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FOREWORD FOR AD-MINISTER — SPECIAL ISSUE ON: DISASTER RISK MANAGEMENT AND BUSINESS EDUCATION: SUSTAINABLE AND RESILIENT BUSINESS 15/07/16

An in-depth study carried out by the UN Office for Disaster Risk Reduction (UNISDR) three years ago concluded that economic losses from disasters such as earthquakes, tsunamis, cyclones and flooding were reaching an average of \$250 billion to \$300 billion per year.

It is clear that many countries would not pass a stress test of their fiscal resilience to a 1-in-100 year loss. The question has to be asked: How many businesses would pass such a test?

Small and medium enterprises are particularly at risk. A single disaster can wipe out a business overnight. A 2013 survey of disaster prone cities across the Americas showed that less than 15% of companies with fewer than 100 employees had a business continuity or crisis management plan in place.

In a world where climate change is playing havoc with preconceived ideas about extreme weather events - their intensity, regularity and geography - it is clear that the bar has to be raised on the visibility and relevance of disaster risk management as a key element of business strategy.

Disasters not only directly affect business performance when critical infrastructure is destroyed and global supply chains are disrupted, they affect employment opportunities and the quality of life for people across the globe if private sector investment in new cities and towns is not risk-informed.

Given replacement or repair costs, we cannot afford to lose expensive critical infrastructure such as schools, hospitals, roads and public utilities to hazards such as earthquakes and floods. The same is true of manufacturing facilities which have to close because they were built on a flood plain or at the bottom of an unstable hillside.

We are still in the early days of engaging the private sector in the overall effort to reduce disaster risk and disaster losses but progress so far, including this volume, is promising. There is now a clear commitment at the highest level across UN Member States and in the UN family, to ensure that the private sector is fully engaged in disaster risk reduction efforts.

The Sendai Framework for Disaster Risk Reduction that was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, in March, 2015, makes clear the important role that the private sector can and should play in building resilience to disasters across the world.

The truth is that private investment largely determines disaster risk. In most economies 70% or more of overall investment is made by the private sector.

In 2015, the adoption of the Sendai Framework was the first milestone of the 2030 Agenda. The others were the agreement on Financing for Development, the Sustainable Development

Goals (SDGs), and the Paris Agreement on climate change. These outcomes are mutually dependent because increasing disaster risks, climate change, poverty and inequality are all markers of unsustainability.

Escalating disaster losses magnified by climate change are an increasing threat to low and middle-income countries, especially small island developing states, robbing them of resources that could otherwise be invested in poverty eradication and other social expenditures in order to achieve the SDGs.

The Private Sector Alliance for Disaster Resilient Societies, ARISE, was launched with a hundred members in November 2015, building on the success of earlier UNISDR sponsored initiatives with the global business community.

It is the launch platform for our engagement with the private sector and aims to realise a substantial reduction in economic losses from disasters and achieving reductions in disaster damage to critical infrastructure and disruption of basic services, as called for in the Sendai Framework.

UNISDR and ARISE, with support from the Federal Government of Germany's Ministry for Economic Cooperation and Development (BMZ), partnered with Florida International University's Extreme Events Institute (FIU-EEI) and 12 leading business schools to introduce disaster risk management to curricula for business students.

This present publication should give that initiative a welcome boost and raise awareness beyond the countries whose academics have contributed so thoughtfully to the development of the business case for disaster risk reduction. These include Brazil, Canada, Chile, Colombia, India, Jamaica, Mexico, Peru and the United States.

I would like to thank the authors for their seminal contributions to advancing the incorporation of disaster risk management in business school teaching and research.

Not only have the authors shed light on the business opportunities associated with disaster risk management, highlighting the importance of business continuity in the education of future managers, but they have also confirmed the importance of research and alliances between academia, governments and the private sector.

They have done the cause of resilience a great service.

Robert Glasser

Special Representative of the Secretary-General for Disaster Risk Reduction & Head of the UN Office for Disaster Risk Reduction



EDITORIAL

While the evidence is compelling that disaster risk management (DRM) creates value and increases business competitiveness, it should follow that its savvy implementation should guide investment decisions. Yet worldwide, it has been observed that there are very few companies with strategies and mechanisms with integrated DRM, and further the theme hasn't yet become a priority in business schools around the world.

This special international issue aims to confront that startling observation by highlighting the importance of local contexts, regional realities and global trends. As an important academic collaborative, it endeavours to contribute to a variety of curricular issues including: (i) identifying teaching opportunities and curricula development (i.e. co-creation and co-development of teaching materials in DRM for business related programs; promotion of business start-ups; integration of experiential learning in DRM in business education); (ii) designing professional development and executive education programs (i.e. identification of specific skills and competencies needed for DRM in management; creation of a job market in the business community for those with specific skills and competencies in DRM); and (iii) establishing avenues for future research and publication (i.e. identifying the "business case" of DRM, mapping existing sources, and defining the state of the art in DRM, conducting specific case studies; developing a critical review and understanding of DRM in business, and business resilience; dissemination of a knowledge frontier and cross-fertilisation, and, developing evidence-based research of business and DRM).

This special issued, co-edited by Dr. Juan Pablo Sarmiento, Mr. Neil McFarlane, and Dr. Maria Alejandra Gonzalez-Perez consists of 13 papers authored by 30 academics from 11 higher education institutions from 10 different countries (Brazil, Canada, Chile, Colombia, India, Indonesia, Jamaica, Mexico, Peru, and United States). Given its international scope, this body of papers offers complementary perspectives from diverse disciplines and geographical and institutional backgrounds in addressing DRM and business continuity in business education.

AD-minister seeks to disseminate research on local and international developments in business administration, International Business, Accounting, Marketing and Organizational Psychology. The opinions of the authors are theirs alone. They do not necessarily reflect those of EAFIT, the Business School, the Editorial Committee or the sponsoring agencies.

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This publication is based on the Disaster Risk Management (DRM) in Business Education Workshop held in Toronto, Canada In March 23-24, 2016. The DRM in Business Education is an initiative led by Florida International University's Extreme Events Institute, under the United Nations Office for Project Services (UNOPS), Grant Support Agreement GSA/2016/005, funded by the Federal Government of Germany's Ministry for Economic Cooperation and Development (BMZ), in support of the ARISE Initiative.

The editors and Universidad EAFIT would like to acknowledge that this special issue was supported by Florida International University's "Disaster Risk Reduction in the Americas Program," under the Cooperative Agreement # AID-OFDA-A-13-00041 with the United States Agency for International Development's Office of U.S. Foreign Disaster Assistance (USAID/OFDA).

AD-minister and Universidad EAFIT consider it an honour to have been chosen as the official outlet for publishing this special issue dedicated to Disaster Risk Management & Business Education: Sustainable and Resilient Business.

Maria Alejandra Gonzalez-Perez

AD-minister's Editor-in-chief

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DISASTER RISK MANAGEMENT IN BUSINESS EDUCATION: SETTING THE TONE

GESTIÓN DE RIESGO DE DESASTRES EN LA EDUCACIÓN DE NEGOCIOS: MARCANDO LAS PAUTAS

JUAN PABLO
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ABSTRACT

Looking for windows of opportunity to mainstream disaster risk management within business education, in 2015, the United Nations Office for Disaster Reduction's (UNISDR) Private Sector Alliance for Disaster Resilient Societies (ARISE), partnered with Florida International University's Extreme Events Institute (FIU-EEI) and 12 international leading business schools. This partnership began with a call for White Papers to propose innovative approaches to integrate cutting edge disaster management content into business education programs and other academic offerings, based on seven themes or niches identified: (1) Strategic Investment and Financial Decisions; (2) Generating Business Value; (3) Sustainable Management; (4) Business Ethics and Social Responsibility; (5) Business Continuity Planning; (6) Disaster Risk Metrics; and (7) Risk Transfer. In March 2016, an international workshop was held in Toronto, Canada to present the White Papers prepared by the business schools, and discuss the most appropriate approaches for addressing the areas of: teaching and curriculum; professional development and extension programs; internships and placement; research opportunities; and partnerships and collaboration. Finally, the group proposed goals for advancing the implementation phase of the business education initiatives, and to propose mechanisms for monitoring and follow-up.

KEYWORDS

Business continuity; business education; business ethics; business value; disaster risk; disaster risk metrics; financial decisions; risk transfer; SMEs; social responsibility; and strategic investment.

RESUMEN

En la búsqueda de ventanas de oportunidad para incorporar la gestión del riesgo de desastres en la educación de negocios, en el año 2015, la Alianza del Sector Privado para Inversiones Sensibles al Riesgo (ARISE) de la Oficina para la Reducción de Desastres de las Naciones Unidas (UNISDR), en asocio con el Instituto de Eventos Extremos de la Florida International University Florida International University (FIU-EEI) y 12 importantes escuelas internacionales de negocios. Esta alianza comenzó con una convocatoria de libro blancos (White Papers) para proponer enfoques innovadores para integrar contenido de vanguardia de gestión del riesgo de desastres a los programas de educación de negocios y demás ofertas académicas, basadas en siete temas o nichos identificados: (1) Inversión Estratégica y Decisiones Financieras; (2) Generación de Valor de Negocio; (3) Gestión Sostenible; (4) Ética en los Negocios y Responsabilidad Social; (5) Planeación de la Continuidad de Negocio; (6) Métricas del Riesgo

¹ Director of the Disaster Risk Reduction Program, funded by the U. S. Agency for International Development and housed in the Florida International University Extreme Events Institute. Research Professor at the Department of Health Policy and Management in the Robert Stempel College of Public Health and Social Work, Florida International University, United States. Email: jsarmien@fiu.edu

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Disaster Risk Management In Business Education: Setting The Tone

de Desastre; y (7) Transferencia de Riesgo. En marzo de 2016, se realizó un taller internacional en Toronto, Canadá para la presentación de los libros blancos preparados por las escuelas de negocios, y discutir los enfoques más apropiados para abordar áreas de: enseñanza y currículo; desarrollo profesional y extensión de programas; pasantías y colocaciones; oportunidades de investigación; y alianzas y colaboraciones. Finalmente, el grupo propuso metas para avanzar en la fase de implementación de las iniciativas de las escuelas de negocios y para proponer mecanismos para su monitoreo y seguimiento.

PALABRAS CLAVE

Continuidad de negocio; educación de negocios; ética en los negocios; valor de negocio; riesgo de desastre; métrica de riesgo de desastres; decisiones financieras; transferencia de riesgo; PYME; responsabilidad social e inversión estratégica.

BACKGROUND

At the end of 2013, Florida International University's Extreme Events Institute (FIU-EEI) joined what is today the United Nations Office for Disaster Reduction's (UNISDR) Private Alliance for Disaster Resilient Societies (ARISE), where FIU is leading the Activity Stream #4: State-of-the-Art Disaster Risk Management, Education, Training, and Outreach. In 2015, UNISDR and ARISE, with support from the Federal Government of Germany's Ministry for Economic Cooperation and Development (BMZ), partnered with FIU-EEI and 12 leading business schools to improve or introduce disaster risk management into the curricula of higher education and training services. This supports Priorities for Action I, III, and IV, as stated in the Sendai Framework for Disaster Risk Reduction 2015-30.

This partnership with leading business schools worldwide began with a call for White Papers that propose innovative approaches to mainstreaming cutting edge disaster management content into business education programs and other academic offerings. A list of the selected White Papers is provided in Annex 1.

The project also sought to develop training and outreach programs for small and medium enterprises, which may struggle to gain access to information, by engaging the support of larger experienced corporations, particularly those working in public-private partnerships.

In March 2016, an international workshop was held in Toronto, Canada to present the White Papers prepared by the business schools; discuss the most appropriate approaches for revising existing curricula; and propose new disaster risk management (DRM) courses for existing undergraduate, graduate, professional development, and extension programs. A jury was convened among the sponsor agencies (UNISDR and FIU) to select the best paper in each of the two categories of existing and new DRM academic offerings from the White Papers received. The awards went to: (1) The Rotman School of Management, University of Toronto (Existing DRM academic offering); and (2) The Mona School of Business & Management, University of the West Indies (New DRM academic program). Each laureate university received a prize of USD 10,000 for the implementation of the proposal submitted.

With the support of EAFIT's Business School and the Editorial Committee of AD-minister, we conducted a blind peer review of the White Papers and are publishing a special issue of Ad-minister dedicated to Disaster Risk Management & Business Education: Sustainable and Resilient. The objective of the special issue is to disseminate current advances in DRM as it relates to business education. This publication is supported by Florida International University's Disaster Risk Reduction in the Americas Program, under a Cooperative Agreement with the United States Agency for International Development's Office of U.S. Foreign Disaster Assistance (USAID/OFDA).

This chapter sets the tone for the conversations around DRM and presents the findings of the discussion groups at the Toronto meeting. Five important topics were discussed: teaching and curriculum; professional development and extension programs; internships and placement; research opportunities; and partnerships and collaboration. The final section lists the proposed goals for advancing the integration of disaster risk management to the business curriculum.

EXPLORING A NICHE

Multiple attempts were made to reach out to the business education community, looking for windows of opportunity to embrace the topic of DRM within their academic and extension programs. After careful examination, seven themes related to innovative approaches and cutting edge DRM content were identified: (1) Strategic Investment and Financial Decisions; (2) Generating Business Value; (3) Sustainable Management; (4) Business Ethics and Social Responsibility; (5) Business Continuity Planning; (6) Disaster Risk Metrics; and (7) Risk Transfer.

Strategic Investment and Financial Decisions, or strategic financial management, combines financial management with corporate strategy. Strategic financial management focuses on the creation of value through effective management of a company's financial resources to develop goal-directed actions in order to gain and sustain superior performance relative to its competitors. While both types of financial management, corporate and strategic, seek to maximize value for shareholders and stakeholders, the main distinction between traditional corporate financial management and strategic financial management is the latter's commitment to the long-term strategic goals of the company. There are different schools of thought regarding the combining of strategic and financial management. Traditional financial managers strive to maximize value for stakeholders by allocating resources into investments that generate the most cash return. However, some scholars stress that current capital budgeting techniques alone may not be the most suitable tools for financial managers who seek to achieve strategic goals. This is because financial analysis, on its own, may sacrifice the long-term health of a company for short-term financial gains, creating a bias against long-lived, capital-intensive projects that would add substantial competitive advantage to a company in the long run. They argue

Juan Pablo Sarmiento

Disaster Risk Management In Business Education: Setting The Tone

that the market value of a company is not only described by its capacity to generate cash flow through its assets, but should also reflect the firm's strategic growth potential. This means that the value of the firm would also derive from its capacity to undertake future investment opportunities in a scenario sensitive to competitive moves.

Generating Business Value. The generation of business value, or in other words, the creation of value by the company in order to create and/or satisfy customer demands, is considered the most important activity a company or organization performs. The exact definition of 'value' has varied significantly over time, from the large-scale industrial processes that based their value-added processes on the transformation of raw materials into manufactured goods, to modern processes, where knowledge and information demand focus, and the main purpose of a business is to identify, capture and deliver value for its stakeholders. The process of business value generation begins with a value proposition, a description of the benefits customers perceive and expect from a company's products and services. It is important to note that the customers' perception of value may stem from a variety of characteristics of a company's products/services, ranging from physical attributes, quality of services, price, performance or other features. This fact highlights both the tangible and intangible nature of the concept of value. Early literature on value creation sought to distinguish value (singular) from values (plural). The former implies preferential judgment, while the latter was described as a set of principles that substantiate the judgments made. Generally, current literature on generating business value shares the thinking that 'value' is connected to the idea of 'trade-off.'

Sustainable Management. The concept of sustainable management has stemmed from ongoing discussion about the role of businesses in society. Scholars widely agree that corporations play a central role in the ecological future of the globalized world, where governments' ability to act is often limited by international agreements. Corporations are the heart of modern economies. They have a direct impact on our biosphere, due to their use of natural resources; the pollution generated from production practices; and the promotion of patterns of consumption. For these reasons, in the years following the 1992 Earth Summit in Rio de Janeiro, organizations tackled environmental challenges, positioning themselves as pro-sustainable development and introducing environmental action plans and joint action programs. The general idea of sustainable management is to combine notions of sustainability with management theory in order to allow organizations to run efficiently without depleting natural resources and to satisfy current demands without harming future generations' development. Scholars have identified three main reasons for organizations to adopt sustainable management practices: competitiveness, legitimation, and ecological responsibility. The two leading process models for Sustainable Management are Stuart Hart and Amory B. Lovins et al.

Business Ethics and Social Responsibility. The study of business ethics and social responsibility aims to define a corporation's business policies and practices in the marketplace and also in society. The discussion about ethics in business was a spill-over from the dominant approach to the moral dimension of business, which came to be known as corporate social responsibility. This perspective sought to create a new managerial discipline that later came to be known as business ethics. It was believed that bringing experts in moral philosophy into business schools would generate analytical frameworks and conceptual tools that managers needed in order to choose the morally correct course in difficult ethical situations. However, scholars have emphasized that disagreements exist with regard to the exact meaning of business ethics. Some scholars have pointed out that the concept of business ethics does not exist since corporations are not persons and therefore cannot be held morally responsible for their actions. Scholars argue that the literature on business ethics can be divided into two distinct and broad categories: normative literature and positive literature. Normative literature seeks to provide managers with the concept of what they 'ought to do' and presents useful models that managers can apply to make decisions on situations that have an ethical dimension. Positive literature surveys the opinions of groups of people in order to assess what they consider to be ethical or unethical.

Business Continuity Planning (BCP). BCP intends to identify all the processes, protocols, assets, and benchmarks required for an organization to develop plans that ensure the safety of its employees, its community and the continuity of time-sensitive operations. Since unforeseen events can disrupt business operations and cause revenue losses, a business continuity plan for the resumption of normal operations is essential, not only for the survival of the company, but also for the recovery of the region in which the business operates. Scholars argue that business continuity planning originated in the 1970s, with the emergence of mainframes and networking technology and the subsequent need to secure data from unpredictable events. Nowadays, BCP has evolved together with business models, expanding its focus from technology infrastructure to all the processes and management procedures involved in the continuation of the business in its entirety. Scholars emphasize that business continuity plans should not focus on a particular type of event that may disrupt a company's operations. Instead, it is more important to design a broader plan that encompasses all the steps necessary for an organization to carry on its operations. The idea is that reducing down-time accelerates restoration and recovery of businesses after unforeseen events disrupt their critical operations.

Disaster Risk Metrics. Measuring disaster risk is a complex activity because natural or manmade disasters involve different dimensions and stakeholders. Consequently, risk may be perceived differently. Generally, risk is expressed in terms of loss of life and financial resources. In addition to the lack of common ground on the matter, the

variables involved in calculating disaster risk are not easily quantifiable and may involve several different scientific methods. Since risks vary considerably, some cannot be compared using the same scale. The discipline of disaster risk metrics emerged from the need to create multi-hazard risk metrics, based on scientific methods and evidence, in order to better bridge the gap from insurance models and to better inform disaster risk reduction policies. In the early 1990s, the insurance industry was severely impacted by the challenge of accurately measuring disaster risk and putting a price on insurance. Their model was based on losses from over several decades in a particular region and were proved insufficient to determine the true average cost of large catastrophes. Nowadays, the metrics commonly used to quantify social and economic impacts derived from disasters may include several different variables.

Risk Transfer. According to the United Nations Office for Disaster Risk Reduction (UNISDR), risk transfer is the “process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.” The most common form of risk transfer is insurance, where the insured person pays ongoing premiums in exchange for coverage of pre-determined risk and/or events. Often different stakeholders, such as governments, insurers, multilateral banks and other large risk-bearing entities establish mechanisms to help cope with losses in major events. The most common mechanisms put into place before extreme events are insurance and reinsurance contracts, catastrophe bonds, contingent credit facilities and reserve funds, where the costs are covered by premiums, investor contributions, interest rates and past savings, respectively. These initiatives are deemed crucial since they provide much needed, immediate liquidity after a disaster for more effective government response, and some relief of the fiscal burden placed on governments by spreading the costs of recovery among different stakeholders. However, some scholars argue that these formal mechanisms do not satisfactorily address the issue of reaching the poor, who are consistently the most affected by disasters.

OBJECTIVES OF THE TORONTO WORKSHOP

1. Present and discuss the White Papers on DRM in Business Education and the vision of convening universities, business schools and MBA programs.
2. Discuss options for mainstreaming DRM within the curricula of undergraduate and graduate studies, as well as outreach and professional development programs.
3. Explore partnerships and agreements to move toward an implementation phase.
4. Propose mechanisms for follow-up and monitoring.

PARTICIPATING INSTITUTIONS

Brazil	Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo (FGV-EAESP)
Canada	Concordia University, John Molson School of Business
Canada	York University, School of Administrative Studies
Canada	University of Toronto Rotman School of Management
Chile	University of Chile
Colombia	Universidad EAFIT
India	Indian Institute of Management, Bangalore
Jamaica	University of the West Indies, Mona School of Business and Management
Mexico	Monterrey Institute of Technology and Higher Education, School of Business
Peru	ESAN University, Graduate School of Business
Indonesia	University of Gadjah Mada, Faculty of Economics and Business
United States	Florida International University, Small Business Development Center (SBDC) and the and the Extreme Events Institute (EEI)

PARTNER AGENCIES

The United Nations Office for Disaster Risk Reduction (UNISDR) supports the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. The Sendai Framework was adopted at the Third United Nations World Conference on Disaster, the achievement of its seven global targets by 2030. The Framework highlights a lack of regulation and incentives for private disaster risk reduction investment as an underlying risk driver, and calls for business to integrate disaster risk into their management practices.

ARISE is the Private Alliance for Disaster Resilient Societies, an initiative of the UNISDR.

Florida International University's Extreme Events Institute carried out this event, in close cooperation with appropriate universities and institutes across the globe and special support from York University (Canada).

Financial support for these discussion was provided by the **Federal Government of Germany's** Ministry for Economic Cooperation and Development (BMZ).

DISCUSSION TOPICS

The five themes selected for the group discussions: (1) Teaching opportunities and curricula development; (2) Professional development and extension programs; (3) Internships and placements; (4) Research opportunities; (5) Partnerships and collaborations. Then, participants worked on the follow-up aspects to move toward an implementation phase and to propose mechanisms for monitoring.

Discussion Topic 1. Teaching and Curriculum Development

Moderator: John Molson School of Business - Concordia University

Discussions surrounding teaching opportunities and the development of curricula for disaster risk management (DRM) focused on four main themes:

- Integrating DRM into the curriculum;
- Making the case for a DRM curriculum;
- Addressing the lack of teaching resources and materials;
- Desired educational outcomes.

Below we describe the challenges, opportunities and recommendations made with regard to each of these themes.

Integrating Disaster Risk Management into the Curriculum

Integrating DRM into the business education curriculum can occur at several levels:

- Integration into **existing** core courses;
- Development of new **elective** courses;
- Creation of **new** DRM programs and degrees.

Several key points for consideration were put forth with regard to integrating DRM into the curriculum.

- DRM can face competition from other topics.
- Business continuity and sustainability courses may present the best opportunities for integrating DRM topics.
- Begin on a smaller scale with lectures, guest lecturers, articles, case studies, course units/modules, special events, etc. and scale up over time to create full courses and programs.

In order to maximize the opportunities to integrate DRM into the curriculum, the following recommendations were made:

- Refrain from isolating DRM from similar topics such as strategic decision-making, risk management, and crisis management, as these topics complement each other.
- DRM courses could be developed according to niche expertise available at some universities.
- Create a recognized professional certification program, similar to Chartered Financial Analyst (CFA) or Financial Risk Management (FRM), which establishes best practices in DRM. Take into account the following issues:
 - * Proposed DRM certification may overlap with existing professional certifications.
 - * Many government certifications (especially at municipal level) are already available.

- * An insufficient demand for DRM certification in the overall job market may lead to considering the integration of DRM into existing professional certifications, such as those for risk management or business continuity.
- Establish a professional DRM association that requires periodic continuing education training to renew certification.

Making the Case for a Disaster Risk Management Curriculum

Institutional bureaucracy is a significant barrier to creating new teaching opportunities and developing appropriate curricula. Efforts to integrate DRM into the business curriculum may face resistance on many fronts and will require interest and commitment on the part of students, faculty, university administrators, and other stakeholders. The following challenges and opportunities were cited:

- Work to change the belief that DRM is a fleeting trend rather than a long-term paradigm shift. Dispel the myth that DRM is the government's responsibility and not relevant to businesses. DRM education should make a clear connection between the needs of government and businesses.
- Convince businesses that disaster risks are material to their fiscal wellbeing and that DRM must be part of their risk management strategy.
- Take advantage of the momentum building around climate change policies and practices—increased awareness, regulation, and stakeholder pressure—to integrate DRM into climate change adaptation efforts or as a complementary topic.
- Interest on the part of students is inherently tied to business interests and consequently will remain low as long as businesses and recruiters do not value DRM expertise. It will be necessary to identify gaps that need to be filled so that both companies and students see the value of DRM curricula and expertise.
- There needs to be a clear connection between real job descriptions and DRM educational content so that students see the value of taking such courses or programs.

Addressing the Lack of Teaching Resources and Materials

The lack of evidence-based resources and instructional materials presents a challenge for educators, which may be addressed by creating (individually or jointly) and sharing resources and materials. Following are opportunities and recommendations to increase the relevance of DRM to business education.

- *Creating Resources*
 - * Educators and experts will need to create new teaching materials such as textbooks, cases studies, and course outlines. The Sendai Framework for Action can serve as a guide.
 - * New materials should be designed to make it easy for the 'non-committed' to integrate DRM into existing courses and/or use it as a basis for new courses.
 - * Other venues for the use of new teaching materials include summer school programs, international programs, and MOOCs (massive open online courses).

