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WILLIAM

BONVILLIAN:

So just as kind of a synopsis of some ideas that we're going to get through, we're looking at manufacturing, which is a way to profit from innovation, as a way to scale innovation. And we'll do something of an historical review here today, so we'll look at the last big competitiveness challenge. The US went through a challenge from Germany and Japan. We'll take a particular look at Japan's manufacturing innovations in the '70s.

We'll review a distributed model of production that the US came up with, in some ways in response. We'll look at manufacturing and innovation organizational shifts within both Korea and Japan, and then talk a bit about how the nature of the competition is changing as well. So that's kind of a backdrop, and then next week will be a more pointed focus. So the first piece we'll go through, and I'll lay it out. And Chris, do you have-- RASHEED, you've got Hughes.

RASHEED:

Yeah.

WILLIAM

BONVILLIAN:

Right, OK. So this is Kent Hughes. Kent Huges led the joint economic committee, staff director in the Congress. He was a senior official in the Department of Commerce. And he kind of wrote the history of the competition over production between US and China, a period of time when he was very deeply engaged in policy making.

So let's get this backdrop kind of down because I think it'll help us see a lot about what the US is going through now in terms of manufacturing. So in the 1970s, the US faced a mess-- intractable high inflation, declining productivity growth, therefore a slow growth rate, rising economic competition, rising national anger, frustration with government. Sound familiar?

And the US model of kind of pretty unfettered markets of limited government support for industry was a very different innovation model, innovation system than what Japan and Germany were pursuing. And that in turn led to the beginnings of what could be called the US National Competitiveness Strategy. So the essential elements of that history of the initial response to Japan's development of quality manufacturing, which we'll get into in a minute, there were different responses from each party. And these will be familiar to you as well.

So each party was organized-- remember when we discussed classical economics, right? And the key factors in classical economics were capital supply and labor supply. Each of our parties is organized around one of these, right? So the capital supply response came from the Republican side, and Congressman Jack Kemp of Buffalo and Bill Roth, who was chairman of the Finance Committee and the Senate from Delaware, their argument was, let's adjust marginal tax rates that will spur capital availability and investment. And we'll recover.

The Democrats will organize around their traditional mantra of labor supply, broadly defined, right? And they had moved towards what was then known as industrial policy, still known as industrial policy. So they were looking to rescuing failing industries and reorganizing them for turnarounds. And at a later time, through the Young Commission, another set of ideas begins to enter the discussion around, quote, sunrise industries.

The Young Commission tried to cut between these two party perspectives and develop a different approach. So John Young was head of Hewlett Packard, and President Reagan named him the head of this commission. And their focus was on national competitiveness. And they concurred that things like fiscal and monetary policy are important. But they were also interested in what the innovation side of the research side could do. So it was not simply a governmental role in basic research, but basic technology. And they developed a model that was in this public private partnership that was industry led. And the term partnership nation emerged from some of their work.

So this was, in effect, a third way out of the box. The two parties had their underlying theories. And Young walks in with a different kind of approach. So he's out of the Silicon Valley. He's used to working with DARPA and the Defense Department, so he's not afraid of government and its technology support rule. And this whole effort was called the New Growth Compact, all right? So it was an attempt to cut between the parties and develop a series of new programmatic elements.

So some of the things that eventually emerged-- not specifically from the recommendations necessarily, but emerged over time-- were created as cooperative R&D agreements with industry between governmental laboratories and industry. So in other words, we've got these snappy governmental labs. Little emerges from them. Could we do cooperative agreements to get technologies out of the labs into the hands of industry? It's a new tool.

The Bayh-Dole Act comes out of the same time period, which, prior to the Bayh-Dole Act, the

federal government owned the fruits of the research that it supported at universities. Now the federal government is not a commercial entity, so nothing happened to it. So it was moved to shelves, right? The IP was not really utilized. So Bayh and Dole came up with the idea of giving the universities that had sponsored the research activities-- supported the research activities with federal funds-- let's give them ownership.

And they in turn typically share it with their researchers and give them a vested stake in developing the technologies that the research is leading to. So this plays a really critical role in starting to put universities on the playing field as innovation actors, right? It gives them a stake in the outcomes of their research. The Advanced Technology Program and the Manufacturing Extension Program come out of the Commerce Department in an attempt to introduce both new technologies and an attempt in the MEP program to bring advances Japan had been pushing on quality production into small US manufacturers. There were education proposals.

That attitude was essentially pro-trade. In other words, don't ignore the world. Let's be successful at trade and be innovative in trade. That attitude gets adopted by the Clinton administration and leads to things like NAFTA and the China WTO. So that's kind of what is coming out of the Young Commission in terms of new ideas, but let's go back to the challenge that they were facing. What was this? What was this new model around production that Japan was launching?

And I would argue that was big enough so that it, in fact, amounted to a significant innovation wave. And it was the one wave that the US missed in the second half of the 20th century. So Japan hit on innovating and manufacturing as a way towards its own competitiveness as a leading world economic power. And before the 1970s, the US had come up with a way of dealing with quality in what's called a quality price tradeoff.

So in our mass production system-- and the US essentially came up with most of the elements of mass production starting around the 1840s and moving for 100 years. The US had become a dominant mass produ-- we had really invented mass production at huge scale. And we were selling manufactured goods into a continent sized economy. Of course, continent sized economy that existed.

And part of the mass production idea was never stop the production line. Always keep it moving. Always keep producing. And how do you deal with quality? Well, you do statistical analysis of the products you were producing. You would decide that some fixed percentage

were not meeting those quality standards. And so at the end of the system, after you would produce the goods, you would have an inspection group throw out whatever it was-- 1.8%, 2.4%, whatever the statistical number told you-- after the production system had been developed.

