OOPS! WHAT BUSINESSWEEK LEFT OUT

Now that BusinessWeek has run a cover story on object-oriented programming it's no longer necessary to convince people that object-orientation is the fundamental paradigm for the future. It should speed up developers' time to market, improve the quality of their code and allow customers to adopt and adapt high-tech solutions more quickly and reliably. But it's still little understood, a buzzword for marketers rather than a guide for implementers. As it enters the mainstream, what is the mainstream doing with it? Mostly, just paying lip service. The BusinessWeek article, in particular, focused on benefits and ignored most of the challenges. It failed to address fully the business implications, both for vendors (page 3) and for users (page 8).

One challenge is fairly straightforward (and duly noted by BW). The benefits come only after hard work. Objects must be developed especially carefully and designed for reuse; you can be object-oriented without being easily reusable (or worth reusing). And you can be reused without being object-oriented; as Lotus likes to point out, one of the most reused chunks of code is 1-2-3, reused in a multitude of applications and executable models.

A second challenge is the practical difficulties of reuse even with well-designed reusable objects. One size does not fit all, in objects or clothes. A size-6 dress is reusable, but only by size-6 people. And it should color-coordinate properly with the reusable shoes (also the right size), sweater and scarf. The buttons are reusable too, of course, but they must match each other and the dress. In other words, objects aren't magic.

This is why objects do not spell the end of proprietary advantage, although they will dramatically shift the balance of power towards application vendors, implementers and capable users -- in other words, those who know how to use objects rather than those who create them. Objects will also speed up the cycle time, making it harder for anyone to maintain a competitive advantage.

In knowledge there is power

The underlying problem is knowing which objects to use. It's fairly simple to create, classify and find a paragraph object, but basically we'll end up dealing with semantics. Precisely what kind of "employee" object did you have in mind? What's a "user downloading an application" object -- an important consideration for network-management tools such as Network General's Sniffer or

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the new line from Tivoli Systems? Classifying objects will be just as much an art as "systems integration" today. Knowledge of how objects work together, and even better, innovation in creating new systems out of them, will be the key to competitive advantage. Meanwhile, there will no doubt be object information services and object specialists, just as there are experts in other fields, whose specialty will be finding (rather than writing) just the right objects for any given task.

An architecture lesson (for Apple and IBM)

What about the much-touted object-oriented development environments of the future? Because they will be object-oriented, their components will be replaceable -- much as Lotus wants to "replace" (or forestall) the forthcoming mail module in Microsoft Windows (page 3). Yes, the environments will make some money for their owners, but they won't give them the kind of lock on a marketplace that Microsoft had with DOS (or Lotus with 1-2-3). Those days are over. Instead, class libraries that handle functions once found in the operating system, as well as application functions, will be the focus of competitive differentiation -- and will operate across operating systems. They will be proprietary (despite common interchange standards), and the most popular will be widely used and licensed.

Specifically, consider Pink from Apple and IBM. It will gain customer acceptance only if it's sufficiently "open" -- i.e., if it's broadly available and if third parties can supply components (objects) for it. But that means that IBM and Apple will supply only a small part of the value-added. Why bother? Well, somebody's got to do it, and both companies have a revenue base to protect and grow.

So is nirvana for customers at hand, with the announcement that the Object Management Group will produce a single unified spec for the Object Request Broker, which will allow all systems to interoperate smoothly across time, environments and space? Not quite. The spec is only a spec, not a working implementation, and it addresses only interoperability, not the operation or design of the components themselves.

Thus there will still be room (and need) for system software developers to provide efficient, robust platforms, application developers to provide the individual components, and business analysts to fit them all together. While the committee effort may come up with a unifying solution for interoperability, components designed to work together will still do so more effectively than components standardized to work together. This is a point Apple, IBM and Microsoft will certainly stress.

As customers and software developers are discovering, standards are insufficient to guarantee much in the way of real usefulness. One DOS is worth 20 versions of UNIX. Thus customers will still tend to go for widely used "proprietary" solutions over standards efforts. On the other hand, they will be extremely reluctant to adopt proprietary systems until they are widely used -- a catch that means we'll have more marketing, more consortia and more bandwagons than ever. As any single vendor's products become too widely used, committees and counterconsortia will develop to diminish that vendor's hold on its market.
LOTUS'S OPEN MESSAGING INTERFACE

Exemplifying the trend towards object-oriented environments, Lotus has just announced its Open Messaging Interface, which amounts to specs for a module that you could include in an object-oriented operating system. (You could also use it from a procedural environment as a dynamic link library or other concurrently operating component.) Moreover, it is not OS-specific and is designed to operate within any OS -- although implementations, of course, will rely on the local OS for system services. For mail functions, the OMI acts as an intermediary between the application and the OS.

Thus applications mail-enabled with OMI would no longer need to be OS-specific as far as the mail functions go, but would instead have to be OMI-specific -- a reasonable trade-off if OMI is broadly available. For now, OMI comes complete with support from Apple and IBM and a lukewarm endorsement from Novell -- in effect: "If it succeeds, we'll support it."