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- * DRM teaching materials call for new business case studies, which could be used to promote a DRM case competition.
- * Partnerships with expert organizations, such as the Red Cross, could also be fruitful in producing teaching materials and resources.
- *Sharing Resources*
 - * Sharing resources (cases, experiences, teaching material, course syllabi, research, niche areas of expertise, etc.) facilitates curriculum development and expands DRM education to a greater number of universities.
 - * It fosters standardization, best practices, and a common vocabulary among DRM educators and (future) practitioners.
 - * Meetings, conferences, and the creation of a formal or informal association of business schools could contribute to a meaningful dialogue among educators.
 - * The creation of a dedicated accessible/open/shared website would provide a venue for compiling resources for DRM curricula and facilitate partnerships.
 - * Alternatively, existing websites may be willing to host DRM resources. For example, the FEMA website (www.fema.gov/) for higher education already posts syllabi, yet not very many are in a business context. Prevention Web (<http://www.preventionweb.net/english/>) has a repository of documents, including training material, literature, academic and technical research. Prevention Web could easily adapt the site to provide a space for universities to share resources and materials. Awareness of the existence of the website is key.
- *Adapting DRM to Business Education*
 - * To make DRM relevant to business education, classroom learning can be combined with 'real' experience outside the classroom by encouraging students to work with companies on actual business issues.
 - * Small businesses appear to be especially overlooked and it may be necessary to advocate for research on the impact of disaster risk on small businesses.
 - * Existing DRM materials and resources can be adapted to relevant business education stakeholders. DRM materials can be adapted for small or large firms or to the challenges faced by a particular university, based on its location. Examples from universities leading in DRM business education will be valuable.
 - * A clear link between DRM and tangible business gains and losses must be shown, demonstrating that investing in resilience makes good business sense. This type of linkage is already being used with regard to sus-

tainability and long-term planning in business curricula. DRM can be introduced into other business topics including strategic decision-making, economic performance, and business opportunities.

Desired Educational Outcomes

- Curriculum development will ultimately hinge on the goals of DRM business education. Disaster risk management curricula should not only raise awareness of the issues, but also equip students with the right expertise and skill sets to become disaster risk managers.
- DRM teaching materials should prepare students to practically implement disaster risk management. This will require consensus on the basic content, common vocabulary, definitions and standards, and best practices.

Conclusion

- Each university must adapt the strategies discussed to its own particular needs and realities. It is important to retain flexibility and offer different options according to the level of change possible in each institution, while ensuring that the Sendai Framework and the needs of students and business schools serve as the basis for DRM curriculum development.
- This requires clarifying educational goals and agreeing on DRM content that is universal, standardized, easy to share, and can be adapted to each university's needs. It also requires creating sharable resources and identifying existing international initiatives to build partnerships with key players.

Discussion Topic 2. Professional Development and Extension Programs

Moderators: Indian Institute of Management Bangalore & Faculty of Economics and Business - University of Gadjah Mada

The discussion of this topic focused on the following issues:

- How to promote professional development and extension programs in disaster risk management as it relates to businesses.
- The key challenges that must be examined both from a demand- and a supply-side perspective.
- How to generate demand for professionals in the field of disaster risk management.
- How to make businesses recognize the need for DRM rather than having experts urge businesses to adopt DRM.
- How to reach small and medium enterprises (SME) so that DRM concepts are adopted more quickly.

Demand-side Measures

- Invest in creating greater awareness among businesses and professional associations on DRM issues by hiring professors/lecturers in the field; redesigning curricula; developing new (separate) DRM programs; creating executive education programs; etc.
- Explore creating a professional association to address requirements for mandatory certification and continuing education. Possibilities for areas of certification include business continuity; financial risk management; disaster recovery; etc. Business schools could provide training for existing professional designations.
- Certification training programs not only should address concepts related to DRM but also focus on solving real business problems.
- Invest in research on particular topics of interest to the business community (private and public sector) to identify needs, strategies, and appropriate technical assistance.

Supply-side Initiatives

- Create executive-level programs: non-degree programs for industry executives.
- Certification training programs for consultants should present both evidence-based knowledge as well as experiential learning that highlights best practices from industry.
- Use alumni networks of participating educational institutions and existing DRM and allied programs to promote internship opportunities as well as to seek support and collaboration for applied research on issues of importance to these organizations.
- Use alumni networks and school-industry linkages to reach SMEs.

Opportunities

- Many countries and specific sectors need professionals specialized in disaster risk management. There are significant opportunities for both academics and professional organizations, including consultants.
- Opportunities may be greatest in micro, and small and medium-size enterprises, which traditionally do not have the means to establish disaster risk management programs on their own, thus offering an opportunity to build capacity.
- Some associations or organizations are more stringent when it comes to requiring members to hold DRM certification. For example, in Indonesia, the Financial Service Authority requires that all bank management staff have risk management certification issued by the Indonesian Bankers Association (IBI). Other companies are required to hold ISO31000 or COSO if they choose to be vendors.
- Students in the University of Gadjah Mada's executive MBA program were required by the company sponsoring their studies to write their thesis on a disaster risk management problem or issue that the company had faced, a clear indication that many companies are giving growing importance to the topic.

- Universities and business schools have vast alumni networks and organizational ties that can be tapped into to create internship programs and conduct applied research.

Challenges

- The first challenge is managing the supply-side initiatives in a manner that builds credibility in the field of disaster risk management.
- Many small and medium-size enterprises operate in the informal sector and therefore may be difficult to reach.
- The number of professionals (including professors/lecturers) working in disaster risk management is still limited and the field itself is not seen as offering a solid career path.
- Some professionals view certification as simply a means to improve their career path rather than using it as an opportunity to aggressively push for the adoption of DRM in their company.

Conclusions and Recommendations

- As noted above, creating demand and managing the supply of highly qualified and industry-ready DRM professionals is a major concern. This requires concerted and collaborative action by academic institutions, industry associations and policy makers.
- Raising awareness on the part of companies, public institutions, and individuals is the key to increasing the number of DRM professionals and the disaster resilience of companies.
- The opportunities/initiatives cited in this field are within our reach and challenges will most likely be overcome or reduced once initiatives are implemented.

Discussion Topic 3. Internships and Placement

Moderators: School of Administrative Studies - York University & University of Chile

General Observations

- Through internships and placements, the private sector can provide opportunities for students and professionals to build upon and improve disaster management and managerial skills.
- Internships and placements—such as the academic exchange of scholars, PhD candidates and post-doctoral positions—can create research development opportunities.
- They support a cross-fertilization of ideas from a more regional-global perspective on topics related to disaster risk management in business, rather than from a narrower, country-specific perspective.

- As interns or researchers work with public institutions, companies, the economic sector in general, or others to address disasters risks, they will also put their knowledge into practice to develop innovative solutions to stakeholders' challenges.
- With regard to internships and placements, both businesses and business schools should explore the options that work best for them, considering aspects such as course development; roles and responsibilities of different stakeholders; paid versus unpaid internships; field placements, and monitoring and supervision.

Opportunities

- Students, universities, and public and private organizations are interested in this issue. Students appreciate the importance of real world experience. Businesses and organizations are interested in receiving help and fresh ideas on DRR and business continuity, while helping students to learn in practice. Universities are allocating greater resources for experiential learning.
- Look to local opportunities and global possibilities. Although local economies have specific challenges related to natural disasters, there is a growing synergy between global networks of universities and global bodies, such as UNISDR and ARISE, which may be enlisted to share innovative methods to address local challenges.
- Alumni are a strong asset for universities and colleges when it comes to placements and internships. As York University's experience has shown, the extension and growth of a network of firms offering internships was strengthened, thanks to alumni and the positive experiences their firms witnessed.

Challenges

- Bureaucracy can be a major challenge. Compared to regular university courses, creating and implementing field placement and internship courses is very challenging and requires dedicated faculty, university resources, and interested local and national businesses. It also involves multiple levels of paperwork on both sides.
- Field placement and internship courses may require insurance coverage that can be provided by the government, university or host organization. Governments normally insure mandatory field placement. Therefore, it might be easier to make these courses mandatory when sufficient opportunities are available.
- Depending on the company and/or country, paid internships and placements may be the only option. Some unions do not support unpaid internships in their institutions. Since paid internships are very limited, this creates a major obstacle for potential host companies.

- The evaluation of courses may be limited to self-reporting by students and the evaluation of field supervisors. A lack of commitment on the part of field supervisors or firms/agencies may affect the evaluation of the experience. Addressing this challenge requires close collaborations between the university and field placement supervisors.
- Unlike conventional curricula, the added course load for faculty members may be challenging.
- Identifying a diverse range of field placement positions is challenging and may be overcome with time by creating a network of interested institutions.
- Based on the experience of York University, businesses have demonstrated interest in placing recently graduated students or those pursuing an advanced degree. While this is an opportunity for some, it poses a challenge for undergraduate students.

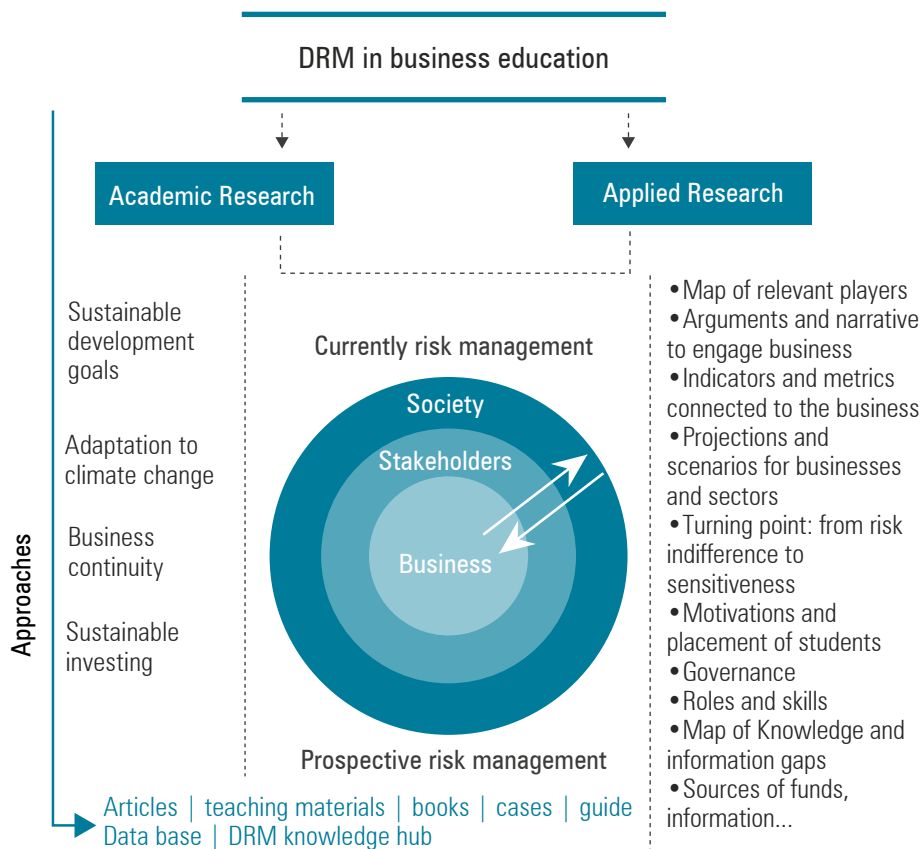
Conclusions and Recommendations

- Internships and field placements provide valuable opportunities for both students and organizations to enhance disaster risk management and business continuity education as well as practice.
- Field placements (such as those arranged by York University) reveal substantial bilateral benefits associated with experiential education courses.
- Local, regional, national, and international agencies should encourage their private sector partner agencies to create internships and field placements for students in the areas of disaster risk management and business continuity.
- There is a need for better ways to enable small and medium size businesses to benefit from internships and field placement opportunities. Business schools may consider creating student-led business continuity and DRR consultancy firms to enable students to provide support to small and medium-size businesses that are unable to accept internships or field placement.
- Consider creating or adapting existing tools to support SMEs—as they develop plans and projects—to reduce their exposure to natural risks disasters.
- Business and industry associations can serve as a bridge between businesses and universities to create field placement and business continuity and DRR opportunities.
- Universities and national and international agencies should recognize participating businesses for their involvement and for providing such opportunities.
- The perspective of learning-by-doing should underpin all internships and placements.
- Stakeholders must work together to overcome institutional challenges that affect the development and outcomes (case studies, availability of information, tools) of internships and placements.

Discussion Topic 4. Research Opportunities

Moderator: Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo (FGV-EAESP)

The diagram below, prepared below by the Center for Sustainability Studies at the Getulio Vargas Foundation, School of Business Administration, served as a point of reference for the discussion on research opportunities.



Opportunities

- Research on the impact of disasters, particularly with regard to the financial cost, as it is very hard to come by. This is a common problem in most countries. It would be advantageous to engage in collaborative research on the impact of disasters on businesses, as soon as possible after the event. Research outcomes will yield realistic and convincing arguments for companies to adopt a DRM perspective.
- Produce a publication, or more than one, that includes an introduction about disaster risk management in business education; evidence-based information

that supports the case for for this synergy; and the white papers and case studies developed. Participants recognize that an undertaking of this magnitude presents a significant challenge that will require external funding.

- Collaboratively, develop a survey to be given to students taking DRM courses in the universities participating in this workshop. Apply the survey before each course to understand their initial interest in DRM. A follow-up survey would gauge how they applied their improved knowledge. Results would point to areas of potential comparative research, such as comparisons between students from different countries; between similar courses (what interested a student in this particular course); and between different courses (e.g., DRM in climate change-related courses vs. DRM in business continuity courses).

Challenges

- To address the challenge of a disconnect between teaching the theory of DRM in business education courses and real issues in the business world, identify several key disciplines in business schools into which DRM could be mainstreamed. This will also help overcome the scarcity of research opportunities and topics and advance DRM from a purely theoretical issue to a field of practice.
- Another challenge is deciding the type of journal in which to publish DRM research—whether a standard business journal or a journal related to sustainability, ethics or corporate social responsibility. For example, an analysis of DRM through the lens of adaptation could be published in a journal focusing on climate change, while a similar analysis, but from business competitiveness perspective, could be published in a management journal.
- Funding is an important challenge related to research development, particularly complex research. Researchers must consider the trade-offs between available resources (e.g., time, staff) and the products to be created. Doing one thing well is preferable to doing many things superficially. To address the challenge of funding, develop a collaborative proposal and seek funding from interested countries/businesses.

Conclusions and Recommendations

- In the short term, the first steps may be a) to develop an article about the impact on and losses to a business as a result of a disaster and b) prepare the survey for students taking DRM courses at participating universities. A longer-term objective would be to prepare a publication as mentioned in the section on opportunities.
- A next step is to create a network of participating universities to prioritize the issues identified as opportunities in this forum, and seek funding for further research related to DRM and business management.

Discussion Topic 5. Partnerships and Collaboration

Moderators: ESAN Graduate School of Business & Mona School of Business and Management - University of West Indies

The group identified three levels of partnership, each presenting different concerns and possibilities.

1. There is the potential to identify partners and opportunities for collaboration in networks of business schools, with leadership from Florida International University and support from UNISDR (Private Sector Alliance for Disaster Resilient Societies). Another possibility is an international observatory, which could provide evidence on innovative DRM trends in business and industry, as well as their impact on the economy and society.
2. There are potential partners and collaborators within university systems, upon whom the successful inclusion of DRM will depend. These include university administrators, lecturers/trainers, students, and university bodies conducting research on disaster risk management.
3. There are potential partners external to university networks, including stakeholders whose practices can and should be modified to encompass DRM. Among these are businesses, governments (their perception of the place of business in DRR and the role they might play in DRR policy planning and implementation), and national organizations dealing with hazards.

Opportunities for partnerships include:

- Internships;
- Networking;
- International Observatory;
- Research;
- Shared experience;
- Developing case studies.

The Getulio Vargas Foundation (Brazil) and Concordia University (Canada) highlighted the importance of partnerships in their programs. However, the network must identify the goals and objectives of developing partnerships to mainstream DRR; what resources are required; the existing capacity; and outstanding needs.

Specific, Immediate, and Long-term Opportunities

- Publish the White Papers prepared for this workshop on the UNISDR website.
- Publish a book on disaster risk management and business using the White Papers and the discussions at the Toronto meeting.
- Create a partnership, led by Concordia and York Universities, to develop a proposal to fund research by the end of 2016.
- Convene panel discussions for upcoming academic conferences:

- * Mona School of Business & Management Conference. Kingston, Jamaica, 9-11 November 2016
- * Academy of International Business Conference. Lima, Peru, 8-10 March 2017.
- Form a partnership, led by York University, to conduct research on post-disaster response.
- Develop case studies and other content for DRM curricula. Partners can focus on specific themes according to their area of expertise. The Sendai Framework for Disaster Risk Reduction may serve as a guide.
- Partner with Florida International University to deliver DRR training to SMEs.
- Create visiting research fellowships to exchange expertise.
- Include business and professional associations as part of the network's programs and activities; they have greater access and the ability to reach companies, especially SMEs.
- Call on the extended business community to lead the process. This includes engaging groups that are not necessarily businesses but suppliers or clients in order to influence behavior change among businesses.
- Learn from each other's experience (e.g. York University, regarding the development of new curricula; Brazil's experience with a climate approach; Indonesia's executive development program, etc.).
- Engage existing organizations that produce technical information on DRR to avoid duplication. Use databases such as the international disaster database EM-DAT (University of Louvain, Belgium). The UNISDR has improved its database, soon to be re-launched on the Prevention website. These existing resources and organizations should be seen as resources to be accessed and utilized where necessary.
- Partner with international development agencies and the U.N. in the development of material (via ARISE), such as case studies; development of topics, and the identification of subject matter experts.
- The network of business schools could partner to arrange a parallel workshop at the 2017 Global Platform for Disaster Risk Reduction, to be held in Cancun, Mexico.

Challenges

- Begin by determining if the institutions participating in this workshop constitute a network. Identify the next steps to taken.
- Clearly define goals and assign coordinators/owners to tasks.
- Overcome funding difficulties.
- Recognize that the time available to develop activities and collaboration among participants is limited.
- How to create demand on the part of students and professionals to participate in DRM courses.

- How to achieve change within existing university systems that is conducive to creating or modifying programs.

Conclusions and Recommendations

- Call on the extended business community to lead the process.
- Use the experience of institutions that have already tackled some of the challenges.
- Win over partners and collaborators by demonstrating tangible results and providing incentives for others to join:
 - * To funders such as ARISE: the Toronto Workshop, the White Papers; the Emerald publication.
 - * To the private sector – demonstrate the benefits and opportunities inherent in DRR.

DISASTER RISK MANAGEMENT IN BUSINESS EDUCATION: AREAS OF FOLLOW-UP

Moderator: Universidad EAFIT

Teaching Opportunities and Curriculum Development

Goals

- a. Co-create and/or co-develop teaching materials in DRM for business-related programs.
 - Activities:
 - * Design and share potential course outlines.
 - * Write teaching cases on business successes/failures in DRM.
 - * Develop technical modules on standardization for DRM (e.g. training in ISO 22301).
 - * Design technical courses on disaster preparedness, such as business survival in a non-technical environment.
 - * Design specific, stand-alone modules to be integrated into existing courses on strategy management, sustainability management, operations management, risk management, CSR, and business ethics.
- b. Promote business start-ups.
 - Activities:
 - * Design and implement a business case competition.
- c. Integrate experiential learning in DRM in business education.
 - Activities:
 - * Design DRM simulation exercises to be used in the classroom.
 - * Design board games inspired by the Celsius game, designed by FGV.
 - * Adapt/reproduce the business continuity planning tool developed by York University.

d. Integrate service learning in DRM in business education.

- Activities:
 - * Class projects for students doing junior-level consultancies in SMEs and community based organizations.

Professional Development and Extension Programs

Goals

- a. Identify specific skills and competencies needed for disaster risk management.
- b. Create a job market in business for those with specific skills and competencies in DRM.
 - Activities:
 - * Develop a “recruiter buy-in” package.

Internships and Placement

Goals

- a. Facilitate faculty and student exchange programs for participation in courses/ initiatives in universities with a specialized knowledge of DRM.
- b. Replicate the model of in-service learning based on the *pasantia* (short-term internship) from FIU.

Research and Publications

Goals

- a. Identify the ‘business case’ for disaster risk management.
 - Activities
 - * Identify the value proposition of DRM.
 - * Identify specific competitive and comparative advantages of DRM.
- b. Map the players, existing sources, and define the state-of-the-art in DRM.
 - Activities:
 - * Conduct a meta-analysis /systematic literature review on DRM.
 - * Prepare an inventory of non-academic literature.
- c. Develop a critical review and understanding of DRM in business and business resilience.
 - Activities:
 - * Define what constitutes a resilient business.
 - * Identify when resilience can be positive/negative.
 - * Identify mechanisms to measure the impact of resilience.
- d. Prepare arguments and a narrative to engage small, medium and large companies in DRM.
 - Activities:
 - * Identify the indicators and processes of companies that should be associated with DRM.
 - * Determine the metrics to be calculated to present to business leaders.
 - * Understand which projects and scenarios make sense for key sectors.

- * Identify leaders in different sectors that can ‘champion’ the initiative and mobilize their colleagues.
- e. Expand knowledge boundaries
 - Activities:
 - * Identify similarities/differences between the fields of strategy management, risk management and sustainability management.
- f. Advance existing literature and reach out to other industries.
 - Activities:
 - * Advance the academic literature on real option analysis in the field of DRM (find applications to industries other than oil and gas).
 - * Build a body of literature on prospective risk management.
- g. Develop evidence-based research on business and DRM.
 - Activities:
 - * Identify or write business case studies on the successes/failures of DRM. (i.e. institutional reaction to the hurricane Patricia in Mexico; supply chain management in disasters in Japan; small islands’ response to disasters in Jamaica; oil and gas in Indonesia, etc.).
- h. Diagnosis of the international status of DRM in business education.
 - Activities:
 - * Conduct a survey in business schools that are already part of the network.
- i. Publish White Papers developed for this workshop in an indexed/peer-reviewed publication.
 - Activities:
 - * Adapt White Papers to the requirements of the publisher (referencing style, number of references, structure, abstract, word count, etc.).
- j. Highlight the important of the local context, regional realities and global trends.
 - General recommendations:
 - * Frame initiatives around specific local contexts. Take into account regional institutional realities and background, and global trends.
 - * Provide contexts that would increase understanding of local dynamics and implications of disasters on business. (“What might be a local emergency in one country, may constitute a national catastrophe in another, dramatically affecting the GDP.)
- k. Identify key research questions/focuses.
 - Questions and Themes:
 - * Business governance of DRM.
 - * Climate change and DRM.
 - * Integration of DRM into the international agendas on sustainable development or climate change/adaptation.
 - * Implementation of the Sendai Framework agreement in the business sector.
 - * DRM in the informal sector.
 - * DRM in SMEs.

- * DRM in business education in the framework of Principles for Responsible Management Education.
 - * What constitutes a turning point from risk indifference to risk sensitivity?
 - * Motivations and placement of students.
 - * Governance.
 - * Roles and skills.
 - * Map of knowledge and information gaps.
- l. Mini-grant for evidence-based case studies of successes/failures of business approaches to DRM.
- Questions and Themes:
 - * Business governance of DRM.
 - * Climate change and DRM.
 - * Integration of DRM into international development agendas.
 - * Implementation of the Sendai Framework agreement.

Partnership and collaboration

Goals

- a. Establishing a business education community of practice (CoP) on DRM.
- Activities:
 - * Create a formal academic network on DRM in business education, focused on the implementation of the Sendai Framework 2015-2030.
 - * Identify engagement mechanisms with SMEs, policy makers, and other strategic users.
 - * Identify ‘champions’ to move the DRM agenda FORWARD: Alumni, chambers of commerce, local governments, PPP, university-university partnerships, university-industry-governments alliances.
- b. Hosting local/national workshops/public events to multiply the interest and knowledge on DRM for SMEs, and supply chains.
- Activities:
 - * Design a three-day agenda for a parallel academic event during the 2017 Global Platform for Disaster Risk Reduction in Cancun, Mexico.

ANNEX 1. WHITE PAPERS ON ISSUES RELATED TO DISASTER RISK MANAGEMENT

Concordia University, John Molson School of Business

Kibsey, S. and Walker, T. [Research and Teaching on Disaster Risk Management through the Sustainable Financial and Economic System Knowledge-to-Action Network at Concordia University.](#)

Getulio Vargas Foundation, Center for Sustainability Studies

Vendramini Felsberg, Annelise; Casagrande Rocha, Fernanda; Ramos, Ligia; Nicolletti, Mariana Xavier; Camolesi Buimaraes, Thais. [Adaptation to Climate Change and Disaster Risk Management in Business Education.](#)

University of the West Indies, Mona School of Business & Management

Minto-Coy, Indianna; Rao-Graham, Lila. [Mainstreaming Disaster Risk Management into Management Education.](#)

Gadjah Mada University

Setiawan, Kusdhianto. [Mainstreaming Disaster Risk Sensitive Investment Decision Making Analysis in Gadjah Mada School of Business using Real Options Method.](#)

Universidad EAFIT

Herrera-Cano, Carolina; Gonzalez-Perez, Maria Alejandra. [Disaster Risk Management in Business Education Entrepreneurial Formation for Corporate Sustainability.](#)

ESAN University, Graduate School of Business

Dejo-Esteves, Cecilia; Parodi-Parodi, Patricia. [Disaster Risk Management in Business Education: Proposal to Integrate DRM into Academic Programs.](#)

Florida International University, Extreme Events Institute

Sarmiento, Juan Pablo; Hoberman, Gabriela; Jerath, Meenakshi; Ferreira-Jordao, Gustavo Florida. [Disaster Risk Management and Business Education: the Case of Small and Medium Enterprises](#)

Indian Institute of Management Bangalore

Jose, P.D. [Sustainability Education in Indian Business Schools: A Status Review.](#)

Monterrey Institute of Technology and Higher Education, School of Business

Villasana, Marcia.; Cardenas, Bertha E.; Adriaenssens, Marianela.; Trevino, Ana Catalina; Lozano, Jorge. [The Case of the School of Business at Tecnológico de Monterrey.](#)

University of Chile

Munoz-Gómez, Leonardo. Business Education and Sensitization for Disaster Risk Management in Chile.

University of Toronto

Tilcsak, András. Teaching Disaster Risk Management at the Rotman School of Management

York University

Asgary, Ali. Mainstreaming Business Continuity Management in Business Education: Why and How Case of York University.

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ANEXO 2. Continuation

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DISASTER RISK MANAGEMENT IN BUSINESS EDUCATION ENTREPRENEURIAL FORMATION FOR CORPORATE SUSTAINABILITY

GESTIÓN DEL RIESGO DE DESASTRES EN EDUCACIÓN DE NEGOCIOS: FORMACIÓN EMPRENDEDORA PARA LA SOSTENIBILIDAD CORPORATIVA

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ABSTRACT

The purpose of this paper is to show the importance of business education in Disaster Risk Management (DRM). This paper aims to evaluate the awareness level of the Master in Business Administration's (MBA) students regarding the importance disaster risk management (DRM) plays. This paper develops a literature review concerning the concept of disasters, Disaster Risk Management, Disaster Risk Reduction, and the role of MBA programs. Furthermore, a survey at Universidad EAFIT (Medellin, Colombia) was designed and implemented as primary source information with the purpose of showing the DRM awareness level of MBA's students. Finally, a case study connecting DRM with entrepreneurship formation is described. This paper identified a limited formal education in DRM Latin American MBA programs, and specifically at Universidad EAFIT. Additionally, a lack of awareness in MBA's students about the importance of DRM was identified. In this sense, the paper proposes a DRM education model that uses a Corporate Social Responsibility (CSR) and entrepreneurial formation in business education. This study aims to show the importance of the inclusion of disaster risk reduction and management knowledge as part of the courses in: Corporate Social Responsibility (CSR), Sustainability, and Entrepreneurship content in Masters in Business Administration (MBA) programs.

