

Lecture Text

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How Does IT Matter?

(edited for clarity)

Introduction

About four years ago, a guy wrote an article in the house publication of Harvard Business School—the *Harvard Business Review*—called “IT Doesn’t Matter,” which really captured the spirit of the post dot-com era, and the pessimism that went along with it. It essentially said, “Look, we’re spending huge amounts of money on what is essentially a utility. It’s like electricity, it’s like water, it’s like toner paper, or paper clips.” It’s good, right? We like this stuff. It’s actually useful input to your business. But we all can buy it, we all have access to it. It’s getting cheaper all the time, we’re not writing it ourselves, we’re buying it off the shelf. Everyone can buy the same stuff off the shelf. As a result, none of us are getting ahead of anyone else, and we’re in this massive spending frenzy in an arms race that’s not getting anyone anything important.

So he made a very strong argument and he got beat up for it, like you can imagine. My colleagues and I were doing most of the lumping. But he actually made a couple of pretty interesting points. If this stuff is universally easy to come by, it’s not a really good place to go look for competitive advantage. We hope you all learned that while you were here.

So he put the challenge out there to go articulate what’s going on. Does IT matter? If it doesn’t, why on earth are we spending, on average, 5 percent of revenue inside big companies on it? This is a fairly deep puzzle.

So one of the things that we get to do at HBS when we’re confronted with a puzzle like this is to go out and talk to companies and write cases, and learn about the phenomenon by immersing yourself in it. So that’s what I’ve been doing for a while. And I want us to start to get toward an answer to this question by telling you three stories, three cases that I’ve written in recent years. And it’s pretty clear that if you want to understand the impact of IT, you go watch a motorcycle race, right?

Ducati

So I wrote a case with my colleague Francesca Gino about Ducati motorcycles entering the MotoGP circuit, which are the biggest, fastest, nastiest motorcycles in the world. Ducati entered this MotoGP circuit in time for the 2003 race season. And they announced in May of 2001 that they were going to enter this race circuit. In May of 2002, they had a bike ready. Now, this is starting from scratch. And in twelve months, they designed the bike absolutely from scratch. Every component in it is custom made, including the engine; the first four-cylinder engine the company had ever made in its history. They simulated it, they designed it, they fabricated it, and they got it on a race track in twelve months.

Now, I’m used to the world where derivative car projects take five and six years. This is what Kim Clark [former HBS dean] made a lot of his reputation studying. The fact that they could get this thing off the ground and onto a track in twelve months, and in the very first

season that they competed, this team came in second place overall. This was a very, very successful effort on their part.

And the question is, how on earth did they do it? And what role did technology play in it? There's kind of a two-part answer to that. The first part is in how they designed the bike. And they used amazing amounts of technology to design that. This is a screenshot of the program, CATIA, which is a three-dimensional modeling program they used to design basically every part of that bike. They used incredibly powerful software to simulate the engine. So if you wanted to know how an engine was going to perform in the Old World, you went and reamed out a lot of metal, and put it in a testing platform, and tested an engine. Now you design it on a computer. You see exactly what you're going to get out.

And they told us that the engine simulation software that they used is so accurate that if they build the physical engine and they stick it on the test bed, and they get results back that are different from what the simulation software says, they're a lot more likely to question the test bed than to question the software. So they had access to fantastic software for designing this bike.

We went to the track and actually watched them doing some test runs. We saw something interesting. Every time the bike came in from the track, they would immediately start messing with it; all the mechanics would go to work. And one guy would walk up and put this cable on the bike. And he wasn't charging the battery. He was getting data from all the sensors that were on the motorcycle. These things have between thirty and fifty sensors on them all the time. After every run, they download the data from all of those, and they get information about tire pressure, and braking pressure, and engine RPMs, and suspension, and everything else that you might care about. And it gives them this amazing pool of data that they work with so that they know what to go tinker with on the bike. And they can do very intelligent, very tailored tinkering over time.

So not only was this amazingly cool, but we actually learned a lot about one of the ways that information technology is actually making a pretty big performance difference these days. What they did on this team was simply infeasible—the speed with which they did it, simply infeasible certainly twenty years ago, probably ten. Maybe even five years ago they couldn't have done this work as quickly. And what we learned from watching this was that there are some functions—engineering, tinkering on a test track—some jobs that are very much accelerated, revolutionized by information technology.

Wikipedia

And the second story I want to tell you is about this weird beast called the Wikipedia. Anyone got any exposure to this thing? Anyone ever use this? Five years later, we have volunteers. It's so heartening to see. Well, Justin, what is this thing?

___: It's just a community encyclopedia. People can just post the content directly as a user of the system.

PROFESSOR McAFEE: So hold on. Who's the body of professionals and editors?

___: It's just sort of a community-policed, I think.

___: Yes, absolutely, the wisdom of crowds.

PROFESSOR McAFEE: Does this sound a little weird to anyone? So this is an encyclopedia where I, right now—I haven't signed up for anything, I haven't registered for anything—have the right to go to any page in that encyclopedia and make any changes I want.

