

Technology application in 21 century 12849



A quote I heard many times when I was in high school and which I now know traces

back to Sir Francis Bacon, one of our earliest scientist or philosophers as they

were then called, is the statement " Knowledge Is Power." Today, I

believe that the fuller, more correct statement is to say, " the application

of knowledge is power." The study of science, and technology subjects will

broader our opportunities in life. As we continue to advance to the 21st

century- now lesser than 30 days away-we are well aware that technology is

possibly the hottest industrial commodity around the world today. In the

years

ahead, it will be an increasingly critical factor in determining the success or

failure of businesses. It is the fuel many of us are looking at to help us win

this race to the 21st century. To do that, we should make technology matter.

In

this paper I am going to share my technology forecasts. I try to focus on my

new

forecasts a decade into the future - the first decade of the 21st century,

because that is how far most businesses need to be looking ahead. There has

never been a neutral or value-free, technology. All technologies are power. They

evoke economic and social consequences in direct proportion to their dislocation

of the existing economy and its institutions. I believe that technologies such

as: biotechnology and genetic engineering, intelligent materials, the

miniaturization of electronics, and smart manufacturing systems, and controls,

will be the hottest technologies in the next decade. I am going to put together

a list of what I think as the top ten innovative products that will result from

those technologies. Number one on the list is something we call genetic.

There

are pharmaceutical products that will come from the massive genetic research

going on around the world today. In ten years, we will have new ways to treat

many of our ills - from allergies to AIDS. We may see the discovery of new

methods of treatment for various types of cancer, for multiple sclerosis, osteoporoses, Lou Gehrig's and Alzheimer's disease, to name just a few. The biotechnology frontier, especially developments in the field of genetic, promises- and to some degree has already archived - a revolution in agriculture and human health care. But proving the means to develop plant species that are more disease-and-pest-resistant, more tolerant of drought, and able to grow during extended periods of adverse conditions. These technologies will very likely provide future increasing in agricultural productivity. So far, these techniques have not add much to world food production; recent grow has come primarily from increasing acreage in production, in response to higher grain prices. However, further expansion of productive land is limited, and the increased application of fertilizer appears to be reaching a point of diminishing returns. Therefore, increased agricultural productivity from this new field could be essential to feed the growing population. The mapping of human and plant genomes, a process already well underway, will provide greatly

increased knowledge of genetic processes and, to some extent, information about

how to control them. For humans, this will provide the means to deal with diseases that have genetic origins or result from malfunctioning of genetic material in the body. These diseases include potentially: cancer, cystic

fibrosis, Gaucher's, hemophilia, rheumatoid arthritis, AIDS,

hypercholesterolemia, and many others. Furthermore, genome analysis of an individual can indicate propensity to diseases whose symptoms have not yet been

manifested. Scientists believe that many psychological and behavior attributes

can be genetically controlled and therefore subject to diagnosis and eventually,

for aberrant conditions, corrected. Such uses of this technology, of courses,

raise serious social and ethical questions that must be considered. Other

applications of biotechnology might produce novel protein for food replacing

meat, stimulate awareness and evaluation of microbial threats (including archaea,

ancient bacteria, being perhaps more adaptable and potentially hazardous than

was previous thought), and creation of plantation to produce and distribute biological products in the ocean. The process of cloning was perfected; evidence

by the fact that in 1997 a sheep was successfully cloned in Scotland. Hence, biotechnology could eventually eliminate food shortages, improve health, and

extend life expectancy. Number two on the list is the personalized computer. The

personal computer now sitting on our desk will be replaced by a very powerful,

personalized computer. It will be able to send and receive wireless data. It

will recognize your voice and follow your voice commands. It will include a

variety of security and service tools that will make the computer fit your own

individual needs. When we turn on our personalized computer the intelligent

agents built into it might automatically show us high-lights and stories from

last night's football game. It could display the current stock report on your

own portfolio and ask if you would like to make any changes. It would give us
a

traffic report for our normal commute to work and suggest an alternate, if

necessary. Finally, it may let us know what the lunch specials are at our

favorite restaurants and ask if we would like to make reservations. The third

product on my list is the multi-fuel automobile. In ten years, our cars will

have to meet even stricter requirements for emissions and efficiency. And to
do

that, we are going to see a gradual shift to other fuel and power sources.

Barring a major oil crisis, we don't see a rapid shift to those alternatives.