KEYWORDS

DRM; business continuity; MBA; Business Schools; Business education; CSR; sustainability.

RESUMEN

El propósito de este artículo es mostrar la importancia de la educación de negocios en la Gestión del Riesgo de Desastres (GRD). Este artículo busca evaluar el nivel de consciencia de los estudiantes de la Maestría en Administración (MBA) con respecto a la importancia de la gestión del riesgo de desastres. Este estudio desarrolla una revisión de la literatura sobre los conceptos de desastres, Gestión del Riesgo de Desastres, Reducción del Riesgo de Desastres y el rol de los programas de MBA. Además, como información primaria, se diseñó e implementó una encuesta en la Universidad EAFIT (Medellín, Colombia) con el propósito de mostrar el nivel de consciencia en cuanto a la GRD de sus estudiantes del MBA. Finalmente, se describe un estudio de caso que conecta la GRD con la formación emprendedora. Este artículo identificó una limitada educación formal en GRD en los programas de MBA de América Latina, y de manera específica, en la Universidad EAFIT. Adicionalmente, se reconoció una falta de consciencia en cuanto a la importancia de la GRD en los estudiantes del MBA. En este orden de ideas,

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este artículo propone un modelo educativo de GRD que utiliza la Responsabilidad Social Empresarial (RSE) y la formación emprendedora en la educación de negocios. Este estudio busca mostrar la importancia de la inclusión de conocimientos en reducción y gestión del riesgo de desastres como parte de los cursos y contenido de Responsabilidad Social Empresarial (RSE), Sostenibilidad y Emprendimiento en los programas de Maestría en Administración (MBA).

PALABRAS CLAVE

GRD; continuidad de negocio; MBA; escuelas de negocios; educación de negocios; RSE; sostenibilidad.

INTRODUCTION

Recent increases in the population, urbanization levels, and climate change have increased the awareness level of international organizations' concern for the need to advocate for a comprehensive and integrative approach to Disaster Risk Management (DRM). Disaster risk management (DRM) has gained greater importance as economic, social and environmental losses arising from disasters have grown dramatically since the 1990s. A variety of organizations have become aware of the need to promote the integration of initiatives based on the collaboration of diverse stakeholders. The United Nations (UN), through its Office for Disaster Risk Reduction (UNISDR), has implemented several initiatives on this topic. Its concerns have also been addressed in the Global Assessment Report (GRA), a biennial global assessment of disaster risk reduction and comprehensive review and analysis of the natural hazards that are affecting humanity. Additionally, UNISDR and Pricewaterhouse Coopers (PwC), together with other public and private sector organizations around the world, including The Economist Intelligence Unit (EIU), Florida International University (FIU), UN supported Principles for Responsible Investment (PRI), AECOM and Willis, have joined to create the RISE Initiative which seeks to make all investments risk-sensitive.

These efforts will be aimed at reducing global disaster mortality, the number of affected people, economic losses, and disaster damage to infrastructure while promoting the implementation of disaster risk reduction (DRR) strategies globally and enhancing international cooperation. The need to raise awareness and knowledge about disaster risk management (DRM) and disaster risk reduction (DRR) in the business environment demands action from those involved with business education. The role of educational institutions will be crucial due to the importance of knowledge generation and its influence over society as a whole. More specifically, for this analysis, business education, in its mission to educate future managers, does not only have a responsibility with the production and imparting of knowledge, but also has a direct effect on how private organizations work. The paper aims to highlight the importance of DRM education in business schools, particularly the role of Masters in Business Administration (MBA) programs in contemporary corporate agendas from both the Corporate Social Responsibility (CSR) and Sustainability perspectives. This analysis will explore the need to raise the level of concern in disaster risk management in business education, and consequently, in private organizations.

It is likely that the discussion of disaster risk management will increasingly gain relevance given the 2030 Development Agenda. The Sendai Framework adopted in March 2015, “the first major agreement of the post-2015 development agenda” has created awareness of the need to reduce disaster risk through a collaborative approach. This is also consistent with current academic literature that supports the idea of a paradigm shift in how disaster risk management is addressed. Different scholars (Al-Nammari & Alzaghal, 2014; Chitakornkijasil, 2010; Henstra & McBean, 2005) discuss the importance of adopting a proactive model to replace the reactive perspective which has predominated. According to UNISDR (2015a) the only possible way to come up with proactive actions, with capacity building and value added solutions in the imminent context of disaster, is to see responsibilities as common objectives of different actors within society. Responsibility for the Seven Global Targets proposed in 2015 during the Third UN World Conference on Disaster Risk Reduction (WC-DRR) should be shared among multiple stakeholders including local government, the civil society in general, and the private sector.

Within this context, two important stakeholders emerge based on their ability to transform the way human society works today. These are private organizations and educational institutions. In the case of companies, the 2013 Global Assessment Report (GAR), draws attention to the role of private organizations in disaster risk management. Previous editions of the GAR focused predominantly on policy and decision-makers in governmental institutions. The 2013 edition brought the disaster business case to corporate agendas with its theme “From Shared Risk to Shared Value: The Business Case for Disaster Risk Reduction”, and it aims to show the challenges and opportunities for businesses in a hazard-prone environment. According to the 2013 GAR: “disaster risk management reduces uncertainty, builds confidence, cuts costs and creates value” (UNISDR, 2013, p. iii). In the case of educational institutions, they will be decisive actors in a post-2015 scenario because education has the potential to promote structural changes in society.

Based on the role that business education plays, it emerges as an important tool in 2030 development agenda, and the overall disaster risk management development strategies for companies. Business schools have both the potential to transform individuals, as well as how the business environment works. It has been said that business education is responsible for training future managers, and consequently it is important to identify the extent to which Master in Business Administration (MBA) programs are responding to current needs in terms of disaster management.

LITERATURE REVIEW

Disaster Risk Management

Since the 1990s, losses arising from natural disasters have continuously grown both in developed and developing countries (Courbage & Mahul, 2013). The United Nations Office for Disaster Risk Reduction has calculated in its last Global Assessment

Report on Disaster Reduction (GAR) (UNISDR, 2015b) that economic losses resulting from disasters like earthquakes, tsunamis, cyclones, and flooding are now reaching an average of US\$250 billion to US\$300 billion each year. Disasters are becoming an increasing concern not only for international organizations and governments, but also for the society in general. UNISDR (2016) defines a disaster as a “serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.” Additionally, disasters are commonly described as a result of the combination of the exposure to a hazard; vulnerable conditions; and insufficient capacity to reduce or cope with the negative consequences of the event (UNISDR, 2016). On one hand, natural disasters are catastrophic events that originated from natural causes such as volcanic eruptions, tornadoes, earthquakes, etc., over which man has no control; they are often termed “Acts of God”. On the other hand, man-made disasters, are those disastrous events caused by human action or decisions. They tend to be related to structural collapses, transportation accidents, international or national conflicts, and terrorism (Shaluf, 2007).

Some other definitions from academic studies include an event in which one or more of the following consequences occur over a relatively short period of time: (i) ten or more fatalities, (ii) damages for more and USD 1 million, and (iii) 50 or more people evacuated (Keller & Al-Madhari, 1996). Similarly, Shaluf (2007) argues that it is a sudden disruption of the functioning of a given society which causes widespread human, material or environmental losses. Shaluf also cites the Center for Research on the Epidemiology of Disasters’ (CRED) (2003) criteria in order to define disasters: 100 or more people affected, a call for international assistance, and a declaration of a state of emergency. Rautela (2006, p. 802), defines a disaster as “a state of extreme ruin and misfortune that leads to the breakdown of the social fabric” in which the affected community’s recovery is difficult to reach, and usually needs external assistance. Finally, public health disasters have been defined as destructive events that result in the need for a wide range of emergency resources, to assist and ensure the survival of the affected population (Geale, 2012).

According to the United Nations Development Programme (UNDP) disasters can not only reverse economic growth, but also restrict advances in poverty elimination, and environmental sustainability (UNDP, 2016). Given this position, UNDP has drawn international attention to the importance of reducing risk as part of national governments’ development plans: “Every dollar spent on preparing for disasters saves around seven dollars in economic losses.” Risk assessment is the process of the identification, quantification and characterization of threats to human health and environment (Vatsa, 2004). Consequently, disaster risk reduction (DRR) has gained visibility and importance as a way to achieve better results and foster change that helps society to be resilient to risks (Ishiwatari, 2010) or in the words of Geale (2012): to alleviate human suffering. Al-Nammari & Alzaghaf (2014) emphasize how DRR

comprises the systematic development and application of policies, strategies and practices to avoid or limit the adverse effects of hazards. UNISDR (2007) sees DRR as “the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters.” This process includes reducing exposure to hazards, and managing the vulnerability of people and property, as well as dealing with the use of land and the environment. Finally, UNISDR (2016) highlights the importance of reducing exposure to hazards, lessening the vulnerability of people and property, wisely managing land and the environment, and improving preparedness and early warning for adverse events as effective measures in DRR.

Disaster Risk Management (DRM) comprises mitigation, preparedness, response, and reconstruction (or recovery) (Madu & Kuei, 2014; O’Brien, O’Keefe, Gadema & Swords, 2010), and it involves a range of policies and practices developed to prevent, manage, and reduce the impact of disasters (Henstra & McBean, 2005). Salter (1997) argues the main objective of DRM is to guarantee the reduction of the community’s exposure to major risks. This perspective is consistent with the “paradigm shift” described by Henstra & McBean (2005) in which there is an increasing consensus in the international arena on a move from a reactive response to more proactive disaster management including mitigation and risk reduction. This concept has been described by Chitakornkijasil (2010) as a shift from an offensive line towards an earlier stage which tackles the problem at its source, and by Al-Nammari & Alzaghal (2014) as a way to turn disaster management into an integrated approach that combines it with development activities. Alexander, Chan-Halbrendt & Salim (2006) describe the evolution in disaster management as a shift to an integrated and overall dynamic sustainable development for sustainable capacities they lack.

Such an approach has been described as Integrated Disaster Risk Management (IDRM): a process which comprehensively estimates and manages risks from synergies created through different procedures and institutions (Amendola, Linneroath-Buyer, Okada & Shi, 2008). Bildan (2003) discusses the effective coordination of knowledge and action from multiple organizations in the processes of prevention, preparedness, and mitigation phases of disaster management as effective tools in reducing lives and property losses. Gall, Nguyen and Cutter (2015) also promote interdisciplinary efforts and perceive the coordination, with the international organizations as one of the main actors, as a collaborative model reflecting holistic interpretations and actions and not a mere “sum of all the parts.”

The international concern about disaster risk management has been present since 1990s, when UNISDR (1994) hosted the World Conference on Natural Disaster Reduction, held in Yokohama, Japan. The strategies and plan developed at this conference provided important guidelines for natural disaster prevention, preparedness and mitigation, and served as a framework for DRM during International Decade for Disaster Reduction. In 2005, the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA) replaced the Yokohama Framework. This action plan described and detailed the work that would be

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required from all the different sectors and actors to reduce disaster losses (UNISDR, 2016). This framework aimed to ensure that disaster risk reduction was a national and a local priority with a strong institutional basis (Amendola et al, 2008). A number of authors identified the initiatives needed to reach cooperation between public and private sectors with the facilitation of the international community (Rautela, 2006). These initiatives have also been promoted by the Sendai Framework for Disaster Risk Reduction 2015-2030 signed in 2015. The Sendai Framework is a 15-year, voluntary agreement which recognizes that the State has the primary responsible to reduce disaster risk but it also highlights that responsibility should be shared with other stakeholders including local government and the private sector (UNISDR, 2016).

Disaster Risk Management in Business Education

Historically, higher education has been perceived as a crucial stakeholder in society's transformation. For the case of DRM, there has been an effective coordination between different fields of knowledge including engineering, health sciences, technology, and at some point, economics. For the Latin American case, a universities' network has worked together using knowledge and best practices from different fields with the purpose of providing solutions for the most vulnerable populations in the region. Redulac is the *Latin America and the Caribbean University Network for Disaster Risk Reduction* which works with different educational organizations in 17 countries in the region, and which highlights the great responsibility the higher education sector plays a role in addressing the problems associated directly or indirectly with the issue of risks and disasters in the region and the world. This organization works with the support of the United States Agency for International Development (USAID). This institution recognizes its role in the search for possible solutions to the causes of disasters, and the need to play a more proactive role aimed not only in the prevention and reduction of natural hazards, but the promotion of recovery and resilience instruments within a sustainable framework (Redulac, 2016).

The UNISDR (2012) has recognized the importance of this Latin American initiative and the convening of the Latin American Forums on Disaster Risk Reduction in Higher Education which have taken place in Panama City, Panama in 2012, and in Bogota, Colombia, in 2014. The great contribution of this network, in the words of UNISDR (2012) is the continuation of its efforts during recent years in the promotion of the institutionalization process of disaster risk reduction in educational institutions in Latin America, using the power of higher education to transform not only the society, but the complete educational system including preschool education and basic education in general. The academic offer by Redulac includes academic programs in risk management, disaster risk management, emergency care, environmental studies, public health, and disaster prevention, which operate within health, development, engineering, environmental, and social sciences schools. However, for the case of the present proposal, it becomes apparent that there exists an ineffective component inherent in the inclusion of business schools in this network. In

the following section, some academic support regarding the need to both integrate managerial skills and knowledge to the disaster risk management discussion, and promote a disaster-conscious education in higher business education is presented.

The role of business education in disaster risk management comes from its ability to transform communities and to generate capacities. Although fields like engineering, science and technology have traditionally been the leaders in innovations and processes in disaster management. Due to this fact, there has not been an effective inclusion of business education in capacity building for mitigation, preparedness, response, and reconstruction for disasters. Additionally, the fact that professional managers, especially Masters in Business Administration (MBA), will become decision-makers and important actors in the private sector; and consequently in the whole society. "The fundamental mission of business schools is to train the future generation of managers. As part of education process, business schools strive to prepare managers to lead changes in their organizations" (Almog-Bareket, 2011, p. 1600). Moreover, MBA students are commonly perceived as the future managers of the corporate world stakeholders (Jain, Datta, & Roy, 2014), and are now considered to be "among the most influential mechanisms for preparing future business leaders" (Hart, Fox, Ede & Korstad, 2015, p. 721).

This demonstrates not only the relevance of business education for the private sector, but for the society as whole. If topics dealing with development are not in the mind-set of managers, it will be very difficult to undertake the collaborative actions between private sector companies and other organizations, that DRM demands. In the same way it has been done with CSR, by engaging MBA students in disaster risk management concerns, they can make companies understand their responsibility towards stakeholders (Jain et al, 2014). In this sense, disaster risk management can actually become part of the CSR and sustainability agenda of private companies, as it can be used to respond to stakeholders' interests. In fact, this cannot only turn into a social need, but as has happened with CSR and sustainability, it could become a requirement for MBA students: "as CSR becomes increasingly important for success in the business world, business students increasingly expect CSR to be an important part of MBA programs" (Hart *et al.*, 2015, p.715) Consequently, CSR and sustainability in the context of business education are becoming both a way to respond to today's business environment, and as an effective differentiator for those MBAs that offer this content (Rubin & Dierdoff, 2009). As stated by Rubin & Dierdoff (2009), as educational institutions should drive their curriculum design responding to actual managerial requirements and to relevant challenges in the current corporate context, there is an increasing need to integrate DRM as part of the MBAs educational programs.

METHODOLOGY

This paper addresses the question of the role of managerial education in DRM. This paper primarily relies on secondary, publicly-available information to develop a literature review concerning the concept of disasters, Disaster Risk Management, Di-

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saster Risk Reduction, and the role of MBA programs. Different academic studies and *América Economía's* ranking were also used as secondary sources. Additionally, for this study, a survey was designed and implemented to provide primary information to describe the case of Universidad EAFIT's MBA. Finally, some conclusions are drawn for the case of business education in DRM.

After presenting the importance business education plays in the promotion of a disaster risk management consciousness, some figures about DRM in business schools, specifically in MBA programs are presented. *América Economía*, the Latin American magazine which analyzes the business, economics, and finance of the region, had developed the MBA Ranking with the purpose of identifying the best business education schools in the region. In 2015, *América Economía* highlighted the role of 35 MBA programs in the region by measuring their academic strength, knowledge production, internationalization, and the power of its network (this evaluates the current positions of MBA graduates). Mexico, Chile, Brazil, and Nicaragua and Costa Rica are in the top of this list with Egade Business School, Universidad Adolfo Ibáñez, FGV- EAESP, INCAE, and Universidad de Chile. This means, following Almog-Bareket (2011) and Jain, Datta & Roy (2014), these educational institutions will have an important impact in Latin American companies, while training their future managers (América Economía, 2015).

FINDINGS

As has already been mentioned, there is a need to integrate managerial skills and knowledge into the disaster risk management discussion, while promoting a disaster-conscious approach in higher business education. However, when reviewing the academic programs of *América Economía's* ranking it is difficult to identify specific content on disaster management. Consequently, and with the objective of proving a proposal based on Universidad EAFIT's case, this paper evaluated its MBA program, and MBA students' knowledge about disaster risk management. In this sense, this evaluation will be useful in understanding if the current business education program promotes DRM as part of their training priorities and if DRM current students are aware of DRM as an organizational challenge. Universidad EAFIT is in position 24 in *América Economía's* MBA ranking. EAFIT's *Maestría en Administración* was the first MBA program in Colombia; and actually its host business school was the first one in the country. The MBA was born in 1973 in response to the need for educating current and future managers and decision makers in Colombia. As of March 2016, the program has 215 students in a variety of cities in Colombia including Medellín, Bogotá, Pereira, and Armenia. It also has foreign operations in Guatemala. Currently, disaster risk management is not part of the curriculum, although some concepts of risk management are addressed in different courses. In this sense, our hypothesis is that MBA students are not familiar with the concept, and if they are, this knowledge has probably not been acquired through their formal education.

The survey used, evaluated a total of 64 students, which represents almost 30 percent (29.76%) of the total population, and shows the awareness of Universidad EAFIT's MBA students in terms of disaster risk management. In general terms, it is possible to observe that the majority of the students are not familiar with the concept of disaster risk management (DRM): a total of 60.9% of the population (39 students) answered "No" to the question: "Are you familiar with the concept of Disaster Risk Management?" (Appendix 1 contains charts 1 and 2 with the results). This finding shows a lack of DRM knowledge within MBA students. Furthermore, when asking those who answered "Yes" about how they knew about DRM, 76% confirmed they were familiar with disaster management because their current job was connected in some way with DRM, 16% agreed they knew of the concept because of job training they had received. Primarily, these sectors include: Insurance, Banking, Construction, and Consultancy. Finally, only one student (4%) mentioned "Education" as the reason for knowing about DRM. It is possible to conclude that MBA students at Universidad EAFIT are not well instructed about DRM concepts, and disaster risk education usually comes from the work environment.

Based on the fact that the MBA program does not give specific instruction on disaster management, the survey also aimed to identify the relevance that students would give to DRM as a potential change to the curriculum. Accordingly, the survey asked students: "How important do you think it would be to include DRM content in your MBA curriculum?" In this question, the sample had to decide between five options which defined the level of importance they assigned to the matter: Extremely Important, Important, Moderately Important, Somewhat Important, and Not Very Important. However, results in this question are not as significant: almost a third of the population (33%) considers "Moderately Important" the inclusion of DRM content in the academic program, while option "Not Very Important" was selected by 16% of the population, and "Somewhat Important" and "Important" were both chosen by an equivalent of 20% each. Finally, only 11% of the sample (5 students) considered DRM as an "extremely important" element in their MBA curriculum. To summarize, most of the students do not consider DRM to be a crucial skill in their business education, and more importantly, only a few think it should be a priority in a potential change to the MBA curriculum.

DISCUSSION

After analysing *América Economía's* MBA ranking, it is possible to observe that top MBAs in the region offer specific courses in corporate governance and ethics, corporate sustainability, leadership, innovation, entrepreneurship, corporate social responsibility, sustainability leadership, and leadership and organizational change, and risk management. In this sense, while it is not possible to claim that disaster risk management is not part of the business education, due to the impossibility of checking the complete structure of the MBA courses, it is important to mention, for the purpose of

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this analysis, that it seems that disaster risk management is not one of the core skills that MBAs aim to develop in Latin America. This differs with CSR and sustainability education, when looking at the ranking, as it is an important differentiator of top business schools. For the case of MBA students at Universidad EAFIT, it is possible to identify that they are not well versed with DRM concept. Disaster risk formation usually comes from the work environment. Most of the students do not consider DRM to be a crucial skill in their formal business education, and more importantly, only a few think it should be a priority in a potential change to the MBA curriculum.

Using information on how to address multi-stakeholder, and sustainability concerned practices in MBA programmes, this paper proposes a Corporate Social Responsibility and sustainability-sensitive education in MBA programs, with an entrepreneurship-oriented focus. In keeping with the international concern about the need of a collaborative approach between stakeholders towards disaster risk management, this type of business education will not reduce the impact of disasters in business environment, but is aimed at promoting value generation with sustainable management perspective. It will be possible to mainstream DRM content into the Master in Business Administration (MBA) programs. With the purpose of showing the potential of sustainable sensitive entrepreneurship formation, this study shows the case of a successful spin-off at Universidad EAFIT that promotes a proactive perspective towards DRM.

CASE STUDY: UTÓPICA

In the following section, this paper provides an example of a disaster risk management initiative that has been developed by Universidad EAFIT in Medellín, Colombia. This project is not only an example of how higher education can create innovative tools in DRM, but an important example of how cooperation between different stakeholders may create synergies. Utópica is a spinoff from Universidad EAFIT which was founded by two product design engineers in response to the disasters caused by the 2010 and 2011 rainy season in Colombia. This disaster caused by the *La Niña* phenomenon affected an estimated of 2,350,207 people in the country in 998 municipalities (IGAC, IDEAM & DANE, 2011), and caused economic losses for about 11.2 billion Colombian pesos (COP), an equivalent of 6,052 USD million. These rains presented the highest levels in 40 years and created floods that triggered damages in the water supply, agriculture, and manufacturing sectors, and in education (CEPAL, 2012). After the 2010-2011 rainy season or *ola invernal* (“wintery wave”), as it has been known during last years, schools were flooded and hundreds of children lost months of education due to the problems caused to infrastructure. Lina Cataño and Andrés Walker, product design engineers from Universidad EAFIT, saw the consequences of this disaster as an opportunity to provide engineering solutions. The first project was developed in Sempegua, a population in the Colombian province of Cesar, located in the Northeast side of the country.

The project was created with the support of United Nations Development Program (PNUD) and *Unidad Nacional para la Gestión del Riesgo de Desastres* (UNGRD), National Unit for Disaster Risk Management. Utópica provides DRM solutions through amphibious houses as an alternative to basic housing for flood-prone areas. This spinoff is considered a DRM idea as it not only reduces the consequences of disaster risks, but it also considers processes of mitigation, preparedness and reconstruction. In general terms, both Lina and Andrés highlight the importance of adopting new strategies to deal with climate change. They consider adaptation as a key element in any DRM plan for governments and other stakeholders, and amphibious houses respond to climate change adaptation needs. Sempegua's floating house is the first to be built in Latin America, however this technology has been developed by developed countries in other continents, like England and Germany. The main innovation developed by researchers at Universidad EAFIT was the possibility of creating floating platforms with low cost materials: amphibious houses around the world use expensive raw materials that would otherwise make it impossible for low income communities to build.

It is also important to mention that Utópica's team recognizes the need to improve its managerial skills for the purpose of becoming a sustainable and accomplished business model. Andrés Walker, emphasizes the great potential that business schools have to contribute to disaster risk reduction plans in terms of lowering costs, developing efficiencies in the project, and reaching economies of scale. In spite of the importance of different stakeholder collaboration in the project, the sustainability of the operations will only be realized if a well-planned business model in which business managers and students work collaboratively is achieved.

CONCLUSION

The need to foster collaborative strategies in disaster risk management between different stakeholders have created the concern for the effective inclusion of business education in the generation of value added alternatives. This is consistent with the need to respond to a paradigm change in how disasters have been undertaken: from a reactive to a proactive model. In this context the role of business education has been proposed due to its ability to cultivate future managers along with the potential of higher education to lead structural changes within the society. In keeping with the international concern about the need for a collaborative approach between stakeholders towards disaster risk management, this type of business education will not reduce the impact of disasters in business environment, but it aims to promote value generation with a sustainable management perspective. This paper identified a limited formal education in DRM in some Latin American MBA programs, and specifically in Universidad EAFIT's, and a lack of awareness in MBAs students. With the purpose of showing the potential of sustainable- sensitive entrepreneurship formation, this study showed a case of a successful spinoff at Universidad EAFIT that

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promotes a proactive perspective towards DRM. This approach seeks to integrate managerial skills and knowledge with DRM, and to promote a disaster-conscious education in business education.

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NOTE

This paper is the result of the research presented at the Workshop on Disaster Risk Management in Business Education, hosted on March 23-24, 2016, in Toronto, Canada by York University's Schulich School of Business. The conclusions and outcomes of this conference will be implemented at Universidad EAFIT by a multi-disciplinary team. The proposals for the implementation of these measures are explained in detail in Appendix 2.

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APPENDIX 1. DSM AWARENESS IN MBA STUDENTS

Chart 1. Describes the responses to the question “Are you familiar with the concept of Disaster Risk Management?”

Are you familiar with the concept of Disaster Risk Management?

