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## **Session 39IF Applied Futurism**

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**Moderator:** PAUL V. BRUCE  
**Panelist:** PETER C. BISHOP†  
**Recorder:** PAUL V. BRUCE

*Summary: As a group, we brainstorm to identify several key factors affecting actuaries of the future. Then we develop two or three scenarios or “stories” that each represent possible future directions.*

**Mr. Paul Bruce:** I’m the vice chair of the Actuary of the Future Section, which is one of the cosponsors of this session along with the Futurism Section. The goal of the Actuary of the Future Section is to explore and leverage nontraditional roles for actuaries. We’re going to go through an exercise that will help us to take a shot at that. Futurism, on the other hand, and I quote here from a new study note, “is a discipline that systematically explores what we can know about the future of human systems and how we can use that knowledge to attain desirable results.”

We will collectively apply that discipline to develop some possible future scenarios, and then try and determine what the role of an actuary would be within those scenarios. To lead us through that process I’m pleased to introduce Dr. Peter Bishop of the University of Houston, who is the head of the studies of the future department. He and Alan Mills are the coauthors of the study note I just quoted.

**Dr. Peter C. Bishop:** This session is actually the second of two sessions on futurism. How many were involved in the first part? Three? OK, you’re going to be experts.

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†Dr. Bishop, not a member of sponsoring organizations, is chairman of the graduate program in Studies of the Future at the University of Houston-Clear Water in Houston, TX.

I'm with the University of Houston-Clear Lake where we offer a master's degree in studies of the future. There are other people in the world who talk about the future, yourselves included, and there are other people even who identify themselves as futurists. But as far as I know, we are the only degree program with the word "future" in the title, which is itself an anomaly. There is another program in the country that teaches about the future, and that's offered at the University of Hawaii. That's actually a program within the political science department. I believe it is unfortunate and perhaps a little culturally myopic on our part that we have so many departments in the world devoted to the study of the past. Actually, there are 7,500 institutions of education, including elementary schools, secondary schools, colleges, and universities in the U.S., and each one of those has a department of the past. We are a little bit off balance. I think we should study the past, but I believe that we've forgotten why we're studying the past, and that is applying what we learn from the past to the future.

For many people, their first exposure to work in the future may have been through exercises in strategic planning or exercises in which you had to estimate future forecasts where the traditional actuarial techniques did not work very well. You probably did not feel very comfortable and did not do a very good job. That's not surprising because almost none of us have been prepared for this particular venture into the future. My degree is in sociology, and I came to future studies believing that if you obtained enough data, and you had the right models, that you just had to do your homework, grind it down, and get the correct information to predict what people would do in the world. Though I was silly, they let me stay in the futures department anyway once I became educated about the fact that this was impossible.

This morning's session was essentially an introduction to futurism. I was very happy to work with Alan on the study note for the Futurism Section. We are both interested in the future. We both work professionally in the future, though future studies is a complementary set of skills and tools to what you do in actuarial science. I was overjoyed, however, to see that there were others in the world besides a few professional futurists who even thought about the future. When I saw the study note and realized that you all had an examination question on this, it was really a wonderful day, and we hope that this study note is quite an improvement.

This session, as I said, is one of two sessions on the future. We are going to actually practice a little bit of future studies around the issue that Paul mentioned, which is the actuary of the future. You could probably apply some actuarial techniques to that question were you to be asked to, but I doubt that you would be very satisfied with the results. This is a task that is particularly appropriate for future studies techniques because it has to do with a great deal of qualitative input, many assumptions, and many things that may happen for which we don't have very good data or very good models.

The difference between future studies and many other forecasting techniques is that we don't say, There's nothing we can know about that. We actually charge in where fools fear to tread and say, No we can't predict what's going to happen, but we can understand it better. We can't control what's going to happen, but we can influence what happens. One of the principles that we have is that knowing something about the future is better than knowing nothing. And if you just simply give up in the face of enormous uncertainty and enormous complexity, then by definition, you don't know anything. In future studies, what we do is say, No, you can know some things, though they are not as satisfying as the clear, wonderful predictions that you sometimes make. Of course, they're probably more correct than that because we're dealing with such big concepts.

After a little introduction, we are actually going to discuss and ask you to participate in some future talk and use some of the tools that we're involved in. Basically, our objectives are: to investigate the potential changes to the actuarial profession over the next ten years, to identify some ways to prepare for those changes, and what's most important, to demonstrate the techniques of future studies. This is a tasting session. This is certainly not a full meal. These are not industrial strength products we're going to develop, but they will give you some sense of what it is like to talk like a futurist, walk like a futurist, and before long, be a futurist.

