by Valerie Chavez

Business Schools in an Age of Extremes

Extreme flooding, forest fires, severe heatwaves, and catastrophic avalanches are no longer anomalies that occur once in a decade. In a single season, climate disasters now claim thousands of lives, destroy infrastructure, trigger costly rescue operations, and disturb entire communities. These events, causing billions in financial losses, clearly demonstrate how climate-related volatility has become a real risk rather than a mere theoretical concern. Across business schools, this reality is transforming the way we teach risk.

The Evolution of the Concept of Risk and Unpredictability

The concept of risk has evolved along with economic and technological progress. Initially, business education focused primarily on operational effectiveness and market competition, operating in a stable environment where forecasting and diversification could manage uncertainties. Over time, financial crises, globalisation and digital transformation have all broadened the concept of risk in management thinking. Risk is no longer viewed as a purely financial variable, but as part of a wider spectrum of interconnected forces.

Today, climate change is accelerating this shift. For more than a decade, sustainability has been part of business education: MBA students study ESG frameworks, finance courses explore transition risks, and strategy discussions focus on decarbonisation pathways. However, a major change is the growing frequency of extreme weather events. Floods, heatwaves, wildfires and droughts are no longer rare events but increasingly regular features of the global environment. Flooded logistics centres, prolonged heatwaves reducing labour productivity, supply chains disrupted by wildfires, and water shortages influencing industrial location decisions are no longer hypothetical scenarios. They are real operational constraints with measurable financial consequences.

100-year

What is the likelihood of a '100-year' flood during the lifetime of an infrastructure investment?

As financial markets begin to assess physical climate risks more clearly, business schools now face a new question. The issue is no longer whether climate change matters, but how it is localised, and uncertain effects should be incorporated into risk assessment, strategy and management models.

This shift challenges long-standing assumptions in management education because conventional risk models are generally based on historical averages and normally distributed outcomes. By contrast, extreme weather events are rare, high-impact shocks that do not follow previous patterns. Understanding risk today, therefore, increasingly means confronting uncertainty itself.

Risk Models

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ECCE

Against this backdrop, the Expertise Center for Climate Extremes (ECCE) was established in March 2023 at the University of Lausanne through a collaboration between the Faculty of Business and Economics (HEC Lausanne) and the Faculty of Geosciences and Environment (FGSE). This centre is Switzerland's first research hub dedicated to extreme weather events, including floods, heatwaves, landslides, droughts, and hail. It is also unusual in that it is closely integrated into a business school.

ECCE's mission is to improve the understanding, modelling, and prediction of extreme weather events and their societal and economic impacts. Rather than treating climate science and business analysis as separate fields, the centre brings together researchers from multiple disciplines to study how detailed climate data can support financial modelling, risk assessment, and decision-making.

This initiative reflects an increased awareness that physical climate risks are becoming critical economic factors that must be taken into account. Businesses must assess how their infrastructure, assets and supply chains will cope in a world of acute environmental volatility. Policymakers and insurers face similar thorny challenges as they try to understand how the changing probabilities of extreme events affects the financial resilience and stability of their industry.

In bringing extreme weather events into the business school agenda, ECCE signals a deeper shift: sustainability goals are no longer the only focus; attention is increasingly turning to the scientific foundations of risk itself.

From Abstract Sustainability to Quantified Exposure

Decision-makers increasingly need more tools to measure exposure rather than simply describing the problem. Extreme weather events raise practical questions that require concrete answers. What is the likelihood of a '100-year' flood during the lifetime of an infrastructure investment? How should asset values change when heatwaves reduce productivity or when drought disrupts water-dependent industries? And how should insurers set premiums when historical data no longer reflects future risks?

ECCE tackles these questions by combining climate science with statistical modelling and financial analysis. Researchers at ECCE estimate the probability and potential impact of rare events using data-processing methods that work with limited historical records and rapidly changing environmental conditions.

As climate change disrupts traditional actuarial assumptions, new modelling approaches are essential. Collaboration with the actuarial science department at HEC Lausanne plays a key role in this work. Actuarial science connects physical events with their financial consequences, translating environmental uncertainty into indicators such as expected losses, rising insurance premiums and capital requirements.

