

Anticipating and Managing Risks in the 21st Century*

by Denis Kessler**

My subject today is the universe of risks. There is currently a lot of talk about finance and banking, distribution channels and new technologies that may disrupt or circumvent insurance. But I propose that today we talk about risks, and the universe of risks which is, in fact, our universe. It is important to keep in mind that risk is the raw material of the insurance industry. And we would not be in business if this raw material did not exist. By the same token, any change in the nature of this raw material is bound to have an impact on our business.

1. A universe of risks undergoing radical transformation

So what causes risks to change? We know that risks evolve over time, and that this is due to a whole series of factors, among which we might mention global transformations, new production techniques, demographic shifts that impact fertility and mortality rates, environmental changes, climatic changes, economic growth (we know that aversion to risk increases with wealth), and changes in regulations governing liability.

After this brief look at what causes the universe of risks to change, we need to define just what we mean by change. When we say that risks change, this can mean the appearance of new risks, for example, due to the development of new cloning technologies or genetically modified organisms. With every advance in new technologies, specific risks appear in our universe. At the same time, certain existing risks disappear: accidents involving horse-drawn buggies, for example, which were still covered by insurance at the beginning of the 20th century, have disappeared. But changes in risks arise in particular when there is a change in the distribution of probability – that is, when the frequency with which the risk itself occurs is altered. For example, if we consider the case of unemployment, we can see that the risk differs depending on whether underemployment is caused by business conditions or by underlying core factors. This is also the case with car accidents and all risks for that matter.

The fourth factor governing change in the universe of risks involves changes in the variance and average cost of risks. A well-known phenomenon in life insurance illustrates this point. When the mortality table changes and the survival curve is altered due to higher rates of survival at an advanced age, as this graph shows, this results in a substantial modification from one generation to the next in what is called the survival risk. The survival risk of 40 years ago does not reflect the same reality as today, simply because the survival curve has radically changed since that time.

Two examples from property-casualty insurance also illustrate the point. First, the

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breakdown in accident costs at three different points in time: 1980, 1988 and 1998. Using 100 as the base for the entire population 20 years ago, we can see that, while the risk of having a car accident has steadily declined, it remains correlated to driver age brackets. Nonetheless, the risk has changed, since the distribution of probability and the related cost have changed.

Second, and once again using automobile insurance in France as an example, if we examine the average cost of accidents and separate the material and human costs, with all bodily injury claims, and using the same base 100 in 1989 for both categories, we can see that in the space of barely ten years, the material cost has increased much more rapidly than the human cost. And if we make 10- to 15-year projections of these curves, it appears that the cost of an automobile accident will be essentially material.

What are the major foreseeable trends impacting the evolution of risks in the century ahead? I see three.

The first is that the universe of risks will expand. This is fortunate for us, since if we had concluded that the universe of risks would contract, this would mean that the raw material of our business would become less abundant than in the past and that our industry would be facing reduced development prospects.

The second major trend concerns the radical change in the nature of risks.

And the third trend is tied to the appearance of new risk-management techniques.

2. An expanding universe of risks

So, the universe of risks is expanding and the reason for this is simple – the rate at which new risks appear is significantly higher than the rate at which the existing ones disappear. There are a number of examples that illustrate this point: the multiplication of risks related to new technologies is only one. Everyone knows that new technologies are currently giving rise to new risks, such as the propagation of computer viruses, Internet site hackers, security problems in connection with online transactions (it is interesting to note that, while they account for only 2 per cent of all insurance transactions, online transactions already account for half of all disputes), the protection of copyrights, and a myriad of problems caused by network incidents. In addition, it is becoming increasingly difficult in this universe of changing risks to determine liability and identify causal chains. And it is alarming to witness the increasing speed with which risks propagate, which means that active attempts to prevent them or at least limit their impact have become much more difficult to implement than was the case just a few years ago.

The second phenomenon involves the amplification of risks related to new economic activities, as evidenced by four major phenomena. The first is the serial or snowball effect, as can be seen in the food chain. The recent storms in France show how risks can snowball: the occurrence of a storm leads to power outages, which in turn interrupt the cooling chain, which in turn causes food poisoning, which in turn causes businesses to lose market share or even go out of business. Such chain reactions are also at the heart of current debate over the use of genetically modified organisms.

There are also highly complex cluster effects. Risks that touch on several lines of our business interact with one another.

Then there is the mass effect linked to such phenomena as urban concentration and mass transit. In the early years of the 20th century, an airplane crash left a total of one casualty. If the A3XX ever sees the light of day, an airplane accident may result in 800 casualties. And if this trend continues, air transport accidents of the 21st century may be as devastating as the sinking of the *Titanic*.