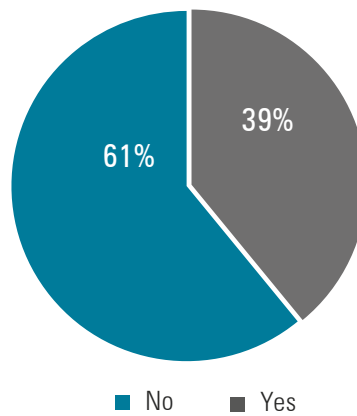
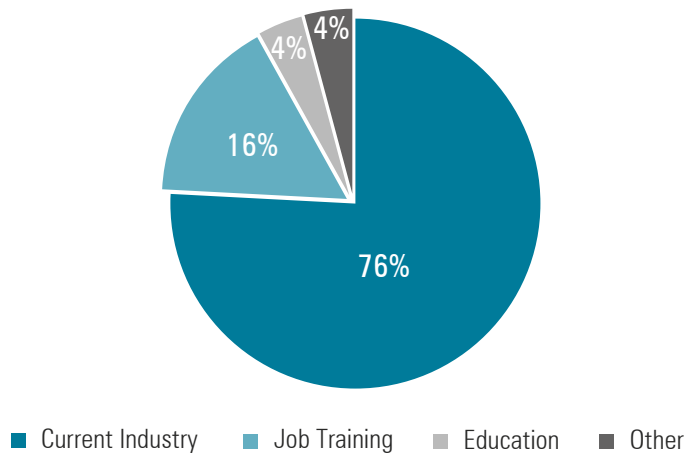


Chart 2. Describes the responses to the question “How did you know about Disaster Risk Management?”

How did you know about Disaster Risk Management?



BUSINESS CONTINUITY AND DISASTER RISK MANAGEMENT IN BUSINESS EDUCATION: CASE OF YORK UNIVERSITY

CONTINUIDAD DE NEGOCIO Y GESTIÓN DEL RIESGO DE DESASTRES EN LA EDUCACIÓN DE NEGOCIOS:
EL CASO YORK UNIVERSITY

ALI
ASGARY¹

JEL: H12, M14, Q54

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ABSTRACT

Increasing levels of business disruptions and disaster events on one hand while local, national and international campaigns on the other have increased businesses' awareness, attention and demand for the need for business continuity management. As more and more businesses are looking to integrate disaster risk and business continuity management into their business operations and decision making processes, the need for such expertise has also increased. Despite these needs, many business schools around the world have not fully identified, realized or addressed them. While there are several models for integrating disaster risk and business continuity management in business education, York University has established undergraduate and graduate level disaster and emergency management programs in a business school setting to address these growing needs. Through this integration, considerable numbers of business students enroll in disaster risk management, and business continuity courses. Knowledge and skills that students acquire through these courses make them informed and knowledgeable players in business continuity management teams in their varied work places.

KEYWORDS

Business continuity management; York University; business education; disaster risk management.

RESUMEN:

Mientras que por un lado los niveles de interrupciones en los negocios y los eventos desastrosos son crecientes, por el otro, las campañas locales, nacionales e internacionales han incrementado la consciencia, atención y demanda de las empresas con respecto a la necesidad de la gestión de la continuidad de negocio. En la medida en que más empresas buscan integrar la gestión del riesgo de desastres y de la continuidad de negocio en sus operaciones y procesos de toma de decisiones, la necesidad de dicho conocimiento también ha aumentado. Sin embargo, a pesar de estas necesidades, muchas escuelas de negocios alrededor del mundo no las han identificado, no se han dado cuenta de ellas, ni las han abordado. Si bien hay diferentes modelos para integrar la gestión del riesgo de desastres y de la continuidad de negocio en la educación de negocios, York University ha establecido programas de pregrado y posgrado sobre la gestión de desastres y emergencias en una escuela de negocios para hacer frente a estas crecientes necesidades. A través de esta integración, un número considerable de estudiantes de negocios se matriculan en cursos de gestión del riesgo de desastres y de continuidad de negocio. El conocimiento y las capacidades que los estudiantes adquieren a través de estos cursos, los convierten en actores informados y conocedores para los equipos de gestión de la continuidad de negocio de sus diferentes lugares de trabajo.

PALABRAS CLAVE

Gestión de la continuidad de negocio; York University; educación de negocios; gestión del riesgo de desastres.

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INTRODUCTION

Businesses like other facets of the society are at risk for a large number of dynamic, natural, technological, and human made hazards. Increasing business complexity, government and industry-specific regulations, corporate governance requirements, stakeholders push, media and public scrutiny, demand an integrated approach to business risk and continuity management (Shaw & Harald, 2004). Moreover, as the number of large disruptive disasters is increasing businesses are becoming more and more concerned with disaster-induced direct and indirect losses in their supply chains, along with the fall in output, revenue, and profitability (Desai & Sarmiento, 2015) and therefore seek to prepare business continuity plans (Sarmiento et al., 2015). Considering that significant amount of critical infrastructure, wealth, investment, employment, and income sources rest with private sector companies, it is important to make sure that the educational support for disaster risk management and business continuity is available to businesses for risk reduction and business continuity.

The Global Assessment Report (UNISDR, 2013) highlighted some of the key issues in this area with particular emphasis on disaster risk considerations in private sector's investment decisions. In order to address these issues, national and international agencies have embarked on a number of initiatives to shift the focus from the government and public sectors to the private sector. New standards in business continuity and risk management have been released by national and international standard agencies, new educational programs and academic journals have been created, global campaigns such as the United Nations Global Compact have been initiated and the UNISDR Sendai Framework for Action (SFA) has paid significant attention to the role of private sector in disaster risk reduction and business continuity.

This paper examines the development of business continuity in business education using York University's disaster and emergency management program as a case study. It is argued that disaster risk reduction and business continuity management should be an integral part of business education if the objectives of the Sendai Framework for Disaster Risk Reduction in private sector's role in disaster risk reduction at both corporate and wider levels are going to be achieved by the year 2030. The rest of this paper is organized as follows: Section two reviews the need for business continuity and disaster risk management education in general and in business education in particular. Section three presents four contemporary approaches and models for dealing with business continuity and disaster risk management in business education. Methodology of the paper is explained in section four. Section five describes York University's approach to integrating business continuity and disaster risk management in business education in detail. Finally, section six concludes with some recommendations.

DISASTER RISK AND BUSINESS CONTINUITY MANAGEMENT IN BUSINESSES EDUCATION

Disaster risk and business continuity management aim to integrate risk and business continuity management into corporate, strategic, tactical and operational man-

agement systems. Several standards of risk and business continuity management provide guidance on implementation of risk reduction and business continuity. To incorporate disaster risk reduction and business continuity management in all businesses and industries, business administration program professionals should develop the knowledge and skills needed to effectively apply risk and business continuity management. This requires careful design and implementation of certain courses in the existing business curriculum. While disaster risk and business continuity management experts are needed to lead these activities in businesses and organizations, especially large ones, it is important that all key decision makers and key business personnel have a good understanding of disaster risks and business continuity management concepts and methods. The Hyogo Framework for Action (2005 to 2015) formed the needed awareness about the risk and the need for its management in both public and private sectors. Sendai Framework for Disaster Risk Reduction (2015-2030) calls for integrating disaster risk and business continuity into business models and practices at all businesses, particularly small businesses. This can be achieved more successfully by making sure that business schools equip graduates with the needed knowledge and skills.

“Substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” has been mentioned as one of the key outcomes of the Sendai Framework. To achieve this, the Framework states that:

1. “Business, professional associations and private sector financial institutions, including financial regulators and accounting bodies, as well as philanthropic foundations, to integrate disaster risk management, including business continuity, into business models and practices through disaster-risk-informed investments, especially in micro, small and medium-sized enterprises; engage in awareness-raising and training for their employees and customers; engage in and support research and innovation, as well as technological development for disaster risk management; share and disseminate knowledge, practices and non-sensitive data; and actively participate, as appropriate and under the guidance of the public sector, in the development of normative frameworks and technical standards that incorporate disaster risk management”. (UNISDR, 2015)
2. “There is a need for the public and private sectors and civil society organizations, as well as academia and scientific and research institutions, to work more closely together and to create opportunities for collaboration, and for businesses to integrate disaster risk into their management practices.” One important area of such collaboration between these parties is disaster risk and business continuity education.” (UNISDR, 2015)

While there is no direct mention of disaster risk and business continuity management education in the above statements, one can conclude that these goals and objectives cannot be attained without integrating disaster risk and business continuity

management into business education. Evidently, significant progress has been made in disaster and emergency management education during the past 15 years in most countries (McCreight, 2014) and disaster risk and business continuity domains have hindered their recognitions as a legitimate field of scholarship (Holloway, 2014). Despite this, its penetration and presence in business has been relatively slow and marginal. Although some business schools have courses in crisis management, many business schools have not integrated disaster risk and business continuity management in their curriculum (McCreight, 2009).

As businesses become more aware of their risks and vulnerabilities, their demands for disaster risk and business continuity plans, planning experts, tools and methods increases. As mentioned earlier this increasing attention and demand are the outcome of several internal and external factors. Internally, companies are facing a dynamic and complex risk landscape as well as employees' safety, well being, and job security. Externally, businesses are faced with increasing supply chain disruptions, new and mega risks, rising competition, and inability of governments to protect them during major disaster events. Moreover, companies are now being rated and ranked for disaster risk and business continuity management, organizational resilience, and enterprise risk management (Gatzert & Martin, 2005).

Lack of attention to disaster risk and business continuity management in business schools is evident from the lack of theories, academic textbooks, and relatively low threshold of research (Shaw & Harrald, 2004). While the demand for disaster risk and business continuity management expertise has increased, universities have not been able to adequately respond. Instead these rising needs have been partially met by practitioners and consultants through short training courses, handbooks, industry seminars, etc. As highlighted in the 2013 Global Assessment Report (UNISDR, 2013), if disaster risk reduction and business continuity are to be integrated into business operations and investment decisions, one key means to achieve this is to embed the relevant knowledge and skills into business education.

If we look at the proposed competencies for business continuity professionals proposed by Shaw and Harrald (2004) (such as: expert knowledge of business continuity planning; detailed knowledge of business recovery planning; working knowledge of the organization's critical business processes, policies, risk appetite, etc.; working knowledge of critical point and IT disaster recovery; working knowledge of the organization's investment/financial management practices, ability to communicate calmly, effectively and authoritatively), we can see that most of these competencies are covered in the existing business curriculums. Therefore, adding business continuity planning and disaster risk management knowledge and skills to the existing business curriculum will meet the basic requirements.

Studies conducted in both developed and developing countries show that existing technical knowledge and expertise in disaster risk and business continuity management play a key role in businesses' disaster risk and business continuity management (Teikoku Databank Ltd, 2011; UNISDR, 2013). Moreover, maintaining business

continuity for many organizations is no longer an option, nor is it appropriate to address it with traditional crisis management approaches such as an ad hoc reactions to events. As argued by Herbane (2010) we are moving from a self-regulation and voluntary base business continuity period to a period in which businesses are increasingly required to have business continuity plans. “This transition has been driven by the introduction of legislation, along with regulation, and national and international business standards that have in turn arisen in response to, and in the aftermath of, important historical events” (Herbane, 2010: p 979; Waugh, 2005).

INTEGRATING BUSINESS CONTINUITY MANAGEMENT INTO BUSINESS EDUCATION

An examination of the existing programs in disaster risk and business continuity management around the world (Building Research Institute, 2007), reveals at least four models for integrating disaster risk and business continuity management in business education (Figure 1). This section briefly describes these models.



Figure 1. Disaster risk and business continuity management education in business administration.

Business Administration (Status Quo)

This is the conventional model in which disaster risk and business continuity management are not on the business schools' radar and mainstream business discipline (Orlando, 2008; Acharyya, 2010) and therefore are not considered in the business education curriculum. Disaster risk and business continuity management are primarily viewed as separate disciplines. This view is consistent with the traditional perspectives in which disaster risk management is considered as being part of the natural sciences, engineering, and social sciences area (Shaw et al., 2011a) and business continuity management is considered as an information technology field (Herbane, 2010). In other words, business continuity and disaster risk reduction are not

considered as true business functions, such as marketing, accounting, finance, etc. Because business continuity also known as disaster recovery was initially emerged as a response to information technology failures and business continuity experts often come from support areas of business, many business schools consider continuity management more as a technical skill than business function (Orlando, 2008). As a result there are many business schools that do not have disaster risk and business continuity management education as part of their curricula. These topics are either covered by other disciplines (such as Information Technology) or emerging degree programs in disaster studies/management and business continuity. During the 1990s and especially in the 2000s a significant number of degree programs in these areas emerged. Hyogo Frameworks for Action (HFA) (2005-2015) emphasized on knowledge and education and highlighted education as important component for disaster risk reduction (Shaw *et al.*, 2011b). Although there are many disaster and emergency management degree programs (often with a business continuity element), degree programs in business continuity are relatively rare. Example of such programs is the Master of Science in Business Continuity Management at Norwich University (Vermont, USA).

Business Administration with Disaster Risk and Business Continuity Management Courses

This is a model in which disaster risk and business continuity management contents and courses are added to the business education curriculum. This approach is based on the view that disaster management and business continuity education need to be included in every relevant discipline to increase awareness and capacities of graduates to reduce the risks in their decisions and enhance their abilities to reduce social and economic disruptions caused by a variety of disaster events. This view has been implemented in two ways: 1) adding more disaster risk reduction and modern business continuity contents to the existing relevant courses; and 2) creating new disaster risk and business continuity management courses. In the first case, disaster risk and business continuity management materials are integrated into the existing business courses such as “strategic management”, “crisis management”, “risk management”, “supply chain management”, “occupational health and safety”, “corporate social responsibility”, “project management”, “audit”, “information security management for business”, “information assurance, and “management information systems”. In the second case, disaster risk and business continuity management courses are added to the curriculum.

Business Administration with Disaster Risk and Business Continuity Management Streams

The third option is a model in which disaster risk and business continuity management become streams in business programs. Depending on the degree level and type of the stream, a certain number of specialized or stream related courses are cre-

ated. For example, Walden University (Maryland, USA) has created a Homeland Security Specialization in its Doctor of Business Administration (DBA) program. This program includes a number of foundation and core business courses (i.e. Contemporary Challenges in Business, Organizational Leadership; Information Systems; Marketing; Finance; Business Operations). Specialized courses include: impact of homeland security policies on business continuity, homeland security, business planning, business infrastructure vulnerability analysis².

Business Administration with Disaster Risk and Business Continuity Management Certificates/Diploma

The fourth option or model is a combination of the business administration degree with a certificate/diploma in risk management or business continuity management. Certificates/diplomas are offered by business schools (i.e. business continuity certificate in Coventry School of Business in the UK), disaster and emergency management schools, or professional associations such as Disaster Recovery Institute (DRI), Business Continuity Institute (BCI), etc. This option leaves it to the business students to decide whether or not they want to enter into the disaster risk and business continuity profession and seek certification if needed. While there is a tendency in businesses to hire individuals with a business continuity degree, having a degree in business administration and a certificate in business continuity is acceptable. Having a certificate in business continuity management is viewed as an important credential and more and more companies require certifications when hiring such professionals.

While comparing these options with today's business and risk environment, it is difficult to accept that the status quo is a viable option. First, business continuity is no longer restricted to information technology and it encompasses many aspects of business functions. Second, businesses are more frequently disrupted by internal and external hazards and the consequences of disruptions have become significant and sometimes deadly. Third, emergence of national and international standards in risk management and business continuity management provide further evidence of the importance and maturity of this field, and business students' knowledge of these standards are vital. The fourth option may work during a period when the need for disaster risk and business continuity experts has increased but universities and business schools are not prepared to address these needs. While having professional certificates is necessary in these fields, it is not sufficient. Certificates may be more useful when combined with university degrees with sufficient coverage of the field. In other words having a certificate in BCM with a business degree that has no business continuity component may not be ideal. This leaves us with the other two models. Both models have their own advantages and disadvantages. Depending on the availability of faculty resources and demands, business schools can choose among these two options.

² For more info, see: <https://www.waldenu.edu/doctoral/doctor-of-business-administration/curriculum/homeland-security>.

METHODOLOGY

This paper uses primarily a case study method in which York University's programs and courses in disaster and emergency management are the focus of the study. Survey results conducted by the university and the course instructor are used to provide insights into students' experiences in these programs. University surveys have been conducted as part of cyclical program reviews in 2015 in which past and present students are asked some key questions about various aspects of the programs. The author who teaches some of the case study courses (ADMS 2700 and ADMS 3703) has also conducted various surveys during the past few years in order to better understand why students take such courses and what kind of impacts these courses have on their individual, social, and professional lives. Secondary data regarding the student enrollments in specific courses are also used to understand students' enrollments in different courses.

DISASTER RISK AND BUSINESS CONTINUITY MANAGEMENT IN BUSINESS EDUCATION AT YORK UNIVERSITY

Recognizing the societal needs and building on its key institutional values and missions, York University embarked on creating a disaster and emergency management program in 2005 that is now one of the flagship programs of the University. Housed in the School of Administrative Studies of the Faculty of Liberal Arts and Professional Studies, York University's Disaster & Emergency Management (DEM) Programs have been offering disaster and emergency management degrees, certificates, courses, and professional trainings to a large number of students and practitioners over the past ten years. Starting with a certificate in emergency management in 2005, the department developed a masters degree in 2007, a bachelors degree in 2010 and a PhD program is currently in the approval process and is scheduled to start in 2017 (Figure 2).

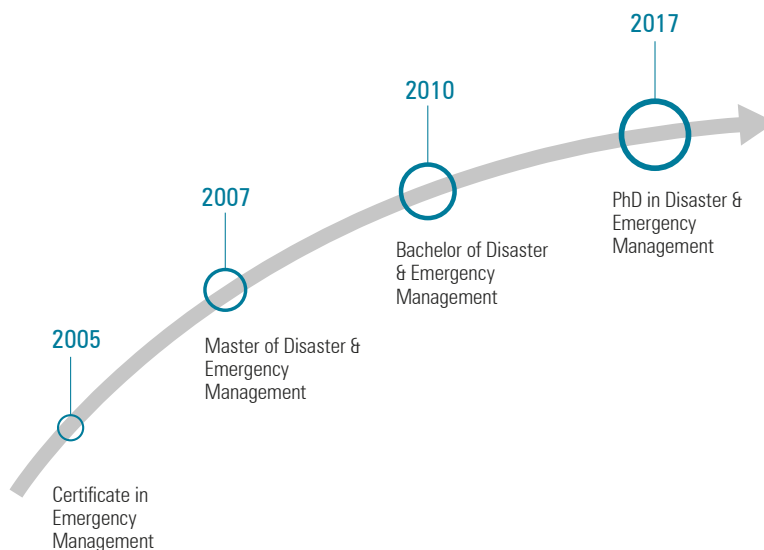


Figure 2. Creation of various degrees in disaster and emergency management at York University.

DEM is an example of York's leadership in developing programs to address new needs and interests, locally, nationally, and internationally. York is a large and comprehensive university with a strong commitment to accessibility and social responsibility. The disaster and emergency management program is fulfilling the University's strategic plans and contributes to Canada's disaster risk reduction goals and objectives. Given that more than 10 years have passed since the establishment of these programs at York University, there are a number of lessons that can be learned from this experience.

Developing a world class research and training capacity in disaster and emergency management has been a priority for York University. Therefore, York is the only university in Canada that offers both undergraduate and graduate degrees in this field. York Universities' disaster and emergency management programs are housed in the School of Administrative Studies (SAS) that is part of the Faculty of Liberal Arts and Professional Studies (Figure 3). In addition to the disaster and emergency management unit, the School has nine other units (Management, Management Science, Finance, Accounting, Marketing, Audit, Financial Accounting, and Financial Accountability). The Disaster and emergency management unit has a close collaboration (teaching and research) with a number of units in the School of Administrative Studies, Faculty of Liberal Arts and Professional Studies, and other Faculties at York University. Students from most Faculties take disaster and emergency management courses at both undergraduate and graduate programs. Disaster and emergency management students also take some of their elective courses from other schools. Disaster and emergency management faculty members are involved in collaborative research with professors from other departments and Faculties. For example, a number of disaster and emergency management faculty and faculty members from the Faculty of Science, School of Information Technology, Faculty of Engineering, and Faculty of Environmental Studies are involved in a Natural Sciences, Engineering Research Council (NSERC) CREATE funded program (\$1.65 million) on Advanced Disaster, Emergency, and Rapid Response Simulation. The aim of this program is to train the next generation of highly qualified personnel in disaster risk, response, continuity, and recovery simulations for both public and private organizations. Disaster and emergency management has close ties with governmental, non-governmental, and private sector organizations in Canada.

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Business Continuity and Disaster Risk Management in Business Education: Case of York University

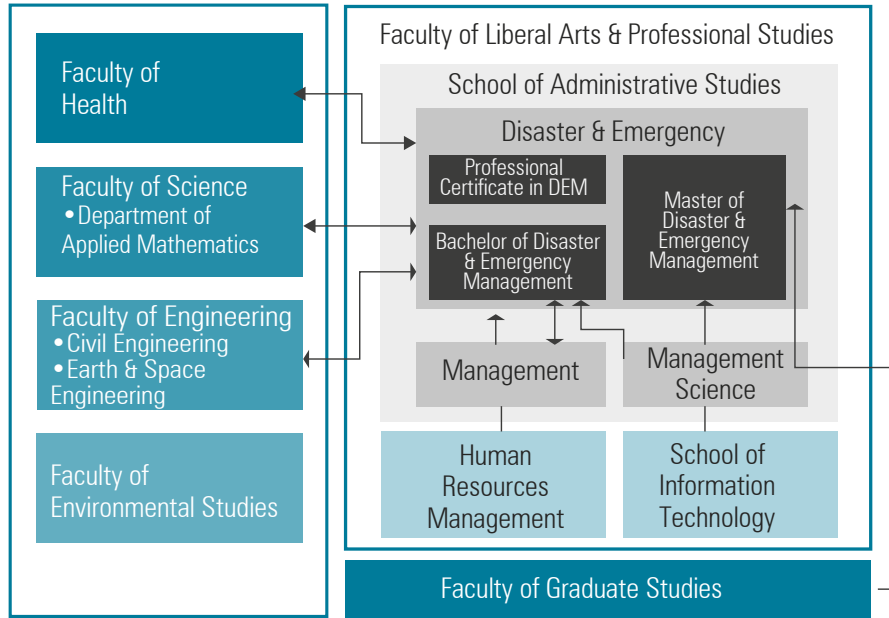


Figure 3. Disaster and emergency management at York University and its linkages to other departments, schools and faculties.

Undergraduate Program

York University offers bachelor degrees in disaster and emergency management (BDEM) in various formats (ordinary 90 credits, 120 credits honors and specialized honors) and a professional certificate (24 credits, can be completed in campus or on-line). Students from other disciplines can do a double major or minor in disaster and emergency management. BDEM curriculum consists of 15 disaster and emergency management specific courses, management courses (offered by SAS management and management science such as organizational behavior, project management, and quantitative methods), and courses from other schools and departments in the Faculty of Liberal Arts and Professional Studies including human resources management, political science, public policy, geography, and faculty of environmental studies, faculty of science and faculty of health.

BDEM is designed to provide students with the core competencies needed by emergency and business continuity managers as well as a critical understanding of the theoretical approaches and assumptions underlying these competencies. The program is broadly conceptualized into four areas of study. In addition, it contains a substantial emphasis on experiential education.

Disaster and Emergency Management

Through a series of foundational courses, students develop a working knowledge of the assessment procedures, measures for preparedness, service delivery systems, impact on communities and hazards associated with disaster and emergency management. The core course “Fundamentals of Emergency Management” introduces students to the theories and principles of disaster management. Subsequent courses focus on the disaster risk management process and specific methods/tools used to address risks faced by communities and businesses; business continuity planning; theories of effective communication particularly in a crisis context; and theoretical understanding and practical analysis of the four pillars of comprehensive emergency management - mitigation, preparedness, response and recovery.

Management

The multi-dimensional complexities of disaster and emergency management require that students develop competencies in project management, leadership, administration, communication and public policy. The program includes a substantive complement of administrative studies content designed to give students the knowledge and competencies needed to perform these management functions.

Interdisciplinary Studies

Interdisciplinary is inherent to this field. Emergency and business continuity managers must be able to communicate effectively with professionals from a variety of disciplines and know when to draw on their expertise. They also must approach emergency and business continuity management from a range of perspectives. In planning and responding to disasters and emergencies, they need to consider the critical interrelationships of a variety of disciplines on outcomes. By including courses from a number of key disciplines, the program enables students to develop a basic understanding of their theoretical underpinnings and how these fields intersect in relationship to disaster and emergency management.

Practical Experience

There is general agreement among emergency and business continuity management professionals that there needs to be a strong relationship between the theory and practice. The BDEM program provides opportunities for students to integrate academic concepts into operational settings. Third year students in the program have the option of completing a three credit field placement course (equivalent of 140 hours) in emergency or business continuity management. This field experience fosters a greater understanding of the complexities and challenges of the application of theories of emergency management to real-life situations. Using a formal agreement, students are placed in local, provincial, federal and international agencies at governmental, non-governmental, and private sector organizations carefully selected by the program under the supervision of faculty and professionals hosting the

students. Participating students report their experiences in the placement early in the course, at middle of the term, and at the end of term. Student assessment is carried out jointly by the field and faculty supervisors. York University provides insurance for students.

BDEM Program courses are offered by faculty members from the disaster and emergency management area, other units in the School of Administrative Studies such as management and management science, Faculty of Environmental Studies, and a number of practitioners as part time instructors. Part time instructors are professionals in the field (i.e. Emergency Manager- City of Brampton; Emergency Manager-City of Toronto; Business Continuity Manager - Sunlife Assurance; Coordinator, Emergency Planning at City of Toronto, Business Continuity Consultant- Hydro One, etc.). Disaster and emergency management unit is a corporate member of a number of professional associations and networks including Ontario Association of Emergency Managers, Disaster Recovery Information Exchange (DRIE) and the Canadian Risk and Hazards Network.

A recent survey of students in the BDEM program conducted as part of the cyclical program review in 2015 found that: close to 70% of students rated the overall program quality good, very good or excellent, while 21% rated the program fair and 8.6% rated the overall program either poor or very poor. A significant number of students (69%) believe that “Course instructors provide high quality teaching” in all, most, or half of the courses. Close to 78% believe that “Instructors are enthusiastic about their teaching” and that “Instructors encourage students to become independent learners”. Close to 69% of students believe that the program does very well or fairly well in “Covering a variety of disciplinary or multi-disciplinary perspectives”. About 88% mentioned that the program does very well or fairly well in “Addressing equity, diversity and/or inclusivity”. In response to the open ended question of “In your opinion, what is the ONE BEST thing about your program?” students have listed the followings: Interesting field and compelling program, interesting courses and assignments, experienced, knowledgeable and caring instructors, small class size, application of theory in real world, evening courses, and field placement. A majority of the students (65%) believe that the program does not do well in “Avoiding unnecessary repetition of the same material in different courses” (Institute for Social Research, York University, 2015).