Partnerships with professional and industry organisations, including actuarial associations, insurers, and meteorological institutions, further strengthen the link between research and practice. These joint efforts ensure that academic advances meet real-world needs, while giving industry partners access to new analytical tools. The result is a shift from abstract debate about sustainability to tangible measurement of exposure and risk.

Interdisciplinarity in Practice

Extreme climate risks cannot be understood through the lens of a single discipline. The physical processes that cause floods or heatwaves originate in meteorological and geological systems, while their consequences permeate economic networks, financial markets, and human decisions. ECCE, therefore, functions as an institutional experiment in interdisciplinary cooperation.

At ECCE, geoscientists contribute their expertise in environmental dynamics and climate modelling. Statisticians develop methods for analysing rare events and uncertainty. Finance specialists study the implications for asset pricing and systemic risk. Artificial intelligence methods assist pattern recognition and scenario analysis. Together, these perspectives provide a better understanding of how extreme events propagate through systems.

ECCE also illustrates a new model of engagement between business schools and society. Collaboration reaches beyond academia to include industry partners and public institutions. Such cooperation allows research questions to emerge from practical challenges whilst maintaining academic independence.

This approach demonstrates a broader evolution in higher education. Increasingly, complex planetary risks require collaboration between faculties, universities, and organisations. By bringing together statisticians from HEC Lausanne and geoscientists from the Faculty of Geosciences and Environment, ECCE illustrates how institutional boundaries can be reconfigured to address shared challenges. The centre thus acts not only as a research initiative but also as a governance model for interdisciplinary collaboration.

Teaching Uncertainty

Sustainability is widely taught in business education programmes, often as a mandatory component. However, the rise in extreme weather events is expanding the scope of sustainability education beyond responsibility and compliance to include the management of uncertainty and risk. Training future managers to operate in volatile environments requires new teaching methods.

Traditional business education often focuses on optimisation under known conditions. Extreme weather events, however, highlight completely unknown situations where probabilities are uncertain, historical data incomplete, and outcomes can be highly uneven. Students, therefore, need to learn how to assess low-probability, high-impact risks and make decisions even when information is limited.

ECCE facilitates this transition by exposing students to interdisciplinary perspectives and real-life data. Climatic scenarios, crisis simulation exercises, and case studies based on extreme events prompt learners to challenge the assumptions embedded in conventional models. Quantitative courses include non-normal risk distributions, whereas strategic discussions focus solely on organisational resilience rather than efficiency.

It is important to note that this evolution does not represent a purely moral agenda. Business schools are responding to developing regulatory frameworks, investor expectations, and advances in data access. Increasingly, financial regulators require disclosure of physical climate risks, while investors seek clearer assessments of exposure. Teaching uncertainty thus aligns management education with the new realities faced by contemporary organisations.

Signals for the Future

Although ECCE is rooted in the Swiss academic context, its implications reach far beyond national borders. The collaboration between statisticians at HEC Lausanne and geologist colleagues at the University of Lausanne shows how business schools can address increasingly complex planetary risks.

In academia, collaboration is increasingly a key trend as institutions face challenges that cross disciplinary boundaries. Extreme weather events serve as a clear example: integrating statistical modelling, geoscientific expertise, and financial analysis enhances both research and teaching. Similar strategies could be applied to other systemic issues, such as biodiversity loss, technology governance, risks related to artificial intelligence, or threats to our democratic institutions.

As such, the ECCE experience encourages a wider reflection. Instead of merely including a few new current thematic modules, business schools might need to reconsider some of their fundamental assumptions regarding uncertainty, interdependence, and resilience.

Interdisciplinary centres can play an important role by bringing together research insights, management knowledge and societal needs.

As global risks become progressively interconnected, the ability to build bridges between disciplines could become a defining characteristic of leading institutions. ECCE shows how scientists and management researchers can work together to produce research that is both rigorous and has practical application in real-world decision-making.

About the author

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