Now someone else has the right to go look at my changes and say, "He's an idiot," and roll them back and change my changes. But the only kind of editorial board, or any kind of overseers of this thing, is a fairly small group of people who have the right to roll back changes if enough people disagree with them, and to kick me off if I start doing anything really inappropriate, like posting hate speech, or doing things like that. Then they'll block me by user name, or IP, or something like this. Aside from that, this is a completely community-based, community-generated encyclopedia with no professional staff at all.

Now, I heard of this for the first time, and my initial reaction was, "Give me a break. Either this is going to be incredibly trivial and silly, or something even more pernicious is going to go on; which is that, as it scales up, the bad apples are going to ruin the barrel. In other words, people with an agenda, people who enjoy messing with things, people who really don't appreciate communities and norms are going to come in here and just pollute this thing to the point where it becomes useless."

And I went to the Wikipedia, and I tried to think of a topic that was sure to arouse passion, and sure to arouse very strong feelings among groups who really don't get along with each other, and who have very strong agendas. And the term that I came up with: skinheads. If you don't know anything about skinheads, they're people who shave their heads and dress in a very particular way, and they have some very, very strong ideologies, which many people find unpleasant. And internally, there are these very severe divisions. So there are racist skinheads. There are avowedly nonracist skinheads. You can imagine those two groups of people don't get along very well at all. So I thought that this would be a great entry to look at, to find out about the breakdown of the Wikipedia.

"Skinheads, named after their shaven heads, are members of a subculture that originated in Britain in the 1960s, where they were closely tied to the Rude boy of the West Indies and the Mods of the U.K." "Categories: There are a number of different 'types'"

I started to read this, and a couple of things became clear. First of all, it was really informative. I wasn't a skinhead expert, despite my haircut. And I didn't know a lot of this. Second of all, it's extremely neutral, very fact-based, very kind of sober and mature in its tone. And it's actually talking about Nazi skinheads right next to the avowedly nonracist, non-Nazi skinheads. But you don't see the flame war breaking out on these pages, and you don't see people screaming at each other here. And you go down and you learn why they dress the way they do and where it came from. And it reads to me exactly like a good, professionally edited, professionally generated encyclopedia entry. And I read this and I had no idea how it came about.

Then there's this interesting link up here called "Discussion." So here's the link. If I wanted to edit this page right now—bang: I would click here and I could just go to town on this entry. But what's more interesting is the discussion page. And you look at this, and this is the background to the page where people who feel like it, who are contributing, get to talk about the main page, get to talk about the main entry, and hash out their disagreements.

Keep in mind, the folk hashing out the disagreements are neo-Nazi skinheads versus non-racist skinheads versus fashion skinheads. These are not people who get along and play nice. But you read the debate going back and forth and it is an amazingly well-informed, calm, sober, very fact-based debate where they're explicitly not about promoting a point of

view. And you start to see abbreviations like "POV." That means "you're putting a point of view in the main encyclopedia entry, which is not what the Wikipedia is all about. Stop it!" And then the person writes back and goes, "You know, you're right. I'm sorry. I understand what this thing is about and I'm going to play by the rules." And I went around and I tried to find the most controversial topics. And this place does a brilliant job of having pretty violent disagreements very, very civilly.

So that bore no relation at all to anything that I saw on Ducati but it's clearly some kind of innovation that is being fostered by new technologies. In this case, the Internet and all the stuff that we've put on top of it have allowed these platforms to appear where we communicate. We collaborate with each other. Some of these things form very healthy norms and we start to generate really good content via this spontaneous, volunteer kind of community effort. Nothing to do with what I saw at Ducati, but a really interesting phenomenon going on here.

We talk about the blogosphere, which is this universe of blogs that we're all generating. "Wiki," which is where the term "Wikipedia" comes from, actually is from the Hawaiian word for "quick." And it's just a Web site that doesn't have a professional staff; that is generated and built over time by the people who actually go and look at it. Now, Wikipedia is the best-known example there. So that's story number two.

Mount Auburn Hospital Physician Order Entry System

Story number three is a case that I wrote about Mount Auburn Hospital, here in the Boston area. You might remember that Mount Auburn was in the news a little while back because one of the surgeons left the operating room to go cash a check. This place had people problems. They thought a little technology might come in handy. And in particular, the technology they wanted to put in place was called the physician order entry system (POE).

What these things do is just automate the process of physicians saying, "Oh, we've got to give this person some penicillin. We've got to get some medication from the pharmacy and get that to the patient in room 203," or whatever. And the way that process worked before: the technology that came around was, as you can imagine, a physician scribbles something on a piece of paper, hands it to a nurse, and walks away. The nurse faxes it to a pharmacy; a pharmacist can maybe read it. If they can't, they try to call up the doctor who's somewhere in the hospital and figure out what's going on. There is no immediate checking for drug-drug interaction, there's no immediate checking for dosages that might be off. It is a very manual, very kind of broken, messed-up process.

And there has been research done in other hospitals that says, "Look, if you put one of these physician order entry systems in place, you have a much more uniform process. It's much more automated. The handwriting problems go away. We can put in rules behind it so that we can automatically check to see if the drugs don't get along. Or if you're giving an eight-month-old a dosage that's appropriate for a 200-pound person, we can just do all of this." So Mount Auburn Hospital says, "Oh, fantastic, we should probably do that."