Graduate Program

Master of Disaster and Emergency Management (MDEM) is a 30 credits degree offered as a course base (10 courses) and as Major Research Paper options (8 courses plus a 6 credits major research paper). York University’s graduate programs are administered by the Faculty of Graduate Studies and resourced by the home Faculty (Faculty of Liberal Arts and Professional Studies in case of MDEM). A PhD proposal in under review and will be initiated by September 2017 upon approval. Although MDEM is considered a general master degree in disaster and emergency manage-

ment, the program has certain focusing areas such as: business continuity, disaster risk management, health emergencies, public safety, and public policy (Table 1).

Table 1. MDEM courses

Course number and title	Course type
GS/DEMS 5010: Advanced disaster and emergency management	Elective
GS/DEMS 5020: Disasters concepts and causes	Core
GS/DEMS 5030: Social and behavioral dimensions of disasters	Core
GS/DEMS 5040: Natural disasters	Elective
GS/DEMS 5051: Qualitative research methods	Core
GS/DEMS 5052: Quantitative research methods	Core
GS/DEMS 5053: Topics in business continuity	Elective
GS/DEMS 5060: Terrorism studies 1	Elective
GS/DEMS 5070: Terrorism studies 2	Elective
GS/DEMS 5080: Practicum	Elective
GS/DEMS 5081: Applied topics in DEM	Elective
GS/DEMS 5082: Medical and public health issues for non-medical personnel	Elective
GS/DEMS 5710: Critical infrastructure protection	Elective
GS/DEMS 6070: Disasters and ethics	Elective
GS/DEMS 5000: Directed readings	Elective
GS/DEMS: Major Research paper	Core (Major Research paper stream)

Like the BDEM program, some of the MDEM courses are also taken by students from other master programs. For example, students from Master of Information Technology regularly take Topics in Business Continuity and Advanced Disaster & Emergency Management courses from MDEM. Also, some MDEM students take courses from Refugee Studies, Environmental Studies, Health Management, Public Policy, etc. MADEM graduates are now employed in key emergency management and business continuity positions at both public and private sector organizations across Canada. Students can do MDEM in full time (four semesters) or part time basis.

In a recent survey of MDEM past and current students also conducted as part of cyclical program review in 2015, it was found that majority of students (53%) enter the MADEM program based on personal interest and 32.4 % choose MDEM for career opportunities. Close to 82% of students rated the overall program quality good, very good or excellent, while 14.7% rated the program fair and 2.9% rated the overall program either poor or very poor.

York University received a major grant through Ontario Research Fund (ORF), York University and Industry Partners to create an Advanced Disaster, Emergency and Rapid Response Simulation (ADERSIM) facility (Budgeted for \$ 4.3Million) to be launched by March 2017. ADERSIM's 12-room, multi-function infrastructure will mimic an advanced Emergency Operations Centre, with the capability to develop large scale computer based disaster simulations.

DEM Courses for Business Students

In this section three key undergraduate courses that are taken by business students will be discussed and some insights into their enrolments and students' experiences with these courses will be provided. These three courses are: ADMS 2700 Fundamental of Emergency Management, ADMS 3701 Disaster Risk Management, and ADMS 3703 Business Continuity Management (Figure 4).

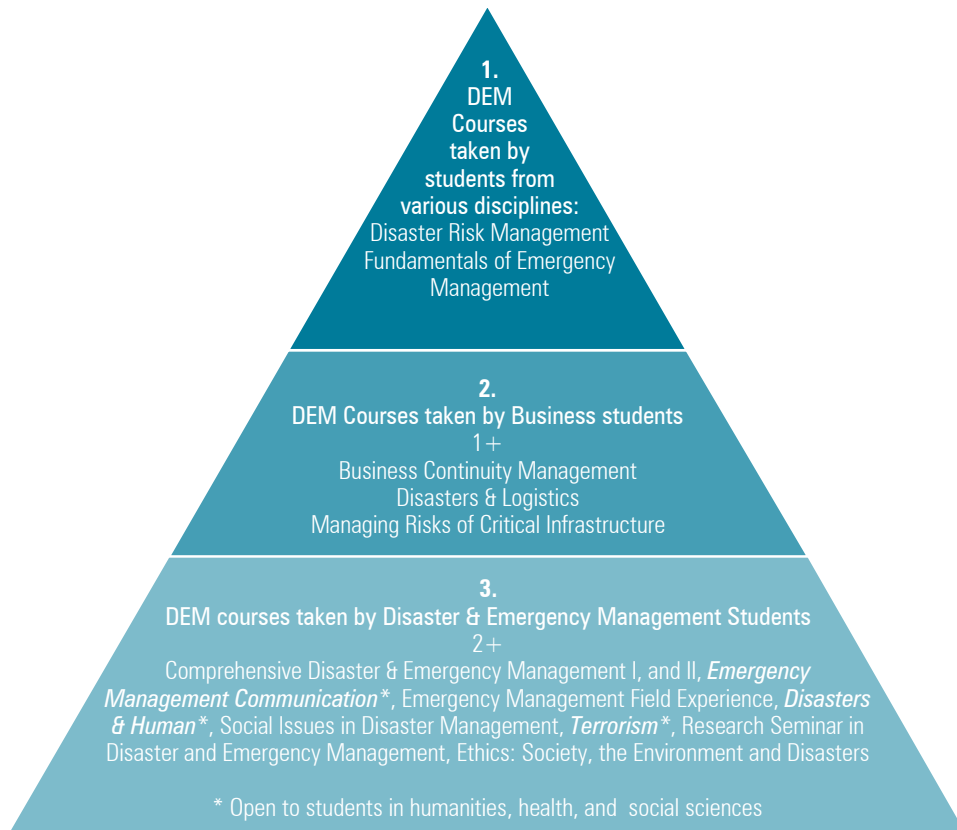


Figure 4. Disaster and emergency management courses taken by various students.

Both ADMS 2700 and ADMS 3701 are three credit courses that are available to all students at York University. ADMS 2700 is organized around the four pillars of mitigation, preparedness, response and recovery. This course provides students with the key concepts and basic knowledge required to operate effectively in an emergency management context including the legislative context, risk identification, assessment and communications. ADMS 3701 covers practical analysis of the risk management process and the specific tools and methods used to address the risks facing organizations, institutions, and communities. Both courses are offered in the fall, winter, and summer (fully online) semesters. Each section accepts up to 100 students and in most semesters the enrollment reaches the full capacity. Students of all levels and various degrees enroll in these courses. In particular one can find students from the disaster and emergency management, administrative studies (accounting, finance, management, and marketing), business economics, business and society, public policy, political science, nursing, geography, health information technology, international development, social works, sociology, environmental studies, biology, history, language and journalism in this course.

Our investigation reveals that as expected these courses are taken by a diverse and large number of students. Between 45 to 48% of the students enrolled in these courses are enrolled in the bachelor degree programs other than the BDEM and BAS. They include students from other social sciences disciplines (sociology, psychology, political science, communication studies, and public policy), health, and science, and environmental studies. About 40 percent of the students that are taking the Disaster Risk Management and 31 % that are taking the Fundamentals of Emergency Management are from the Bachelor of Administrative Studies (Figure 5).

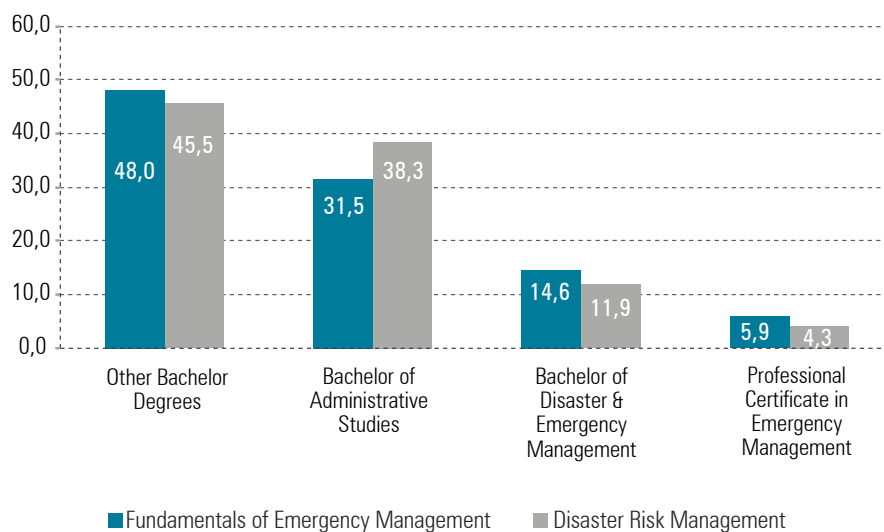


Figure 5. Percent of students enrolled from different disciplines in ADMS 2700 (Fundamentals of Emergency Management) and ADMS 3701 (Disaster Risk management) (2010-2016).

In another study of students taking the ADMS 2700 Asgary (2008) found that while disaster and emergency management students take the course as a required course, close to 60 percent of the students take the course as an elective course. More than 70 percent of the students would recommend the course to other students. Students believed that this course has increased their knowledge of disaster risk and emergency management and their interests in the field and that they intend to take more courses in this area. Students support the idea that as a result of taking this course, they would be willing to participate in emergency and business continuity teams in their workplace and that taking this course is benefiting their families as well through awareness and knowledge transfer. Appendix 1 contains some quotes from students in response to the survey asking their overall impression about this course.

ADMS 3703 is a three credit course. This course provides an introduction to the field of business continuity. Continuity management is a holistic management process that identifies potential impacts threatening an organization and provides a framework for building resilience with the capability for an effective response. The course is based on the ISO 31000 Standards in Risk Management and four major business continuity standards:

- ASIS International SPC.1-2009 Organizational Resilience: Security Preparedness, and Continuity Management System Requirements with Guidance for use (2009 Edition)
- British Standards Institution 25999 (2007 Edition), Business Continuity Management.(BS 25999:2006-1 Code of practice for business continuity management and BS 25999: 2007-2 Specification for business continuity management),
- National Fire Protection Association 1600-Standard on Disaster / Emergency Management and Business Continuity Programs, 2007 and 2010 editions;
- ISO 22301: Societal Security- Business Continuity Management Systems, Requirements: 2011) (see Table 2 for a more complete list of standards).

Table 2. Some of the existing national and international business continuity and risk management standards.

Standard Number	Standard Title
BS 25999	British Standards Institution
ISO PAS 22399	Societal Security- Guidelines for Incident Preparedness and Operational Continuity Management
SS (Singapore Standard) 507	Standards for Business Continuity/Disaster Recovery (BC/DR) Service Providers
BSI PD 25666	Business continuity management - Guidance on exercising and testing for continuity and contingency programs
ISO 31000	<i>Risk management – Principles and guidelines</i>
BCI	The Business Continuity Institute Good Practice Guide
ANSI/ASIS/BSI BCM	American National Standard, Business Continuity Management Systems

Table 2. Continuation

Standard Number	Standard Title
AS/NZS 5050:2010	Australia New Zealand Standard Business continuity: Management of Disruption-related Risk
ISO 22301	Societal Security- Business Continuity Management Systems – Requirements: 2011
ISO/IEC 27031	Information technology – Security techniques – Guidelines for ICT Readiness for Business Continuity
NFPA 1600	Standard on Disaster/Emergency Management and Business Continuity Programs
BSI PD 25111	Business continuity management - Guidance on human aspects of business continuity
BSI PD 25888	Business continuity management - Guidance on business recovery
BSI PAS 200	Crisis management guidance and good practice

This Business Continuity Planning course is offered in both fall (face to face) and winter (online) semesters. As expected, this course is taken mainly by the BAS and BDEM students (Figure. 6). Considering that Business Economics and Business and Society are part of the broader business discipline, it can be argued that at least 50 percent of the students taking the business continuity course are business students.

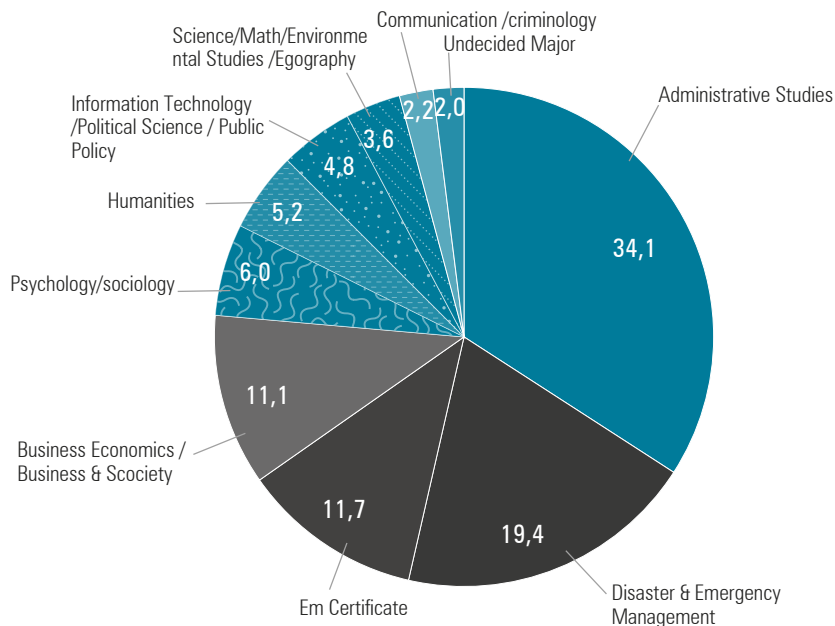


Figure 6. Percent of students taking the business continuity course by home faculty (2010-2016).

When a sample of students who took the Business Continuity Planning course in January 2016 was asked about why they have chosen the course, various reasons were provided (Appendix 2). Students are interested in taking the course as they see it very relevant in today's business world and they can apply the learning in their work place, especially when they run their own business. Some of them have been already involved in business continuity in their work place but had no knowledge of the process.

CONCLUSIONS

The need for disaster risk reduction and business continuity education in business schools is evident. Businesses should proactively reduce the risks and enhance their continuity planning and resilience in order to meet the regulatory requirements, stakeholders' expectations, and long term sustainability. Unlike creating new programs, adding a couple or more courses to the existing business programs is not a difficult task administratively. Business programs normally encompass the necessary foundations and much of the required competencies and experts needed by disaster risk and business continuity programs. By adding some disaster risk and business continuity courses, graduates would be able to become active members and advocates of disaster risk and business continuity management in their workplaces.

While hiring a full time business continuity or disaster risk manager is not feasible for many small and even medium size companies, having business staff with academic and professional skills in these areas can help them to better manage disaster risks and prepare them for potential disruptions.

Since most universities in both developed and developing countries have undergraduate business programs, York's approach may be a practical and feasible solution to expand disaster risk and business continuity management education in business programs.

Emergency management education in universities should be looked upon as a discipline and as a general education subject. The more students learn about disaster risks and disaster management the better prepared a society will be. A general education course that can be taken by all students would be timely and needed. Experience shows that students who have taken disaster and emergency management courses believe that such a course is beneficial to themselves, their families, place of work and the society at large. Therefore, it is ideal if universities offer at least one emergency management course to their students. The content of such course should be well designed and appropriate to students coming from every discipline.

If disaster risk and business continuity management are going to be integrated into the business education, all key stakeholders (i.e. practitioners, professional associations, academics, business associations, and private sector executives) ought to participate in curriculum development. This engagement is very important for creating experiential education opportunities for students as well. Close collaborations between the stakeholders will make sure that the provided education meets their needs.

It is believed that students graduating from the business programs by taking disaster risk and business continuity courses will be able to actively take part in such activities and decisions in the workforce. Providing some courses as part of the existing business programs may be the starting point towards integrating disaster risk and business continuity in business education. Creating streams would be the next important step. Finally, integrating disaster risk and business continuity management into business curriculums is not an easy task and should go beyond just adding a couple or more courses into the existing business curricula.

Finding instructors who have the required background knowledge, skills and qualifications has been relatively difficult. As this integration is taking place, attention should also be paid to the training of highly qualified personnel who can teach the proposed courses.

This paper provides for insights into York University's current approach to integrating disaster risk and business continuity education into the higher education level with particular emphasis in business education. Further studies are needed to examine similar programs in other universities around the world to better understand the pros and cons of different models.

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APPENDIX 1

Sample of students overall impression about the ADMS 2700 (fundamentals of emergency management) course

"I have really enjoyed this course. Although I do work in the emergency management services, this course has really opened my eyes. Because of this course, I have become involved with table top exercises at EOC's involved in the policing aspect of a disaster."

"I have learned a lot throughout the course. It opened my eyes to the real world. There is a lot happening around the world that I do not know about. This course made me start to read the newspaper a lot more. Before I would just stick to the business and sports sections but now I read more of it so I know what is going around all over the world."

"This course is very important; I think it should be taken by everyone. I do not understand how we have to take humanities and social sciences that are irrelevant to my degree and life in my opinion. This course should be made a mandatory course for all students."

"Taking this course has broadened my knowledge of emergency management. Coming into the course I wanted to see if it was a field I would be interested to pursue in college after my undergraduate degree in English was completed. I find it very interesting and enjoy the broad scope it encompasses - Emergency Management is definitely something I am considering for post graduate studies and as a future career."

"I am so surprise to learn, what unprepared is the entire world. After knowing more about Hurricane Katrina in New Orleans, and SARS in Toronto, I have realized that We all need to put more interest in learning how to be prepared for the next disaster."

I personally communicated to the City of Brampton my willingness of being part of Brampton Community Emergency Response Volunteer Member Section, as well in my workplace of being part of the Influenza pandemic preparedness team."

"Overall, this course has really enlightened me in a way, that will forever be beneficial to me. This course has opened option that I would never have encountered. Really, as university students and global citizen we have a huge responsibility to respond to the changing environment around us. Therefore, course like these are great to give students an outlook of how disaster and emergency management unfolded. I believe it enhance any students knowledge and is applicable to any field of study. I am really considering more courses in this field."

"I'm so glad I took this course. Even though it is an elective it's given me a wealth of knowledge that i can share with my family and friends, even if i do not pursue this as profession."

"... I believe the type of knowledge gained from this course can stay with you as an individual over a life time and it also provides you with a sort of weapon of defence in terms of knowledge against any future hazards."

"I personally would rate this as one of the most important courses to take for virtually any kind of university student. Disasters affect EVERYONE, not just business students. I'd love to see this course become an elective course to any student who wishes to take it."

This course has proven to be very beneficial to me as an individual and as a professional in the healthcare field. If anything it has given me a basis of knowledge regarding how emergency procedures are conducted and the importance of them. Since taking this course my change in behaviours have affected my family's well-being as well. I am now more prepared for emergencies such as power outages etc. I also realized what hazards truly affect me because the media used to influence my beliefs a lot more than I realized previously. This course has been an excellent learning opportunity and I will certainly recommend it to other students. Everyone should have this knowledge!

APPENDIX 2

Field of study and reason taking Business Continuity Planning Course

Field of Study	Reason for taking the course
BAS (management)	"The reason as to why I chose this course is because I plan on opening a business of my own in the near future and I know that with the knowledge that I can gain from this course, it would greatly assist me in my future endeavors."
BAS (Accounting) Work and run a small business	"I believe the knowledge I gain from this course can help and apply to my work as well." "I expect to develop an understanding of impacts of disasters on businesses and how to develop business continuity plans and processes."
BAS Work as Financial Services Manager	"I ran a business, did not have a business continuity plan, and was forced to lay off my employee's and shut down my business. Now working in a different industry, at a much larger scale, with much higher stakes, I am building my business keeping in mind all that can go wrong, and carefully planning what steps we can take to minimize risk. My current company already has a business continuity plan in place but it has some very large weaknesses."
Business Administrative Studies	"I am looking forward to expanding my learning about how to effectively develop risk management and business continuity programs and plans." "I believe it is applicable to any business and organization."
Children' Studies	"Because I was interested in the topic of business and continuity and I also wanted to learn information about the business world that I could possibly apply to any real life situations."
Business Administrative Studies	"to learn how business deal with risks that may arise because one day I hope to own my business, so this course will help me a lot."
Economics	"I would like to know more about business continuity and contingency planning as a whole and the different strategies and processes that can be used to implement a business continuity plan."
Law and Society	"in gaining some business knowledge as I plan to open up my own company some day."
BAS	"I want to run a business in the future. It might be a little big for the small business for my plan."
BAS (Accounting)	"A friend recommended ADMS 3703 to me as it helped him with his 4th year audit courses. I hope to learn how to identify, and mitigate potential organizational threats."
BAS (Management)	"Last year I took a DEMS course which really got me interested in risk management and that's why I decided to take this course! "

APPENDIX 2. Continuation

Field of Study	Reason for taking the course
BA in Economics Work at retail industry	" This course is also relevant to the retail industry I work for and I am sure I will gain knowledge and understanding to bring into the workplace."
BAS (Finance)	"I chose this course because I am an aspiring entrepreneur and would like to have a solid educational foundation before embarking on that journey. I would also like to develop the necessary tools for creating a sustainable and adaptable business plan and the appropriate strategies to implement such a plan."
BAS (Finance) Work as Business Analyst at a bank	"I have taken Introduction to ADMS 2700 in the past, I found it extremely interesting and applicable to everyday life." "It is not a mandatory course for my degree, however I believe it is applicable to any business and every organization. Our office has its own Business Continuity Plan and I am interested to see whether it covers all the aspects it should cover and if there a way to improve it."
BAS (Human Resource)	"I am taking this course as an elective as it seems interesting. I am hoping to gain knowledge that I can apply at my workplace from this course."
BAS (Management) Work as Director of Sales (a company that specializes in manufacturing state of the art packaging	"My interests in the business world have always been directed to the financial, commercial and managerial aspects pf the business cycle, but frankly I never paid to much attention to risk management and/ or Business Continuity Planning. after seeing the subject available and reading in greater detail what this course is all about, I realize that a fundamental part of my business education was missing and decided to learn more about this subject so I can be a better business person in my career and be prepared to handle and overcome unforeseen event is that may interrupt a company from continuing operating."
BAS (Management) Work as Bookkeeper and Operations Manager at a wholesaler company	"Business Continuity Planning caught my attention because I believe that as humans we always try to prepare ourselves in case something unexpected happens, call it natural disaster, a financial crisis, etc. However, I really never thought how a business could be prepared and have a plan to continue its operations within or after unpredictable circumstances. I find it fascinating to have the opportunity to learn something that can not only help me as an individual but also help many people that could be in danger or out of a job if a business is not prepare for the unforeseen."
BAS Work at a Transit company	"This <i>online course</i> is very convenient for me. We are living in very serious times anything can happen. We need to be prepared just in case."

Ali Asgary

Business Continuity and Disaster Risk Management in Business Education: Case of York University

APPENDIX 2. Continuation

Field of Study	Reason for taking the course
Business Administrative Studies (Finance)	"I decided to take this course because I am a looking to broaden my knowledge of business outside of the finance stream. I have had very little experience with business continuity in the past so I am expecting to learn a great deal from this course."
Alumni from York in Information Technology	"I am taking the course because of interest in business continuity in IT most specifically how institutions can respond to Security breaches from determining critical assets to responding and recovery."
BAS (Accounting) Work at Investment Firm	"because it's online". "I know for sure it's going to apply to real life situations because a couple of months ago, my Chief Compliance Officer actually had me help him with the firm's business continuity plan."
BAS Program Work at a HR Firm	"will allow me to broaden my knowledge and experience. I know with the concepts I learn I will be able to apply them to real life situations".

DISASTER RISK MANAGEMENT AND BUSINESS EDUCATION: THE CASE OF SMALL AND MEDIUM ENTERPRISES

LA GESTIÓN DEL RIESGO DE DESASTRES Y LA EDUCACIÓN DE NEGOCIOS: EL CASO DE LAS PEQUEÑAS Y MEDIANAS EMPRESAS

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ABSTRACT

It is safe to say that building disaster resilience by preparing for disasters with a business continuity plan is vital for small business to thrive in the long run. More often than not, small business owners invest large sums of money, time, and resources to make their ventures successful and yet, many of them fail to properly plan and prepare for disaster situations. With this problem in mind, Florida International University (FIU) became the house of the Small Business Development Center (SBDC) and the Extreme Events Institute (EEI). Together, both institutes have collaborated in their mission to spread disaster resilience and business continuity management knowledge and best practices in an accessible way to small businesses in South Florida and Latin America. By developing and disseminating knowledge, processes and best-practices through several activities and channels such as business consulting and business continuity plan elaboration, *Pasantías (Practicums)*, and the Disaster Resilience Toolkit for Small-and-Medium Sized Enterprises, both institutes truly represent FIU's experience with SMEs and its commitment with entrepreneurship and South Florida's community.

KEYWORDS

Business continuity; business education; disaster resilience; mainstreaming disaster risk reduction; SMEs.

RESUMEN

Es posible afirmar que la construcción de resiliencia de negocio a través de la preparación para los desastres utilizando un plan de continuidad de negocio es vital para el desarrollo de las pequeñas empresas en el largo plazo. No pocas veces, los dueños de las pequeñas empresas invierten grandes sumas de dinero, tiempo y recursos para hacer exitosos sus emprendimientos y, sin embargo, muchos de ellos fracasan en la apropiada planeación y preparación para las situaciones de desastre. Con este problema en mente, Florida International University (FIU) se convirtió en la casa del Centro de Desarrollo de Pequeñas Empresas (SBDC) y del Instituto de Eventos Extremo (EEI). En conjunto, ambos institutos han colaborado en su misión de difundir el conocimiento y las mejores prácticas en cuanto a resiliencia de desastres y gestión de la continuidad de negocio de una manera accesible a las pequeñas empresas del Sur de la Florida y de América Latina. Por medio del desarrollo y la difusión de conocimiento, procesos y mejores prácticas a través de diferentes actividades y canales, como la consultoría empresarial y la elaboración de planes de continuidad de negocio, *Pasantías (Practicums)* y del Kit de Herramientas de Resiliencia de Negocio para las Pequeñas y Medianas Empresas, ambos institutos representan verdaderamente la experiencia de FIU con PYME y su compromiso con el empresarismo y la comunidad del Sur de la Florida.

PALABRAS CLAVE

Continuidad de negocio, educación de negocios, resiliencia de negocio, incorporación de la reducción del riesgo de desastres; PYME.

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INTRODUCTION

Even as small business owners invest large sums of money, time and resources to succeed, lack of proper planning and preparation for disaster events often leads to significant losses and failed ventures. This is especially true for the community of small business owners in South Florida where disaster risk is a constant. Florida International University (FIU), cognizant of the needs of South Florida's small business community, made a commitment to promote and support entrepreneurship in South Florida at the time of its inception in 1965. The longstanding relationship continues to thrive until today. In the 1970s, FIU expanded its pledge by reaching out to the Latin American and the Caribbean region as it launched programs and began recruitment with an international focus (Florida International University, 2016b). FIU has since promoted several initiatives and institutes to help spur and develop the entrepreneurial spirit in South Florida, and eventually in the Latin American and Caribbean region.

