

# Micropayments: An Idea Whose Time Has Passed Twice?

**D**uring the dot-com boom, many predicted that micropayments would soon let Web sites sell all sorts of things individually. People could buy magazines article by article, or music a bar at a time, if they wanted. In 1998, Jakob Nielsen wrote that “most

sites that are not financed through traditional product sales will move to micropayments in less than two years.”<sup>1</sup> MIT’s Nicholas Negroponte predicted the same year that “you’re going to see, within the next year, an extraordinary movement on the Web of systems for micropayments.”<sup>2</sup>

Well, not much happened. Payments of less than \$5 generated 1 percent of online content sales in 2002, adding up to only US\$9.6 million.<sup>3</sup> Many small sites have either disappeared or given up on attempts to charge, and many useful Web sites still don’t have a straightforward way to support themselves.

As advertising stopped being the magic solution for Web business plans, however, some entrepreneurs took another look at small-scale payment schemes. Figure 1 charts the number of uses of the word “micropayments” in business news articles on Lexis/Nexis over the past ten years. In 2002–2003, there was another bump.

## What next?

Why would we want a new technology for micropayments? The simple answer is that existing payment systems can’t handle very small transaction amounts.

With 35 million users, Paypal is

the best known online payment system; it charges 30 cents plus 2.9 percent of each transaction. Mastercard and Visa also typically charge around 2 percent of the value plus 25 to 30 cents per transaction. Micropayment systems tend to collect 15 percent of the amount transferred, but with no minimum charge. Thus, they can support small sales—say 25 or 50 cents—which other payment systems can’t handle.

With that incentive, and some new ideas, a few new startups appeared in the past two years. Perhaps the most interesting is Peppercoin, which relies on averaging and statistics. The company bills users the exact amount, but rather than paying a merchant for each transaction, Peppercoin randomly picks one of every hundred transactions and pays 100 times as much. This model assumes that merchants would rather process a smaller number of larger transactions.

The idea is intriguing, although I’m not sure I understand how it would work if, for example, a user wanted a refund for not receiving what was promised in some transaction. If this wasn’t one of the 1/100 of the transactions picked for payment, would Peppercoin pay the refund? That would seem to be the model: and if one of the selected

transactions failed, the merchant would presumably refund 100 times the price.

Bitpass, another new company, charges 15 percent for transactions up to \$5, and 50 cents plus 5 percent for larger amounts. Again, the hope is that small or nonexistent minimum charges will make it practical to sell things online for a few cents. Paypal is also trying to join the micropayment game, having recently announced that new merchant terms (2.5 percent and 9 cents per transaction) for online music stores only.

## Will people be interested?

Clay Shirky (an NYU professor and Internet consultant) recently posted a very popular article in which he argues that micropayments don’t make sense because the cost of making the decision to pay a few cents is too high.<sup>4</sup> He points to the inherent contradiction between saying “this is so cheap you don’t have to think about it” and “in order to get this you must decide to buy it and click on something to pay.” It takes more time to decide to buy a newspaper one story at a time than it does to decide to buy the whole paper. Will the money saved buying only a piece of the paper compensate for the time spent choosing it?

In looking at consumers’ choices when buying telephone service, University of Minnesota’s Andrew Odlyzko has identified a different problem—namely, a tendency toward risk aversion.<sup>5</sup> He found that, given a choice, people frequently buy unlimited monthly service even if per-call service would be cheaper. Users generally don’t like the uncer-

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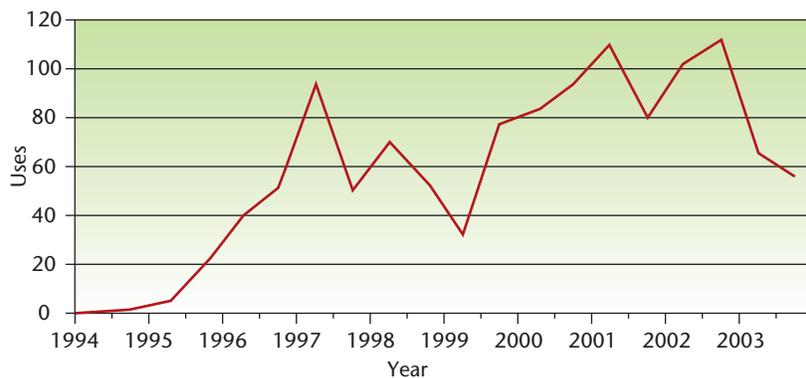


Figure 1. Use of the term “micropayments” in business press. The Lexis/Nexis database shows a recent bump in the use of the term, indicating a possible resurgence in popularity.

tainty of not knowing how high the bill will be, and they like the feeling that they can make all the calls they want without an unpleasant surprise at month’s end.