Lotus's OMI announcement precedes, purposely, an October 9 seminar Microsoft will hold to rally developer support for its own Mail API and service, which will be part of Windows. There's not much difference between what each can do, but the details will require developers to write for two "standards" if they can't be resolved. Neither side looks likely to back down. (Still, things will be a lot easier if the calls of each can at least be easily mapped into the other. Both sides will attend each other's meetings so there is some hope of that.)

The inevitable trade-off

The Open Messaging Interface lists the services mail should provide and defines how to call them. Lotus is encouraging all comers to write applications or user agents that call on OMI services, and also mail engines or servers that provide such services. By contrast, Microsoft is offering one implementation, its own, for one basic operating system/environment, its own. In that sense, the Lotus offering is more "open," while Microsoft's MAPI is optimized for Windows.

The trade-off for the commonality across operating systems, as Microsoft's Cameron Myhrvold hastens to point out, is lack of support for the full (proprietary) facilities of any single one. Specifically, he says, OMI doesn't support OLE within message bodies, just in attachments. Nor does it support forthcoming security features of Windows (how could it?).

What you see isn't what I see

The basic issue is not just one company against another, but one view of the world against another -- from where each sits, of course. Microsoft wants to put as many common services as possible into its object-oriented operating system; Lotus wants to leave the OS kernels to others -- IBM, Apple and Microsoft, for example -- but to play a strong role in defining at least the interface of common-service objects such as mail in what used to be the OS.

Thus, while OS vendors and everyone else (even BusinessWeek) profess support for object-oriented operating systems, they carry the seeds of destruction (or at least commodityhood) for the OS vendors -- including not just Microsoft but also Apple and IBM with Pink. By definition, because they are
built of modules, object-oriented operating systems need not be monolithic. In fact, they are better described as a kernel plus common service objects, as in the Object Management Group's reference architecture. (See page 5.)

These common services first showed up as parts of individual applications, such as mail. Then, as OSes expanded to incorporate more and more services, they became components of full-featured operating systems such as UNIX -- in theory, at least. (Of course, OS vendors offering mail -- as Apple has long promised/threatened -- may meet resistance from mail-application vendors.) Now, as objects, common services are operating system modules that can be supplied by anyone and work anywhere (subject to implementation details).

This is not a new idea, of course. Microsoft has been talking about an "installable file system" for some time -- but only Saros, using a SQL Server database underneath, has taken up the challenge. That's just another module that can be provided by a third party. We expect to see more of them, perhaps based on object-oriented databases, sometime soon. In fact, if it's successful with OMI, Lotus could conceivably be emboldened to offer the database underlying Notes, in a generalized version, as an installable object/file manager.

No winners?

All this means that the balance of power will shift and dissipate, as no single vendor controls the broad range of services once provided by, say, Microsoft, or Apple or IBM. Just as hardware platforms became commodities, so will the operating system kernels that sit directly on top of them. So, too, will the operating system services, since a number of vendors will vie to provide implementations that conform to broadly available interface specs for each module. In the case of the Open Messaging Interface, for example, there are three forms in which it will be available (if Lotus's crusade works): 

- as part of a mail package such as Notes or cc:Mail, callable both by its own user agent and by other applications and user agents;
- as part of an operating system, such as OS/2 and Macintosh (and possibly NetWare);
- as a separate mail engine supplied by a third party and installable within an operating system/environment, such as Windows.

Here and now

In practical terms, what's available now? The OMI project started early this year when Lotus started to build a consistent interface for the mail engines within cc:Mail and Notes, as well as the message manager it is developing for IBM within OS/2. That would allow its other applications, 1-2-3, Ami Pro and Freelance, as well as OS/2 applications, to use any of them as a mail back-end. The OMI team took cc:Mail's object-oriented Windows API (see Release 1.0, 11-90) as the starting point. (In essence, that meant carving out and defining clean interfaces to a subset of the broader Notes functionality.)

Then one day it became clear that with a little extra work those interfaces could be made public for even broader use -- and some benefit to Lotus over-
all. Lotus opened discussions on the spec with Apple and IBM, seeking broad support, outside input and political correctness. The draft specification drawn up by those three companies was hastily sent out a few days before the announcement on September 23 to a variety of third parties (including Microsoft, which complained about the short notice). Lotus is now collecting feedback. It will hold an open meeting in early December to go over the feedback and draft a final spec. (The precise date is not yet decided, but it should be the second week of December in Boston.)

The spec will be maintained but not owned, exactly, by Lotus. Anyone is free to build products that use it: either mail tools that implement services it describes, or applications that use such services by making OMI calls. Who will certify that an application or mail service is compliant? Properly and laudably, Lotus will leave that to the market. Anyone who offers an incompatible mail client or engine will be found out soon enough by punctilious testing labs, pesky reviewers or angry developers and users with CompuServe accounts. (Just try selling a noncompliant DOS or Windows application nowadays; it's the same idea.)