The internal combustion engine will still have a major place in ten years. But

we will see an increase in vehicles running on energy sources like batteries,

kinetic energy, fuel cells, and hybrid sources. At first, these will be used in

low-weight vehicles that typically travel short distances. But as these

alternative- powered vehicles are introduced into the general population,

many

of our experts believe that they will likely run on a combination of fuels -

like reformulated gasoline, electricity, and compressed natural gas. The

fourth

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product is the next generation television set. Ninety-nine percent of American

homes have televisions, and over the next decade, we will be replacing them.

These new television sets will be wide-screen, digital, high-definition models with extremely sharp clarity. Many will be so flat that we will hang them on the

wall much like a large painting. Eventually, these televisions will merge with the personalized computer I mentioned earlier. Of course, we are going to have

to pay for all these wonderful products, and we will probably be doing that will

the fifth item on the list, electronic cash. We will be using electronic money

for everything from buying soda in a vending machine to making an international

transaction over our computer. In ten years, our pocket might not jingle,

because credit-card-sized smart cards will have all but replaced our cash and keys. At colleges, we will developed a system that will allow students to pay

their tuition, sign up for classes, download textbooks onto their computer, do

their laundry, enter their dorm, and order a pizza, all with one smart card.

That card, of course, will be directly linked to their parents' bank account!

The next product on my list is the home health monitor. These devices will be

inexpensive, simple-to-use, and non-invasive (which basically means they won't

puncture our skin). We will use them to monitor our health conditions right at

home. They will be able to track a variety of our physical functions - like

liver, levels of cholesterol, triglycerides, sugar, hormones, water, salt, and

potassium. Monitoring our total health will be as simple as keeping track of our

weight today. The future industrial applications of biology and computing will

allow more people than ever before to participate in creating imaginative

service, to build new markets and to generate personal wealth. Number

seven on

the list is another one for our cars. It is smart maps and global positioning

systems. Already, we can get a global positioning system in our cars, and it

will show us where we are on a map and plot routes. But it won't give us any

information about what's going on around us. That is what's going to be

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different in ten years. We will be combining global position system with the traffic management infrastructure to help manage traffic flow. So, our dashboard

map will show us where traffic problems are, and it will plot the best route around them. We will also be using global positioning systems to help stop crime

by giving us the power to monitor the location of our cars and other valuables.

And we will be able to follow the exact location of our most precious valuable.

Parents will be able to follow the location of their children as they walk home from school. The eighth product on my list is also one we might have in our cars, and we might also have it in our office buildings, pipelines, airplanes, and even our sports equipments. These are new, smart materials that will give off

warnings when they detect excessive stress. Materials in bridges or airplanes,

for instance, could send a signal to a central operator when they detect stress,

and that operator could send a return signal for the materials to respond to the

stress. Automobile parts could give us a similar warning when they are approaching the point of breakdown. What is really amazing is that these materials will be designed with sensors built into the molecular structure of material. And, not too far in the future, they will be inexpensive enough to be in products all around us. Ninth on my list are anti-aging and weight-control products. That is something we would like to see. Over the next decade, we will

see the development of a host of high-tech weight-control and anti-aging products for all the aging baby boomers. Unfortunately, no Fountain of Youth is

on the horizon. If it was, I would be back in the lab working on it myself.

Nevertheless, new products will make aging a little less traumatic. In fact, we think technology will allow us to look forward to active and comfortable retirements well into our 80s. These new products may include: weight-control

drugs that use the body's natural weight-control mechanism, wrinkle creams that

actually work foods with enhanced nutrients, and an effective cure for baldness.

The final item on my list is not technically a single, specific product. It is more a trend that will change the way we obtain many products, especially computers and major household appliances. Within the next decade, we will begin

to lease these products rather than buy them. Already, some utilities are developing programs that would allow you to lease expensive appliances (like

water heaters) that use their respective sources of power. The trend for utilities is that over the next several years they will transform into

“ comfort companies.” Instead of selling you a furnace, for instance, they will sell you the comfort of maintaining the proper temperature in every

room in your house. Those are my predictions. But what may be even more important are the lessons we have learned as we’ve put together the forecasts.

Three of those lessons are particularly noteworthy. They apply to business decisions that leaders in any industry make in this race to the 21st century.