The agenda is to discuss a little bit about applied futurism, as I said, as kind of an introduction, and then we're going to go through a three-step process. What are the change drivers that are changing your profession today, and what are the implications for the future? Second, what kind of scenarios might there be? Basically, the question here is, What are the alternative futures? And I would be the most surprised person in the world if the expected future actually came out to be true. So we always look for what else might happen. And then finally, out of all that, we look at where the opportunities are for you personally, for your units, departments, firms, and indeed for the profession as a whole.

I believe this is the kind of thinking that society, as a whole, can engage in fruitfully. If you, as professionals, are going to change, then, of course, society is going to have to change too. By prediction, I mean a nice, clear, precise, accurate number about what the future will be. That's what they want, but you don't always get everything you want. We use the term "forecast" to mean the fuzzy, imprecise, probabilistic, maybe, maybe not kind of forecast of the future. And generally, it is not based on mathematical techniques or scientific analysis. We would like it to be, but frankly, in most cases of future areas, particularly those dealing with human systems, we can't have that because of the presence of uncertainty. Uncertainty is the beginning of the futurist's task. It is the end of most everybody else's task. Once faced with uncertainty, most forecasters throw their hands up and say, We

don't know what's going to happen; put the check in the mail, I'm done. That's where futurists begin. There are things you can do about uncertainty. There are two major sources of uncertainty that we can do something about. We can get more information, and we can get better models. And that's what research is all about. I don't believe the other parts of this are amenable to research. If you would like to challenge that position, I'd love to have a discussion about it. There are some aspects, particularly of human systems, that are irreducibly uncertain, and more research is not going to help.

One aspect that we're beginning to understand is that human systems are probably, though we don't know for sure, a type of chaotic system. Chaotic systems in their mathematical version mean that in the medium and the long term, they are so exquisitely sensitive to initial conditions that prediction is impossible. Consider the pure logistic equation,  $x$  times the quantity  $1$  minus  $x$ . As long as  $x$  is between zero and one, and I have a sufficiently large coefficient, I have a chaotic system. It's very simple and very deterministic. Because of the recursive nature of that equation in the short term and the medium term, it is impossible to predict where it's going to be. Second, we know that systems, organic systems particularly, have the ability to create novelty. Certainly humans are sometimes creative, and they do new and surprising things. Single-cell organisms become multi-cell organisms. Nonsentient organisms become sentient organisms. Nonmobile organisms become mobile organisms. Evolution at least, if not some higher power, has given systems the ability to organize themselves in new and novel ways. No model and no forecasting technique in the world can handle that problem.

And finally, we believe we have some choice. What else is choice except an unpredictable behavior based upon people? Now, if we are just the victims of our circumstance, if we are just the effects of our causes and conditions, then there's no choice and you can predict. But this combination of three things gives us futurists some comfort that we are doing something that other folks like actuaries are not doing. We are dealing with systems in this degree of uncertainty. Let me stop here and give that as a kind of a point to reflect upon—futures are a complementary approach, a complementary perspective for dealing with the future.

Basically, what do we do with uncertainty? We make assumptions to resolve uncertainty. The good thing about assumptions is that they do resolve uncertainty. The bad thing is that the uncertainty sometimes ought not to be resolved. So futurists leave uncertainty on the table. We don't take it off. We don't say we're just going to assume all of the things being equal. In fact, when we deal with uncertainty, we say, Let's talk about those assumptions, and let's entertain alternative assumptions. In fact, our use of forecasting systems, and even mathematical systems, is a kind of standard forecasting paradigm.

We put an extra step into assumption forecasting. The forecast is a way of giving us more knowledge about our assumptions, particularly in a group process. Different forecasts will reveal different assumptions that people are making, particularly in working with a client. Your forecast may reveal assumptions that your clients have about the future that they need to understand even more than they need to understand the numbers that you're giving them. Understanding the future, understanding how change happens, and being able to navigate those changes is what success in the future is about. It's not knowing what the future will be because clearly that's impossible to predict. If decisions require certain knowledge of the future, then clearly you can't make decisions. So we're talking about the assumptions and two different processes for dealing with the future: the futurist's process and processes based more on prediction. The futurist's way of knowing results is not obtained from a single-point forecast, and often it's not even obtained from a quantitative forecast; it can be obtained more from a range of plausible forecasts. Even "range" is probably the wrong term. A "basket full", a "bushel basket" of plausible forecasts is a better term. Each has a different set of assumptions, each that could plausibly happen.