By the way, healthcare errors in the United States kill somewhere in the neighborhood of 100,000 people a year. The single largest category of error is a medication error inside a hospital. This is a very serious problem. Here is a technology that can help fix it

So they put in place this technology. And all it did was kind of standardize the flow for ordering medications from the internal hospital pharmacy, and ask physicians to use their user names and passwords to do it. How do you think that went over? It was just a nightmare, from start to finish. They couldn't figure out where in the hospital to start it,

because no one wanted it in their part of the shop first. They tried to figure out if they should make it mandatory or if they should make it optional. And the whole thing was just one long series of fits and starts—just a slog, month after month, year after year.

I was talking to a guy at a party a while back, who happened to be a resident at Mount Auburn in the part of the hospital where this system went in. I say, “Oh, fantastic. How’s that working out?” He goes, “I scribble my prescriptions on a piece of paper and hand it to a nurse, and she enters it into the system.”

So with that kind of technology, there was clearly some potential there. And there was a problem that needed to get fixed. The technology had been demonstrated to do some good. And it ran into this organizational brick wall, and something just about the opposite of what we see with the Wikipedia was going on at Mount Auburn Hospital.

The Three Computer Revolutions

So the first thing that I learned as I wandered out into the field and started talking to people and writing cases is that it’s a real oversimplification to talk about the Computer Revolution. There are actually three revolutions unfolding in parallel with information technology these days.

So I want to separate the revolutions into three categories. The first one’s what we saw at Ducati, which is functions being transformed by technology. The work of engineering these days is very different than what it used to be. The work of a mechanic at the track is very different than what it used to be. The work of an academic, actually, is pretty different than it used to be. We used to have to go visit the mainframe to go run fairly simple statistical analyses, and we’d wait overnight and we’d get our results back. And now we just crank these things out—doctoral students crank them out; we don’t do it. But you can just crank. The amount of power and the amount of speed you get is just fantastic. So there have been functions that have been really deeply affected by technology.

There have also been networks that have been deeply affected by technology, using the Internet and the stuff on top of it, primarily. Wikipedia is a great example. The blogosphere is a great example. Kazaa, and BitTorrent, and all these things that we use to illegally share music with each other—these are very much of the same beast. They just provide a forum where we can swap information around and get benefit out of it. Some folk love it. Music companies tend to hate these kinds of things. But we are enabling all kinds of different networks with modern technologies.

And then finally, when we look at what’s going on inside different enterprises, we see them using technology to try to do the kinds of things that we saw at Mount Auburn, which is just to define and then roll out a bunch of new ways of doing business across an organization.

So three very separate phenomena going on. They’re all going on at once. They’re mixing and matching with each other. But it’s very helpful to separate them for a couple of reasons.

Benefits

First of all, the benefits that each of these provides. At first blush, all of them make us more productive, all of them help us get more widgets out the door every day or every year. And there was a famous quote a while back from a good economist at MIT, who said, “We see evidence of a computer age everywhere except in the productivity statistics.” That’s actually not true anymore. We see really solid evidence of the computer age in the productivity statistics. Our economy has become much, much more productive, and most people agree

that IT is the only thing that has really changed enough to account for that difference. So, bang—we're getting a lot of productivity.

When you look a little bit deeper, though, you start to see some differences. The function IT gives us some specific categories of benefit. It lets us optimize things. It lets us iterate. It lets us experiment. It lets us test a bunch of different engines before we have to bore any metal for the first time. So in that sense, it makes us a lot more productive.

The network IT that builds things like the Wikipedia gives us a very different category of benefits. It lets us collaborate, it lets us communicate, and it lets us share knowledge. It lets us agree or disagree in some kind of forum—very different stuff than we see with the function IT. But again, it can be quite powerful, and we see that over and over again. Music companies don't like the way we're communicating but people who use the Wikipedia think it's fantastic.

And then finally with enterprise IT, we do a very separate set of stuff. When it succeeds, we get a very different set of benefits. And look at what they are trying to do at Mount Auburn. They were first of all redesigning the process of getting medications to people in hospitals. They were trying to make sure it got done in the same way all across the hospital. They were trying to standardize that new practice using technology. And it gave them great tools to see if the new process was being followed or not, to stay on top of that, and to monitor it in real time; see if people were doing the right thing.

So we get very different benefits from these three different kinds of technology. And that was the second thing I saw as I have wandered around and talked to a bunch of different companies over the past few years. There are three different things going on. The three things give you three different benefits.

Now, all of that can be true, and the person who wrote "IT Doesn't Matter" can still be absolutely right. Right? If all of these things are like paper clips, and toner paper, and electricity—great, all of that might be true. But still, we're overspending like crazy and we're being fairly silly about the whole thing.

Ease of adoption

Now, the third thing that I learned—and I think this is what really has made the biggest impact on me—is that when we look at how easy this stuff is to adopt, how easy it is to bring it into your organization and use it, we see some really interesting things. The function IT tends to vary a lot. It can be quite easy to bring in. When I hear about a new statistics package that's available, I go, "Oh, fantastic. I'll check it out. That's what I wanted to do." Bang! Very, very smooth. I'll tell you a story a little bit later about what happened when BMW tried to change the way it designed cars using technology. That was a little bit more tough.