The big issue is Lotus's own commitment to openness: Will it properly support third parties, even competitors? Will it really put all the interface in the public domain? (Some previous efforts, such as LEAF, languished from lack of openness and broad support.) We're sure Lotus has considered these issues, and we assume that Lotus went to IBM and Apple not only for support, but as a way of forcing itself to be honest.

For Lotus, buying Novell would have been fighting fire with fire. The Open Messaging Interface, by contrast, is competing against fire with electricity.

Temporary advantage

For the moment, the first two implementations will be from Lotus, within Notes and cc:Mail. Beta versions of cc:Mail for Windows, which exposes an OMI interface (although it will use the old calls inside until the final version), are expected by year-end; beta versions of OMI-supporting Notes should show up early next year.

Then, an application could use OMI services by replacing the cc:Mail user agent with its own, and using its engine as a dynamic link library. Juan could try out a model with his spreadsheet and then send it to Alice by selecting the "send" item on his spreadsheet menu. That "send" was newly installed on his spreadsheet when it was mail-enabled; it has calls to OMI and thus to the resident mail engine. In this case, Juan's spreadsheet can now call the OMI and send a document through the cc:Mail server directly, without having to bother with the cc:Mail user interface. By selecting send Juan gets a dialogue box, which allows him to specify Alice's name and address, or to select them (another set of keystrokes) from his address book. (For the immediate future, Juan does have to own a full copy of cc:Mail or Notes to get an OMI server.)

Meanwhile, IBM hopes to offer some preliminary OMI materials at its OS/2 developers' conference in November. It's not yet clear when IBM and Apple
will have OMI server implementations in their operating systems. Eventually, Lotus could offer an OMI mail engine as a discrete module, but it has announced no plans to. Other potential players include Novell and a variety of mail vendors, including implementers of X.400 services.

Object-oriented architecture in context

How do all these components fit in an object-oriented world? Basically, the platform (OS and kernel) performs the physical processing. The objects, either common services that used to be part of the operating system, or specific services that used to be called applications, specify and control the processing tasks, such as database activities, spreadsheet calculations or delivery of mail.

And how do they conform to the Object Management Group's model architecture? The OMG's Object Request Broker (ORB) is itself a network/operating system-type service: It manages dynamic binding of methods (code) to objects, the flow of messages among objects and transfers messages to and from remote systems. It may itself call upon both kernel services and other objects, such as a database that manages names, code modules or system locations, to perform its tasks. The Object Request Broker also decrees interface specs, defining how messages should be addressed, how selection parameters should be expressed and so on for any ORB to handle them.

There will be multiple implementations of the ORB for each platform/OS combination. Thus the ORB is not an operating system, but a message-manager that sits on top of a variety of operating systems (and partly takes away the proprietary advantages of any OS). It also handles dynamic binding and other niceties of object-orientation.

The value-added of any particular environment will lie in the objects in it (which will be made as portable as possible by their vendors). In this light, consider Sun(Soft)'s new Distributed Objects Everywhere environment. If you look at the announcement carefully, you can see it's a UNIX kernel plus object-oriented user interface tools plus ToolTalk, a cross-platform message-handling system (sort of a precursor to the ORB). But most of the object-oriented modules that ToolTalk will allow you to use will come from third parties. One of the first could indeed be an implementation of the Open Messaging Interface (a front-end to the existing UNIX mail server).

OMI -- interface for a mail broker

While the ORB handles messages among objects, OMI mail services handle the larger-scale messages that people send to each other. However, there's more similarity than one might think at first, and agents for humans will increasingly get into the act, both as recipients and senders of messages. (See the discussions of Beyond Mail and Wijit; Release 1.0, 11-90.) A message might be sent to an application requesting a certain set of data, or an application might check some data periodically and send a user a message when it reached certain values (or ratios). But these messages typically have a human at one end or the other, as opposed to object-oriented messages between applications.
Client-side tasks

The OMI spec is an interface both to server tasks of e-mail, such as transport, remote delivery or address resolution, and to client-side tasks. Client-side (or user-agent) tasks include local storage and classification of messages in "folders;" address-book management of a database of names, aliases and addresses, optionally extendable to include parameters such as interests of a recipient, group membership, rank, customer priority or whatever matters to a user; tickler files; and forwarding in the user sense. (On the server, "forward" means moving a message from mail-server to mail-server; at the client, it means, say, "Take this message addressed to me and send it on to Juan and copy it to Alice."

Any application can take advantage of these generic services without bothering to incorporate them itself. Then, most of our (currently) monolithic applications will seamlessly incorporate messaging facilities. You can send out spreadsheets or other application output to anyone in your address book, store them in a mail folder by category, or put them in a tickler file to handle later. Will people start using their handy mailbox filing system instead of DOS? Why not?

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1 Confusingly, the code that implements the OMI server is typically resident on the physical client; it is a server to the calling application, but it is a client, or "user-agent," to a mail server on a network or host. To avoid client-server confusion, it will probably be called a mail engine. This OMI mail engine could be a standalone module, a dynamic link library or a TSR; it could also be an OS component in the Microsoft Windows model; or it could be part of cc:Mail or Notes in the Lotus model -- unless Lotus makes a mail engine available. In the past, mail engines were hidden away within mail "applications" and could not be used by outside agents.
Everyone is excited about the potential for object-orientation. But how can we be sure of the ultimate impact? Despite the billions of dollars of investment in information technology over the past decades, most studies show little overall impact on US productivity. Certainly there's not the sort of clear evidence of a return you'd want for investing millions or billions of dollars. There's just a lot of anecdotes; we can see productivity in the trees but generally not in the statistical forests. Where did it go?