Along with the need to develop the entrepreneurial spirit in the region, FIU's mission has been to spread the knowledge and best practices in disaster resilience and business continuity management to small businesses in an accessible way. Aligned with this mission, FIU became the house of the Small Business Development Center (SBDC) and the Extreme Events Institute (EEI). The Center collaborates with FIU's College of Business to provide South Florida's entrepreneurs with professional business consulting at no cost, management training, and vital information they need to grow and succeed in a complex and competitive global environment (Florida Small Business Development Center Network, 2016). The Extreme Events Institute, working under the Vice President's Office for Research & Economic Development, embodies FIU's research and applications leadership at the global level in extreme events, reflecting an institutional interest in development and multi-hazard disaster resilience, including disaster risk management, vulnerability reduction, preparedness, emergency response, resilience, and "smart" recovery (Florida International University, 2016a). The EEI brings the latest research on disaster risk for the benefit of the business community, with special emphasis on Small and Medium Enterprises.

BACKGROUND

While knowledge of disaster resilience and business continuity is commonplace among large business managers, small business owners are often unaware of the costs of not preparing for unexpected events and disasters. In addition, some never get a chance to recover after being affected by such events. According to the Insti-

tute for Business and Home Safety study, an estimated 25 percent of small to mid-size businesses do not reopen following a major disaster (U.S. Small Business Administration, 2016). Another study, conducted by the University of Texas, has shown that about 43% of all businesses that experience a catastrophic data loss never reopen, and 51% shut down within two years (Armstrong, 2007).

Furthermore, 80% of companies that do not recover from a disaster within one month are likely to go out of business; 75% of companies without business continuity plans fail within three years of a disaster; companies that aren't able to resume operations within ten days (of a disaster hit) are not likely to survive; and of those businesses that experience a disaster and have no emergency plan, 43% never reopen. Of those that do reopen, only 29% are still operating two years later (HP & Score, 2008). An infographic by the Eastern Kentucky University Department of Safety, Security, and Emergency Management (Eastern Kentucky University, 2016) further informs on the impacts of natural disasters on small businesses (Figure 1).

DISASTER RISK MANAGEMENT AND BUSINESS EDUCATION: THE CASE OF SMALL AND MEDIUM ENTERPRISES

A study on Private Sector and DRR was led by FIU and supported by USAID/OFDA (Office of U.S. Foreign Disaster Assistance) and the UNISDR (United Nations Office for Disaster Reduction), in collaboration with researchers of the INCAE Business School (Costa Rica), the University of Chile, Ohio University, and York University (Canada). The study was conducted in six cities of the Americas in 2012: Bogotá (Colombia), Miami, FL (United States), San José (Costa Rica), Santiago (Chile), Kingston (Jamaica), and Vancouver (Canada).

With close to 1300 survey responses, the key findings were: (1) 56% of respondents indicated that they do not have a Business Continuity Plan (BCP) in place; (2) 36.5% of businesses considered that BCP is desirable but other priorities take precedence; (3) the lack of protection in private sector is caused not only by financial constraints, but also by the still not well-understood issues of avoidance, competing priorities excuses, narrow decision-making, and concerns over accountability; (4) small businesses show the least progress in establishing business continuity plans (14%), compared to larger businesses (44.9%); (5) there are insufficient incentives for DRR strategies to have practical impacts on business vulnerabilities and lack of resilience; (6) implementing regulations and enforcement mechanisms are weak to non-existent; and (7) little progress has been made in social responsibility and commitment to reducing the vulnerabilities of at risk populations.

Box 1: FIU-DRR Program's 2012 study

Private Sector and Disaster Risk Reduction: The Cases of Bogota, Miami, Kingston, San Jose, Santiago and Vancouver

According to the study conducted by Sarmiento et. al (2013) with business owners from Bogota, Miami, Kingston, San Jose, Santiago, and Vancouver, the events that inspired major concern between managers are power outages (55.1%), followed by damage to facilities, equipment, and inventory (53.7%), and loss of telecommunications (38.2%). Other disruptive events feared by managers are water outages and supply chain disruptions, listed as disruptions of major concern by at least 32% of all sample respondents.

Additionally, the study indicates a correlation between company size and the presence of a business continuity plan. A far greater percentage of respondents from small businesses (those with fewer than 100 employees) indicated that their businesses had no BCM plans (65.8%). In comparison, about 28.7% of respondents from companies with 100 to 499 employees and 23.3% of respondents from companies with 500 or more employees indicated that no plan was currently in place. This highlights the fact small businesses are 59% more vulnerable to hazard and less prepared to build resilience in the aftermath.

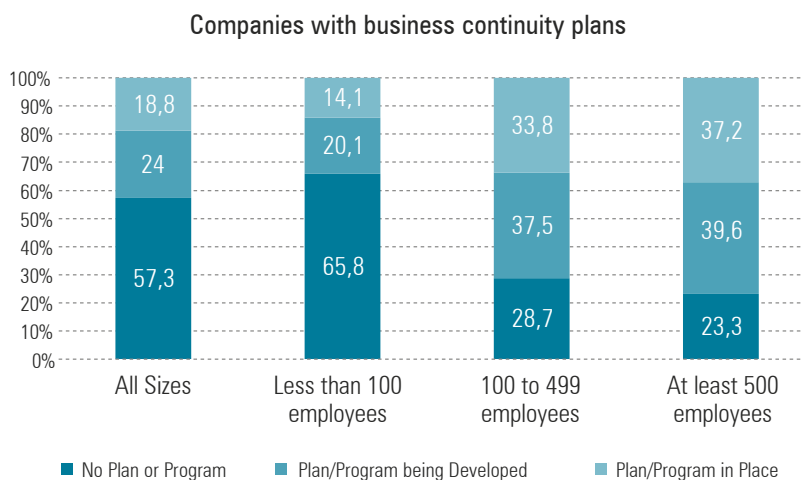


Figure 1: Percentage of companies

Source: Sarmiento, J.P., Hoberman, G., Ilcheva, M., Asgari, A., Majano, A. M., Poggione, S. and Duran, L.R. 2012. Private Sector and Disaster Risk Reduction: The Cases of Bogota, Miami, Kingston, San Jose, Santiago and Vancouver. Background paper prepared for the 2013 Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: UNISDR. <http://www.preventionweb.net/gar>.

A robust body of research has demonstrated the importance of Disaster Resilience and Business Continuity for small businesses. Asgary et al. (2012) highlight the size of a business as the most significant factor on disaster impact on businesses. Some researchers suggest that a smaller business size is a major source of vulnerability to negative disaster outcomes (Alesch, Holly, Mittler & Nagy, 2001), while others argue that smaller businesses suffer disproportionately greater losses than larger businesses (Kroll, Landis, Shen & Stryker 1990). Further research suggests that smaller businesses have fewer resources to plan, respond, and recover from disaster impact (Runyan, 2006), which is in line with data that points that businesses with fledging financial conditions and smaller businesses have less chances of recovering from disaster related losses (Tierney & Dahlhammer, 1997).

Additional research also reflects on the ownership of the business premises as an important predictor that affects the preparedness and recovery. Researchers argue that owning a business facility provides more access to financial resources than renting (Dahlhammer & Tierney, 1996), and that one of the major impediments for small business in preparing for disaster was renting their business facilities (Dahlhammer & D'Souza, 1997). Further corroboration of these findings suggests that owners are more engaged in disaster preparedness than lessees (Asgary et al., 2012).

It is safe to say that building disaster resilience by preparing for disaster with a business continuity plan is vital for small business to thrive in the long run. More often than not, small business owners invest large sums of money, time, and resources to make their ventures successful and yet, many of them fail to properly plan and prepare for disaster situations (U.S. Small Business Administration, 2016). Possible explanations for this vary, ranging from small business owners' disbelief that a disaster would strike them, prohibitive costs, lack of resources, and general belief that a business continuity plan is not necessary (Hammock, 2015). Figure 3 describes business owners' reasons for not investing in a business continuity plan.

Primary Reason for Not having Business Continuity Plan

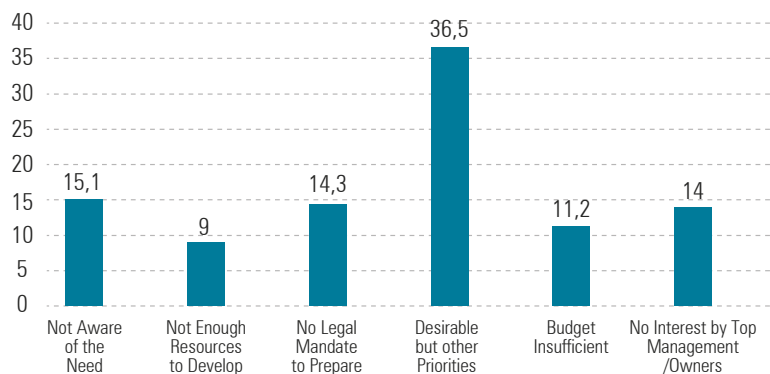


Figure 2: Primary Reason for Not Having Business Continuity/Crisis Management Plan.
Source: Sarmiento et al. 2012.

Small business owners who claim that a business continuity plan is an unnecessary investment or that is not a high priority project for implementation in their enterprises might not realize the significant benefits reaped from such plans, especially in terms of return in investment (ROI). Many organizations utilize ROI procedures, a formula that measures and compares the tangible benefits of expenditures and discounts with those that are intangible, to quantify financial success of an investment and justify the necessary expenditures. Business continuity management benefits stem from understanding how “intangible” areas can also influence tangible business decisions, and this knowledge may reap relevant ROI results and tangible benefits (Cybulski, 2016).

Therefore, utilizing ROI calculations to make a case for investment in a business continuity management program may understate its real benefits. The complete range of benefits offered by a business continuity plan is only recognized after the planning and implementation processes have been completed (Cybulski, 2016). By understanding a business continuity plan, its objectives and planning components, small business owners can better understand the tangible and intangible benefits derived from it.

BUSINESS CONTINUITY PLAN

A business continuity plan can be described as “a set of technical, administrative, and management activities aimed at planning the steps to recover and restore critical business assets after an unforeseen event has impaired corporate functions.” (Cremonini & Samarati, 2008, p. 671) The objective of a business continuity management plan is to define all the process, protocols, assets, and benchmarks for an organization to develop plans ensuring the safety of employees, its community and the continuity of time-sensitive operations (Cybulski, 2016). It is also important to highlight that, since unforeseen events can disrupt a business’ operation and cause revenues loss, a business continuity plan to resume normal operations is essential not only for the survival of the company, but also for the recovery of the region where the business operates (Savage, 2002).

Scholars argue that business continuity planning originated during the 1970s, when mainframes and network technology gained prominence within business and methods of securing the data from unpredicted events that could undermine them (Cremonini & Samarati, 2008). Nowadays, BCP has evolved together with business models, expanding its focus from technology infrastructure to all the processes and management procedures involved in the continuation of the business in its entirety. The idea is that reducing down-time periods also accelerates recovery and business restoration (Cremonini & Samarati, 2008).

According to Aon Global Risk Consulting, three steps are essential when developing a business plan that is efficient and complies with standards, codes and best practices: 1) the Discovery Phase, which consists of business impact analysis and risk assessment; 2) the Planning Phase, composed of the emergency response

and management and crisis management and communications steps; and 3) the Governance Phase, which follows the plan auditing, updating and exercising procedures (Figure 4).

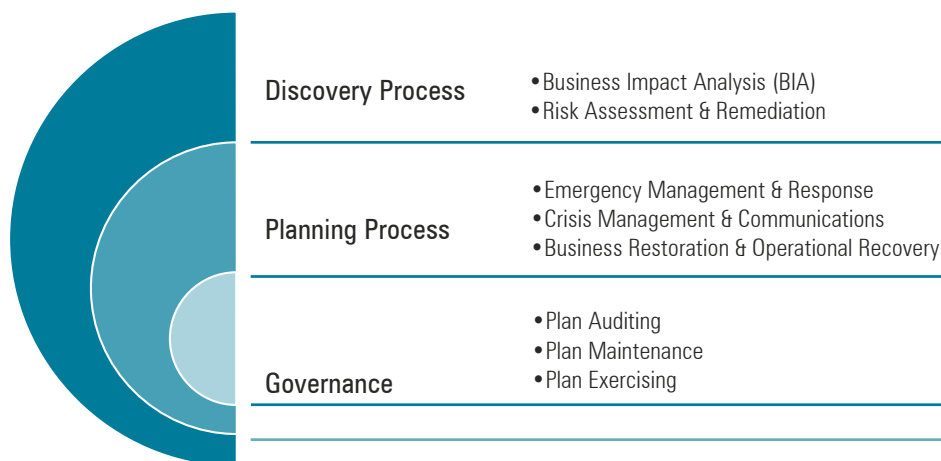


Figure 3: Adapted from The Three Steps of a Business Continuity Plan (Cybulski, 2016)

The Discovery Process phase of a business continuity plan seeks to identify potential risks that a company is exposed to, and measure the amount of disruption an organization can withstand or those that must be addressed. The first process of the Discovery Phase is the Business Impact Analysis (BIA), which seeks to identify and qualify the time-sensitive business functions and processes. By measuring these processes, organizations are enabled to understand the point in time when an impact starts to drive negative consequences. Once these impacts are understood, the organization can develop the framework to accept, remediate, or develop planning strategies to support organizational recovery (Cybulski, 2016). The next step in the Discovery Phase is the risk assessment and remediation (RA), which yields measurable results by quantifying and qualifying those risks and threats that can disrupt the organizations ability to continue time-sensitive business functions and processes (Cybulski, 2016).

The second phase, the Planning Process, is composed of three separate but integrated plans to coordinate activities, authorities, and responsibilities during disasters. These plans utilize the information captured and analyzed during the Discovery Process phase to ensure the organization not only survives catastrophic events, but can more effectively manage the situation, and drive operational resiliency (Cybulski, 2016). The Emergency Management & Response plan outlines the initial strategies for responding to, and stabilizing an unforeseen event. First responders are responsible for life safety, stabilizing the incident, qualifying and remediation of damage, and communicating to authorities and the Crisis Management Team (Cybulski, 2016).

The second plan to compose the Planning Process phase is the Crisis Management & Communications plan, which bridges the responsibility and coordination between the response team and business restoration and operational recovery; providing leadership, decision-making, and communications structure to support the restoring of critical functions. The last plan to compose the Planning Process is the development of business restoration and operational recovery plans, which includes the strategy development, documentation and deployment of activities required to restore and recover functional operations to meet or exceed the recovery time objective (Cybulski, 2016).

Lastly, the Governance phase provides the organization with the ability to keep the business continuity plans updated and accurate to their situation and risks. Three steps are devised in order to take on that task: plan auditing, updating, and exercising. Plan Auditing provides a formalized method for measuring the management of business continuity processes, and determining the effectiveness of the organization's objectives, and understanding of capabilities or maturity of the plans. Plan Updating ensures accurate and up to date strategies; resources and agreements have been documented in compliance with the business continuity policy. The Plan Exercising step is then conducted on a preset schedule in order to allow the participating teams to practice the plan implementation, strengthen responsibilities and capabilities while identifying improvements to strategies and resources (Cybulski, 2016).

It is important to highlight that these are general and broad steps that business continuity plans include in order to assess disaster risk and to provide guidelines for swift recovery of operations. Managers and small business owners that possess the full knowledge of their business will be able to fine tune the BCP to their company's needs. Additionally, disasters can take several forms. Some primarily affect individuals, while others have a larger, collective impact, such as natural and manmade disasters. Even though some of them may only cause short-term disruptions in normal business operation, the recovery of an impacted area from the many disasters can take much longer, especially if organizations have not made preparations in advance (Disaster Recovery, 2016).

FIU, BUSINESS CONTINUITY AND SMES FROM SOUTH FLORIDA AND LAC

Based on the 2012 public-private study conducted by FIU-EEI, particularly on the findings that business size matters and that there is an urgent need to overcome "risk indifference", FIU understood the challenge and initiated a comprehensive strategy to focus on small businesses to help them incorporate business continuity plans (BCP) and disaster risk reduction measures in their daily operations. In 2014, the EEI-DRR program began the project involving business school representatives from the USAID/OFDA priority countries to expose them to the BCP-DRR approach in order to mainstream disaster risk reduction into their academic programs and community services. The project emphasizes partnerships between universities, national emergency organizations, chambers of commerce, and small business associations (tourism, food and agriculture, services) at national, sub-national, and local levels.

The initiative encompasses four interventions: (1) developing a Small-and-Medium Enterprise (SME) disaster resiliency and recovery toolkit (in collaboration with the FIU Small Business Development Center (SBDC) to merge BCP and DRR into one single, comprehensive, and practical guideline; (2) translating that guideline into Spanish and adapting it to the Latin American and Caribbean environment; (3) implementing a ‘train the trainers’ strategy on the toolkit’s usage; and (4) developing an SME application (SME app) (in collaboration with the FIU-Digital Communications Unit), based on the information in the SME toolkit. The SME App, developed for both iOS and Android mobile devices and tablets, will be available in both English and Spanish.

In addition, FIU-EEI joined the UNISDR (United Nations Office for Disaster Reduction) Private Alliance for Disaster Resilient Societies (ARISE) in 2013, leading Activity Stream #4: State of the Art Disaster Risk Management, Education, Training, and Outreach. In 2015, UNISDR and ARISE, with support from the Federal Government of Germany’s Ministry for Economic Cooperation and Development (BMZ) partnered with FIU-EEI and twelve leading business schools to improve or introduce disaster risk management in higher education curricula and training services, which supports Priorities for Action I, III, and IV of the Sendai Framework. The process began with a call for White Papers that proposed innovative approaches to mainstreaming cutting-edge disaster management content into MBA programs and other academic offerings, themes addressed at the Toronto’s DRR and Business Education Workshop in March 2016. The project also sought to engage the support of larger experienced corporations, particularly those working in public-private partnerships.

The Small Business Development Center (SBDC) and the Extreme Events Institute (EEI) head Florida International University’s commitment to South Florida’s community of Small and Medium Business Enterprises. . Both institutes have developed activities with cutting-edge knowledge of Business Continuity in order to provide support and increase the disaster resilience of the SMEs community. The SBDC activities with the Small Business community focus on South Florida’s hurricane season, helping owners understand and assess the disaster impact on their business. Additionally, the SBDC presents Business Continuity as an achievable competitive advantage for small business owners, while helping to build disaster resilience by exposing stakeholders to essential concepts such as risk management, contingency planning, emergency preparedness, disaster recovery planning, succession planning, business continuity planning, cyber-security assessments, and disaster recovery planning.

The following are a collection of materials that the SBDC utilizes in their training and consulting activities:

- **SBDC Disaster Checklist:** A general checklist of everything that is vital for the small business owner to run its company. The checklists contain advice on how to prepare the essential aspects of the business, such as employees, customers, suppliers, equipment, property, company records, and insurance related information.

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- **Disaster Tabletop Exercise:** The SBDC provides small business owners with training by applying scenarios in order to assess a business's disaster resilience. The purpose of the exercise is to review and discuss the actions they would take in a particular emergency, testing their emergency plan in an informal, low-stress environment.
- **SBDC Data and Cyber-Security Checklist:** The institute also provides data and cyber-security advice for small business owners in order to increase their protection against cyber-attacks and critical data loss. The advice ranges from internal procedures to minimize risk to hardware and asset management.
- **Disaster-related Apps:** The SBDC also provides small business owners with additional sources of information and tools to help build disaster resilience for small business owners. The following are the most popular apps for disaster preparedness and recovery:

Box 2: Popular apps for disaster preparedness and recovery

Disaster-related Apps

Below are some of the most popular apps for disaster preparedness and disaster recovery:

1. Red Cross

The Red Cross is the gold standard in terms of quantity and quality of disaster apps. Their apps include first aid apps, hurricane apps, shelter finder apps, and a very informative app for children teaching them disaster preparedness tips. <http://www.redcross.org/prepare/mobile-apps>.

2. ICE Standard

This app helps first respondents and emergency room personnel locate a person's updated medical information, emergency / medical contacts, medical insurance information, blood type, name, address and a photo verification of the individual. It backs up this information on your phone, so you can access it in your car with family/friends. <http://emergencystandard.org/apps>.

3. FEMA

If you download this app, you can receive alerts from National Weather Service for five different locations, access maps of disaster resources and shelters, and utilize other features. The app also has Spanish language capability and allows you to access Federal disaster assistance from your smartphone. <http://www.fema.gov/mobile-app>.

4. Hurricane Tracker

This is a very comprehensive app focused on hurricane-related information. You can see live hurricane briefings, access NOAA weather radio, see detailed satellite loops and maps, and receive updates on your phone. <http://itunes.apple.com/us/app-hurricane-tracker/id327193945>.

5. Emergency Radio

The Emergency Radio app gives you live access to EMS, police, fire, NOAA weather and other frequencies. You can add favorites to quickly access those frequencies in an emergency. <http://www.edgerift.com/emergency-radio/>.

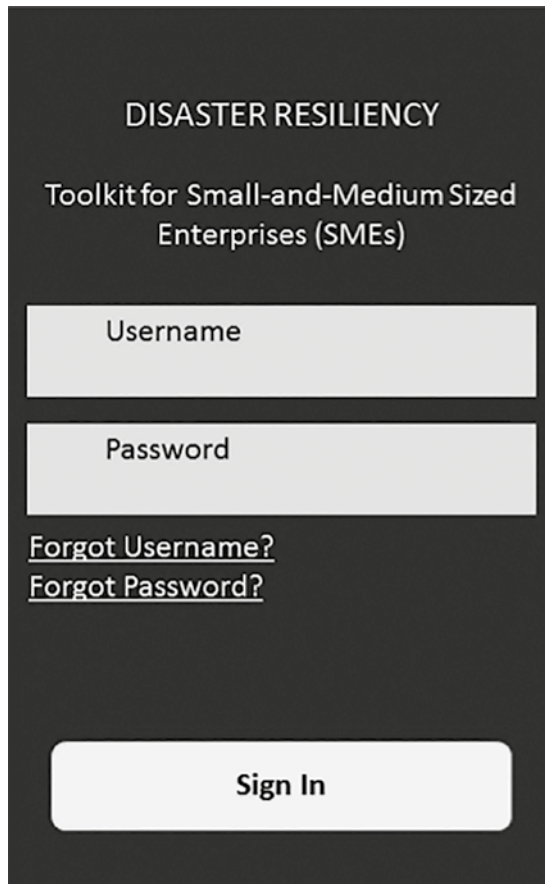
The Extreme Events Institute has also developed several activities and tools in order to provide small business owners and other stakeholders to improve their businesses' disaster resilience. One of the best examples of EEI's engagement with the small business community is the promotion of *Pasantías*, or practicums in English. The motivation behind the *Pasantías* is to bridge the gap between the conceptual, the operational and the practical by combining site visits, presentations, real world observations, and discussions, taking advantage of noteworthy experiences and capabilities in South Florida.

The *Pasantías* aim to bring together professionals, technicians and leaders working in public administration, project management, non-government and international organizations, private sector, and academic institutions who have disaster risk reduction and/ responsibilities, putting special attention on those who can guide or influence their institutions toward improved disaster risk reduction and resilience. The *Pasantía* also looks at Business Continuity and Disaster Resilience from a high-level research down to community preparedness and illustrates the private sector's corporate social responsibility of developing Emergency Plans and Business Continuity Plans. A noteworthy fact of the *Pasantías* is that it not only involves stakeholders from South Florida's multi-cultural environment but also from Latin America and the Caribbean, extending its reach and commitment to small business owners and informal sector operating in those countries. The *Pasantías* provides real examples of topics such as risk identification and vulnerability assessment, risk reduction and transfer, and disaster management, recovery and business continuity plans.

Another example of EEI's activities aimed towards disaster resilience and business continuity for small business is the new Disaster Resiliency Toolkit for Small- and Medium Sized Enterprises (SMEs). This initiative is embodied by a mobile app that allows its users to have an accessible and easy-to-understand way to build

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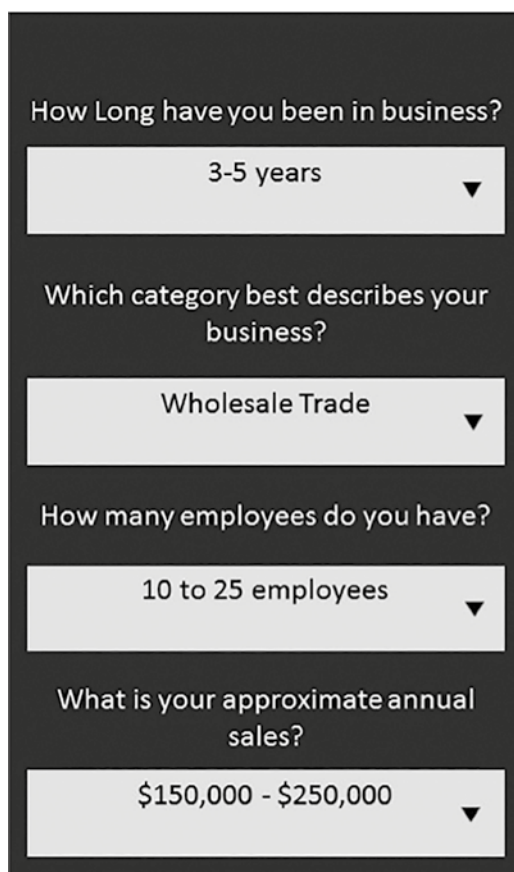
disaster resilience by self-designing and implementing business continuity plans for their organizations.



The image shows a dark-themed mobile application interface for disaster resilience. At the top, the text reads "DISASTER RESILIENCY" followed by "Toolkit for Small-and-Medium Sized Enterprises (SMEs)". Below this, there are two input fields: "Username" and "Password". Under the password field, there are two links: "[Forgot Username?](#)" and "[Forgot Password?](#)". At the bottom of the screen is a large, rounded rectangular button labeled "Sign In".

Figure 4: The SME App's initial screen (FIU-Disaster Risk Reduction Program, 2016)

The app allows users to answer a predetermined questionnaire about their organization that can relate from its assets, business category, number of employees, annual sales and more. The questionnaire is the first step a user takes to assess the risks their businesses face and a fundamental step for the construction of a solid and reliable business continuity plan.