The network IT tends to vary from easy to ridiculously easy. People love this stuff. It tends to be very easy to implement, and there's not a lot of strife and not a lot of contention when we introduce things like blogs, and instant messaging, and SMS (Short Message Service), and e-mail into organizations.

This enterprise stuff tends to vary from hard to unbelievably difficult: Tank a company and bring an entire organization to its knees. You just don't see that with the other categories. So when Hershey's very nearly went out of business a couple, three years ago, they did it because they were trying to put in place new business processes. They were trying to standardize on new ways of doing business and failed miserably with it.

And this brings up a bunch of interesting questions: Why are these three beasts so different? What explains it?

Technical difficulty

One explanation is that they could just be technically easier or harder to do. This could be a “geek issue,” in other words. You need a fantastically good bunch of engineers and a CIO to make the enterprise stuff succeed. You really don’t need as much technical competence for the other two categories. There’s a little bit of truth to that but actually not a heck of a lot. The functional IT just tends not to be very difficult to put in place.

The network IT tends to be unbelievably easy to put in place. The tech stuff in the enterprise IT tends to be hard. You really have to configure the database. You have to put enough capacity in your network. You have to set all of the switches the way you want for the business processes. It’s fairly difficult.

Everyone who has studied this issue about what makes technologies easy or hard to adopt, everyone—myself included—who has studied this issue, says that the tech factors explain almost nothing. This is not what separates the winners from the losers with information technology. So we’ve really got to dive a little bit deeper here and understand what’s going on.

Initial reaction

One of the ways to do this is to look at the different time periods involved. When you announce a new technology that’s going to come into the organization, what happens? What’s the reaction like? With the function stuff, you see a pretty wide range. You see people being skeptical all the way to very enthusiastic. The design team at BMW was the Mecca, was the nerve center of the company. BMW prided itself for its entire many-decade history for being the best car designers on the planet. Their cars were sculptures, they were works of art. They really are beautiful machines. That came from this very elite group of designers who are probably more inclined to call themselves artists than designers. They certainly didn’t call themselves engineers. These people literally sketched. They worked with clay. They would build small clay models of a car and then they would build a full-sized clay model of the car. They would go through and go like that to make the side panel look a little bit different. These folk were the elite of the company. They were core to how BMW thought of itself and for how they turned out cars that a lot of us wanted to drive.

For the first time in their history, a few years back, an American became head of design for BMW. So here is earthquake number one inside the company. There’s this young Yankee who comes in and is going to tell them how to design cars. Earthquake number two was when he said, “We’re going to start using computers.”

And the design team at BMW said essentially, “Over our dead body we’re going to start using computers! I can’t go up and shave a little clay off a computer. I can’t walk around it and see how it looks. I can’t feel it, I can’t—yuck! There’s no way that we are going to start using these tools.” So the skepticism in that case, just around a pretty simple functional IT, was quite high. So we see a range going on there.

When you introduce network technologies into organizations, people tend to go, “Fantastic! I get to instant message and find out where people are, and chat all day in real time with them—great. I get e-mail—fantastic. Short messaging on a cell phone—yeah, I love it.” I’ve never heard anyone get up and pound the top of a table and say, “Over my dead body will

we e-mail inside this company." Maybe after they have it for a while and the SPAM mounts up, you start to say these things. But in advance, these things are not contentious.

When you announce that an enterprise IT is going to hit the organization, there's a bit of a range. In general, you see armed insurrection take place. I have definitely heard people say, "Over my dead body will we ERP (enterprise resource planning) inside this company. Over my dead body will this supply chain system work as you're designing it right now. We are not going along with this, we're just not participating." So you start to see people prepare for battle immediately when you talk about deploying in one of these systems. And the turf becomes very, very clearly defined.

Implementation

So now let's look at the next time group, which is actually getting these things in place, implementing these. These functional technologies—it turns out to be surprisingly smooth. What the head of design at BMW did to make these things succeed was actually a little bit of managerial genius because he didn't try to ram them down their throats. He simply put these really powerful workstations with great design software at their desks and he walked away for a little while. What he saw when he came back was, in general, they weren't using them. But a couple of them were and, in particular, these genius designers at BMW had small armies of helpers around them: draftsmen, sculptors, engineers, people like that.

A lot of the small armies started using these tools. "Hmm, I'll play around with that. That's pretty cool." So when the guy walked back in the room a few months later, he saw this mass of people using the technologies and a bunch of designers still turning up their noses at it. And he said, "Huh! We're not getting enough value out of this asset. Gang, here's what I'm going to do. Either I come back in a couple of months and start to see a lot of use of these technologies or I'm going to give them to the engine-design department. They need powerful workstations. They could use this capacity. I'm going to hand the tools over to somebody else." And that was enough, that threat was enough to get the people who were already using them to say, "No, no, don't let them do that! Come on, this is cool. Check it out." And they'd spend a little more time and spend a little more time. And he didn't need to ram anything down anyone's throat, and he didn't need to threaten, and he didn't need to bribe. He just said, "I'll take them away," and that was enough to get the ball rolling. So the implementation was surprisingly smooth inside that organization.