This issue aroused more interest, comment and passionate argument than anything said by John Sculley, Bill Gates or Jim Cannavino at the recent Agenda '92 conference. But no one, including the speaker who posed the question, Harvard B-School economist Gary Loveman, could come up with much of an answer. Other scholars taking a rigorous look at the issue include Eric Clemons, professor of Decision Sciences at Wharton; Thomas Malone, Patrick McGovern Professor of Information Systems at the MIT Sloan School and director of the Coordination Science Center at MIT; and Erik Brynjolfsson, an assistant professor at Sloan and a member of the Coordination Science Center. (We have asked Malone, also known as the father of Information Lens, to speak on the coordination and productivity at the forthcoming PC Forum; see page 15.) Malone and Clemons spoke at a recent meeting of the Global Business Network in Atlanta.

From their contributions and others, we have synthesized some possible explanations for the seeming lack of impact from IT investments. It seems to be more a question of what and where to measure than a true lack of impact. But whatever the reasons, it's clear that IT vendors need to do a better job of telling their story if they want to flourish over the next decade.

Where did it go?

The problem is that you can show productivity gains in individual cases, but they seem to vanish when you consider the economy as a whole. And even in individual cases, the gains usually dissipate as new techniques and practices percolate through an industry. So what's the point of all this investment? Although we know the benefits from experience and intuition, how can we sell them to customers? Loosely speaking, the factors offsetting those must-be-there productivity gains are as follows:

- As an industry gets more efficient the benefits are competed away. Visible productivity may go up but profits, the ultimate test, don't.

- It's a zero-sum game; the benefits to the winners are offset by the losses of the losers in a given industry. But it's still worth it for individual firms.

- Technology is misused or misapplied.

- The benefits are offset because the government's increasing "productivity" requires increasing productivity from business, which has to file more forms, obey more laws, take more precautions, generate "prophylactic" documentation, and so forth.
The benefits are offset because other factors (workforce education levels, other demographic factors, product liability costs, etc.) are decreasing productivity.

We're just not measuring the right things. Many benefits are experienced by consumers or workers, but have no economic (measurable) value.

The benefits will appear; give them time!

In summary, these items amount to:

- The benefits vanish because of competition.
- They're offset by other factors, including misuse of technology.
- The benefits are real but we can't measure them.
- Just wait!

How the benefits vanish (1): Consumers get them

Perhaps the most significant deterrent to visible productivity gains is the fact that our economy is already fairly efficient, and the gains are dissipated by effective competition. Take the celebrated case of McKesson Corporation, suggests Clemons, which automated its order-taking system in the mid-Seventies and now receives, confirms and bills 99 percent of its orders -- for drugs and health & beauty aids, primarily -- electronically. (If you're excited about the potential of Electronic Data Interchange, regard this as a cautionary tale.) Ten years later, in 1985, McKesson's market share had gone from around 20 percent... to around 20 percent. (It's now around 28 percent, through acquisitions.)

The only difference is that the industry -- drugs and health & beauty aids distribution -- now has fewer than 90 players, down from over 180 in 1975. The industry as a whole is more efficient, and productivity per employee and assets employed has improved. But margins are about the same; whatever gains existed have been competed away. The firms in the distribution business haven't benefited, although their customers, the independent drugstores, now have lower costs that enable them to compete with lower-margin drug chains and grocery stores.

Have consumers benefited from cheaper drugs and health & beauty aids? Not noticeably, but probably prices are lower than they would have been -- or rather, consumers have the option to buy at those prices from independent drugstores as well as from chains. Without the price breaks from the wholesalers, Clemons says, most of the independent drugstores would probably have gone under.

How the benefits vanish (2): Zero-sum gets them

A second variant is even more distressing. "Many, if not most, of the reasons for investing in information technology given by the articles in the business press involve taking profits from competitors rather than lowering costs," notes MIT's Brynjolfsson. Call it the Metaphor metaphor, as recounted by David Liddle of Metaphor and others. The companies that use the
Metaphor analysis tools increase their marketing skills dramatically, and sell more Pampers, Liquid Tide, Tampax or whatever. But the overall market size stays the same. Total revenues show no impact, nor do costs necessarily go down (as they did in the case of McKesson). One firm simply gains a little share at the expense of another. In the long run, the share-losers should be driven out of business and their assets employed elsewhere, presumably more productively. But there's no short-term impact on productivity on the industry as a whole.

Clemons points out that technology used to leverage other imbalances, rather than just to gain a temporary technology advantage, can provide a lasting competitive edge. He cites the difference between ATMs, where the machines are conduits or electronic links between vendor and customer, vs. airline computer reservation systems (CRSs), which are closer to electronic markets.