What does that do for a decision maker? First, we believe that's the real future. The real future is not one thing. When the future actually occurs, it will be one thing, but right now, particularly in the medium and long term, there are many plausible outcomes, and we should leave them all on the table. Second, it allows us to monitor which of those outcomes is going to come about. If you've already decided this is the future, you give up on monitoring because you expect to move down that predicted road. If you're not on that road, you rarely know it. You don't even know that you're not on that road until it's too late and you realize you're lost. So once you establish a range, then you say, Let's keep in touch with this and see how the uncertainties are going to resolve themselves. If you assume away the uncertainties, then you don't have any rationale or any reason for monitoring how the uncertainties are going to go forward. So here's the \$50 word for you today: *heuristic*. Heuristic forecasting is forecasting designed to increase learning rather than knowledge and to increase understanding rather than to give hard and fast data about the future. It's an iterative process of continuing to learn and continuing to be open to novelties as we go along.

So, this is a complementary set compared to actuarial science. This is the futurist tool kit. It's a large, complicated mess. If you were to write down all of actuarial science, it would probably be even larger and more complicated but not more of a mess. Basically, we're interested in producing results for clients just like you are. Those results are the function of initiatives. The strategic plans produce the initiatives, and a whole host of conditions and inputs go into the plans. The part that we're going to talk about is the trends, events, scenarios, and issues that will form

the future of your profession. Where is your profession likely to be in ten or fifteen years? Wouldn't it be nice to have some angle on that among other people like yourself that's discussed and understood? That's part of the process. There are whole other sets of tools and a whole different set of processes that we do as futurists that we're not going to finish in this session. So we're going to touch on a few of these tools, primarily in the area of scenario development.

The very first question is, How much change do you expect there to be in the future? The first thing I'd like you to do on a sheet of paper is list what you think the major changes in the actuarial profession have been in the last ten years. This is a way of trying to calibrate and get a baseline for how much change you expect there to be. So list two or three things that you think have been significant changes in the actuarial profession in the last ten years.

Next, pick a number that gives you the amount of change that has occurred. Make that 100. Now imagine how much change you expect there to be over the next ten years. Are we moving into an area of more change, more turbulence, and faster change, or are we moving into a more placid area of less change? If you think there's more, give yourself a number more than 100. If you think it's less, give yourself a number that is less than 100. I have made an assumption that we don't have people who believe that change has suddenly come to a stop; that would be zero. I'm also assuming that no one thinks the actuarial profession will go through an apocalypse in the next ten years; that would be about 3,000. So there is a range. Read out your numbers, and I'll tally them all up.

**From the Floor:** 101.

**Dr. Bishop:** See, 101 already.

**From the Floor:** 80.

**From the Floor:** 100.

**From the Floor:** 200.

**From the Floor:** 20.

**From the Floor:** 130.

**From the Floor:** 150.

**From the Floor:** 125.

**Dr. Bishop:** There always has to be one.

**From the Floor:** 150.

**From the Floor:** 130.

**From the Floor:** 200.

**From the Floor:** 200.

**From the Floor:** 300.

**From the Floor:** 150.

**From the Floor:** 80.

**From the Floor:** 125.

**Dr. Bishop:** I already have the first empirical result from this exercise: you all are a bunch of radicals. I did this at the Palm Desert meeting, and the median was 110. One-third of you expect at least double or triple the amount of change that you've been through already. Another third are expecting at least 50% more change, and there are a couple of folks who think the wave has passed and we're on the down-swing.

In future studies it's not important for us to figure out now which one it will be. We leave all this uncertainty on the table. These are alternative futures. Some people say major changes are in the past and we're getting into a better, calmer phase. Most of you, of course, think that there's more change in the future than there has been in the past. Notice where we stopped. We're leaving this as a distribution.

Now I'm going to estimate risk. If you were going to be in charge of estimating and coming up with a number for the amount of change the actuarial profession should prepare for, what statistic would you use? Would you choose the median? The median is 130. Is that how much change we should prepare for? Why not? If you're talking about risk, you don't want to choose the median because half the people think it's more than that. If we're preparing for change, we certainly want to prepare for the maximum plausible change, not for the median amount of change. The reason is if there is more change, and if this is an accurate representation of the probability distribution of futures, we'd be leaving ourselves exposed 50% of the time. Where would you want to put it? At 200? If the person who chose 300 weren't here, we'd probably have to move it up to 180. So this is just a little

estimation of how much change you or the SOA should be preparing for. I'm talking about risk, but there's also opportunity. Holding and saying what we have so far is OK, but one should at least imagine what double the amount of change would be like. Be ready for that. Futures study is about being flexible. It's about being prepared for many differences and not focusing on one thing. In fact, it means that you must get ready for a whole range of things. I like to think of tennis players waiting for the serve. They don't know which way it's going to come, but they're ready to go one way or the other. That should be our attitude toward change. We're excited about it, and anticipating that kind of double change.