Quality is really how good is the product. Quality control is what's the unit of-- are there units of equal quality, right, across all that you're producing? Japan came up with a completely different system and a much better system. And it was called here the Toyota model. But it was based in Japanese manufacturing. So the idea here was build quality into each product, not at the end of the system, throw a bunch of stuff away. Ensure that the entire system is working to ensure quality. And anyone, any worker, can stop the production line if they see a quality problem. So catch it at the beginning and build quality into your entire production process.

The idea came actually from an American named Edward Deming. And he was unable to persuade US manufacturers to adopt this model. So he takes it to Japan. And we sense Japan's rich culture here around craftsmanship, right? It fits wonderfully with it. All right, so this is-- Japanese samurai culture, of course, respects the samurai, but accords almost equivalent respect to the sword maker, right, who is almost equally as famous. So there's a huge focus on high quality and craftsmanship in Japanese culture. So what Deming is saying fits with the kind of culture of Japan.

There are other pieces that Japan comes up with-- just in time inventory. In other words, a major burden that manufacturers face is that they have to store up a lot of inventory to have enough goods available for the marketplace. But when you hit an economic downturn, then you're stuck with this massive inventory that you can't get rid of, right? And it becomes a huge cost burden on your system.

Japan's idea was produce for what the market is actually absorbing-- in other words, produce just in time to get it to market. So that calls for a whole new level of efficiency and communications really IT embedded in earlier kind of ways throughout the whole production system. And it significantly reduced the exposure of significant manufacturers to economic downturns.

Japan integrated its dealers and its suppliers into its system. So in the US, major manufacturers would keep their suppliers at arm's length and have them bid. And there was

no particular relationship. They were just looking for the lowest price, right? Japan, the suppliers were actually integrated into that system. And in turn, the dealers who were just selling these goods were also integrated in, so that you had much closer touch with what customers actually needed and wanted, as well as what the quality of the suppliers, what they were producing, is going to be.

Japan had a culture of respecting the production moment. So they would move their engineers onto the factory floor as their first set of assignments. So if you look at, in contrast, the US didn't do that. All right? So the engineering profession was one in the 19th century US that was trying to take a hold with those other established professions-- doctors, lawyers, ministers. So when you look at these early photographs of MIT and you look at photographs of MIT labs, those wonderful photographs of the steam lab, you can't imagine coal dust all over the place.

These characters were all wearing these starched white shirts with those fancy weird bow ties they wore at the end of the 19th century, right? They looked so prim and proper. They're trying to be like ministers or doctors, right? They're trying to elevate their profession and separate themselves in a way from the work floor right? So the engineers want to be in a glassed up area up above the factory floor in the US, right? They don't want to be down with-- heaven forbid-- the workforce.

So it's an attempt by an engineering culture to establish its identity. You can understand why it happened. But Japan hit on a much better plot, right? Integrate the engineers in the workforce and make them one, right? Much better, right? So we have learned to get our engineers into the mix in the manufacturing sector. Japan came up with this quality manufacturing model. Sometimes we call it here a lean manufacturing. It led to an effort by the US to simply copy what Japan had come up with. We had to take apart the Toyota model.

A lot of that work is being done at MIT, right? So Dan Rus and several others at MIT are writing up the Toyota model. And explaining it to the rest of the country was a really important stage. Standard industry approaches like Six Sigma that came out of GE have essentially attempted to incorporate Japan's quality ideas and make them pervasive in US production for both major manufacturers, OEM suppliers.

A few other things, there's something called the product cycle. And time is a competitive factor in this, so eliminating time delays and then something actually the US really contributed to was concurrent engineering design. So you engineers in the room I'm sure know what I'm talking

about. But in other words, if you and I constituted Chrysler Motors, the way in which we would organize Chrysler Motors in the old days was we would have a bunch of engineers, and they would do the design. And then they would finish the design, and then they would take it to the production people.

And the production people would say, well, that's all very well and good, but we can't make that. So we do it, right? And then it would be redone. And then they would take it to the engineering people again and then take it to the marketing people. And the marketing people would say, well, that's all very well and good, what your engineering people have done, what your factory floor people have done, but we can't sell this thing. So completely redo it. In other words, it was a stage by stage process, with every stage having a veto. So the development process for design was painful, and lengthy, and often adversarial. Concurrent design is to put all those teams together at the outset contributing to the design-- dramatic time savings, dramatic efficiency savings. So these are all kinds of ideas that came out of this time period.

Another idea that Japan had-- and we weren't organized this way-- Japan had a whole different way of approaching what we could call the labor trade-off. So Japan had a system of essentially guaranteed lifetime employment. So if you were a worker in Japan, you were pretty well assured in this era. It's changed a bit now, in this era of a lifetime job. And in return for that assurance of a lifetime job, management would control the work rules, or what's actually happening on the factory floor, right, now that we processed where the rule systems is. That was the trade-off.

The US had a complete different trade-off. We treated labor not as a fixed cost, like Japan did. We treated it as a variable cost. And the trade the unions insisted on-- this was an era of pretty heavy unionization of manufacturing in the US at the time-- unions weren't able to affect who gets hired and fired in the employment side of the equation. But they would control the workloads, right? And they designed those to be as protective as possible as their workforces, right? Not necessarily the most efficient system. So Japan actually had a better model here, right?

Now we continue to treat our workforce as a variable cost, right? So whenever there's an economic downturn, US companies dump their workforces as a quick response, right? That's fundamental management theory in the US. Other countries don't necessarily do it this way. Japan has had to get more flexible in its model as it's gone to more global competition. But it had a completely different way of organizing its workforce. Labor became much more

collaborative, rather than adversarial, and ready to leap on new efficiencies in the production process, rather than fight them every inch of the way. So again, this was a contributing factor to the kind of new model that Japan was creating.