ATM systems may deliver the cash, but each bank still has a direct relationship with its own customers. By contrast, the reservation systems have successfully interposed themselves between the airlines and the travel agents; they control the travel agents, who in turn control the customers. Sabre and Apollo are consolidators and manipulators of information (as long as new regulations don't take their power away). Control of the information and the customers, not of the technology, gives them their edge.2 (Certainly the airlines would rather deal direct and avoid both CRS fees and travel-agent commissions, but the agents prefer the multiple-source CRSs, and the customers prefer the full-service travel agents.)

The Red Queen effect

Meanwhile, when an industry or company becomes more efficient, it loses employees who move to other jobs, where they may in fact lower productivity as they learn new jobs. In addition, they're probably working in less productive sectors that haven't yet automated. So will productivity go up when it's all over? In theory, yes.

But in fact, the world never stops moving. Thus, one paradoxical cost of innovation may be lower productivity. Depreciation schedules accelerate. Workers' skills and experience become irrelevant more quickly, and they spend more and more of their work time learning. Of course, the workers benefit from computer-based training and electronic "performance support" (in a future issue), but these benefits are offset by a faster and faster cycle time. In essence, we have a shorter and shorter time to get a return on any particular investment because the world is changing so quickly. We have to keep running faster and faster to stay in place -- the "Red Queen effect," as described (first) in "Through the Looking Glass" by noted business analyst Lewis Carroll.

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2 In this light, the recent repudiation of copyright for Yellow Pages information is significant and scary for would-be information vendors.
The result of easy-to-adopt technology is that instead of technology investment, we have technology arbitrage, where all you can hope to do is benefit from temporary imperfections and imbalances in the market before a new technology sweeps through an industry. We believe that this is partly true, but it neglects the role of good management and motivating leadership. Federal Express, for example, has benefited from a pretty long "market imperfection" as its competitors try to catch up.

Machine abuse

One popular complaint is that much new technology is misused. There are the obvious cases, such as our friends in Moscow who bought a pc more for show than for productivity. Their programmer was their driver (a more lucrative profession) who wrote programs when he wasn't needed behind the wheel. In economic terms, the pc lowered his productivity because drivers make more than programmers.

There are also the dp projects that never end, the systems that never get used, and the machines that never work. Then there are the "enhancements" of useless productivity: making stupid business plans look more beautiful with graphs and fonts, without improving the quality of the analysis or decisions based on it. Mass-produced memos or electronic mail waste more people's time reading them, or pile up unread. Similarly, pointless processes are automated but not redesigned or streamlined, as companies try to adopt technology without disruption. A little disruption -- rethinking of business processes and policies -- is key to making new technology useful.

More dangerously, as Doug Merchant of AT&T said at the GBN meeting, "Technology has increased the speed of decision-making to less than the half-life of dumb ideas, so that it's easier to do dumb things more quickly."

And finally there are frustrating tools such as automated answering systems. They save the salary of a receptionist ($30K a year, including benefits and overhead) at the expense of customers' and clients' time -- frequently as much as $100K a year -- plus potential revenues, coverage or other goodwill that may be lost when a customer, reporter or other caller gives up in fury.

IT pays for everything else

Investment technology may be carrying the burden of other factors that tend to decrease productivity, such as declining workforce education levels and other demographic factors, overall diminished work ethic, to say nothing of the impact of product liability litigation, environmental and safety requirements, etc. While health and safety regulations should tend to improve overall productivity, the concomitant paperwork and procedural bloat use up a lot of productivity that might otherwise be gained. We must now keep records for tens of different government agencies, as well as records to protect us in the event of lawsuits from customers, shareholders, employees, ex-employees, competitors and bystanders of all kinds. Moreover, the government itself has increased its "productivity," which enables it to spend more time occupying our time -- receiving, filing and possibly even analyzing our outputs.
Do YOU feel better?

Of course, one can argue that the economists and professors are simply missing the benefits by measuring the wrong things. They assure us they’re accounting for quality improvements, such as more powerful computers, better cars and healthier food. But is our only goal in economics to increase measurable production? What about pleasanter working conditions, more interesting tasks, more attractive reports?

On the consumer side, for example, ATMs have allowed consumers to get cash in more places at more times. They don’t (generally) pay more for this ability, but surely they benefit from it. (For the banks themselves, however, it has generally been a zero-sum game, sharing the same total market with better service.) In a similar vein, consumers have more choices in a variety of areas, from entertainment selections to frozen diet dinners, vegetable choppers, scented toilet bowl cleaners, personalized insurance policies and investment vehicles and new miracle ingredients. The daily life of an average US citizen is profoundly more agreeable than that of earlier generations (or of former Soviet citizens) in ways that simply can’t be measured by financial comparisons or quantitative measures of any kind. We have fast food instead of slow food (or home cooking, on the other hand). We can take overnight trips on a whim by paying up, or plan cheap vacations way ahead. Services are allocated to those who value them most, and suppliers’ returns are maximized even as competition keeps prices down.