Now that we've estimated how much that change may be, now we have to talk about what it may be. I'll share another couple of principles that we use in first-year study. First, some of the changes that you can anticipate in the next ten years, that are part of doubling of change, are already going on. Some of them, however, and the most interesting ones, are not yet going on. When I say they're not going on, I mean they are not yet going on within your professional domain and environment. In other words, they're not part of this conference, they're not in your journals, and they're not in your newsletters. But there are things going on out there in the world that ten years from now will be part of your conferences, part of your journals, and part of your newsletters. If you just prepare yourself for the changes that are going on within the profession right now, you leave yourself open to not being prepared for changes that may come over the fence between now and then. In ten years, there may be something going on there that changes my life. Imagine what's going on right now. Think of the big issues that you're all dealing with. They didn't start yesterday. They didn't start last week. They may have entered the profession a few years ago, but they didn't start there either. They entered from somewhere else in the world. So future studies assume that change is already going on, and it is going to affect us. If we look out far enough into society, we can find the sources of all kinds of different changes.

Risk analysis is imagining all the possible things that could come along to effect change. Our recommendation is to go out and look as broadly as possible. How broad? My personal checklist includes many of the different areas of human activity, such as demographics, natural environment, technology, economy, government, social, whatever. I'm sure you would have one of your own. Other futurists have different ones. This just happens to be one that I find I can remember, so that when I'm doing forecasting I say, Have I got some social things in here? Have I got some technology things in here? In futurism, we don't leave anything out. What about changes in the sun? Sun spot activity affects radio communication, which could knock out satellites. Satellite communication people are really concerned about changes in the solar cycle because you could lose a \$100 million piece of equipment in a second.



Second, we are also most interested in the interaction of things. What is going to affect what? There are seven different domains that make 49 cells and a cross-impact matrix. It is impossible to know all those 49 cells well. The problem is that most people focus on just one of them. You're clearly working in the demographics and financial areas. That's your expertise. You have depth of knowledge there. Other people are interested in areas of technology. Other people are interested in areas of politics and government. Other people are watching the social environment of culture and values and family and lifestyle. All of those things, in the long run, affect everything else. Everything affects everything in the long run. That's what we're in the process of trying to look at.

I'm going to give you a sheet of paper. Now we are going to talk about what changes may occur. What is a trend that you think has important implications for the profession in the next ten years? Write down only one, but think carefully because this is going to be very important. Write down a trend that you believe is going to have a significant implication for the future of the actuarial profession. One category, one trend. It can be something that's going on in your profession. I would prefer it if you thought of something going on in the world that nobody has noticed yet. This is your chance to give what I call a favorite forecast. Write down that one trend that you think is really going to be the blockbuster or that is going to be what's going to change the map of the actuarial profession. It has to double the rate of change so far. We're going for 200 here since that was your collective assessment of the change that we need to prepare for. This is just like a projective psychological test. The first thing you write down is the most important.

Now I'm going to make you get into the dreaded small group. We're going to break into four groups around the room. The first thing you should do is pass your paper to the person on your right. Look at the trend that your neighbor has given you and try to get a very clear image in your mind of the world in which that trend becomes a reality. When we look back ten years from now, we'll say, Jim's trend was really the one that did it. It came on much stronger and was much more important than anybody realized in 1997.

Then you should describe what difference that makes in the world. What are the implications of this trend for the world? How does it change the world? What's the next effect of this trend?

You now have a trend in front of you that's going to change the world and the profession in ten years. You have written down what the change in the world is going to be. Pass that note to the right. Now you have a different world. Notice how we're handed the future. We're not creating it here, we're handed it. You have to describe the answer to the question, What happens to the actuary in that

future? How is the actuary different in that world compared to today? What change does the actuary go through?

Now we will begin the discussion phase. We'd like you to see if there's any pattern in the responses that you've written down so far. There is more material than we can possibly process in five to seven minutes. Just briefly go around and get a sense of what worlds you're talking about and see if there's any pattern.

**From the Floor:** In our group, we had a recurring theme on three of the five pieces of paper. The upshot is that we see increased economic and social globalization and we foresee a standardization in the insurance industry, which creates less need for actuaries.