How Long have you been in business?

3-5 years ▼

Which category best describes your business?

Wholesale Trade ▼

How many employees do you have?

10 to 25 employees ▼

What is your approximate annual sales?

\$150,000 - \$250,000 ▼

Figure 5: Business Continuity questionnaire (Disaster Risk Reduction Program, 2016)

The Disaster Resiliency Toolkit for Small-and-Medium Sized Enterprises app offers a step-by-step approach to building a Business Continuity plan. The whole plan is composed of a business assessment, response and recovery steps. Inside each step, the app provides users with brief explanations of what constitutes the phase of the Business Continuity plan for a better understanding.

Juan Pablo Sarmiento · Gabriela Hoberman · Meenakshi Jerath · Gustavo Ferreira Jordao
Disaster Risk Management and Business Education: the Case of Small and Medium Enterprises

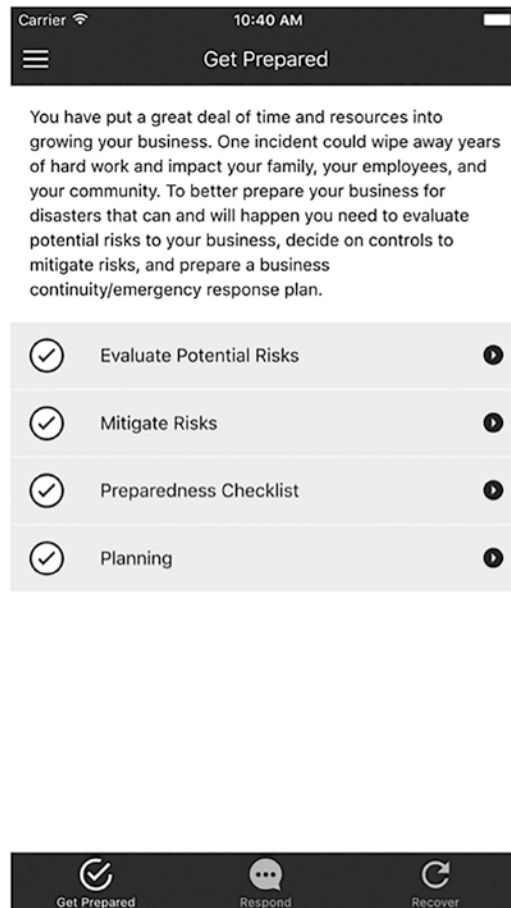
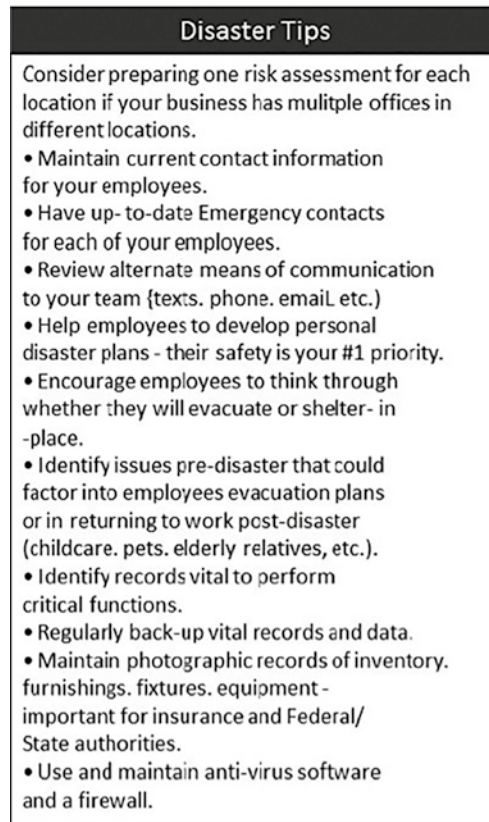


Figure 6: Business Continuity phases (FIU-Disaster Risk Reduction Program, 2016)

After the user completes filling all the categories to build its Business Continuity plan, the app provides useful advice for small and medium business owners and suggests other apps that will provide further information, allowing them to build disaster resilience into their organizations.



Disaster Tips

Consider preparing one risk assessment for each location if your business has multiple offices in different locations.

- Maintain current contact information for your employees.
- Have up-to-date Emergency contacts for each of your employees.
- Review alternate means of communication to your team (texts, phone, email, etc.)
- Help employees to develop personal disaster plans - their safety is your #1 priority.
- Encourage employees to think through whether they will evacuate or shelter-in-place.
- Identify issues pre-disaster that could factor into employees evacuation plans or in returning to work post-disaster (childcare, pets, elderly relatives, etc.).
- Identify records vital to perform critical functions.
- Regularly back-up vital records and data.
- Maintain photographic records of inventory, furnishings, fixtures, equipment - important for insurance and Federal/State authorities.
- Use and maintain anti-virus software and a firewall.

Figure 7: SME App's useful disaster tips (FIU-Disaster Risk Reduction Program, 2016)

The Disaster Resilience Toolkit for Small-and-Medium Sized Enterprises is a very useful tool for small and medium business owners to prepare for unforeseen events, as well as an accessible and educational tool to spread knowledge on how to build business continuity plans. The Disaster Resilience Toolkit for Small-and-Medium Sized Enterprises will be available in English and Spanish for both mobile operational systems iOS and Android by June 2016.

CONCLUSIONS

The quest to involve business schools in disaster risk reduction topics represented an important challenge during the last decade for all actors involved. Looking for windows of opportunity, the FIU-EEI DRR program has developed a systematic strategy with two approaches: first, identifying business schools to mainstream the crosscutting topics of disaster risk reduction. During this process, several business schools with key themes related to crosscutting issues of business and disaster risk reduction in their curricula were selected. Second, fostering a better collaboration between business schools and small business enterprises and associations. With this strategy in mind, the FIU-EEI DRR program, with support from USAID, has organized a workshop in Medellín, Colombia, in June 2016. The workshop aims at exposing leading business schools from six Latin American and Caribbean countries to the BCP-DRR approach to mainstream DRR into their academic programs and community services. FIU expects that business schools along with their national emergency organizations will reach out to other stakeholders, such as chambers of commerce and small business associations, after this experience.

Both institutes, SBDC and EEI, embody FIU's passion for entrepreneurship and its commitment to the SMEs community. The Small Business Development Center, by providing South Florida's entrepreneurs with a range of professional activities, such as business consulting and management training, plays a key role in disseminating vital information for small business owners and aspirant entrepreneurs to face the challenges of the global business environment, and build increasingly resilient operations against unforeseen events. The Extreme Events Institute sets a true example of FIU's "Worlds Ahead" spirit by leading research and applications in extreme events and developing cutting-edge knowledge in disaster resilience, including disaster risk management, vulnerability reduction, preparedness, business continuity, emergency response, and resilience. Together, these institutes make much more than a case for FIU's experience with Small-and-Medium Sized Enterprises.

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ADAPTATION TO CLIMATE CHANGE AND INTEGRATION OF DISASTER RISK MANAGEMENT IN BUSINESS EDUCATION: A CASE STUDY IN FUNDAÇÃO GETULIO VARGAS, BRAZIL

ADAPTACIÓN AL CAMBIO CLIMÁTICO E INTEGRACIÓN DE LA GESTIÓN DE RIESGO DE DESASTRES EN LA EDUCACIÓN DE NEGOCIOS: UN ESTUDIO DE CASO EN LA FUNDAÇÃO GETULIO VARGAS, BRASIL

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ABSTRACT

The aim of this paper is to discuss improvements for the Master in Sustainability Management of Fundação Getulio Vargas (FGV), in order to incorporate the topic of disaster risk management (DRM). Considering the risks and opportunities that climate change – and more specifically extreme weather events that can lead to disasters – represent to business, it is essential that business schools help prepare managers to deal with this critical sustainability issue. Therefore, it is extremely important to include this topic in management education. Aiming to support companies to assess and address business risks and opportunities derived from climate change, the Business for Climate Platform (EPC) of the Center for Sustainability Studies (GVces) of FGV has developed a framework and a tool for business adaptation strategies for climate change and implemented them with seven large companies in Brazil. Thus, based on EPC's experience, the paper brings a proposal for the inclusion of DRM in the MSM's syllabi, through the lens of climate change adaptation.

KEYWORDS

Climate change; adaptation; business education; disaster risk reduction.

RESUMEN

El objetivo de este trabajo es discutir mejoras para la Maestría de Gestión de la Sostenibilidad (MGS) de la Fundação Getulio Vargas (FGV), con el fin de incorporar el tema gestión del riesgo de desastres (GRD). Teniendo en cuenta los riesgos y las oportunidades que el cambio climático -y más específicamente los eventos extremos capaces de generar desastres- representan a las empresas, es esencial que las escuelas de negocios ayuden a preparar a los gerentes para hacer frente a este problema crítico de la sostenibilidad. Por lo tanto, es sumamente importante incluir este tema en la educación de gestión. Para apoyar las empresas en la identificación y actuación frente a los riesgos y oportunidades de negocio, la

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Plataforma Empresas por el Clima (EPC) del Centro de Estudios de Sostenibilidad (GVces) de FGV ha desarrollado un marco y una herramienta para construir estrategias de negocio para la adaptación al cambio climático y los implementó en siete grandes empresas en Brasil. Así, con base en la experiencia del EPC, este artículo aporta una propuesta para la inserción de GRD en los planes de estudios del MGS, a través de la lente de la adaptación al cambio climático.

PALABRAS CLAVE

Cambio climático; adaptación; educación de negocios; reducción del riesgo de desastres.

INTRODUCTION

According to the latest report from the Intergovernmental Panel on Climate Change (IPCC), released in full on January 30, 2014, there is no doubt about the occurrence of global warming, and that human influence has been its dominant cause since 1950 (IPCC, 2013). One of the main problems related to climate change is that it leads to an increase in the intensity and frequency of extreme weather events, which in turn can lead to disasters.

Disasters can seriously undermine business competitiveness and longer-term economic sustainability. Companies are affected by disaster-related direct losses to their assets and indirect losses in their supply chain, which can often be composed of small and medium enterprises (SMEs). SMEs “are more likely to lack risk awareness or struggle to find the capacity to manage disaster risks, mainly owing to financial, human resource and technical limitations” (UNISDR, 2013, p. 184), and few of them have been able to strengthen their capacities to manage disaster risks.

Seeking to increase resilience, large companies are trying to better understand what impacts of climate change are material, and what risks and opportunities are represented for each sphere of the business. In this context, there is an opportunity to include SMEs (the key suppliers in the risk assessment), and to develop a more robust adaptation plan as part of a business strategy. Therefore, knowledge and tools are needed to assist in the process. It is in this context that the work of The Center for Sustainability Studies (GVces) at the Business Administration School of Getúlio Vargas Foundation (FGV-EAESP) takes place.

Fundação Getúlio Vargas (FGV), founded in 1944 in Brazil, is a nonprofit organization that offers several services to the technical-scientific-business community and the society as a whole. The business school at FGV has three important accreditations: Association to Advance Collegiate Schools of Business (AACSB), the European Foundation for Management Development (EFMD) and the Association of MBAs (AMBA). In 2015, FGV was in 13th place among the global top think tanks and has been considered the best think tank in Latin America, according to the Global Go To Think Tanks Rankings 2015 (McGann, 2016).

The Center for Sustainability Studies (GVces) at FGV, in turn, was established in 2003 as a reference in the study of sustainability-related topics within the corporate and public contexts. The objective of GVces is to provide answers to economic agents to identify, measure and assess risks and opportunities concerning the environment, social responsibility and corporate governance. Four lines of action guide

its programs, which are capacity building, research and knowledge, articulation, and communication and outreach.

Climate change – mitigation and adaptation – is one of the most important research topics at GVces, which seeks to meet the growing interest of private and public sectors regarding the risks that climate change poses and potential opportunities still unexplored. GVces has initiatives related to climate change (Appendix 2), and among them, specifically working with the business sector, there is the EPC (Portuguese acronym for Business for Climate Platform)

Launched in 2009, in partnership with The Prince of Wales's Corporate Leaders Network (CLN) for Climate Action, and supported by its 27 Founding Companies, EPC today is a platform of 35 Member Companies working towards one goal: to mobilize, raise awareness and connect business leaderships for GHG emission management and reduction practices, climate risks management, and to propose public policies and positive incentives related to climate change in Brazil. The EPC platform engages companies not only with discussions and actions related to reduction and management of GHG corporate emissions, but also with the sector's positioning with regards to climate-related issues, and in building proposals for public policies that can contribute towards a low-carbon economy in Brazil. Recently, GVces, along with the British Institution UKCIP, under the Platform, launched a tool to help companies better understand their vulnerabilities and risks to climate change, and also build an adaptation strategy and plan.

Besides the EPC, GVces leads several other projects on climate change in partnership with public and private sectors, producing applied research and supporting and influencing the decision-making processes. At the same time, GVces has a broad range of teaching experience on sustainability and climate change and their connections with business and economics. GVces is the academic coordinator of two fully-operational courses (an undergraduate and a master's degree) and two courses that will be launched in August 2016 at FGV (Appendix 1). All courses are grounded in applied research conducted by GVces. These courses are part of a series of initiatives that responds to FGV's commitment to PRME – the United Nations Principles for Responsible Management Education. The PRME were developed in 2007 by an international taskforce to promote a global engagement platform for academic institutions, setting six principles that lay the foundation for a global platform for responsible management education. In 2009, FGV became one of its more than 500 worldwide signatories.

Concerning the master program that is operational, GVces has been academically managing the Master in Sustainability Management (MSM) for more than ten years. The objective of this program is to engage participants in the sustainability potential as a key strategic factor for achieving and maintaining competitive advantage in an increasingly globalized environment, as well as providing tools for participants to evaluate results, identify risks and opportunities. Furthermore, GVces is academically involved in the development of two other Master's degrees at FGV, one at the School of Economics, and the other at the Business Administration School. The first one, the Professional Master's degree in Economics (MPE) with emphasis

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on Sustainable Development, examines issues regarding environment, society and economy. The second one, the Professional Master's degree in Business Administration (MPA) with emphasis on Sustainable Development, will also involve environmental issues, social responsibility and corporate strategies in order to achieve sustainable development.

Considering the risks and opportunities that climate change – and more specifically extreme weather events that lead to disasters – represent to business, it is essential that business schools help prepare managers to deal with this critical sustainability issue. Therefore, it is extremely important to include that topic in management education. In this context, the aim of this paper is to discuss improvements for FGV's Master in Sustainability Management in order to incorporate the topic of disaster risk management, based on the experience of the Business for Climate Platform, in developing business adaptation strategies for climate change.

The paper is structured as follows: it presents a literature review on management education for sustainability, with particular emphasis on climate change. It also presents the main theoretical approaches towards climate change as risks for companies as well as Disaster Risk Management (DRM). The following section explains the methods used and then it brings the empirical results. This section is divided in two subsections, which, respectively, covers GVces broad research experience with adaptation to climate change and explains in detail the Master in Sustainability Management (MSM). Finally, recommendations to increase adaptation and disaster risk management in MSM based on GVces' broad research experience and on the literature review are presented. Also, it discusses other recommendations to incorporate adaptation and disaster risk management in other FGV courses. Section 6 wraps up with conclusions.

LITERATURE REVIEW

Climate change and disasters: implications to business

The impact that an extreme weather event has on society and the environment depends on the degree of vulnerability and exposure of the system. The greater the magnitude of the impact, the greater the severity of the disaster. Each decision and action taken by society makes it more vulnerable or more resilient to disasters (UNISDR, 2016). In this sense, there are two fronts: mitigation and adaptation. Mitigation seeks less carbon-intensive development paths in order to avoid and reduce GHG concentrations' increase in the atmosphere. Adaptation, in turn, seeks to attenuate the already irreversible effects of climate change on natural and human systems and influence the socio-economic development towards models and arrangements that are more resilient. Disaster risk reduction can be part of both fronts, through systematic efforts not only to analyze and reduce the causal factors of disasters, but also to improve preparedness for adverse events that are likely to occur due to the irreversible effects of climate change.

Disasters affect the lives of millions of people around the world. In recent decades, those phenomena have caused the deaths of several million people, and the average

annual loss of life was estimated at 150,000. In addition, financial losses exceed US\$ 50 billion a year and these costs do not include losses such as unemployment, mental illness and reduced productivity (Keller & Blodgett, 2008). Data released by the United Nations (UN) shows that disasters, only in the twenty-first century, have cost the global economy the equivalent of Brazil's GDP, and the costs in total would reach US\$ 2.5 trillion in the first thirteen years of the century (UNISDR, 2013).

Considering that data and the fact that climate change has already been increasing the intensity and frequency of extreme weather events, the importance of investing in adaptation becomes clear. Since impacts occur in various segments of the economy and public policy areas, without observing social, sectoral or geographic boundaries, adaptation requires the efforts of a wide range of actors, including multilateral organizations, governments, local communities, scientists, companies, and civil society organizations, among others. In this context, the private sector has a great potential to contribute to this agenda: whether in a broader context, in which it generates business value through the provision of knowledge and resources to society, or by developing their own adaptation strategies to manage risks and opportunities to business.

Disasters can seriously undermine business competitiveness and longer-term economic sustainability. Companies are affected by disaster-related direct losses to their assets and indirect losses in their supply chain, causing a fall in output and revenue, which affects profitability. Additionally, considering the context of globally- integrated economies, wider impacts and macroeconomic effects also affect business. Considering that global trade, financial markets and supply chains have become increasingly interconnected, local disasters' impacts are not only felt in the company's own operation, but they also ripple through regional and global supply chains (UNISDR, 2013). A survey on global risk management in 2015 has shown that disaster risk is listed as the eighteenth most important risk out of the top 50, and as the ninth most important driver strengthening risk management (Aon Risk Solutions, 2015). Considering that, in most economies, 70-85% of overall investments are made by the private sector, it is possible to understand that private investment largely determines disaster risk. Because of this, both regulators and investors are increasingly demanding that businesses disclose their hidden risks, which includes disaster risks (UNISDR, 2013). Thus, it is relevant for businesses to invest in disaster risk management.

If, on one hand, businesses are increasingly concerned with disaster-related direct and indirect losses that affect their profitability, on the other hand, disaster risk management can also be a business opportunity. Companies are starting to recognize DRM and invest in the development of products and services – such as new crop-insurance products and more resilient infrastructures –, which leads to the expansion of existing markets and also the creation of new markets (UNISDR, 2013).

The four priority steps brought by the “Sendai Framework for Disaster Risk Reduction” help companies design a disaster risk management strategy (UNISDR, 2015):

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- **Priority 1. Understanding disaster risk:** Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.
- **Priority 2. Strengthening disaster risk governance to manage disaster risk.** Disaster risk governance at the national, regional and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.
- **Priority 3. Investing in disaster risk reduction for resilience.** Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.
- **Priority 4. Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.** The growth of disaster risk means there is a need to strengthen disaster preparedness for response, take action in anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase is a critical opportunity to build back better, including through integrating disaster risk reduction into development measures.

In this context, “embedding disaster risk management in business processes is increasingly seen as a key to resilience, competitiveness and sustainability in an increasingly unpredictable world” (UNISDR, 2013, p. viii). Thus, considering the risks and opportunities that climate change – and more specifically disasters – represent to business, it is essential that business schools help prepare managers to deal with this critical sustainability issue. Therefore, it is extremely important to include that topic in management education.

Sustainability in management education

Sustainability in management education, in general, is a recent phenomenon (Rands & Starik, 2009) that began around 1990. Over the past years and especially in the past decade, attention to business sustainability has expanded and various studies have been published on how to integrate sustainability into business and management education (Rusinko, 2010). The way a business school is going to address sustainability depends on what it considers to be strategic (Lindgren et al., 2006; Scott & Gough, 2006), so it is important to consider the institution’s goals, resource constraints and also the best approach to start with.

Literature recommendations for sustainability’s integration into business and management education include:

- Sustainability needs to be integrated both into management education and across the business school (Rusinko & Sama, 2009).

- The three dimensions of sustainable development (environmental, social and economic) should be addressed simultaneously, not separately (UNESCO, 2004).
- Both curricular and co-curricular engagement is important, once co-curricular options for sustainability allow students the opportunity for additional experiential and applied learning outside the classroom (Ahren, 2009).
- Sustainability can be integrated not only within and across disciplines (Shriberg, 2002), but also beyond the management discipline, into a broader business curriculum (Steketee, 2009).

To assist in the effective integration of sustainability into management and business education, Rusinko (2010) proposes a matrix of options to its implementation (Figure 1): through existing structures or by creating new structures, and through discipline-specific focus or cross-disciplinary focus.

Focus	Delivery	
	Existing Structures	New Structures
Narrow (Discipline-Specific) Curricular	I. Integrate into existing course (s)	II. Create new discipline-specific sustainability course(s)
Co-Curricular Options	<i>Service learning, Competitions, Common experiences, Clubs, Activities, Committees</i>	
Broad (Cross-Disciplinary) Curricular	III. Integrate into common core requirements	IV. Create new, cross-disciplinary sustainability course(s), minor(s), major(s), program(s)

Figure 1. Matrix to Integrate Sustainability into Management and Business Education.
Source: Rusinko, 2010.

The Matrix is divided into four quadrants. In the first one, existing structures do not suffer changes, and sustainability comes punctually in disciplines as a topic, case or module. It is an introductory/trial approach to sustainability. In the second quadrant, a new structure is created, such as a sustainability topic within an existing course. This option distinguishes discipline with respect to sustainability. The third one relates to the theme's integration into existing structures, but in a cross-disciplinary manner. For example: each discipline of an existing course starts to include discussions on sustainability issues within its analyzed content. Here, sustainability is a priority across disci-

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plines. Finally, in the fourth quadrant, the integration of sustainability occurs through new structures, but with a broader, cross-disciplinary focus. In this option, sustainability is integrated across two or more business disciplines and can include non-academic stakeholders. It is especially relevant for business schools that consider sustainability's integration across the curriculum as a strategic goal.

Concerning the integration of ethics, corporate social responsibility (CSR) and sustainability in MBA curricula, Christensen et al. (2007) has shown that from the top 50 global business schools rated by the Financial Times in their 2006 Global MBA rankings, 84.1% of the schools that responded require students to take courses that address one or all of these topics. It is also interesting to note that 65.9% of the respondent schools have a research center connected to these topics, which was considered by the authors as a level of investment in the topic beyond that implied by curriculum content requirements. Research centers imply long-term institutional support, legitimacy and validation for the study area.

Although sustainability has gained attention, it is usually addressed decoupled from economic performance, strategic decisions and day-to-day business operations. Thus, integration is one of the greatest challenges faced by business schools concerning the incorporation of sustainability into management education (Russell, 2006). Disaster risk management is still largely ignored in businesses' economic forecasts and growth projections (United Nations, 2013), which reinforces the role of business management education to integrate the topic into its courses and disciplines, so that managers can be prepared to deal with this critical issue.

Nevertheless, beyond formal education, companies are preparing to deal with climate change and disaster risk through informal learning processes, such as social learning. This process is described as "a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks" (Reed et al., 2010, p. 5). Therefore, informal learning processes - in which a multi-stakeholder dialogue and collective learning processes occur, prompting future leaders to spread the theme in their companies - can complement formal business management education.

METHOD

To achieve the proposed objective, an exploratory study was conducted, which aims to provide greater familiarity with the problem, so as to be able to make it more explicit (Gil, 2002). The intention is to exploit the theme of disaster risk management through the lens of adaptation to climate change, aimed at generating referrals that can contribute to the solution of the problem presented.

Thus, the case study technique was used, which is characterized by the study of one or a few objects in order to allow its broad and detailed knowledge (Gil, 2002). The cases analyzed in the paper are two GVces initiatives: the experience of the EPC within the theme of business adaptation to climate change, and the MSM experience in the education of future leaders within the theme of sustainability.

For the analysis, primary and secondary data were used, related both to the activities and products developed under the EPC initiative as well as the MSM's creation and syllabi development.

Thus, from the analysis of the activities carried out by the EPC for the management of climate risks and opportunities and also assessment of the MSM's syllabuses, the paper brings a proposal to the inclusion of disaster risk management in the syllabi, to, in this way, contribute to the integration of the theme into future leaders education.

RESULTS

GVces and Applied Research on Adaptation to Climate Change

GVces has been actively engaging with governments, businesses and civil society organizations to foster the adaptation agenda in Brazil. Since 2011, the theme Adaptation has been part of the Business for Climate Platform (EPC) agenda, a network composed of 35 multinational companies aimed to mobilize business leaders to manage and reduce GHG emissions, manage climate risks and propose public policies on climate change. In an international workshop in 2011, EPC's member companies were invited to debate adaptation: main concepts and the strategic importance of the subject, the role of the private sector, and to pilot a real case. Since then, EPC has been fostering the adaptation agenda, promoting discussions and practices with its members.

The urgency of the adaptation agenda became clear at COP 17, held in 2011, in Durban. Although it also became clear that its relevance would increase dramatically in the following years, the top players in this agenda were not ready to invest and engage. That was the case of the private sector – not only in Brazil – which believed that adaptation was restricted to policy making and represented only losses that should be avoided or responded to by governments.

Favorable national and international contexts motivated EPC to initiate a consistent work approach in adaptation to climate change. The Brazilian Ministry of the Environment (MMA) was drafting the National Adaptation Plan⁷, and GVces became a partner providing technical background. As an example, we researched motivations, barriers and elements to foster the engagement of private sector companies on adaptation. It became clear that EPC should assist companies in understanding which climate impacts are material and what risks and opportunities are represented for business. Furthermore, access to financial resources to face the impacts from climate change, reducing vulnerabilities and increasing resilience, especially in developing countries, is one of the greatest challenges of the adaptation agenda.

Responding to that context, The Latin America Adaptation to Climate Change Forum, held at FGV on July 26, 2013, brought together more than 150 representatives of the private sector, governments and civil society organizations. From the presen-

⁷ To be launched in 2016. A public consultation is in progress and the draft of the PNA can be found here: <http://www.mma.gov.br/clima/adaptacao/plano-nacional-de-adaptacao>.

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tations about concepts, initiatives and case studies, a collective Framework emerged, with the steps that should be followed by companies in order to elaborate consistent business strategies on adaptation. Moreover, the Forum stimulated participants to create a network to exchange experiences, particularly in Latin America.

In 2014, with the support of the German Agency for International Cooperation (GIZ) and based on the Latin America Adaptation Forum's outcomes, EPC held three workshops. It also created a working group with 25 of its member companies to co-build the Framework⁸ (Figure 2), which brings a step-by-step process to support the development of corporate strategies for climate change adaptation.