Even when nothing more is produced, having the choice among a variety of goods is a direct benefit of information technology that may not be measurable. In this case the quicker feedback loop from customer to producer does not generate more products, but generates products that are more useful or satisfying to the consumers. Competition ensures that they do not pay more for that satisfaction, but it still exists.

The impact of time

Finally, productivity may be just a matter of time. As Malone explains elegantly, there are three (at least) stages in the dissemination of a new technology:

- **substitution.** People do the same thing the new way and reduce costs (or time). They drive instead of walk.

- **increased use.** People do more of the new thing, because it is cheap and the returns are higher. They drive further to an outlet store because the discounts on the goods purchased cover the costs of extra gas and time. City stores lose business.

- **creation of technology-intensive systems.** New systems and industries are built around the new technology. Companies build outlet stores (and new outlet-store companies are created) to respond to the new economic environment; people move to the suburbs.

In information technology, we’re still mostly in the first and second stages; people are automating what they already do. The real benefits start to appear mostly in stage three; in stage two, losers may offset winners.
The market comes home

Long run, consumers may trade goods for leisure, skewing apparent economic progress even further. As information technology allows firms to coordinate horizontally through the market instead of integrate vertically, firms will become smaller and more work will be accomplished through project teams, temporary consulting assignments, rather than through process-oriented, rigid business units. As we automate the routine, a larger proportion of resources, and especially human time, will go towards exception-handling. The workers may choose to work less, in a market where they can easily find temporary work when the mood strikes them or economic circumstances impel them to. We may even go back to a preindustrial situation where home and work are more integrated, Malone notes. (All this is far off, of course.)

In a world of greater efficiency and fluidity of information and capital (and easy transfer of ownership of physical assets), it may become harder and harder to build giant, cohesive industrial enterprises. There will always be brokers and intermediaries taking their cut and managing the arbitrage. As we move (long-term) towards a world of physical plenty through efficient use of resources, most people will be able to live quite comfortably with little effort; people will exercise personal preferences on whether to earn more or spend their time otherwise. For those who do want to work, the proportion of personal rents -- i.e., how much you get paid for your personal contributions as opposed to a return on capital invested -- will grow. Movie stars are just a forerunner...

On the other hand

Where does this leave motivators, teamwork, water coolers and the like? How can management and leadership make a difference when few people are around for them to be applied? For example, The New York Times just featured a mobile car-salesman who moves from dealership to dealership as brands of cars rise and fall in popularity; he fails to get thorough knowledge of the cars he sells and generates little customer loyalty. Is his mobility really a benefit?

And in any case, how do we broaden the community of well-educated, well-off mobile professionals with marketable skills managing their own careers to include all of the population and all of the world? While this vision is appealing, it seems to neglect another world where people report to work most days with little notion of options, or worse, where people have no jobs and no training. Even more seriously, it may ignore fundamental human preferences for security and stability. Too many options can be confusing and unsettling.

Building a forest out of trees

So what's the answer to the productivity paradox? There is no single answer, but it's clear that the issue is complex. We believe each of the factors we explored is valid. Together, all of them help to explain why there is no apparent increase in overall productivity, even though each of us can see a treeful of it for ourselves. Our biggest job as an industry is to get our customers to see that same vision, and to dispel legitimate doubts.
PenBook is the second in Slate Corporation's series of applications for pen computers, conceived mostly on PenPoint but also available for Windows for Pen Computing.

Basically, it's a publishing and display tool, which lets people take documentation, reference materials and other uneditable information with them on their pen machines. Like any book, a PenBook can be marked up, indexed, highlighted, crossed out, tabbed and bookmarked, but it can't be edited or reformatted. The goal is to make it almost like paper, but a little bit better. Slate decided to eschew the finer points of hypertext so that PenBook feels like an electronic book, not like some new invention. PenBook illustrations stay on the page, instead of zooming in and out like hypertext images. You turn pages by flicking them (a stroke of the pen), not by clicking on a button (although you can tap the tabs or bookmarks to go to the pages they mark). You can search for specific words and phrases, and add bookmarks, tabs and annotations. You can even white stuff out, but you can't edit or reformat the text. The reader module costs $99.

The author module ($495) is a compiler that takes PostScript output and prepares it for display on a pen machine. The good news is that the process is automatic; the bad news is that you can't really tinker, even if you want to. Basically, it lets you create a table of contents and identify each section with a tab, but you have to go back to the individual files to alter the content. The automaticity makes it simpler to handle regular updates: Produce the output, run it through the compiler, and distribute it to the salesforce by e-mail every second Tuesday. You could set this up as a routine operation using a scripting tool.

Assessing PenBook makes us feel a little like a restaurant critic trying to review Mom's Diner: Of course it's not gourmet, but people prefer it that way.

Customers include Marriott, for executive information reports, Siemens Pacesetter, for product documentation. Most interesting are applications for agent and salesforce automation at Northwestern Mutual Life and American Express, where agents and salespeople will use PenBook and PenApps forms together. Although PenBook is fairly static, you can link between a PenBook and fields on PenApps forms using the regular PenPoint facilities.