There's another element here of industrial policy. So Japan is recovering from World War II. It develops an innovation system that is very focused on production. That's what it's got to stand up against. And that's where this quality model comes from, and these other pieces. And Japan is very resource poor. So starting in the 1880s, Japan understood that it had to have an export orientation. It had to export to live because it had to get the resources in order to produce them, right? And buy those back, so it needed an export surplus to be able to do that.

One of its core institutions was called MITI-- Ministry of International Trade and Industry-- now called METI. And the nickname for this was Japan Inc. But a very integrated system of governmental leadership tied to major industries. And the major industries weren't organized as they were in the US. We had anti-trust laws in the US. We did not really impose that in the post-war period and allowed Japan to keep its, quote, keiretsu system. So that's a system of major firms typically engaged in production activities, financing, global trading, and then networks of suppliers that are tied to those.

So these are groups of related firms that are all mutually owned and tied to each other, all right? They would violate US anti-trust laws in all likelihood, but that's the way Japan organized its core industries. Now, not all Japanese firms are part of these keiretsu, right? So a company like Sony was actually outside of this, right? But most of its industry was organized in this very simple kind of way. And you can see how their dealings with a major governmental entity, like MITI, could be readily tied to unify government decision making and industry decision making.

So when the US was competing against Japan in this quite centralized, quite efficient model, US had a lot of trouble coping. And you've seen them-- when we talked about Jorgenson, you saw some of the productivity and GDP curbs. So historic US productivity rate generally around 2%, and historic US GDP growth is generally around 3%, right? Between '73 and '91, those plummet, so we fall to productivity rates at around 1% and GDP growth about 2%. It was a pretty grim time in the United States. We were up against a powerful industrial competitor, and Japan was able to take economic sectors that the US thought it would always have, like consumer electronics, like a large part of the auto sector. Because it had a better innovation model.

So in a very brief period of time, that's kind of what happened in the 70s and 80s. The US response, as I suggested earlier, was that we would attempt to copy Japan on quality. And we call it lean manufacturing, but we would attempt to replicate as much as we could of that Toyota model. And by and large, our industries have pretty well done that. But we also kept a focus on our very strong innovation system. So we launched in the 1990s the IT innovation wave, which Japan misses, right?

And if you get your economy to a leadership right to the edge of the technological frontier, and you organize your economy around leading innovation ways with Japan and just organize its economy around doing, around a new production system, and then you miss a wave, it can be pretty unpleasant, all right? So it was unpleasant in the US when we missed a wave in the '70s and '80s. But then things got tough for Japan. Now that's not the only factor that's going on. There's macroeconomic factors. There's demographic factors. There's a series of things that are occurring simultaneously in Japan. But one part of the story is around missing this innovation wave.

So that was the kind of response that the US came up with. It used its innovation system to develop effectively radical innovations in the IT space and create whole new industries. So we pursue radical innovation. Not consciously-- but in a way, that was effectively our response. Why don't we stop there and go through the sheets and discussion of Kent Hughes?

RASHEED:

Yeah. So Kent Hughes, I think he really talks about sort of this '80s period in Japan and then really isolates the sort of US response. So how is the US going to respond to kind of larger problems with our manufacturing system and really competing on that global scale, now that Japan has sort of captured a lot of things going on with quality manufacturing and that sort of innovation wave? I think one of the really important things that he talks about is sort of this bureaucratic climate.

So there's a lot going on sort of trading on the international scale, but bringing it back home to the US. You have to get a lot of people onboard in order for you to sort of move forward in this cohesive way, unless you're riding an innovation wave. And so we're set up in a radically different way than Japan. And we have to kind of figure out what to do. And so talking about Ronald Reagan's response, I think it was pretty cool and important that Ronald Reagan sort of exercises his discretion with this commission on industrial competitiveness with John Young. So I was just wondering if any of you guys had any feelings on sort of the presidential power to not only kind of highlight issues, but sort of take the lead and take action, separate from all the

bureaucratic dealings? Oh yeah, so Steph, I saw you raise your hand.

STUDENT 2: Oh, I wanted to point attention to Matthew.

STUDENT 3: I mean, I thought when I was reading it, that he was actually quite slow to act on it, and it was really Congress that kind of pushed the efforts. And later on, he decided that this was something that was important. Yeah, it seemed more of like a political at first.

STUDENT 4: Yeah, or making motions without actually making actions, just to sort of look like Reagan is taking action on this thing. And yeah, I agree. I thought he ended up dragging his feet, and other people had to sort of push for anything to be enacted with the Young Commission.

RASHEED: So I think one of the big pieces in this Young Commission is how they decide to choose members. And they pick kind of large manufacturers of industry, and they start with John Young. But I thought it was interesting how he didn't get to sort of hand pick the members that he'd like to be on his own commission. I thought that might be a little bit short-sighted, considering he's going to have to work with all these people. And it might be a way of sort of to drag your feet. But I thought the sort of what came out of the commission, which is this new report, which highlights a lot of these sort of transformative things, sort of would've never happened if he didn't sort of grab from all these places in industry and manufacturers.

But is there any sort of merit to sort of bringing these people in, having them work on this commission, and then publish this report? Even though we don't sort of act on it, but you see all of these things that he highlighted in sort of New Growth Compact, maybe 10 years down the line, might really be important. And sort of, this lays the groundwork for five or 10 years in the future when you're ready to sort of act on these things. So I guess my goal would be, is there a merit to sort of even if it's kind of haphazard attempt at addressing the issues, is it a still important metric, maybe not now, but five or 10 years down the line?

