TSUNAMI - Linking Insurance and Science

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TSUNAMI

TSUNAMI is a joint venture, funded by a consortium of companies from the UK insurance industry and the DTI's Sector Challenge competitiveness initiative. Its mission is to increase the competitiveness of the UK insurance industry by using science to improve the assessment of risk.

TSUNAMI has a total budget of £960,000, spread over three years, beginning in December 1997. The funding will be used to support a programme of research of potential value to researchers. Currently, six research projects are supported by TSUNAMI and a number are under development. Two personnel, seconded from the insurance industry, are responsible for the development, management and promotion of the projects.

The ultimate aim of TSUNAMI is to effect cultural change, in the attitude of the insurance industry towards using external, principally scientific, experts to meet some of the challenges it faces and of the scientific community, in looking to industry for funding to support research. The process of 'building bridges to support technology transfer' is a key role of the initiative and facilitation is a key function on TSUNAMI.

RESEARCH PROJECTS

The insurance industry is expanding, both geographically and in the risks against which it protects companies and individuals. The established practice of using past experience to judge the level and likelihood of risks is thrown into doubt by this expansion (as well as the possible effects of changes in the world's climate) and a deeper, more fundamental, understanding of risk is required.

A number of TSUNAMI's research projects deal with natural hazards. Two projects, on Tropical Cyclones and Extreme Weather Events in Northern Europe, deal specifically with forecasting the weather. Other projects deal with new mathematical techniques for analysing extreme events, the strategic issues facing the UK insurance industry in dealing with the increasing risk of flooding, the economic distribution of loss from natural catastrophes and the risk from tsunamis themselves (tidal waves).

The Tropical Cyclones Forecasting Project is a two year project to develop a system for predicting the level of Hurricane activity that will affect the US mainland. To be of value to insurers (and the reinsurance market in particular) the predictions need to be delivered before the 1st January of each year, which entails a lead-time of the forecasts of some nine months.

The forecasts are derived and presented in a probabilistic format. This reflects the essentially stochastic nature of the weather and the uncertainty that surrounds the forecast estimates. The experience of TSUNAMI has been that the presentation format is an essential element in providing a forecast of value to users. Explaining the level of skill that attaches to the predictions is also a crucial element, in gaining confidence in the forecasts amongst users.

It needs to be recognised that scientific research output can only hope to gain a *position of influence* in business, rather than strictly determining decisions. Technical results from research have to compete with many other influences, such as customer relationship issues and market perceptions of risk and value. Although it is desirable for the influence to be as great as possible, care should be taken to ensure that it is commensurate with the level of confidence that attaches to the predictions of likely future events.

VALUE OF INFORMATION

The chain of analysis from data, to information, to knowledge, to decisions is extremely complex and becomes increasingly subjective with each step. An interesting book by Richard W. Katz and Allan H. Murphy has attempted to discuss the value of this chain, with specific regard to the weather and climate. "Economic Value of Weather and Climate Forecasts" (Cambridge University Press, ISBN 0-521-43420-3) draws form the fields of meteorology, statistics and economics, to discuss how forecasts are derived and presented, and how a value might be placed on them.

One of the strong messages to come from the discussion is that decision-making, using information contained in forecasts can only be optimal when users fully understand the options available to them and the consequences of each choice. As industry, generally, does not have a full knowledge of the options available, of their consequences, there is a serious challenge (and opportunity) in improving the quality of decision-making, to allow the maximum value of forecasts to emerge.

A second point concerns the level of influence that a forecast can achieve. It is explained in the discussion that a 'threshold' level of quality (or skill) exists, below which forecasts have no value. Certainly, the practical experience of TSUNAMI is that users place no value on a forecast when it has only a modest level of credibility. Gaining credibility (and hence delivering value to users) is not just a matter of demonstrating a high level of skill, but involves gaining trust, through consistency of delivery and careful explanation of the science behind the forecasts.

THE FUTURE

TSUNAMI is committed to supporting technology transfer and playing its part in moving the UK towards a "knowledge-driven economy". It also seeks to encourage collaboration between competitors within the market, where this is practical, to share experiences, realise synergies and seize opportunities. A similar challenge and opportunity also faces the scientific community, where inter-disciplinary research can realise valuable new results and insights.

However, the existing funding mechanisms, based on peer review by specialists in individual fields, handicap multi-disciplinary research proposals. The scientific community needs to address this failing. It is clear that some steps are being taken, with the emergence of new "mission-defined" research programmes, such as the Climate Change Centre under the EPSRC, ESRC and NERC.

"Good Science" has come mainly from specialisation, with good reason, and the creation of an environment in which specialist knowledge can be combined to realise new opportunities and solve new problems will require careful planning and management. TSUNAMI, supporting mainly "mission defined" research, is also keen to see collaboration within the scientific community, and its entire research programme relies on co-operation amongst scientists from different research institutions and disciplines.

CONCLUSION

As the insurance industry develops, in the areas that it insures and in its reliance upon knowledge in supporting its products, it will increasingly look to science to understand the risks it covers. Weather will continue to be a major source of risk and the demand for weather and climate forecasts can be expected to increase over the foreseeable future. The work of the ECMWF and this conference in particular can make a valuable contribution to realising this important opportunity.