This stuff is a little *too* smooth for a lot of our likings. You start to look around, and a lot of managers have looked up and saw the volume of instant messaging going on inside their organization and said, "What is this thing and why is everyone spending all day doing it?" We recently just turned off a lot of IM inside HBS. There are security problems. But fundamentally it's a little bit like crack inside an organization. People just use this stuff a lot. So this stuff tends to go over like gangbusters.

And then after the insurrection, of course, comes the Civil War, when you actually try to put these enterprise technologies in place. And the factions form and the fights go on. And, really, it becomes quite a contentious, very ugly process over and over.

So we start to see a little bit how IT can start to matter within and between organizations. There are some categories of stuff that really are hard to adopt, really tend to separate winners from losers. There are other categories of stuff that are really powerful, really valuable. They have some tricks. They're not totally smooth to put in. But, in general, they're not sources of unbelievable friction and unbelievable conflict in organizations.

Organizational impact

Now, fundamentally, the reason for all of these differences is that these technologies do very different things to organizations. And the functional stuff does the most narrowly defined stuff to organizations, has the most narrow impact. It changes the way designers work inside Ducati. It doesn't change the way accountants work inside Ducati. It doesn't change the way the HR function works inside that company. But it does require new skills to be adopted by some parts of the organization. In some cases, very profound new skills can be difficult to adopt. But, overall, people who use these things tend to be a little tool-happy, anyway. They go, "Oh, a new tool to play with," and they start cranking away on it. So even the old engineers at Ducati—they weren't that old—but even the old engineers jumped on these new tools, learned them, and started using them pretty productively.

Network IT. The main reason, the fundamental reason we all love it so much is that it just opens up options for us. It just lets us collaborate, lets us communicate with each other. It doesn't impose constraints on us. E-mail doesn't tie us down. It really frees us up. In some cases, frees us up too much. But we adore these technologies because we get to contribute to the Wikipedia, like the editor of the *Oxford English Dictionary* does. Very empowering, egalitarian set of technologies.

These technologies are just about the opposite. The explicit goal with adopting these things is to bring constraints into the organization, to impose new ways of doing business. These are not tools for empowerment overall. These are tools for a group of people deciding the new way the organization is going to work and then deploying that across the organization.

Now these categories blur into each other a little bit, certainly. But, overall, these do very different things inside organizations. And the main reason that this stuff is so difficult . . . You have to go a little bit deeper than "change is hard" because this stuff brings change, too, and it's really easy. The reason this stuff brings change that's difficult is because it's pinning people down in ways that they don't like being pinned down, overall. And fundamentally someone very far away from them in the organization gets to make decisions and then impose decisions about their work. This is unsettling. You see it happening over and over again.

Opportunity

So what do these things do for us fundamentally? The main opportunity that we have with these function technologies is simply to get more widgets out the door; to get more work out of our engineers, our scientists, our whatever.

There are some industries where this is a huge big deal. Pharmaceuticals is a great example. A lot of people anticipate that the work of discovering new drugs is going to continue to be transformed by technology. I have a colleague who says that the historians are going to get it wrong. For very understandable reasons, they're going to get this part of history wrong. And they're going to look back in a hundred years and say that we invented computers only to unlock the genome, and the genome will be the really big deal in human history. And we're going to kind of forget that we actually invented computers for other reasons.

I find that a really provocative argument. I don't buy it for a second, but I think it's a really interesting way to look at it because some things that we do are transformed by the processing, by the crunching power that we have with computers, with these functional technologies. Amazing opportunities with network technology: blogs, and wikis, and IM, and e-mail, and this weird grab bag. The opportunity that we have is to lateralize the organization and to take information flows that used to be fairly up and down, or used to be

fairly confined, and to just spread them out. And to let people start horizontally communicating a lot more and collaborating a lot more.

And in companies that are doing this in a healthy way, this is a big shift. And I've seen wikis used that just capture the organizational conversations, record them for all time. You can go back and look at them at any point. You can refer to them. And we had a category of stuff that we called Knowledge Management Systems for a while, where they tried to suck the contents of our head out and put them in some database, so that our colleagues can go look at them later on. These were miserable failures. But there's one at HBS and it says, "Hey, take time out to go enter all the company contacts you have so that your colleagues can benefit from it then." I like my colleagues. I haven't used that tool a bit. The last thing I'm going to do is take time out to enter all my . . . and have someone who I don't know calling up someone that I've built a relationship with to say, "Hey, can I come in and write a case?" No, I want to be the gatekeeper for that kind of stuff.

The fundamental difference here with these technologies is that you only contribute to the extent that you feel you're getting something back. It feels much more like a win-win. And I think these technologies like blogs and wikis are really going to subsume the old knowledge management systems that a lot of us invested in. And some people are finding that it's subsuming e-mail. You don't need to cc everyone all the time to keep the project up-to-date. The project sits there on some self-constructed Web page and you just go visit it over time. So organizations report some pretty big changes as a result of putting these network technologies in place.