STUDENT 4: Yeah, I think so. And with the Young Commission, I think that out of that commission, Young decided to form-- what's the name? I'm blanking on it, but it still exists today. I looked it up.

WILLIAM The Council on Competitiveness.

BONVILLIAN:

STUDENT 4: Yes, exactly. So yes, there are lasting knowledge and wisdom from a commission like this. So yeah, definitely, it's better than nothing. It's better than sticking your head in the ground. I think some of the stuff they put forward is definitely extremely useful. It's there. It's published. It's

accessible.

STUDENT 5: I think it's one of those better late than never things, right? Because it only seems to happen that-- I don't know if this is a trend with the US or countries in general, but it only seems that they put in all this effort for one specific issue when something's going wrong, right? Why not prevent things from going wrong in the first place? And I don't know. The government seemed to be very hesitant to change their ways surrounding their views on specific policies around innovation. So like I said, better late than never. But in my opinion, it'd be better why didn't they do this decades before?

STUDENT 2: I think the question I have with relation to this reading is that Hughes largely characterizes domestic policy making as reactionary. And I agree. What hope exists for utilizing, A, the courts under the living constitutionalist framework to really address these questions and, or meaningfully integrating the kinds of knowledge and consensus that is created in these commissions.

And I don't know that there is yet a model for effective consensus building outside of these commissions and translating that to policy action with collaboration in the legislative branch and the judicial branch. And that's, I think, where your point sort of comes into action, that there is an opportunity for proactive policymaking, but it has to be integrated with discussions around the branches. It can't just be isolated in one branch because then, as Hughes pointed out, there's going to be competition amongst them on what the right thing is to do.

RASHEED: Yeah, so that brings maybe my follow-up question. You might be able to help us out here. So I think the president, in this way, really was able to just kind of use his power to set aside and kind of call for the study and commission. Is there a way for sort of legislators to kind of do the same thing? Let's say I'm a committee on energy. Can I call for a study or the committee section of Congress that deals with manufacturing? Can they sort of call for a study in the same way, and then maybe work with the executive branch to kind of do the same thing?

WILLIAM BONVILLIAN: I mean, just a comment from my background experience having worked in the Senate for about 15 years-- yes, the committees of Congress can function on an ongoing basis to try and identify, Kevin, exactly the problem you were raising, which is be a little foresighted. Some committees are obviously much better at this than others historically. But there's no guarantees. And frankly, government tends to respond to crises. And if there's not a crisis, it's hard to get it mobilized, organizing, and moving to be foresighted.

That's not necessarily all bad, right? There's advantages of having limits on governmental intervention here. And if the system is working fairly well, you probably don't want government intervention. It's only when you hit a crisis moment that you really want it to fall into place. I understand, though, your points about wouldn't it be better if we were watching all this stuff all the time. So there is that reality. You've got to hope that somebody somewhere in the society is undertaking that review. But it's not something government is terribly good at.

And a typical response to a crisis in a short term kind of way. So we came up with these various mechanisms, none could really be called a competitiveness strategy. We came up with a bunch of pieces, right? One piece that's not on here was Symantec, which is an attempt to deal with Japan's effort to really capture the semiconductor sector, which, again, produced very high quality production capabilities and in semiconductor chips, particularly DRAMs. And the US was producing a lot of chips, but they were not as high quality. And the manufacturing process was not as efficient as Japan was.

So Canon and Nikon were opposed to be able to capture a very large part of that sector. The solution the US came up with-- and again, this is DoD-- the Department of Defense-- which viewed semiconductors as a pretty critical national security technology. Because it was embedded in all kinds of critical defense technologies. DoD agreed to cost share with the big industry organization consisting of both the semiconductor fabricators, but also the supplier system, the equipment and parts suppliers system for the semiconductor in this community.

That community came together, eventually settled on a series of steps to build quality into the US semiconductor manufacturing process. Cost shared with DARPA, and it really turned around a sector. Now there are other developments going on here, too. The US taking leadership of integrated circuits and microprocessors, kind of the next stage of technology, so that certainly helped. But nonetheless, the effort to drive quality into semiconductor production was a very concrete example of an industry and governmental collaboration that actually worked.

So these other pieces here are a little more hands-off-- CRETA, Bayh-Dole Act, the Advanced Technology Program, but not as direct. Symantec was a fairly direct effort in the particular economic sector with national security ramifications to intervene. So in some ways, that's the most seminal model that came out of this time period. But again, the minute that the IT revolution starts to take off at the beginning of the '90s, then the US drops its concern with

manufacturing, right? And we go on to having a great time for a decade with the IT revolution, which, as we discussed, is a remarkable period of growth and of economic well-being in the US. How about another one, RASHEED?

RASHEED:

For Hughes? Yeah, I think we kind of center our discussion a little bit on the US response to what's going on in Japan. But I thought it might be interesting to at least touch on how the different paradigms-- and so the US and Japanese culture. So in Japan, we've talked about kind of like these workers treating labor as a big source. And so you're sort of employed for life. These paradigms play out in Japan, and they're just kind of characteristics of the culture.

But I think looking at international trade, is this sort of the first time that we had to deal with a difference in paradigm affecting international trade, and basically just the fundamentals of the US economy in a pretty large and widespread way? Because I guess, globalization will bring new countries and new actors acting in different ways. But there's sort of no competition until Japan sort of poses this entirely different model for how to do things. But I'd like to at least touch on how does kind of setting up your problem and your paradigms in this way, does that provide opportunity for sort of new innovation ways, in that if I set up postwar Japan in a slightly different way, do I get a slightly different outcome?

