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<https://stvp.stanford.edu/blog/videos/three-cycles-in-it-network-enterprise-productivity-connecting-people-connective-devices>

Estrin talks about the three parts of the IT cycle, particularly the enterprise productivity cycle. Enterprises have changed the way they did business. They use the internet to communicate with others, bringing IT to small and medium businesses. Enabling technologies have fueled this cycle, which is in its maturation phase, where IT is in minimal demand and there is over capacity.



## Transcript

So let's talk first about the enterprise productivity piece of this.. This is really the cycle we're in.. Now I'll get to this in a minute.. Unfortunately, it's the cycle that we're at the maturation phase of which is why it doesn't feel like everything is going up right now.. But this was really fueled and this is what really fueled the growth over the last two decades.. And why do I call this enterprise productivity? This was really about infrastructure build out in enterprises in order to drive access to information and information processing across the organization.. And enterprise has fundamentally changed the way they did business, the way they made decisions.. Because suddenly people had access to information in real time that they never had before.. There's another part of it which smells a little bit like dotcom's but it is what has succeeded from the .com error.. And that was enterprise is using the internet to reach to their partners and customers in new ways..

Now what's the difference between that and kind of the bubble part of the dotcom? The bubble piece of the dotcom's were those that thought the internet was a business.. The people that really leveraged this and the piece of the technology that has continued is those companies who have leveraged the internet to reach out in new ways.. So why is Amazon still here? Or E-bay's still here? While many of the dotcom's are not.. Why is Fed Ex one of the best examples even today of how you use the internet to dramatically lower cost.. It's embracing that to extend their business as opposed to viewing the internet as a business in itself.. And then there was a third thing going on in the cycle which is really about bringing IT technologies and productivity to small and medium business into new ways.. Because if you look back 20 years, all the of the really interesting things in IT were affordable to large enterprises.. But small and medium businesses were really not taking advantage of it.. And so in this infrastructure build out we also brought in small and medium business became a real market over the last 20 years and not kind of an after thought.. So what were the enabling technologies that drove this..

If you kind of think back, there were a lot of them.. And a lot of them coming together and I'll get into how that impacted the growth.. But clearly micro-processors and semi-conductors in general, a new semi-conductor technology.. Systems architecture, so not just the micro-processors themselves but how you built many computers and work stations and PC's and the bus architectures and everything that went around with it.. Bitmap displays and windowing.. Things that now, what do you mean? We've always had it.. Well you know we didn't always have it.. At some point that was that breakthrough technology.. Changes in operating systems.. Packet switching which is where the networking comes in..

Database technologies, the web.. And then in addition to that, cellular, which seems a little bit off to the side but comes together when we're really starting to talk about enterprise productivity.. And how we can be more productive on a day to day basis.. So this is a long list.. When I showed that cycle I showed a breakthrough technology or an enabling technology.. And that is one of the reasons why we had such phenomenal growth in the 90's is we have all these enabling technologies come in

together driving a very, very steep cycle of acceptance.. And then we hit '98 and the Y2K buying came in.. And so you had even more accelerating buying leading up to 2000.. Then we saw with the Netscape IPO and I'm not going to spend time talking about this.. We've all analyzed it..

The change in the stock market which became such suddenly a retail market.. Day traders driving the price of stock.. The relevance to this presentation is only that that drove the notion for enterprises, for telecoms, for .com's and some enterprises that capital was free.. Because you had this crazy stock market.. And if capital's free you run your business on a different way, if it's really free.. But as we know nothing is really free.. You ran your business in a different way.. You don't worry about profits.. You just drive growth through more and more capital.. Now capital is not free..

And that realization is what drove the downside of that bubble.. And what really hurt so as we came down in 2000 and 2001 is we didn't hit the upturn of a cycle.. What did we hit the maturation phase of the technology cycle? So not only we were coming down off a bubble but we're coming into a part of the cycle that just doesn't have the same growth that we used to know.. And so if you look at where we are today and this I promise you is the most depressing slide in the presentation.. Laurie who works for me, once she saw this she said, "Judy you're just going to depress people." But where are we today? Where we are today is in a period of minimal IT demand.. And why are we in this period? Probably the main reason is we're at the maturation part of this enterprise productivity cycle.. And we in technology are denying it and hoping that it's going to go back up again.. Cycles don't do that.. Now coupled to that was an over capacity which I believe is still an over capacity.. Some people and certainly on CNBC, they'd like you to believe that the over capacity is gone..

But the over capacity is still there.. And it was driven both by Y2K buying as well as enterprise IT guys who said, "I have the money.. Why shouldn't I put in fiber all over New York City.. I don't need it but I'll put it in." So now they have it and they certainly don't need more of it.. So it was both Y2K buying and this again more money than they knew what to do with it.. The other thing that I think we in the technology business need to realize is that we are now a little ahead of demand in many of our product lines.. For a long time PC's were lagging demand in terms of CPU processing.. And people constantly were upgrading their PC's because they needed more processing power they had on their desk.. That's not true today.. And one interesting thing looking back at all the companies we've started, everyone of them within six months after starting the company, the engineers were in our office saying I know you bought me that PC but I need a new one..