Discussing micropayments more generally, Odlyzko says that economics, psychology, and sociology all argue against them.<sup>6</sup> Economically, the advantages of selling bundles outweigh the benefits of letting people buy a little bit at a time. Psychologically, people don’t like the sense of a ticking clock or running meter, or the constant pressure to make purchasing decisions. Sociologically, we have plenty of ways to pay for things, and without an existing user group, people are reluctant to learn a new way to pay that is not yet popular.

Nick Szabo finds yet another difficulty: people resent being cheated, and it’s too hard to figure out whether you’re being overcharged in a micropayment world.<sup>7</sup> If I pay US\$50 per year for an online newspaper, life is simple: if I can read it whenever I want, I’ve gotten what I paid for. If I were paying 2 cents per article to read ten articles a day, how would I know if the charges were right? I’d have to keep track of how many articles I read, and the hassle of counting them would probably cause me to cancel the service. If the seller were Dow Jones or *The New York*

*Times*, I’d probably trust them, just as I don’t bother reading my own gas meter, but many Web vendors don’t have any reputation I can rely on.

The advantages of “bundling” also argue against micropayments. Hal Varian points out that sometimes it’s not possible to justify publishing a magazine on an article-by-article basis because purchasers place different values on each article.<sup>8</sup> To simplify, imagine that article A is worth \$5 to Jones and \$3 to Smith, and that the author and printer need \$7 to make the article worth publishing. There is no price at which things work out for all: only Jones will buy at \$5, and Smith and Jones will both buy at \$3, but that brings in only \$6. It might work if we could enforce nontransferability and charge Jones more than Smith—this is what airlines do, and why they won’t let you resell your ticket—but magazine publishers can’t do that. As Varian explains, what they can do is bundle: there is likely to be another article B, which is worth \$5 to Smith and \$3 to Jones. Now the publisher can charge \$7.50 for the two articles together, and both Smith and Jones will buy (because each values the pair at \$8). Bundling thus enables a transaction that won’t work with individual payments.

All of these arguments suggest that micropayments are unlikely to

succeed as a way to sell low-priced content. Is there some other reason they might succeed?

## Anonymity

Besides being possible in small units, cash payments give users the advantage of anonymity. When I put 35 cents in a newspaper vending machine, nobody takes my name to send me junk mail urging me to subscribe. Sellers don’t like anonymity (nor, in large amounts, do the tax authorities), but the explosion of commercial spam has made many users anxious to avoid having their names and addresses circulated more than necessary. Earlier in the life of email, a colleague once replied to a complaint that outside companies were sending us occasional junk email by saying, “this is why God gave you the ‘d’ key.” At 50 or more junk messages a day, however, that’s no longer a good enough answer.

Could micropayments allow us to buy content anonymously? Can users’ preference for anonymity outweigh sellers’ interest in being able to pursue customers, or the advantages (even to the purchaser) of bundled prices and tailored marketing? Some are trying to make it so.

For example, Centipix is a micropayment company that is oriented toward privacy. It is prepared to assure merchants that each cash transfer is valid, without necessarily saying from whom it came. The company imposes no per-transaction fees, and its rates start at 40 percent for one-cent transactions, scaling down to 3 percent for transactions of \$10 or more.

Could we have anonymity without micropayments by using proxy purchasing software? Users could tell the proxy server what they wanted, and it could buy the object and forward it. However, this loses the advantages of bundling; if different purchasers want different stories from a newspaper, for example, it would be hard for the proxy server to figure out that it might be cheaper to

buy the whole paper. Perhaps, if only a small purchase is being made, the seller might be willing to forego the knowledge of who bought it.