STUDENT 4:

I was wondering-- this might help answer that-- does Japan have the equivalent of the US labor union?

WILLIAM

BONVILLIAN:

Yeah, the labor unions are organized very differently however-- far less adversarial. Again, if you have a lifetime guarantee of work what's there to fight about, right? Why do you want to have fights, right? Instead, they're much more collaborative institutions that tend towards moving towards great efficiency to promote their company's performance. There's much greater incentive for collaboration in the system that they set up. Now again, some of that is faded as Japan has entered a much more globalized competitive world of competition than it faced as its system was emerging.

But the trade-off of getting cooperation from labor around work rules in return for a lifetime employment has tended to work well for Japan. In fact, the US auto industry was actually moving in that direction for a time period before, again, high competition kind of caught up with it. But it's just that labor trade-off is just a completely different arrangement. Look, I don't want to underestimate these big macro factors that are playing here, right?

So at the end of the World War II era, the US and the developed world-- non-Communist

world-- essentially came to a set of arrangements around free trade concepts, and open economies, and lowering tariff and trade barriers and so forth. And that was the consensus system of the time. When Japan organized its economy and really began to move on entry as a global economic power, it organized around a different set of concepts. It was not organized around a free trading system. It was organized around a pretty mercantilist approach.

Again, as part of Japan's history, it has to trade to survive. It has to export to survive, right? So they developed a very focused export system. They undervalue their currency so that their manufacturers would always have a price advantage over US manufacturers, right? US put up with that for essentially world national security kind of reasons with an ally. And we assumed we were kings of manufacturing. Who could interfere with us?

Japan had a much more interventionist attitude by its government into supporting particular and assisting particular firms. That was not like the US system. It made it very hard for imports, particularly of complex technologies, to enter the Japanese markets. So it was playing by a different set of more mercantilist kinds of rules.

And frankly, that model became a model for other Asian economies. So that was a model that worked for Taiwan, and for Korea, and now China. And it's not based on that open trading regime consensus policy that the US tried to build at the end of World War II. So we're up against different economic models here. Part of the story is that the US hasn't really figured out what the right strategy is. But RASHEED, I think I interrupted your ability to get answers to your question from the table.

RASHEED: A little bit. Yeah, so definitely wanted to talk about some of these Japanese paradigms kind of being a little bit more pervasive in the way that they set up, just like in the way they set up their whole economic structure. And is there an opportunity for different countries to sort of adopt different paradigms in this way?

STUDENT 3: To an extent. I think it almost goes back to that discussion we had about our innovation systems that makes them [INAUDIBLE]. And I think while that paradigm worked well for Asian countries, I think there would definitely be still a lot of resistance in the US if we tried to set up an identical paradigm here. People have these strong beliefs about free trade and laissez-faire government.

WILLIAM Right, although those are now right at the center of a major political debate, really for the first

- BONVILLIAN:** time since-- well, there was a debate over these issues in the 1970s and '80s, a big debate as Japan came to the forefront in two major economic sectors in particular. And we're back to that debate now. We're having it right now. And so all of this is actually pretty interesting context to be watching, I think. We'll have to see what the new administration proposes, but they appear to be moving in much more of a neo mercantilist kind of direction than prior regimes.
- STUDENT 6:** So in order to figure out whether or not, not only if other countries can try to convert their economies to this, but rather, whether they should, we have to figure out what was the-- so one of the main blocks between any economy and Japan's economy is these kinds of-- what was the term you had for those things like railroad monopolies and oil monopolies? Oh yeah--
- STUDENT 3:** Business sectors?
- STUDENT 6:** What?
- STUDENT 4:** Business sectors?
- WILLIAM** Industrial policy.
- BONVILLIAN:**
- STUDENT 6:** It's the regulations that keep it from--
- STUDENT 5:** Antitrust.
- STUDENT 6:** Thank you. Sorry.
- WILLIAM** All right.
- BONVILLIAN:**
- STUDENT 6:** Yeah, we're on the same wavelength. OK, so those antitrust laws, we have to figure out what is it specifically within Japan that would conflict with those laws. And well, is it really the best system for the individual worker? So from the impression that I've gotten, the government is so closely linked with the industrial sector. I feel like it would be an-- I'm not sure how that transition could occur. It's kind of like because they had come out from World War II, they had the opportunity to restructure from the ground up. So I'm not sure if you could take an economy that's already based, even if it's a better system. And I'm not sure you could just revamp it, at least in any reasonable amount of time.

STUDENT 7: I do agree with that in that there's also historical and cultural factors to consider, like a lot about how America views itself as you're pulling yourself up by your bootstraps and competitively getting ahead, less so than this kind of more collaborative, industrial conglomerate that is making sure everyone's OK. So I think it could encounter resistance in cultures like ours, where that's not as respected.

STUDENT 8: Yeah, I think also there's the issue of scalability. Because Japan is so much of a smaller country than the US, their structure might not translate well on a broader scale to ours, especially with the cultural difference. Because I know educationally, it's very much pretty structured. If you do these things and you go to these schools, you tend to go get slotted in, so to speak, into certain industries and certain roles.

And that's kind of an approach that we've tried to avoid going towards here in the US. We kind of promote, oh, you can go into whatever field you want. You don't necessarily have to go on a certain path. So I think there's definitely differences fundamentally in ideology that prevents kind of the same model being imposed upon both countries.

STUDENT 6: Regarding at least the scalability thing, you could possibly counter that by saying, well, we have a lot of states. So you theoretically could just have a couple of states just try a similar system. It'd be easier to revamp them because it's a much smaller area. It's fewer people. So I mean, of course, there's still plenty of reasons why you can't or why you shouldn't. But it definitely would make it a lot easier to do, or at least look at.