Certainly the PenBook approach eliminates many of the benefits of electronics, but we suspect the scenario is similar to fax vs. e-mail. People prefer the familiar to the powerful -- at least at first. Although hypertext is richer and offers more value in the long run, a simpler tool like PenBook is more likely to be used (and cheaper to implement) in the short run. Ultimately, hypertext will take over; Slate's challenge will be to manage the marketing and technical challenges gracefully.
Platforms for Computing Forum 1992: A New Landscape

We hope to see you at the 15th Annual PC Forum in Tucson from February 23 to 26. Invitations will be mailed to subscribers in mid-October. You should find yours on your desk when you return from Comdex.

The Forum's theme this year is "A New Landscape: Communication and coordination." On the technical side, computers are increasingly used for communication and coordination, not just for computing and calculating. The locus of value-added is moving from platforms and packaged software to networked information services, systems integration and the use of computers in custom-tailored enterprisewide systems.

As noted in this issue of Release 1.0, technical change leads to geopolitical change in the computer business. Strange bedfellows are teaming up: IBM and Apple, Sun and HP, Ashton-Tate and Borland, Novell and DRI. Are these alliances truly strategic, or are they tactical feints?

We will examine these issues with speeches, panels and audience discussions focusing on three topics: mobile/pen computing; e-mail and information services; and the dynamics of object-orientation, operating systems and interoperability. In addition, MIT's Tom Malone will speak on coordination technology and productivity, and Doyne Farmer of Prediction Company and Santa Fe Institute will discuss "the anatomy of prediction."

As it did last year, Lante Corporation will set up a Lotus Notes-based mail and bulletin board facility for attendees. This year we'll add new applications, more workstations and a "substantial" (as many as we can get) number of pen computer loaners. First come, first served!

Speakers will include:

Barry Berkov	 CompuServe
Jim Cannavino	 IBM
Michael Dell	 Dell Computer
Bob Epstein	 Sybase
Doyne Farmer	 Prediction Company/Santa Fe Institute
Bill Gates	 Microsoft
Jeff Hawkins	 GRID Systems
Frank Ingari	 Ontos Corporation
Bill Joy	 Sun Microsystems
Jerry Kaplan	 GO Corporation
John Landry	 Dun & Bradstreet Software
David Liddle	 Metaphor
Tom Malone	 MIT Center for Coordination Science
Darrell Miller	 Novell
Frank Moss	 Tivoli Systems
George Perry	 Prodigy Services
Vern Raburn	 Slate Corporation
June Rokoff	 Lotus Development
Ralph Terkowit	 Washington Post Company
Dave Winer	 UserLand

Company sessions and product demonstrations will include object-oriented databases, rule tools, constraint-based tools and penware.

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RESOURCES & PHONE NUMBERS

Roger Heinen, Apple Computer, (408) 974-3511
Doug Merchant, AT&T, (908) 221-6056
Ray Ozzie, Iris Associates, (508) 692-2800
Terry Rogers, June Rokoff, Lotus Development, (617) 693-5247; fax, (617) 693-4663
Tom Malone, MIT Center for Coordination Science, (617) 253-6843; fax, (617) 258-7579
Erik Brynjolfsson, MIT Sloan School, (617) 253-4319
Cameron Myhrvold, Microsoft, (206) 936-3262
Vern Raburn, Dottie Hall, Brad Jones, Slate Corporation, (602) 443-7322; fax, (602) 443-7325

COMING SOON

- Transaction costs.
- Machine-assisted translation.
- Configuration tools.
- Performance support.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)

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Release 1.0 is published 12 times a year by EDventure Holdings, 375 Park Ave., New York, NY 10152; (212) 758-3434. It covers pcs, software, CASE, groupware, text management, connectivity, artificial intelligence, intellectual property law. A companion publication, Rel-EAST, covers emerging technology markets in Central Europe and the Soviet Union. Editor & publisher: Esther Dyson; associate publisher: Daphne Kis; circulation & fulfillment manager: Robyn Sturm; executive secretary: Denise DuBois; editorial & marketing communications consultant: William M. Kutik. Copyright 1991, EDventure Holdings Inc. All rights reserved. No material in this publication may be reproduced without written permission; however, we gladly arrange for reprints or bulk purchases. Subscriptions cost $495 per year, $575 overseas.
**Release 1.0 Calendar**

**October 6-11**  
OOOPSIA '91 - Phoenix. Sponsored by ACM. Call John Richards, (914) 784-7731.

**October 7-11**  
Interop '91 - San Jose. Sponsor: Advanced Computing Environments/Ziff. All equipment on display must work together by being connected to the show network. With Ellen Hancock, IBM Communication Systems. Call Wendy Gibson, (415) 941-3399.

**October 9-11**  

**October 12-13**  

**October 13-16**  

**October 14-16**  

**October 15-16**  

**October 15-17**  
NetWorld '91 - Dallas. Sponsored by Bruno Blenheim. Keynote by B. Garland Cupp, American Express Travel. Call Annie Scully, (201) 569-8542 or (800) 444-EXPO.