The fourth complication for insurers is the so-called dematerialization effect. Our industry knows how to deal with material problems, provided that the risk can be identified and inspected. But the new economy taking shape is bringing us new problems to resolve, related to the multiplication of services. Insuring a service is not the same thing as insuring tangible property: this can be seen in the *best advice* issue, the duty to offer advice, the difficulty of insuring advisory services, and the increasingly delicate issue of reputation and image.

The third major development is the extension of new liability risks in nearly every field. This is clearly the case in healthcare: consumers with respect to corporations, shareholders with respect to company management, the usual problems between employers and their employees, citizens with respect to those who govern them, etc. These new relationships are the source of increasingly complex disputes, liability, and hence insurance.

The fourth factor is the globalization of risks due to economic and financial globalization. Examples include systemic financial risks, international organized crime, and the problem of money laundering that concerns our industry as well as the banking industry. We are also confronted with the growing international problem of hacking and copyright violations.

Finally, the fifth factor is the possible appearance of new epidemics on a global scale. The current problem of mad cow disease is one example, comparable to earlier AIDS and hepatitis outbreaks. Given the serial, cluster and mass effects that I cited earlier, we cannot rule out possible pandemics or epidemics that would naturally concern insurers.

Our universe of risks is expanding in the same way that the physical universe is expanding, which means that we are facing extraordinary opportunities for growth. Personally, I have a great deal of confidence in our profession. I believe that the future will bring growing demand for life, life-time care, personal protection and educational annuity insurance, not to mention increased demand for health insurance, which will certainly give rise to new types of coverage. Demand for liability insurance should grow virtually across the board, as should demand for coverage against catastrophic and natural disaster risks. Demand for property insurance should also rise, and we can expect greater demand for the insurance of intangible property, that is, the intangible assets of a business. This will provide a new source of growth for the insurance industry.

Finally, as you know, demand for value-added services will accentuate in every country, on the part of households as well as businesses. We are currently seeking to develop the concept of *full service*, which runs the gamut from cash compensation to total reparation for the damage suffered or possibly full restoration to the prior state of repair.

3. The changing nature of risks

So if the universe of risks is expanding, the nature of risks will change. The number of risks is rising and, at the same time, the risks themselves are changing, which poses a second set of problems for our industry. First of all, an examination of risks shows that they tend to be increasingly endogenous rather than exogenous. It is widely believed that the behaviour of agents is one of the primary sources of the appearance of risks and their consequences. This is true in every area, in automobile insurance as well as in sports. It is also true in commercial risks insurance. It is becoming very difficult to make a distinction between the risk to which the entrepreneur voluntarily exposes himself and that to which he is unwittingly subjected.

The second major change in the nature of risks is that today's risks are less likely to be accidental and sudden, and more likely to be gradual. This is true in the area of illnesses,

lifetime care, and environmental impairment, but it is also true in the area of the impairment of human capital, and it poses major difficulties. Risks that are gradual rather than sudden are more difficult to date, and it is more difficult to predict their evolution, a well-known phenomenon in environmental risks. The issues of dating and predicting the evolution of risks is very likely to concern all lines of insurance business in due time.

The third change in the nature of risks is that they clearly last longer, and their effects are sometimes irreversible. This is true of the destruction of forests caused by storms, and is also true of nuclear accidents and many other phenomena.

The fourth change in the nature of risks is that they are becoming increasingly correlated and interdependent. In other words, they are less isolated from other risks. This can be observed in every domain: risks combine, often exponentially and not just incrementally. The example of combining asbestos-related and tobacco-related risks is a good one: individuals who smoke and who are also exposed to asbestos are 400 per cent more likely to get cancer – a phenomenon that was unknown only ten years ago. The same type of non-linear combinations holds for catastrophic risks.

The fifth change in the nature of risks also seems to me to pose a considerable challenge to our industry: risks are increasingly foreseeable and less and less random. This is undeniable, for example, in the areas of meteorology and seismology. In fact, I think that in almost every area we will be better able than in the past to obtain information on the development of risk, including those involving pandemics and epidemics.

4. New approach to risk management

All of these changes will lead to changes in risk management. If we concede that the universe of risks is expanding and that the nature of risks is changing, we are compelled to accept the fact that risk management must also change. This is already reflected in the changing attitudes of agents towards risks: today's agents are better informed, more cautious and less myopic than in the past. They are more risk-sensitive and risk-averse. They also have a more rational approach to risk management, and are more involved in managing their own risks.