STUDENT 5: Yeah, I think just to add on to that, I think one of the writers from the first class actually has a whole-- he's written a lot about these sanctuary cities. I think that's the wrong term, but he talks about cities where they have special rules for certain industries. And that's also especially important because especially in the last election, there's only certain cities that are really doing well because of technology since San Francisco, New York. I'm probably forgetting a couple-- a lot. But what he is really pushing is like, OK, well, we're going to get jobs in this sector in Detroit, and we're going to get jobs in this sector in Houston and bring them back. And that was kind of what he was arguing.

WILLIAM BONVILLIAN: So I'm going to cut this off, so we can make progress with some of the readings. But I think this is a good background for us to lead into-- I mean, you all raising these cultural historical things would be great background when we hit our discussion of Korea and also how Japan had to try and reorganize its innovation system as it got to the frontier in Glen Fong's piece. So

hang on to a lot of these ideas. Let me jump to the next reading here, which I'm going to go through just very briefly.

We're now back. It's post 1990s, right? We're now back in our time with that as a backdrop. I put this reading in here by Barry Lynn and a book that he wrote called *End of the Line*. It's not a book that I have a lot of agreement with, but there's an interesting historical perspective here that I especially want you to get a handle on, particularly given the conversation we've had about industry and culture. So Barry Lynn argues that there's essentially three periods of US manufacturing industrial history.

There is a period between Alexander Hamilton. And we call it 1945, the end of World War II, right? And I mean, Hamilton is an absolutely critical figure in US economic history because he had a remarkably big picture of what the US economy could become, a bigger picture than anybody of this time in the political system. So his fundamental understanding was that in this era of a small new power faced with much larger contending European nations, that the only way that the US keeps its independence is by building a strong independent commercial economy, right?

So Thomas Jefferson at the same time is devoted to an agricultural economy and a concept of young farmer. And that's how democracy is going to take place. Hamilton is working in a completely different direction. Let's stand up a major national banking system. Let's stand up a major commercial economy. And he himself is strongly dedicated to early US manufacturing industry. So he's investing in an early manufacturing plant across New York City and in New Jersey.

So Hamilton's concept was that we need to pursue rational national self dependence in manufacturing. And tariffs are fine because that will ensure the growth of US manufacturing and production capability in the US economy. And he creates a lot of the fundamental institutions that frankly, we still rely on in maintaining that very small commercial economy. Then there is the post-World War II emergence of the Cold War. And Lynn argues that the US government leaves its Hamiltonian notions of national self dependence in manufacturing to build a larger concept, right?

Confronted with an international confrontation with a different economic system, the US works towards building a world economy that integrates the US, Europe, and Japan in particular, and other nations, too. But those are the principal ones-- in a system of mutual dependence, right?

So this is not a self dependent manufacturing system. This starts to move us in the direction of a multi-continent production system that's going to be shared by the participants.

And then Lynn argues that the third stage really occurs in the 1990s as President Clinton moves to move China into the world economic system. And that notion there is a-- it's a similar notion to what occurs in Europe in the post-war period. That if they integrate their economies and they all own each other, they're never going to fight World War II again. All right? There's a lot to be said for that concept, frankly. That an economically interdependent integrated world is going to significantly reduce national security threats over time. That's essentially, Barry Lynn argues, Clinton's driving conceptual framework that this interdependent economic system, tied by joint manufacturing and a common set of economic organizations, will enable world peace, right? That's the notion.

So the WTO agreement and China's entry into the WTO is the critical enabling step here. And the west production system is indeed, to a significant extent, merged into China with China's production output going worldwide. Now there's a whole defense set of perspectives here, right? There are integrationists, which Clinton would be one, according to Lynn, essentially extending a Western manufacturing production system into China, will bind China to a global economic system, substantially reducing national security problems in the long term.

And then there's a whole different school of the list of his profound differences in these nations and their geopolitical systems, geopolitical goals and their political systems that are going to endure, and the only question is which nation gains the advantage from the economic interdependence. But the next thing that Lynn argues is that this globalism has created its own economic determinism, right? That a new global economic system has in fact emerged here that nobody's really in charge of, right? That nobody-- no separate country, or even groups of countries, can manage-- that it's larger than the ability of these countries to manage.

So Lynn writes this before the 2008 financial meltdown, which is truly a world phenomenon, driven by failures in this country, but pervasive worldwide. And then there is these frantic moments as countries try to figure out how to manage this global financial crisis and realize how lacking in tools they are to cope with it. So kind of a final point that Lynn makes is that we've now created a system that's larger than the countries themselves, right? It's largely, frankly, deterministic and somewhat independent of them. And the ability to intervene becomes much more problematic. All right, so I thought it was just an interesting perspective to kind of throw into the mix here, as we begin to think about some of these historical

questions and try to think about the kind of global economy that we've made. So who's got that one?

RASHEED: I think it's still me.

WILLIAM Really?

BONVILLIAN:

RASHEED: Yeah.

WILLIAM Thanks, RASHEED.

BONVILLIAN:

RASHEED: Yeah, we can take it from there. So I thought we'd comment on kind of the interconnectedness and globalism might be very specific to this time. I think he wrote about 2000. And so he's like probably just come from the '90s and seeing Clinton sort of definitely push towards laissez-faire business practices on the international scale, which is something that, yeah, as Americans we're pretty used to this whole idea of the government is very separate from business ideals and business practices, but also the promotion that now it's not just the US that has to operate in the system. But now we have to deal with other countries that promote this.