That hasn't happened at Packet Design.. For the most part the PC's we bought engineers in the beginning except for particular applications where you're doing simulation or you're doing very high-end analysis.. You know what, everybody's using those same PC's because they're not required to upgrade.. That doesn't mean nobody upgrades, or people don't want to upgrade but they don't have to.. And that drives a different cycle.. The three items in red here are what is happening in the technology business.. Now coupled that with what's happening to every business in the world which is world events.. And so whether it is 9-11, whether it is corporate scandals and you could say, "Well why are the corporate scandals after the fact have to impact technology business?" Well it does.. In the way more than we think because the world has become very risk-adverse.. And a lot about embracing new technologies is about taking risks to do business with start-ups to embrace new technology..

Things like SARS.. When SARS hit and we started to focus on that, some people may understand the analogy from the Old Testament.. But I suddenly felt like the world is being hit by the 10 plagues again.. I mean it was like we didn't have enough yet we have another.. And this I believe will continue again to have a pretty long standing impact coupled with weak economic cycles.. And then there are two interesting things that I think we as technologists don't think a lot about.. But certainly from my advantage when I look at my board seats and see where are dollars going.. Well the fact to the matter is you have two interesting things going on from a corporate perspective.. You have a lot of dollars now going into healthcare, pensions, security that might have gone into other areas of technology.. And it's a zero sum game..

There's only so many dollars.. From a consumer perspective, you also have an aging demographic that is putting more and more dollars into healthcare.. And so these just don't bode well for say, "You know what everything's going to get better in six months." There is a long term changing dynamic here in terms of how people are going to spend their money.. So does that mean nobody should be an entrepreneur? And you should just pack up and go home? No! There are areas certainly over the short term and then I'll talk about the long term where people will buy.. You just can't go into the world expecting that you're at this type of growth.. So where we are now for the next couple of years certainly in this enterprise productivity cycle is in what I call very much identifying areas of incremental growth.. And I've listed some of them here.. Wireless and mobility, I believe very strongly will see incremental growth.. Security.. Operations and management, something that was very boring 10 years ago..

Now becomes very important for people who are managing their networks or managing their data centers.. Because they're being asked to be more efficient.. Data center efficiency over-all and this is my catch-all for looking at the data centers and saying, "How do I not just throw more and more servers at it? How do I take this in more effectively, utilize my servers and my storage in a way that I can again operate more efficiently?" Voice Over IP, I think again.. But I believe this is an incremental technology.. I don't think that this is something that is going to drive huge growth.. I think you will see it coming in certain areas.. And then a non-technology area is certainly China.. Now again once we get hopefully get a hold of this whole SARS phenomenon and why? Because China's at a different place on that growth curve.. China is still at the growth part of

enterprise productivity.. So if you can look for markets that are still at the up cycle, you can pick areas of incremental growth..

Now as we look forward beyond kind of this two year incremental growth and go into, "Ok well what's the next cycle?" One thing we need to kind of think about is that there's a couple of forces at work today.. I don't have all the answers.. I'm just going to raise them as issues that are going to impact development and innovation going forward that weren't there when we started the cycle before.. And they are one open source.. And I don't think we really know yet exactly how and where open source is going to make it's biggest impact.. It clearly is going to make an impact.. But we kind of haven't settled into what is the right balance between open source and proprietary technology or owning an intellectual property.. Where is the place where open source can make the most benefit for the consumer or the person buying the technology.. As well as the vendor selling the technology.. Because if no one can make money then there won't be new technology..

There needs to be that balance between the two.. Dominant vendors.. And I put dominant in quotes here.. What do I mean by this? I mean vendors that are so strong in their market.. That it's hard as a start-up to see how you get around it.. I'm talking about vendors that are so strong in their market that if they see what you're doing and choose to circumvent it, it's just easy to squash innovation if the dominant vendor doesn't like it.. What this means is it's great if you can partner with one of these guys.. It's really hard if you're going up against one of these guys.. I mentioned risk-adverse environment.. The venture community is way to risk-adverse right now..

I'll talk about this in a little bit.. But buyers are risk-adverse.. And so you have enterprise buyers who are just not willing to take that risk or don't have the time to try a new technology.. And hopefully that will settle down over the next couple of years.. And then I just grouped it under unintended consequences.. There's just all sorts of weird regulatory and legislative things going on.. Everybody is rushing to protect us as citizens.. But how do we not lose our privacy? Everybody is rushing to protect an intellectual property content but how do we make sure that the consumer still comes out ahead here.. And so there's just a lot of issues here that I think maybe the world's moving a little too fast in the legislation front.. We're going to have to come back and clean-up some of the unintended consequences...