This will engender a series of radical changes, and we can expect to see six fundamental changes in risk management as a result.

The first concerns compensation and prevention. Today we are seeing a marked preference for compensatory rather than lump-sum reparation for damage suffered, for all measurable causes and losses. There is also a clear preference for compensation in the form of annuities rather than a benefit. Parallel to changes in compensation for risk, there is growing pressure for risk prevention, in terms of reducing frequency of occurrence and average cost as well as eradicating extreme risks. Efforts are also being made to stop the spread of risks, and new legislation designed to encourage these efforts is being enacted just about everywhere. Consequently, there is increasing recourse to liability for failure to take appropriate preventive measures. In addition, there is more pressure to test, inspect, audit and obtain certification, which suggests and presupposes a new approach to risk management. This can take the form of quantitative, standards-based or benchmarking methods.

The second major paradigm shift: prevention and precaution. For the insurance industry, the 21st century is already shaping up to be that of the incursion of the realm of the non-probabilistic or uncertain into the domain of risk. In addition to the traditional notion of prevention, we will be increasingly confronted with the famous principle of precaution in areas as diverse as agribusiness and genetics. This will give rise to new rules of conduct in the

face of uncertainty. Moreover, these new rules will apply not just to governments: individuals will face growing pressure in the private sphere with respect to their attitude in the face of uncertainty.

I should like to touch briefly now on the important consequences of this shift from a universe of traditional risks, which we have mastered, to a universe of uncertain risks. This changes everything. As far as traditional risks are concerned, we know the states of the world and the laws of probability. In the realm we are entering, we do not know the distribution of probability, and scientific uncertainty is extremely high. For traditional risks, the utility for the agent of the cost of risk occurrence is known. Conversely, we are not able to give a precise estimate of the costs and benefits of using genetically modified organisms or the possible value of human cloning.

Another fundamental difference is that the temporal horizon of traditional risks is relatively short, but can be extremely long in this new universe of uncertainty, perhaps spanning several generations. Similarly, the utility of preventive efforts is clear when it comes to traditional risks, but much less so with the new risks. Using the principle of precaution as our guide, we may be led to simply abandon the pursuit of a particular technology and its applications, and this could have far-reaching economic consequences.

This new paradigm also makes it much more difficult to discount for the risks in question. The impacts of the occurrence of traditional risks can be discounted using financial market rates. But in the universe of uncertainty, discounting for risk becomes a complex affair, since the temporal horizon compels us to take future generation utilities into account.

The insurability of risks that relate to the principle of precaution is also a difficult issue. In the face of such risks, many economic agents choose to “go it alone” or “risk everything to win big”, forgoing insurance entirely. They figure that if the risk actually does occur, the larger community will be compelled to take responsibility for it due to its magnitude. This is true of many of today’s risks.

Moreover, the liability issues to which these new risks give rise are totally different from those related to traditional risks. With respect to the latter, it is generally held that liability resides with the person who possesses the information. Consequently, the producer’s liability is greater than that of the consumer, and the employer’s liability is usually greater than the employee’s. In contrast, it is very difficult to ascertain primary responsibility for risks in the universe of uncertainty. In this universe, full and equal sharing of information – and hence of liability – is the preferred solution.

I would like to touch briefly on the third disruption relative to problems of information and selection. I am struck by the extent to which the amount of information to which we can have access is growing. In the past, our industry was based on a relatively limited amount of information – statistics, rarely individual, rarely updated, hardly ever in real time. We had information that was a year or two old, usually expressed in averages and not detailed. We are now increasingly likely to have access to information that is highly refined, whether it be in relation to the human genome or the individual behaviour of each automobile driver (as opposed to a particular cohort of drivers). With satellites, we can track the movement of containers – this is rapidly becoming a reality. And we can process this information in real time, which will give rise to problems that are radically different from those we have resolved up to now using a statistical approach. It is no longer a question of assessing risks globally, but rather a question of treating them individually, risk by risk, and for each individual risk-taker.

This gives rise to new issues relating to disclosure and confidentiality, which are already visible in the United States and Europe – what is known as the right to privacy. How far can we

go with respect to disclosure and information, and how should we handle the underlying ethical issues? This question pertains to the use of confidential databases, genetic information, etc. Legislation and regulations governing access to this type of information will become more widespread as public officials realize that detailed knowledge of risks individual-by-individual or business-by-business may pose problems of risk selection and discrimination. The debate has begun, and insurers will have to come up with answers that reconcile the legitimate need to use this new information to improve the coverage of risks and the legitimate requirement to comply with general ethical and moral standards.