And so I thought it was pretty important that we kind of date him in 2000, where we're kind of riding the high of a lot of these promotion of international interdependence. But we do see the trouble, I guess, definitely in 2008. So is there sort of room for us not only as we develop in sort of this interconnected globalized world? Is there room for regulation and sort of do intergovernmental business practices that have to be put in place to sort of keep us in check?

STUDENT 5: OK, to add on to that and also add a fourth perspective, so Andy Grove was one of the three founders of Intel. And their big focus and their main working ability as a company was manufacturing, especially very detailed complex manufacturing. And so he actually wrote a letter in 2010, and then he passed away in 2016. But he wrote one about why we need more manufacturing in the US and why it's dangerous when we don't have it. And he goes on to say, Mr. Grove contrasted the startup phase of a business. What uses for new technologies are identified with the scale-up phase?

When technology goes from prototype to mass production, both are important. But only scale-up is an engine for job growth. And scale-up in general no longer occurs in the United States.

Without scaling, he wrote, we don't just lose jobs. We lose our hold on new technologies and ultimately damage our capacity to innovate. He then goes on to talk a little bit about laissez-faire and open markets. But then he argues that even though laissez-faire and those principles are good, there is room for improvement. He talks about job centric economies and politics, where in a job centric system, job creation would be the nation's number one objective, while the government's setting priorities and arrainging the forces necessary to achieve the goal.

And within this operating, not only in their immediate profit interest, but also in the interest of employees and employees yet to be hired, which is beneficial to the country. He ends with saying something that we're seeing right now, which is wealth inequality, that if we do have a place where we just pretty much outsource everything, we're going to have a country that has very high profitability, but low prosperity, which is what we're seeing right now, and especially very impactful in the last three years. Especially since after 2000-- well, in the 2000s, everyone started to outsource all their manufacturing because it's cheaper in China, Asia. But that's really hurt jobs in the US in a statement.

STUDENT 4: Sorry--

WILLIAM Thanks, Martin.

BONVILLIAN:

STUDENT 4: Who wrote that?

STUDENT 5: Andy Grove. So--

WILLIAM One of the three founders of Intel.

BONVILLIAN:

STUDENT 5: And he was also very important because he--

WILLIAM Andy Grove also has one of my favorite remarks, which is that only the paranoid survive.

BONVILLIAN:

STUDENT 5: Yeah. He's written a lot of great books, but the differences and the reason I added him is because his perspective is more of the business person who's seen kind of the impact versus the three sources added were mostly politicians. And so I thought that would be interesting to add.

WILLIAM Thanks, Martin. And look, a lot of the issues you just raised are going to be prime topics in

BONVILLIAN: next week's class, too. So just hang on to a lot of that. We can discuss it here, too, of course, but--

STUDENT 2: Would it be acceptable and, or appropriate to do a straw poll of who agreed overall with Lynn's argument versus who didn't?

WILLIAM With Barry Lynn?

BONVILLIAN:

STUDENT 2: Yeah.

WILLIAM Sure.

BONVILLIAN:

STUDENT 2: Can we straw poll? Who generally thought that [INAUDIBLE]?

WILLIAM Now which part of his argument?

BONVILLIAN:

STUDENT 2: I mean-- oh, so I think the piece I was missing in your analysis about his argument on Clinton is that he didn't think that was a good idea. He didn't appreciate the integrative approach because he felt that the invisible hand that we had all presumed to exist that would effectively regulate the market and ensure that everyone was acting in not only their own self-interest, but also in the self-interest of the system being sustainable was dangerous. Because it could collapse, and then it did. So overall, I agree with that component. And I guess, that's what I'm curious about other people's perspectives on. Do we think that his conception of how laissez-faire is implemented is generally applicable or not?

WILLIAM I mean, look, that's a good summary of the point that Lynn brings us to. So thank you for

BONVILLIAN: pushing on that.

RASHEED: Agree with some caveats.

STUDENT 7: Oh, we're voting?

STUDENT 6: Yeah.

STUDENT 2: OK, yeah, let's start.

- STUDENT 5:** Let's simplify the statement, though.
- STUDENT 6:** Yeah.
- STUDENT 5:** Just keep it as a true-false.
- STUDENT 6:** Yeah. Yeah.
- STUDENT 2:** Do we think laissez-faire economies are dangerous in the way that Lynn has articulated them?
Yes, do we?
- STUDENT 6:** Yeah, pretty much.
- STUDENT 2:** OK, who does not? Who does not? Who thinks laissez-faire is good with caveats? OK.
- STUDENT 6:** Have you heard of the Great Depression?
- RASHEED:** So I think my caveats were definitely you had this opportunity in laissez-faire to sort of spread this idea of not only comparative advantage, but you also spread, hopefully, if this works, positively sort of like the good things. And if you hit maybe Martin's point on bring in-- job creation is kind of one of the central pieces, just sort of keeping the social tide of sort of everybody rising. I think you get an opportunity to sort of like spread the job creation, sort of spread all these things with laissez-faire and looking, like Clinton did, towards sort of not so much outsourcing, but sort of like looking bigger than just kind of creating jobs in the United States to sort of rise our wealth. But if you look at if you can create jobs now all over the globe and integrate them into this interconnected system, you have the opportunity to sort of rise the tide globally in laissez-faire.
- STUDENT 7:** I just think the main point I got from Lynn's reading is that systems with single point failures are dangerous. And I feel like that would be true on any scale. He's just talking about now we're on such a bigger scale that it's going to affect everyone. But I think that at the national scale, that would still be dangerous. Any system that has single point failures is a concern. But I don't necessarily agree with the fact that he thinks that can't be corrected, while still having a somewhat laissez-faire system. I mean, I do think it would require some regulations, but even if it was just having a few plants that makes semiconductors outside of Taiwan, I feel like that could be not a huge imposition on laissez-faire and reduce this single point failure problem.
- STUDENT 3:** Actually, when I was reading that, I was thinking, would it really be safer then to have every

factory making every component of the phone all in the United States? Wouldn't that just geographically cause you to be less diverse?