**Dr. Bishop:** Once the insurance industry becomes standardized, then all this product development and all this analysis becomes routine and algorithmic. Then all of your fine skills sit on the shelf. But I want to evaluate these things right now. This is a trend, a possibility, a plausible future. Can anybody deny the fact that's at all plausible? Let's hear from another group there. Tell us what your pattern was.

**From the Floor:** I believe we were quite similar to that—globalization economies and internationalization of standards. Without the increased technology, this kind of globalization and internationalization would never occur.

**Dr. Bishop:** So that's a precondition for the internationalization and globalization. Terrific. One of the other groups?

**From the Floor:** One general trend is that more people will be working for themselves versus working for large employers or a governmental agency. More value of leisure time was predicted. One of the outcomes of that was that retirement would not be as set and we would be getting away from the age 65 retirement concept. We'd have people working longer. The implication for actuaries is that many of them will become personal financial planners.

**Dr. Bishop:** Or perhaps even corporate financial planners. You might become independent entrepreneurs, more like attorneys and certified public accountants, and fewer would be employed in standard corporate practices. That's a possibility.

**From the Floor:** Our group had, I guess, a globalization trend, but it came from many different areas, and the results were also quite varied. Alongside of that, we had a drastic wild card, which was more regulations resulting in very strong government regulations. We could see that developing possibly with a worldwide economic depression or a collapse of some markets. This would result in very little

freedom to the actuary, or even no need for the actuary in many of the traditional areas where we currently see them.

**Dr. Bishop:** So your trends fall under globalization, international standards, self-employment, those kinds of things?

**From the Floor:** Globalization, yes. There is a need for more communication skills from the actuary, which is one thing you don't have down there.

**Dr. Bishop:** And that resulted from what trend?

**From the Floor:** The globalization.

**Dr. Bishop:** Standard insurance and more communication emphasis. As abbreviated as this is, it is like wine tasting where you someday want to drink the whole bottle. This is just an indication of the future using ideas and trends. You could spend time studying these things. You could come up with indicators. You could come up with trends, models, forecasts, and those types of things. One of our groups is really the radical group because they already jumped ahead to the next exercise, which explores what might happen instead. We tend to use different forces that shape the future, and trends are only one of them. Trends are the ones that we think of most directly because they are incremental. They happen over a long period of time, they are measurable, and they can be extrapolated. They are also very important.

Discontinuities are changes in trends that are impossible to model because they actually result in a rethinking of what the model is. It's not just more or less inflation. It's not just better or worse investments, asset values, or risk; it means changing the whole nature of the ball game so that those things might happen. The fall of the Soviet Union is one of those. In the insurance industry I'm sure there have been events that you can look back at and say, things were never the same after that happened, whether it was a regulation or a particularly disastrous year, or whatever. The Houston oil industry still hopes that we never return to the amazing price increases and collapses we've had. Discontinuities change the whole system.

Finally then, decision makers, and people in general, will make choices. Issues will become resolved. There won't be one particular way. There could be many ways. So these three things combined mean that what we've looked at specifically as trends are not necessarily guaranteed. Something else might happen instead.

As a result of this, we talk about three different futures. The probable future, or the likely future, is what we oftentimes forecast. We use models and techniques

because they result from the conditions and the trends. Then there are the plausible or possible futures that result from the discontinuities or the surprises. We don't know what the discontinuities will be. But if you know that they will occur sooner or later, you lose what I call the white knuckle grip on the present: people who kind of hang on and hold on to the idea that this is the way it will always be. It's going to change sometime, so we might as well begin thinking about what those possible changes are now, rather than waiting for them to occur when you are at very great risk. Finally, choices and images of the future drive our third future, which is the preferable future. That is the future that is successful in a transformed environment. It is not just more of the same, or just more money, more power, or more influence in the current environment, but discontinuities and trends that give us some leverage to really be much different and even much more successful than we are today.

Keep in mind that our image of the future is a set of three alternatives or things that could happen. The expected future or the probable future is one of those, and the preferred future is one of those. There are others too. And that's what we want to turn to at this point. What are the possible futures? What might happen instead? So with this exercise, I'm going to skip through the scenario planning.

Let's take your trend, the trend that you've decided was the pattern that you came up with, the trend and the implications, and think about what you have to assume to make that trend be the future that actually occurs. Then reverse that assumption. Could you tell a story? Is it plausible to think that there is an assumption in your trend that might actually reverse itself? It would be a surprise, I admit. It's not likely, I admit. But is it plausible? In that sense, you are answering the question What might happen instead? You are beginning to populate the cone of plausibility with alternative futures that we need to think about as well. So take the pattern that you reported and think about what could happen between now and then to turn that pattern around.