understand: Both innovating user and manufacturer often benefit from the commercialization of a user-developed product. Consider the matter in terms of the two 'situations in which users will have an incentive to develop products' discussed at the start of this paper. If, first, the user gained no competitive advantage by developing the product himself, but simply developed it because he needed it, he will usually gain by having some other firm take the task of manufacture off his shoulders. Learning curve considerations alone should allow a commercializer to ultimately provide the innovating user with a cheaper (and perhaps better) version of his product than the one he had been building in-house. If, on the other hand, the user initially built the product himself in order to obtain a competitive advantage he may be willing to assist with commercialization a few years later. This is so because the initial advantage gained by having exclusive use of a particular product or process often fades in time, perhaps because the secret has leaked to competitors or because competitors have independently developed equivalents. Under such circumstances it can pay the innovating user to help an interested commercializer and thereby insure that the commercial version is compatible with his internally developed product or process rather than with that of a competitor. Of course, sometimes the user may oppose commercialization of a product he has developed. But, as we have shown in this section, the manufacturer might well still find it feasible and appropriate to proceed.

#### Suggestions for Further Research

In this article I have outlined the elements and operating principles of some methods for systematically identifying and acquiring user-developed products and product concepts. What is needed next, in my view, is a body of experiments in which the characteristics and cost-effectiveness of methods for identifying user-developed products are systematically explored.

As an additional promising area of research, one might consider not only methods to identify user-developed products already made, but also methods to increase product-development activity by users. Based on the finding discussed previously that users innovate 'if and as it pays', it is logical that one may increase user innovative activity either by increasing users' innovation benefit and/or by lowering their costs. As an illustration of the likely effects of increasing benefit, consider the probable impact of the inducements offered by Pillsbury in its Bake-Off contest. Surely some of the entries were developed in response to that inducement rather than simply taken off the shelf and submitted in response to it. And, as to the potential effects of lowering innovation costs, consider a recent study (14) which showed that the firm whose equipment lent itself most economically to user experimentation benefited from the largest number of related, commercially successful user-developed products.

## Notes and References

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