STUDENT 9: Yeah, I think that's interesting because he uses language to make it seem like this is what a globally distributed architecture looks like. But I agree. I think if you have all of your manufacturing or something concentrated in one geographical area, it's not globalization. It's not really a very complex integrated system. It just happens to be far away from your country. That doesn't make it local.

STUDENT 2: Would we conceive of Lynn's argument as America first then?

STUDENT 8: Yeah, I've been thinking about that.

WILLIAM BONVILLIAN: Yeah, I mean, Lynn is painting a dark side here. And he's painting a portrayal of opening up the system. And then the system itself begins to take control, right? This globalized financial system itself begins to take control and minimize the ability of any of the players to impact or affect that. So it's a fundamental statement about the fragility and lack of resilience. And your single point of failure point is well taken, Chloe.

It's a dark picture here, and what makes it intriguing and the only reason why I still keep it in here is that sure enough, that's exactly what we ended up with in 2008. And boy, that was so close to a really massive worldwide depression that it's painful in economy. So I put it in as kind of a useful warning lesson, but also a lesson about how we've moved in the international organization of our economy from a nation-centered to an ally-centered to a truly globalized kind of orientation here. And what are the implications of that? We need to keep thinking about this.

STUDENT 8: Going back to that whole-- the 2008 collapse, you were saying that it's very difficult to regulate some sort of financial system that reaches across borders. But at least with the 2008 crisis, a lot of the collapse stemmed directly from the US, which means that at least with the collapse of that form, US regulations clearly would have helped significantly and would have prevented the crisis altogether.

So my feeling is at least if we're going to use that as the example, then it just isn't-- I don't know. I don't know how true it is then that we can't actually regulate this system. Because if you have all these countries that are all-- ignoring natural disasters, like what happened in Taiwan, if all these separate countries are regulating their industries properly in order to make

sure that no bank is, quote unquote, too big to fail, then I don't see how the system could collapse if all the individual components are doing what they should be.

**WILLIAM
BONVILLIAN:**

So let me put this in a different way here. We've been targeting an innovation wave. I think this significant argument that the explosion of the financial services sector, incredibly rapid growth in financial services sector, in the 1990s, in the 2000s, that's an innovation wave. There certainly were technological innovations that were at the heart of this. The IT revolution was clearly a great organizing factor. The ability to bring mathematics to bear, to work on a problem of big data and initial kinds of analytics to bring algorithms to bear on market trading-- these were all significant technology advances that were enablers of creating a truly globalized system.

And we moved at a relatively short period from national systems, financial services and financial service organizations to much larger global systems. So when the US economy went down, it hit the rest of the world economy. US financial system went down. It hit the rest of the world economy in wave after wave after wave and began to jeopardize a whole nest of other financial institutions that were caught up in this very integrated kind of system. So that's more of what I'm driving at, Max.

And look, as we've discussed in innovation waves, there's always a bubble, right? And the problem with having a bubble in your financial services sector is that it brings down everything. It's one thing to have a bubble with dot coms. Yeah, lose the dot coms, but if you lose the world financial system because of the technological bubble, it's pretty powerful. Andrew Lowe is a wonderful professor of finance here at MIT. Has a remarkable chart, right? The chart is-- it's the history of the value of home prices adjusted for inflation in the United States. And it's a hockey stick.

OK, so it's inflation adjusted. It's flat, and the numbers start getting put together in about the 1880s. And should you go on the 1880s, there's the Great Depression, right? A couple of recessions, but it's pretty stable. Then about 1990, it just skyrockets, right? It just skyrockets, and you wonder what were we thinking? I mean, this is clearly going to be a bubble. Why was it that the financial services sector decided that the ultimate fundamental unit of value in the world financial order is going to be the American home mortgage? Why did we do this, right? What were we thinking?

But in a way, that's exactly what we do. Now, Andrew goes on to make an argument. We

developed all these very interesting new financial tools in the course of that innovation wave. He wouldn't necessarily call it an innovation wave, but I would. Let's figure out if we can settle on some better units of value than the American home mortgage, right? Is there a way to drive investment, which we can now mobilize on a global scale on to much better units of value?

So the project he's been involved in has been, can we drive it on innovation based research? Can we create agglomerations of, really, major capital? Not just \$60 billion a year in a \$19 trillion economy of venture capital, but real numbers, right? And move those larger numbers on in the innovation system. So he's working on health research in particular. But it's an interesting concept. And in a way, it comes out of trying to wrestle with some of the points that Barry Lynn kind of put on the table here. RASHEED, a closing thought?

RASHEED:

Yeah. So I think Barry Lynn probably takes maybe a different position than in the time that he was talking about her, too. I think if he had said this in the room with Bill Clinton, he would have had an interesting discussion. But I was actually just wondering if we could talk about this, like a little bit more of the critical reception. And [INAUDIBLE] is he the first guy to say maybe laissez-faire wasn't a good idea, guys? And then we see the after effects afterwards. But critically, I think reading this, I was pretty kind of taken aback by a lot of the things he was saying. Is this sort of maybe not politically, but socially acceptable thought in the US in maybe 2005?

WILLIAM

Yeah, it's a moment of dissidence in our reading list, right? It's a little contrarian. So just like

BONVILLIAN:

Charles Schulz was contrary in last week, Barry Lynn is contrary in this week. So, good summary. Thank you, RASHEED.