Then finally the opportunity that we as businesspeople have with enterprise technologies is to make a bunch of decisions and deploy them throughout the organization. And you can deploy them throughout a very big organization. You can deploy them without regard to time or without regard to geography. And you can have some confidence that those decisions are going to be followed. You can monitor them and you can make it impossible to do business the old way. And I'll give you a couple of examples of that later. But this is an opportunity for the kind of middle, or the top of the organization, to assert its will everywhere. This is a management tool to change organizations. This is a management tool that lets organizations change themselves. They have very different categories of impact.

Managers' roles

So, great, what do we do with this stuff? With function IT, you've got to spend money on the new boxes. Some of this stuff is expensive, although it's getting cheaper all the time. And like we saw at BMW, sometimes you've got to do some clever work to nudge people to start using these technologies. You've got to train, you have to put opportunities out there, and sometimes you have to threaten to take them away to get the usage up.

With network IT, I think the reason the Wikipedia works—and it continues to amaze me—I think the reason it works is that the founders of the place, from the start, worked hard on the norms of the community. And from the earliest days, if you started posting swear words or hate speech, they would politely encourage you not to; they would encourage you less politely not to; then they'd kick you off, technically, if you didn't. But they had a very strong culture. And they were able to successfully scale that culture up to the point where all over the world people are doing this—500,000 articles—and the norms are still being followed somehow. So managers have a lot of work to do to set the cultures, set the norms.

The other main category of work that we have, unfortunately, is to tamp down on these technologies sometimes. At HBS, we've turned off instant messaging. A lot of other organizations have done the same thing. A lot of organizations filter Web site access. They

don't want people playing poker all day online, for example. These technologies are so popular that very often we have to constrain them or fence off people from using them.

And then finally, with enterprise IT, these are leadership challenges. These are nasty organizational change efforts in a very thin technology wrapper. Organizations correctly assess them for what they are. And like we said, you have insurrection, and civil wars, and some very unpleasant dynamics. The role of managers is to oversee that process and put a decision-making structure in place and make sure that critical decisions get made.

I've been involved a couple of times as an expert witness for one of these implementations—enterprise implementations—after they go horrifically wrong, and after companies almost go out of business. Of course, this being America, everyone sues each other. And the consultants, and the software vendor, and the company all just cross-sue each other, and they bring in experts to testify as to what really happened here. And it's a fascinating kind of forensic work, because what you do is you get this big old box with the PowerPoints of all the meeting minutes from the Steering Committee for the entire history of the project, and you go like this. It's actually more interesting than it sounds for me, because these become a track record for whether or not these projects were managed correctly.

And the clearest example I ever saw was in one of these boxes, where the meetings from the March Steering Committee said, "Marketing and Manufacturing cannot agree on how we're going to configure this software. Are we going to let this kind of customization take place or not?" Marketing says, "It's essential if the customers are going to buy it." Manufacturing says, "Look, we can't support that level of customization. Project Committee Management: "You have to make a decision."

We went to the April minutes. "Marketing and Operations simply can't agree on the configuration. Someone needs to make a decision." We went to the August minutes and the same thing was going on. This is a critically important decision, not just for the project but for the company, that was simply not getting made. And I testified that there was an inefficient management structure and the leadership basically was asleep at the switch here, not making the tough decisions inside that organization because these technologies bring up large volumes of very tough decisions.

These technologies tend to only bring up the "Yes/No" decision. Very different when you look at the enterprise stuff.

Opportunities for advantage

All right, so let's bring that back and talk about what does this mean, as far as IT mattering or not. What are our opportunities to get some advantage, to get ahead from these different tools that we have? With function IT, this is actually where I think that that argument—IT doesn't matter—might be closest to correct. For example, I've got access to unbelievably good statistical software. All of my academic colleagues have access to the exact same software. Is that stuff helping HBS get ahead of Wharton and Chicago and Stanford? It's impossible for me to believe that. We can all just buy these tools. Does it help an organization like BMW get a little farther ahead? Maybe. Does it help Ducati get ahead? No. They very explicitly told me, "We have to have these tools. We could not have built the bike in a year without them." But we know Honda's got them, we know Yamaha has them. They're a ticket to entry in this competitive battle, but no one is getting ahead of anyone else.

Network IT. I think this is a fascinating open question. I don't know the answer to this. It seems like it's another case of IT doesn't matter, because these are open-source products in a lot of cases. These are free. Can anyone get ahead of anyone else? Maybe they can, because what I saw with the Wikipedia is how important it is for someone overseeing that project to set the norms, and set the culture, and start this ball rolling in a productive way because very often they can go on in unproductive ways. And I think in organizations that don't spend some time on this, we might see these new tools going the way of the old knowledge management tools, which got bought and then sat there and got dusty on a shelf somewhere for a while. I don't know how big an impact these are going to have on competition. Are they going to change the way we're doing business? Clearly. And not just for media companies and not just for the music companies. The conversations going on are proliferating and they really are touching more and more parts of the economy.