**October 15-17**  

**October 16-18**  
EDUCOM '91 - San Diego. Sponsored by University of California at San Diego. Speakers include Sheryl Handler, Bill Joy. Call Diane Balestri, (202) 872-4200.

**October 18-20**  

**October 21-23**  
SGML '91 - Providence, RI. Sponsored by Graphic Communications Association. Call Joy Blake, (703) 519-8160.

**October 21-23**  

**October 21-25**  
*Comdex - Las Vegas. So wonderful they couldn't wait until November? Whatever the reason... Sponsored by Interface Group. Call Elizabeth Moody or Dick Blouin, (617) 449-6600. And while you're there...

**October 22**  

**October 27-29**  
The Classic - Monterey, CA. Sponsored by the American Electronics Association, for cute companies and eager investors. Call Flo Levis, (408) 987-4200.

**October 28-29**  

**October 28-30**  

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<td>November 7-9</td>
<td>1991 nanotechnology conference - Palo Alto. Sponsored by Stanford, Tokyo University, Foresight Institute. All about molecular nanotechnology: complete three-dimensional structural control of materials at the molecular level. Call Chris Peterson, (415) 948-5830.</td>
<td>Palo Alto</td>
<td>Stanford, Tokyo University, Foresight Institute</td>
<td>Chris Peterson, (415) 948-5830</td>
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<td>November 10-13</td>
<td>**Second East-West High-Tech Forum - Warsaw (Prague in 1992). Sponsored by EDventure Holdings. With a roster of serious-minded entrepreneurs and vendors from East and West. Don't just come to listen to advice; come to mingle with the people making it happen. Call Daphne Kis, 1 (212) 758-3434 or fax (212) 832-1720; MCI Mail: EDventure, 443-1400.</td>
<td>Warsaw (Prague)</td>
<td>EDventure Holdings</td>
<td>Daphne Kis, 1 (212) 758-3434 or fax (212) 832-1720; MCI Mail: EDventure, 443-1400.</td>
</tr>
<tr>
<td>November 19-21</td>
<td>PC Expo - Chicago. Sponsored by Bruno Blenheim. Call Steve Feher, (201) 569-8542 or (800) 444-EXPO.</td>
<td>Chicago, IL</td>
<td>Bruno Blenheim</td>
<td>Steve Feher, (201) 569-8542 or (800) 444-EXPO</td>
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<td>December 2-4</td>
<td>*Alliance 91 - Tokyo, Japan. Sponsored by Harvard Business School Ass’n. Strategic alliances with Japanese companies. Call Mark Francis or Yasuhiro Mikamo, (415) 742-0757.</td>
<td>Tokyo, Japan</td>
<td>Harvard Business School</td>
<td>Mark Francis or Yasuhiro Mikamo, (415) 742-0757</td>
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<td>December 10-12</td>
<td>Fifteenth international online information meeting - London, UK. Sponsored by Learned Information (Europe) Ltd. Contact: Tina Lardent, 44 (865) 730275 fax, 44 (865) 736354.</td>
<td>London, UK</td>
<td>Learned Information (Europe) Ltd</td>
<td>Tina Lardent, 44 (865) 730275 fax, 44 (865) 736354</td>
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<td>December 15-18</td>
<td>*Hypertext ’91 - San Antonio, TX. Third international conference on hypertext. Sponsored by ACM. Call Janet Walker, (409) 845-0298, e-mail <a href="mailto:leggett@bush.tamu.edu">leggett@bush.tamu.edu</a>.</td>
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<td>February 11-13</td>
<td>*NetWorld 92 - Boston. Sponsor: Bruno Blenheim. Call Annie Scully or Mark Haviland, (800) 444-3976 or (201) 569-8542.</td>
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<tr>
<td>February 23-26</td>
<td>**EDventure Holdings PC (Platforms for Computing) Forum - Tucson, AZ. New alliances and new technology lead to &quot;A New Landscape.&quot; You read the newsletter; come meet the players and try their tools. Call Daphne Kis, (212) 758-3434.</td>
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<tr>
<td>March 2-6</td>
<td>OpCon West - Santa Clara. The west-coast session of Software &amp; Information's twice-yearly conference for operations managers. Call Tom Stitt, (617) 924-3944.</td>
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<td>March 18-21</td>
<td>*SPA spring symposium - Seattle. Call Karen Johnson, (202) 452-1600.</td>
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<td>March 23-26</td>
<td>DB/EXPO ’92 - San Francisco. Sponsored by NDN Enterprises. Call Victoria Lukanovich, (415) 941-8440 or (800) 2DB-EXPO.</td>
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<td>April 6-9</td>
<td>SunWorld Expo - Santa Clara. Sponsored by World Expo Corporation. Call Ron Toran, (508) 879-6700 or (800) 545-EXPO.</td>
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<td>April 22-24</td>
<td>*Asilomar microcomputer workshop - Asilomar, CA. Sponsored by IEEE. Call Brian Berg, (408) 741-5010.</td>
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Please let us know about any other events we should include. -- Denise DuBois

*The asterisks indicate events we plan to attend. Lack of an asterisk is no indication of lack of merit.

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