Would anonymous payments mean the loss of quantity discounts? Decades before frequent flier miles, lots of people collected “Green Stamps” or “Plaid Stamps,” which they got when they made purchases. This was an era when most people paid cash for purchases. Nobody kept track of your name; you just pasted your stamps in books, and when you collected enough books, you could trade them for merchandise. As proof of the program’s popularity, S&H, the owner of Green Stamps, printed more stamps in 1964 than the US Post Office. It was a consumer-loyalty program that never knew your name. (By the way, if you have some old stamp books in your attic, they’re still good.)

So it is possible to build a system that collects small amounts of money anonymously and can still prove the total amount bought (in a modern world, we’d use cryptographic cookies sent back to the user’s machine).

**W**ill anonymous micropayments work out? Unfortunately, I am fairly pessimistic. Both the user and the seller forfeit something in going to anonymous payments. The user gives up only the ability to get personalized recommendations and tailored marketing, but the seller loses both the marketing information, which is tolerable, and the right to impose detailed usage requirements, which might not be acceptable.

At present, the online entertainment industry’s major thrust is to maintain detailed control over its information’s use and transfer. Just as Microsoft insists that it licenses rather than sells its software, vendors of online music and videos will argue that they are not using the book model but a seat-reservation-by-name

model. Instead of selling an object you can use, pass on, resell at a flea market, or whatever, they want to sell you the right to see or hear the object in some limited place or time, imposing a further transaction to adjust those limits. Even if customers would like an anonymous micropayments model, sellers will resist.

Perhaps the best hope is an experiment by somebody who doesn’t

4. C. Shirky, “Fame vs. Fortune: Micropayments and Free Content,” *Clay Shirky’s Writings About the Internet*, Sept. 2003; [www.shirky.com/writings/fame\\_vs\\_fortune.html](http://www.shirky.com/writings/fame_vs_fortune.html).
5. P.C. Fishburn, A.M. Odlyzko, and R.C. Siders, “Fixed Fee Versus Unit Pricing for Information Goods: Competition, Equilibria, and Price Wars,” *First Monday*, vol. 2, no. 7, July 1997; [www.firstmonday.org/](http://www.firstmonday.org/)

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have much lose: a vendor of online information that isn’t really worth full-scale rights-management protection. Shareware is an obvious example; others include marginal music bands or authors who can’t attract traditional publishers.

Unfortunately, Odlyzko’s sociological argument comes into play here: if the only users are marginal, not enough people will use the system to gain acceptance. Finding a seller with a big enough market to make micropayments popular and a small enough market to be willing to use them is a tough problem.

In the end, I agree with Odlyzko’s adaptation of a saying about gallium arsenide components: “Micropayments are the technology of the future, and always will be.”<sup>9</sup> □

### References

1. J. Nielsen, “The Case for Micropayments,” *Jakob Nielsen’s AlertBox*, 25 Jan. 1998; [www.useit.com/alertbox/980125.html](http://www.useit.com/alertbox/980125.html).
2. G. Smith, “Perspective: A Penny-Ante Business Worth Billions,” *Business Week*, 23 Apr. 2001.
3. *Online Paid Content: U.S. Market Spending Report*, Online Publishers Assoc., Mar. 2003.

[issues/issue2\\_7/odlyzko/](http://issues/issue2_7/odlyzko/).

6. A.M. Odlyzko, “The Case Against Micropayments,” *Proc. 7th Int’l Conf. Financial Cryptography (FC’03)*, LNCS 2742, R.N. Wright, ed., Springer, 2003, pp. 77-83.
7. N. Szabo, “The Mental Accounting Barrier to Micropayments,” *Nick Szabo’s Essays, Papers, and Concise Tutorials*, 1996; <http://szabo.best.vwh.net/micropayments.html>.
8. C. Shapiro and H. Varian, *Information Rules*, Harvard Business School Press, 1998.
9. A.M. Odlyzko, “The Case Against Micropayments,” *Proc. Financial Cryptography: 7th Int’l Conf. (FC ‘03)*, LNCS 2742, R.N. Wright, ed., Springer, 2003, pp. 77-83; [www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf](http://www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf).

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