Enterprise IT. I've seen companies stumble so badly. I've seen them succeed brilliantly with this stuff. These tools are great ways, in my opinion, to go pursue competitive advantage, to try to get ahead. Because if you have a bright idea about a business process that will really work, these things let you define it, bake it into software, deploy it throughout an organization, and then scale that organization like crazy just by deploying it over and over again across an ever-bigger footprint. This is nice. This is really a new addition to the managerial toolkit. These very scalable industrial-strength technologies, these things are about ten years old overall. And they're only getting better over time. So the tools that we have to define and deploy a set of operating procedures or ways of doing business have really come online quite recently. And we're seeing examples of companies who use them very well, versus ones who are falling apart or winding up like Hershey's when they try to do it.

Where Does IT Advantage Come from?

So let me give you a couple of examples of where I have seen companies grab some IT advantage. And the reason that I say this is a managerial phenomenon, and not an entrepreneur phenomenon, not a technologist's phenomenon, and not a CIO phenomenon—this is a managerial phenomenon because, over and over, I've seen managers sense an opportunity to use technology in a very interesting way. And the people that I've written cases about tend not to be geeks, they tend not to be vendors, and they tend not to be CIOs. They tend to be a manager who looks around at their organization and says, "Man, there's a better answer out here."

Developing technology internally

For example, there's a taxi company in Tokyo, where the manager of the company looked around and said, "My business is growing. People love me. But they hate the dispatch center because they've got to call the dispatch center to find out where a taxi is. The dispatcher looks on a computer screen because all my taxis have GPS systems. He can find out where the nearest taxi is. He gets the directions from the customer; gives the directions to the taxi driver. If they don't give them perfectly, the taxi driver wanders around, calls back to the dispatch center, 'Now, were they front door, or back door, or elevator, or parking lot?' And they've got to reestablish that conversation. It's a bottleneck. Very often you've got to hang up on the customer and call them back, once you find a taxi. Everyone involved hates this thing."

"Now, my taxis already have GPS systems. My drivers already have cell phones. Every consumer in Tokyo, basically, has a Web-enabled cell phone, also. And I kind of know where those customers are. NTT (Nippon Telephone and Telegraph Corporation), the telecom company in Japan, can tell me roughly where those customers are. Why don't I put my customers directly in touch with my taxi drivers? Why don't I show them where the nearest

taxis at that point in time are on their little Web-enabled phone screens, and bypass that dispatch center all together?" And that's exactly what he does.

And so he has eased the most severe bottleneck in his organization. This is a classic network technology. All it does is open up opportunities. It turns out consumers love it. The drivers actually love it, once they learn to stop answering the phone, "Yeah?" It doesn't work in Japan, right? So once the drivers learned some new behaviors, they loved it as well. And this continues to accelerate the growth of the business.

So one option we have, and the least common one, is to develop technologies internally, ourselves.

Reorganizing to take advantage

Another option we have is to use those function technologies to reorganize the organization somehow. Team New Zealand was a case my colleague Alan MacCormack wrote about the America's Cup Race a few years back: the first time New Zealand won it—a huge black eye for America. He studied why they were able to build a faster boat. And it wasn't just that they had better computers. It was that they reorganized their experimentation process around those fast computers so they would get feedback. For every day's racing, they would all huddle around the computer and figure out what changes to make to the keel design, which was the really crucial thing. And they'd deploy those the very next day, while the other teams had a much longer feedback and experimentation cycle. So sometimes even the simple technologies, even the functional ones require some reorganization to take place.

Scaling up new business processes

Sometimes you need to define and then deploy a whole new set of business processes. And instead of telling you the pharmacy company story, let me tell you the Zara story, because this really captures both of these points. Anyone know who Zara is? This is a Spanish clothing store. And do you like it?

___: Yes.

PROFESSOR McAFEE: Tell us why.

___: I think that they are pretty successful because they have really seasonal clothes at really cheap prices. So they only design for the season, like the last color, the last shade, whatever.

PROFESSOR McAFEE: So they've always got the fashionable clothes in the store, and the price points are actually very reasonable. How much advertising do they do?

___: None.

PROFESSOR McAFEE: None. So what they don't do is what most other big clothing retailers in the world do, which is to try to tell us what the fashionable clothes are. Remember The Gap had this great campaign a couple of Christmases ago? They hired Madonna to go do fashion at Christmastime in America. Remember what she was wearing in those commercials? She was actually wearing clothes in these, which was astonishing. She was wearing a white T-shirt and jeans. And The Gap was trying to convince us that that was fashion, and that that was what we needed to be wearing this summer. Zara does none of this. They spend zero money on advertising and marketing.

Do you know how they get the fashionable clothes into the stores at the right time? They're fanatic copiers of hot fashions. Now, the problem with that is that you've not only got to copy it quickly, you've then got to get them built quickly, shipped into the stores quickly, and into peoples' hands quite quickly. Because if the copying cycle takes you six months, you're guaranteed to have clothes that no one wants to buy. Because the people they target—forgive me—are none of us. They're much younger, much cooler, much more European. A very small presence in the United States so far, very big in Europe, and increasingly in a few other parts of the world. But they target young urban teens, twentysomethings who must have what's hot now and don't have a lot of money to spend on it.

And what they have to do is figure out what's hot out there in the world of fashion, knock it off, copy it as quickly as possible, and then get it on store shelves. So they do a couple things. They're very vertically integrated. They own many more factories than The Gap, or than Benetton does, because they have to control the production. What their real genius is, is in how they get the production signals down to the factories and then back to the stores.