The first lesson we learned is that we have to be more aggressive than ever in

tracking technology. Technology is growing and spreading around the world faster

than zebra mussels in the Great Lakes. Historically, the United States has taken

the entrepreneurial lead in developing new technologies. Biotechnology is a good

example. But today, that entrepreneurial spirit is spreading around the global,

and hot new technologies are growing everywhere. But here is the problem:

That

makes our jobs even more challenging, because: one more technology means

increased competitive pressure. And two more technology means it will become

harder and harder and harder to identify and keep track of the specific

developments they can make a real difference for us, or our competitor. I

mention that the increased emphasis on time-to-market has been one of the

big

competitive change in the R & D (Research and Development) over the past twenty years. We see it every day in the United States. Just recently, a new toothbrush was developed for Teledyne Waterpik five times faster than any other

one of the market. Another example is Battlle company, developed the coating

that was the key ingredient for the next-generation interactive globe. These were completely new developments, but the company had to take them from the idea

stage to the store shelf in a year or less-and, of course, in time for the

Christmas buying reason. Therefore, time-to-market is the key competitive

factor. Of course, to get new products out on the market quickly, we have to be

able to identify and acquire the key developments in today's widespread sea of

technology. The second lesson is one that folks in Ames may be as familiar with

as we are in Chicago: We'll go crazy trying to predict ISU-Illinois basketball games. In other words, stick to what you know - and team up with people who know

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the rest. Companies which have business in technology, especially technology in

several key markets, are often comfortable making predictions. We cannot predict

who is going to win Olympic medals, but we can forecast how technology will change the Olympic games over the next twenty years. Even though my dorms sits

practically across the street from ISU, and I can see Hilton Coliseum from my room window, there is no way I am going to try to predict what might happen when

ISU meets up with Illinois. And with technology and global markets expanding in

nearly every conceivable field, industry's facing a similar challenge. It's

getting harder and harder to know everything we need to know about every aspect

of our business. Today, for more and more companies, the answer is the alliance.

Companies are focusing their internal efforts on their own core competencies,

and they are developing alliances with other organizations to bring in

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technology related to their business. Through these partnerships, they are gaining access to new technologies and world-class scientist and engineers - and

at the same time reducing costs. Over the next ten to fifteen years, we are going to see business going one step further. This movement toward more technology alliances and partnerships is really just a transition. Basically, we are going to see the emergence of the virtual company and the total R & D alliance. A company might maintain a vice president of technology to manage a

network of R & D alliances with suppliers, universities, and R & D organizations. Maybe it would have a staff of its own scientists and engineers housed right in one or more of those other organizations. This type of setup could be the ultimate way for a company to focus its sources on its core business and still be able to access the latest technology at the least cost.

That brings me to the third and final lesson about the race to the 21st century.

So far, I've mentioned scanning for technology and building alliances. The third

point refers to making technology matter. As I mentioned above, technology alone

is not the fuel that can give us the lead in this race we are all in. There were many amazing technologies that did not make our top-ten list. They were fascinating to dream about. But that does not mean they would lead to valuable

products. And it gets even more complex, because many of these technologies will

merge and open up vast new areas for growth. For instance, when we cross biotechnology and advanced electronic, that opens up a whole new field of biologically based electronics. Will we be growing organic computer chips? Many,

if not most, of tomorrow's top products will come from this merging of two or more technologies. Mastering this vast web of technology will be a necessary step in winning the race to the 21st century and beyond. But it won't be sufficient. The companies that will win that race are the companies that will be

able to anticipate market forces and acquire incorporate the right technology

into their business. We need to combine a savvy understanding of market forces

with a through knowledge of available and potential technology. That combination

will be the fuel that powers us to develop the hottest products of tomorrow.

Innovative thinking, powered by advanced technology, fueled by consumer demand,

driven by responsibility and common sense will allow us taking the lead on preserving the environment and keeping customer priorities front and center. But

taking that type of initiative to link technology to the marketplace we can use

technology to do more than just improve efficient. Our goal should be to capture

and use technology to gain value-and grab a competitive edge. The story with

Teledyne WaterPik's SenSonic toothbrush I mentioned earlier is one of the best

recent examples of a company using that combination of market awareness and

technology initiative to grab a competitive edge. They are using technology and

market awareness to provide their customers with a more valuable product.

And

that is how they are working to win the race to the 21st century. I have made

a

lot of predictions about technology and about this race that we are all in. But

still, there is really only one prediction that I can guarantee. It is that

market and technology forces will continue to transform industry, and we will

all have to keep up with them if we want to succeed. We will all have to be

futurists. Each business will have to develop its own forecast of leading

technology and market trends that will impact the company in the decade ahead.

And, they will have to continually monitor and revise that forecast and their

own technology strategies. Technology alone will not secure our success. But

focusing on the future with one eye on the marketplace and the other on

technology trends- that is what will put us in the fast lane to the 21st

century.