The fourth change in risk management lies in the difficulty of individualizing (or isolating) risks and of grouping (or pooling) them at the same time. The equation that every insurer will have to accept is four-sided:

1. Contracts will have to be written for each risk-taker and precisely adjusted to his or her characteristics and behaviours.
2. It will be necessary to monitor risk dynamically rather than periodically – and this is completely new.
3. The notion of co-responsibility for risk management between the insurer and the insured will have to be developed. The principle of co-responsibility is the inevitable outgrowth of the dynamic nature of risks, and this will presuppose the development of new contracts that reflect this shared responsibility.
4. These principles should make it possible to both pool risks and industrialize the development of individualized contracts.

In the face of these challenges, a number of innovations and adjustments will be necessary, and we should not rule out any potentially promising insurance solutions.

I will not delve into alternative risk transfer or the development of contingent markets, since these subjects will be dealt with this afternoon. But we can expect any number of innovations in other areas: in the packaging or bundling of insurance services; in the development of integrated services with high added value; in the stepped-up monitoring of risks, which may run the gamut from actual tracking to the development of co-responsibility with the insured; in pricing and contract options. I think we shall be seeing more and more dynamic contracts of the multiple-trigger coverage type, in which the attachment of coverage is the result of the occurrence of a combination of events rather than just one. There will also be innovations in investment management.

We know that in the risk-management field, everything is bound to change: management, distribution, the way claims are monitored, cost control and the quality approach, and even specialization – the “risk by risk, risk-taker by risk-taker” approach will lead to changes in our core business. We can also expect to see more research efforts devoted to inventing high value added services, and more attention paid to the profitability and viability of each and every line and aspect of the insurance business, which in turn will lead to optimal allocation of equity, line by line, and perhaps even policyholder by policyholder.

The sixth and final major change is that we can expect to see greater contestability in our businesses. Competition comes as no surprise. Domestic competition will only get more intense, squeezing profit margins. For a long time, insurers were price-makers. Little by little, we are becoming price-takers: the market sets prices, and coverage and policies have to be adapted after the fact. And in addition to domestic competitive pressures, the euro and the entrenchment of the single market will heighten competition on the European level. But it is above all the contestability of our sector that I want to stress, by which I mean the possibility that other economic agents – not insurers – will encroach on our territory, that of carrying and

handling risks. Personally, I feel certain that the degree of contestability rises a notch every year, and that new players can make inroads in our business if they have better access than we do to the relevant information. Let's take the example of the automobile manufacturer that sells someone a new car. The automaker has just acquired strategic information, and it has beaten us to it. And if the automaker has the information before we do, he can use it before us. He will eventually know, with the help of the appropriate tools, how its owner uses this car.

Competitive and contestability shocks will become more pervasive, and this will be reflected in the intensification of insurance cycles and a greater degree of interdependency between the various domestic insurance market cycles. This will render the needed adaptations all the more difficult.

By way of conclusion, the 21st century will be characterized by an increasingly complex universe of risks. The good news is that the universe of risks is growing, which means that our industry has a fantastic future to look forward to. The bad news is that this universe of risks does not resemble the universe of traditional risks that we mastered over the 20th century, and we will have to come up with adequate responses if we want to survive in the new universe of risks.

I think the situation calls for strong language. Our industry will undergo profound cultural evolutions, will see behavioural changes on the part of all its players, including the distribution channels, and will see tremendous adaptations of our organizational structures.

The impact and scope of these evolutions will be all the greater, and the theoretical literature suggests – as you may know, the Geneva Association has honoured me with a position on its Scientific Committee, and I am involved in its research – that we can expect a veritable scientific revolution in the insurance industry in the 21st century, rivalling those that shook other industries in the past.

Contemporary scientific literature stresses the importance of identifying all types and all categories of risks. This is leading us towards an exhaustive nomenclature of risks, whether they relate to human beings, businesses or the natural world.

At the same time, we are improving our ability to identify the nature of these risks: gradual/non-gradual, sudden and accidental/progressive, endogenous/exogenous.

We are also engaged in the classification of risk-management processes, that is to say, the resources that we dispose of for carrying, sharing, transferring, and pooling these risks, or of combining these options in various ways. We are gradually building what might be called a Mendeleev table of risks and how they can be combined and handled.

If this scientific revolution takes place, our industry will be radically different by the end or even by the middle of the 21st century from what it has been up to now. For the first time in history, we will have access to an exceptional combination of resources and knowledge to help us prepare, manage, anticipate and pool the risks that are the driving force of society.