So they've got this fleet of people who wander the world, looking for cool stuff. And they fly back to headquarters in Spain, they talk to clothes designers, and they knock off stuff at a phenomenal clip. They introduce about 11,000 new items every year. Their biggest competitors, The Gap and Benetton, do somewhere between 2,000 and 4,000 new items a year. So they just knock off stuff at a phenomenal clip. Then they send those designs down to very locally owned factories, where they cut fabric in a very automated way, they send it out to be sewn, and they get it back into a warehouse quite quickly. So they can do that in a matter of days.

Now, what they do is they take a look at what they have in the warehouse at any point in time, and they prepare, using a big old server, something called the offer sheet, which is an electronic document that gets sent out to every one of their 600 stores around the world and tells them what goods are available. So it says to the store in Madrid and the store in Paris and the store in Caracas and the store in Dubai, "Gang, here's what we've got in the warehouse right now."

And their genius is to say, "We at headquarters don't know the local demand in those places. We don't know what's selling. We don't know what's going to be hot. You, the store manager, know what's really going to sell in your little corner of the world. So we're going to tell you what we got. And you're literally going to use a little handheld, a little PDA. You're going to look at that list, and you're going to tell us what you want. You're going to do that twice a week for every department of the store."

"When you're done, you're going to put it in a little cradle. You're going to hit the 'Send' button, and it's going to go back to the headquarters in Spain. We're going to aggregate all of those together, and then we're going to go to the warehouse and put all of the clothes that you want in the right boxes; send them on planes, send them on trucks, whatever; get them back out to the stores."

"So we're going to send you an offer. You're going to convert that into an order. You're going to do that twice a week for every part of the store. And our complete fulfillment cycle—in some cases, from initial design to clothes in the stores—is between two and three weeks. We can do that repeatedly. It doesn't put any stress on our organization. And the stuff that you order on Monday, you're going to get Wednesday or Thursday."

So the lag time between when you sense demand and when you actually get the clothes is incredibly small. And they can scale this up all around the world by virtue of these very standardized IT-enabled business processes.

There are really only two or three of them that matter, and the technology in the stores themselves is bizarrely outdated. The terminals in Zara stores run DOS. There's no wireless network, there's no nothing. They literally take this handheld, they put it in a cradle, they FTP the file back to Spain. It is the most old-school technology infrastructure you can imagine, but it works because the business processes that it enables are incredibly effective. And they open up, on average these days, a new store about every other day somewhere around the world. They require no IT support to open up a store. They ship a bunch of computers off to a store. They say to the store manager, "Unplug them. Plug them into the wall. Take this disk. Stick it in the drive. Voila. You're up and running. Good luck. Order the right clothes." That's all they have to do.

It's an incredibly scaleable business model: very light on technology in terms of how much they spend, but very heavy on technology in terms of how they use it to define a standard operating procedure, to deploy that all around the world, and then to monitor how everyone's doing in real time because they keep very close track of what's selling and how good a job the store manager is doing of assessing demand.

Creating a healthy IT culture

And then, finally, to the point I was making earlier about creating a culture that can make use of these network technologies. I just did a case trip a while back to DrKW (Dresdner Kleinwort Wasserstein), which is a London- and Frankfurt-based investment bank. This is the last place on earth I would have ever expected to see these wacky network technologies taking off. You think of investment banking, there's an incredibly button-down, top-down corporate structure.

The leader of the IT organization inside that company wants to change all that, and he really wants to build this lateral, egalitarian, conversation-based culture inside the company, and he wants to enable it with these tools. So he's spending a little bit of time picking the right tool. He's spending a lot more time trying to figure out how to introduce them into the organization, how to encourage healthy norms, and how to get bankers and traders and these very busy people to start using them and to start seeing the benefits from them.

So there are a few different mechanisms that we can use to figure out how to get ahead of the competition.

Wrap-Up

Let me wrap up, before we see if there are questions, by telling you about some work that's going on at the present. I went out and did all these cases. I wrote tons of cases. I saw these things that I found very compelling. And then it came time to do something different. And instead of going case by case by case, company by company, let's look at the entire economy, basically. Let's look at very-high-level data, and try to figure out if all of these things are going on, and if IT actually is making a difference. So I'm collaborating with Erik Brynjolfsson, who's a really good economist—I'm not—at MIT. And we're trying to figure out how to assess at an industry level whether IT is making a difference.

And the punch line is: we think that almost nothing else is making a difference except technology. The effect is so strong. When you look at how IT-intensive an industry is: does it spent a lot on IT as a percent of all of the stuff that it spends money on; or does it have a lot of IT per employee? So if you rank the industries like that, it turns out that the IT-

intense industries in America are more volatile. You see bigger swings in who's ahead: profits, earnings, market cap, you name it. You see much more concentration going on in those industries. So it really is turning more into a winners-versus-losers, more of a winner-take-all, environment in industries that are IT-intense. We can't find anything else that explains the results. So at a very high level, we see evidence for these mechanisms kind of adding up, and spelling very, very big differences between companies who are doing IT well and those who are actually falling behind.

So let me stop there. I'm easy to find on the Web.

Thanks.