Figure 2. Framework for the Development of Business Agendas in Climate Change Adaptation.
 Source: GVces, 2016.

The Framework is divided into three stages. The first stage – diagnosis – aims to access the internal (e.g. organization's culture, processes) and external (e.g. past climatic events, present and future regulations) context of the company, as well as map and prioritize climate risks and opportunities for the organization. The second stage – plan – involves an action plan to respond to priority risks and opportunities. This stage should include actions and priority investments, deadlines and targets. Finally, the third stage – implementation – involves monitoring, feedback and communication to stakeholders. Thus, by following the steps presented in the cycle, the actions taken occur in a systemic and cyclical way, incorporated in the business reality and in the environmental strategy adopted by the company.

⁸ Available at: <http://mediadrawer.gvces.com.br/epc/original/framework_a-path-to-elaborate-business-agendas-for-adaption-to-climate-change.pdf>.

To support the Framework implementation, EPC also designed, with this working group, the Tool for Business Adaptation Strategies⁹. Both products were co-developed and improved through an interactive and enriching process with EPC members, who had different opportunities to learn, use and comment on the EPC Framework and Tool.

Studies and tools of the United Kingdom's Climate Impacts Programme (UKCIP), such as UKCIP Wizard and AdaptME toolkit, essentially inspired the Tool's elaboration. In addition, there were talks with INCAE Business School on their "Herramienta de Identificación de Riesgos, Oportunidades y Acciones de Adaptación al Cambio Climático", a tool developed by them.

Many other references were consulted during the process, for example: the "Australian Government Guide on Risk Assessment" helped to develop a risk matrix, while the "AS ANZS" was useful to evaluate opportunities, and the "Adaptation Scotland" contributed to the step of monitoring the adaptation strategy.

The figure below shows all the inputs considered for the development of each one of the Tool's steps.

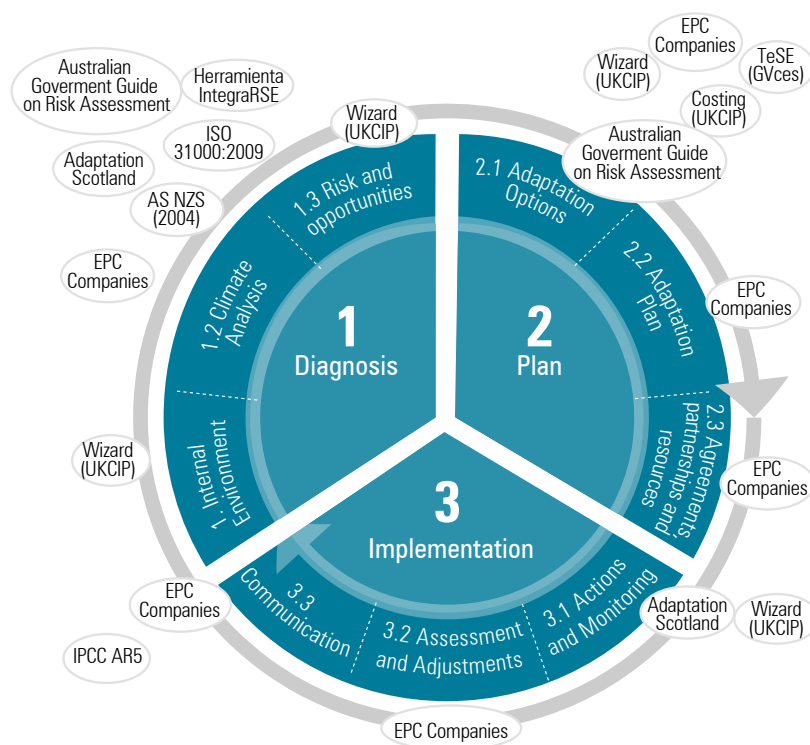


Figure 3. Inputs and References Considered for the Development of the Framework.

Source: Authors

⁹ Available at: <http://mediadrawer.gvces.com.br/epc/original/ferramenta_epc_versao-1-1_ing_final.xls>.

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From 2014 to 2015, five companies applied EPC's business adaptation Tool: Boticario Group, Braskem, CCR Group, the Brazilian National Steel Company (Companhia Siderúrgica Nacional), and Suzano Pulp and Paper. Four of these five companies have published their cases, which are briefly described below:

- The **Boticario Group** produces and distributes personal care products, cosmetics and perfume items. Motivated by historical weather events impacts on its sales points and service centers, the Group sought to develop an adaptation strategy. The analysis covered four Brazilian states vulnerable to flooding, with a time horizon of 2050. Different challenges were faced during the project, such as the access to climate information, lack of internal database on costs and investments and articulation with stakeholders. One of the most important results achieved by the Group was the composition of a multidisciplinary team to participate in the process, and the exchange of experiences with other member companies of EPC. Finally, the pilot project helped the Group to understand that following the steps of an action plan is important to the quality of the final product, and that the method and the Tool applied are also valid for activities within the company.
- **Braskem**, a company in the chemical and petrochemical sector and producer of thermoplastic resins, also chose to develop an adaptation strategy. In order to mitigate risks and exploit opportunities that arose from changes in climate events and to systematize and incorporate climate variables into planning and risk management, the company analyzed its plants in Brazil, the United States and Germany, with a time horizon of 2040. During the process, some challenges were found: the engagement of teams from various areas, long-term planning, obtaining climate scenarios and connecting them with business decision making. Because of the process, the company has incorporated climate variables into their risk management process and has been articulating with key stakeholders to foster this agenda. An important lesson learned in the process was that adaptation actions, unlike mitigation, depend on collaboration with other stakeholders, requiring collective work, from data collection to implementation and monitoring.
- The **CCR Group**, one of the largest infrastructure concession companies in the world, has chosen to develop an adaptation strategy in order to reduce operating costs due to impacts from possible climatic events, and also to identify new business opportunities. Due to the increasing number of engineering projects for maintenance and preservation of heritage, resulting from damages due to weather events, the Group chose to analyze CCR Barcas and CCR Via Lagos concessionaries, both located in Rio de Janeiro. A major challenge, which was also the main result of the adaptation strategy development, was the process of beginning to internalize the climate risks analyses, thanks to training in the subject and involvement of various company areas.
- **Companhia Siderúrgica Nacional (CSN)**, a large steel company in Brazil, decided to develop an adaptation strategy to be prepared to manage risks and

opportunities arising from climate change associated with the use of water resources, since steel production is an industrial activity that requires large water use. The scope considered was the Vargas President Steel Plant, located in Rio de Janeiro, considering the time horizon of 2040. A major challenge of the project was to start building a long-term planning structure, taking into account the inherent uncertainties of climate projections, as well as information collection, such as the estimated costs of climate change impacts and adaptation measures. The main result obtained was the identification of adaptation measures, with the inclusion of the climatic variable in the company's new projects, and in the monitoring of existing projects. The main lesson learned was the importance of the employee's engagement and the integration of different areas inside the company.

Thus, by following the steps proposed by the Tool, companies are able to organize and systematize information to better understand which climate change impacts are material, what risks and opportunities they represent for business, and to elaborate an action plan to avoid or mitigate major risks and develop opportunities.

Other important results are: the engagement of 25 companies in an adaptation agenda, through the creation of a community of practice (Barakat & Campos, in progress¹⁰): a better comprehension about concepts and the amplitude of an adaptation agenda by the business leaders; the strengthening of the managers, involved in the agenda, as leaderships in the companies; identification of collective actions and effective exchange of experiences; in some cases, the composition of multidisciplinary groups, in the companies, dedicated to implement and support the adaptation strategies; and the understanding that for a consistent adaptation strategy it is critical to involve local stakeholders and the supply chain.

In 2015, GVCes worked on the “Economy-Wide Adaptation to Climate Change” project, which was developed with the support of the British Embassy, in partnership with the Brazilian Ministry of the Environment (MMA) and the United Kingdom Climate Impacts Programme (UKCIP). The project purpose was to assist Brazil to improve its National Adaptation Policy and to implement adaptation measures reducing climate vulnerabilities in the public and private sectors.

To contribute to this goal, the “Business Adaptation Framework” and the “Tool for Business Adaptation Strategies” were reviewed and new versions of these documents were launched, considering the feedback from companies and partners and the extensive experience of UKCIP. Moreover, a new material package was attached to the Tool: the engagement toolkit with presentations and dynamics that can be used to mobilize collaborators and stakeholders. Three new pilot projects were developed with the companies Amaggi, Copel and CSN.

10 Paper “Social Learning for Adaptation to Climate Change: Evidence from a Community of Practice” accepted in the 2016 Academy of Management Annual Meeting, which studied the results of the participation on EPC adaptation agenda for the companies through the conceptual framework of social learning and community of practice.

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The figure below shows a summary of all information brought about the work that EPC has been developing on adaptation, in a timeline from 2011 to 2015.

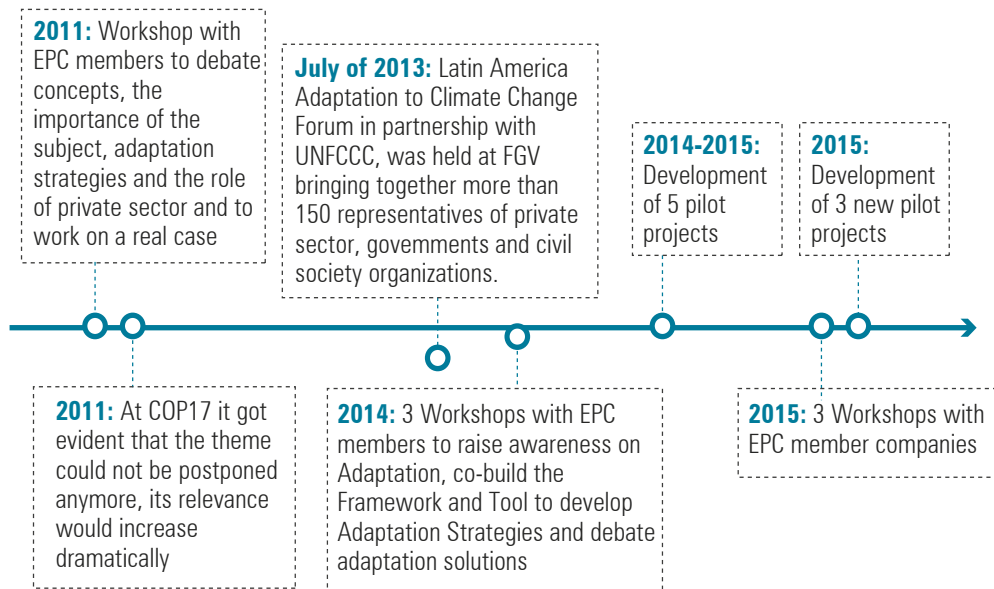


Figure 4. The work of Business for Climate Platform (EPC) on adaptation from 2011 to 2015.
 Source: Authors

Complementarily, due to the relevance of civil society organizations working with vulnerable communities and ecosystems, the importance of supporting these organizations in mapping and managing climate risk became clear. Thus, a working group was created with eight civil society organizations, namely: Engajamundo, Boticario Group Foundation, Habitat for Humanity Brazil, Local Governments for Sustainability (ICLEI), Amazon Institute for Environmental Research (IPAM), Research Society for Wildlife and Environmental Education (SPVS), World Resources Institute (WRI), and World Wildlife Fund for Nature (WWF).

Based on EPC's business Tool, UKCIP's experience, academic research and the eight civil society organization's expertise, four products were developed, in a co-construction process with the working group: a Framework, a Tool and tutorial videos to support the development of adaptation strategies for civil society, and an exercise for engagement, called "Climate Game".

Reasons abound not only for governments, but also for companies and civil society organizations to get involved with the adaptation agenda. On one hand, climate change presents risks to the business and interferes with the ability of organizations to develop their work effectively. On the other hand, opportunities are also relevant to business competitiveness and to improve the organizations' essential support to their stakeholders.

However, there are challenges faced by the business sector and civil society organizations in order to draw consistent adaptation strategies, integrate adaptation into their existing strategic plans, as well as practical considerations such as access to climate projections data. One other significant challenge is to engage and work together with local stakeholders and the other companies from their supply chains. From the EPC experience, it became evident that the agenda requires a high level of interconnection, which is not usual for the business sector. Thus, it is important to disseminate ways to develop a business or organizational adaptation plan, and to reinforce the idea that challenges are not a reason for inaction. It is also key to inspire other companies and civil society organizations with real examples of successful implemented solutions.

In this context, academia and formal education have a key role in preparing managers to advance in this agenda, strengthening the contribution of the business sector for the implementation of national adaptation plans, offering instruments to build bridges between stakeholders, and creating and / or leading the adaptation of intra and inter-sectorial networks.

Master in Sustainability Management (MSM)

To respond to current environmental, economic and social challenges, governments and companies have been seeking professionals able to understand and deal with sustainability global challenges, ready to expand and accelerate the adoption of practices and strategies that incorporate sustainability attributes. Acknowledging the importance and urgency of the education of these professionals, the Center for Sustainability Studies at Getulio Vargas Foundation (FGV-EAESP) began offering, in 2005, a *lato sensu* post-graduation course, focusing on management issues regarding sustainability.

Since its inception, the aim of the course has been to demonstrate the potential of sustainability as a key strategic factor for obtaining and maintaining competitive advantage, as well as providing tools for students to evaluate results, identify risks and opportunities.

Students of the MSM generally hold middle management positions in companies and non-governmental organizations and come from different backgrounds, such as Journalism, Media, Marketing, Law, Biology, Business Administration, Economics, Engineering and Environmental Management. In order to join the course, it is necessary to have a minimum work experience of four years, interest in the area of management, oral communication and writing skills, and good understanding of written English.

Between 2005 and 2008 the course was offered as a continuing education program and subjects were organized into four sequential modules, totaling 360 contact hours. Module 1 was about the sustainability bases, modules 2 and 3 focused on sustainability and management issues and, finally, module 4 was about advanced sustainability issues. All modules relied on subjects that addressed environmental,

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economic and social issues, as well as cross-cutting themes of sustainability, such as corporate governance. Once the modules were completed, students had to submit a final research report, demonstrating the application of accumulated knowledge in a structured, systematic and analytical way, supported by scientific method and proper bibliographic references. Additionally, through a partnership between FGV-EAESP and the *École des Hautes Études Commerciales de Paris* (HEC), students could go for an exchange semester in France in the *Master Management du Développement Durable*, an exclusive program for post-degree in sustainability.

The table 1 shows the four sequential modules and their respective subjects:

Table 1. Modules and respective subjects of the Master in Sustainability Management (MSM) from 2005-2008

	MODULE 1 Sustainability Bases	MODULE 2 Sustainability and Management I	MODULE 3 Sustainability and Management II	MODULE 4 Advanced Sustainability Issues
	Context: Business and Sustainable Development	Strategic Management	The Natural Step	Education for Sustainability
Subjects	Business Social Aspects	Company's Relationship Management with its Various Stakeholders	Corporate Governance	Marketing
	Economic and Financial Aspects	From Environmentalism to Sustainability in Business	Long-Term Economic and Financial Management	Economy and Environment
	Environment, Work Relationships and Trade	Organizational Transformation	Environmental Business Management	Research Methodology

Source: Authors

In order to conform to international quality standards, from 2009 on the course was offered in a master degree format, abandoning the division by modules and extending its hours from 380 contact hours to 484 contact hours. In its current format, the 18 course subjects are distributed around three thematic axes – environmental, economic and social – and around a transverse axis, consisting of subjects that cross and connect the themes, contributing to an integrated vision of sustainability. Still, once the disciplines are taken, students must deliver a final research report. Table 2 shows the above-mentioned axes and the subjects that are part of these axes:

Table 2. Thematic axes and respective subjects of the Master in Sustainability Management (MSM) from 2009-2016

THEMATIC AXES			
	ENVIRONMENTAL	ECONOMIC	SOCIAL
SUBJECTS	Economy and Environment	Economy and Environment	Corporate Governance
	Public Policy and Climate Change	Concepts in Accounting	Stakeholder Engagement and Value Chain
	Environmental Business: from Environmentalism to Sustainability in Business	Controllershship	Local Development
	Integrated Management Systems of Corporate Sustainability	Strategic Management	Consumption and Marketing
		Sustainable Finance and Impact Investment	
TRANSVERSE AXIS			
SUBJECTS	State of the World and Answers in the Legal and Institutional Fields		
	Context: Business and Sustainable Development		
	Sustainability and Strategy		
	Systemic Thinking		
	Research Methodology		
Negotiation Workshop			

Source: Authors

The subjects presented in Table 2 show that the issue of climate change is addressed in the transverse axis and in the environmental and economic axes, strengthening its relevance to the sustainability agenda. This theme is emphasized in the MSM because we understand that the rapprochement between scientific knowledge on climate change and decision-making processes within public and private policies is crucial in order to build a development model in which environmental and social agendas are as relevant as the economic agenda.

The issue of climate change is introduced in the MSM through the transverse axis, in the subject *State of the World and Answers in the Legal and Institutional Fields*, which aims to understand the role of public and private actors in setting normative standards on sustainable development at the global level, as well as current socioenvironmental impact management methodologies embedded in international standards of corporate social and environmental responsibility. The syllabus of the course provides details on the topics:

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“Presentation of the main current of environmental issues. It is intended to demonstrate the relationship between different economic cycles, the use of natural resources, impacts on society and the environment, and major challenges facing humanity to ensure the maintenance and improvement of quality of life, in developed or developing countries. It lists the set of legal and institutional responses at the multilateral level to address these challenges. International conventions and treaties on environment, human rights and labor relations are presented in evolution, as well as their incorporation into the Brazilian legal framework. Finally, the subject relates social and environmental issues to international trade”. (Course syllabus)

In the environmental axis, the issue of climate change is addressed in two subjects: *Public Policy and Climate Change*, and *Environmental Management: From Environmentalism to Sustainability in Business*. In the first subject, there is a focused approach in public policies designed to respond to the challenges created by climate change, as indicated in the syllabus: “The course includes studies of the main problems related to climate change at the international and national level, focusing on the interface between economic development, mitigation and adaptation to climate change and the key challenges and responses generated in the field of public policy”. Still, specifically, this subject covers the following topics: i) international legal regulations on climate change; ii) National Policy on Climate Change; iii) carbon pricing; iv) sectoral plans on climate change; v) adaptation to climate change; and vi) payment for environmental services.

Environmental Management: from Environmentalism to Sustainability in Business presents practices, procedures and management processes used by companies to minimize or eliminate the adverse effects caused by their activities on the environment, as indicated in the syllabus:

“The course introduces environmental concepts necessary for the full understanding of corporate environmental management, such as natural resources, biodiversity, ecosystems, environmental services and pollution. It shows the development of environmental strategies in business organizations, their motivating factors and trends. Key approaches and environmental management tools in companies will be studied, analyzing their potential, weaknesses and major gaps in relation to sustainability management. The following topics will be addressed: i) the environmental impact assessment (EIA); ii) inventories of pollution sources (including greenhouse gases); iii) ecological footprint and derivatives (water footprint, forest footprint, carbon footprint); iv) life cycle analysis (LCA); v) eco-efficiency, pollution prevention, cleaner production (CP), industrial ecology; and vi) environmental management systems”. (Course syllabus)

Connecting the environmental and economic axes, *Economy and Environment* subject explores the climate change issue from an economic perspective, generating reflections on the relationship between the environment and the economic systems. According to the syllabus of the course: “Analysis of the relationship between the

environment and the economic system, based on neoclassical environmental economics and the green economy. Reflection on the main differences and limitations of these approaches. Introduction and discussion of relevant issues in the discussions on economy and environment, for example, environmental policy instruments (instruments of direct regulation and economic instruments) and the mechanisms of environmental management that incorporate economic incentives”.

In the economic axis, the subject *Sustainable Finance and Impact Investment* introduces a discussion about the risks of climate change to investors and insurance companies, as presented in the syllabus: “discussion of the impacts generated by financial institutions in society and examination of how sustainability affects financial institutions, investors and creditors. Historical aspects and a motion analysis in financial institutions in Brazil and abroad, the risks hanging over the banking sector, with special emphasis on the Equator Principles and environmental policies. Discussions about the economic value of socially responsible investments and benchmarks are also included”.

DISCUSSION

From the analysis of the syllabi, in the Master in Sustainability Management, climate change is explored and discussed from different perspectives, offering students a solid background on the subject. However, there is room to improve climate risk management, adaptation and disaster risk management in greater depth. Adaptation demands an interdisciplinary approach, but, more than that, the strengthening of leadership, communication and mobilization skills of the team leading this agenda within the organizations – a process which GVces has been accessing, studying and promoting especially on its Integrated Education for Sustainability (FIS) initiative (Appendix 1).

GVces can bring to the classroom the results of its own research on adaptation. Adaptation is a complex matter and requires a long-term view, dealing with uncertainty and knowledge from a great diversity of subjects. It is a good example of a “wicked problem”¹¹. However, there is no specific focus on adaptation to climate change in the Master in Sustainability Management.

In this context, it is important to make recommendations to mainstream adaptation to climate change and disaster risk management in the MSM. The aim is to: i) promote discussions on theoretical concepts and methods related to these themes in the classroom; ii) consider the matter in all its dimensions (anticipatory and responsive adaptation, smooth and disruptive changes in weather patterns, different categories of risks and impacts); iii) make clear the materiality of these themes for businesses; and iv) foster systemic view and interdisciplinary approach.

11 A “wicked problem” is characterized by three aspects: social complexity, uncertainty, and complexity of its statement. “Surprises, fluctuating conditions, sudden changes and irreducible uncertainties are fundamental aspects of wicked problems” (Termeer, Dewulf & Breeman, 2013: 28-29).

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The recommendations are based on GVces research on adaptation to climate change mentioned in Section 4.1, particularly on the work developed with 25 multinational companies, under the EPC since 2014. As presented in Section 4.1, those companies composed a working group that co-created, with GVces technical support and coordination, a Framework and a Tool for the elaboration of business strategies on adaptation.

This experience is the basis of the recommendations because it proved to be successful in preparing managers to undertake leadership on adaptation to climate change agendas within their companies. These are the reasons:

- It enabled a “community of practice”¹² that facilitated the exchange of knowledge among participants and fostered self-confidence to lead adaptation planning process in their companies (Barakat & Campos, in progress)¹³.
- It promoted change in the perception of the professionals involved about the theme: the participants reported that, by understanding adaptation, they could better assess the business materiality of the subject (Barakat & Campos, in progress).
- It made it clear that stakeholder engagement is key: internal stakeholders as well as local governments, community organizations and the supply chain – for the elaboration of a comprehensive strategy and, especially, for its implementation (GVces, 2015).
- It enabled an environment for peer learning and learning from practice (Barakat & Campos, in progress);
- The process generated information and intermediary results that were effective in raising the interest of the companies’ higher management level in adaptation, showing that the agenda is material for the business¹⁴ (GVces, 2015).

Moreover, EPC’s Framework is aligned to the Sendai Framework for Disaster Risk Reduction’s four priority steps (UNISDR, 2015). Therefore, our recommendation to mainstream adaptation and disaster risk management in the MSM and, afterwards, in other business education programs, consists of the following components:

Recommendation 1. Review EPC Framework and Tool for Business Adaptation Strategy, improving it and strengthening the content of disaster risk management.

The first step is to improve EPC’s Framework and Tool, incorporating theoretical concepts, metrics and examples related to disaster risk management. An initial exer-

¹² The community of practice can be defined as “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger, McDermott, & Snyder, 2002, p.4).

¹³ Based on the paper in progress “Social Learning for Adaptation to Climate Change: Evidence from a Community of Practice” (Barakat & Campos, in progress) elaborated from interviews with nine companies that took part in EPC adaptation working group.

¹⁴ Braskem and CCR cases on adaptation exemplify this statement. Braskem developed a plan considering the two major risk categories for its business, presented the results to the Vice-President and all directors and is expanding the process, inserting other risk categories. After elaborating the adaptation plan for two business units, CCR is adding adaptation to the company strategic planning (for further information, please visit: <http://adaptacao.gvces.com.br>).

cise comparing the concepts and terminology of both areas, adaptation and disaster risks, was made and is summarized in Appendix 3. Based on that exercise, changes will be implemented in the following steps of the Tool for elaboration of business adaptation strategies:

1. Diagnosis
 - Step 1.2 (A) | A table to record how climate events are affecting the company – eventual historical disasters will be included here.
 - Step 1.3 (A) | Potential impacts for the companies in the short-, medium- and long-terms – disasters forecasted based on climate scenarios will be identified here.
 - Step 1.3 (B) | Evaluation of the risks identified previously – the risks of the disasters identified previously will be qualified and prioritized in this step.
2. Planning
 - Step 2.1 | Extensive mapping of adaptation options – possible adaptation measures to build resilience and mitigate risk of disasters will be listed here.
 - Step 2.3 | Map of agreements, partnerships and funds to be raised – considering also the potential disasters identified and the adaptation measures related to them, the stakeholders to engage and partners will be pointed out.
3. Implementation
 - Step 3.1 | Development of the indicators and metrics to monitor the measures and actions of the adaptation plan – it will include indicators and metrics related to the mitigation and management of disaster risks.
 - Step 3.3 | Elaboration of a communication plan focused on the achieved results – here the losses avoided and the co-benefits achieved with the adaptation measures implemented will be recorded.
4. General
 - Examples that are presented in all steps of the Tool will include common or forecasted disasters in Brazil.
 - Glossary, aligning with the “Terminology” presented in PreventionWeb¹⁵, bibliography and additional instructions.

Recommendation 2. Incorporate adaptation to climate change in the **syllabus of the MSM** through an **interdisciplinary and innovative approach** considering the recommendations for sustainability integration in business and management education (Rusinko, 2010).

As presented in Section 5, MSM is consolidated at FGV. Around 20 professionals per year, of different business backgrounds, have attended this course for the last ten years. Reinforcing adaptation to climate change and disaster risk management in the syllabus of the course presents an opportunity to strengthen it. Adaptation is essentially an interdisciplinary subject and requires the articulation among areas and stakeholders. Based on our research experience and on the literature recommen-

¹⁵ <<http://www.preventionweb.net/risk>>. Website visited on March 14, 2016.

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dations on how to integrate sustainability into business and management education, Recommendation 2 is composed by two key steps:

1. Reinforce adaptation and disaster risks content in the disciplines that already cover climate change since the first semester, which, as presented in Session 5, are:
 - *State of the World and Answers in the Legal and Institutional Fields* | transverse axis
 - *Economy and Environment* | Environment and Economy axis
 - *Sustainability Strategy* | transverse axis
 - *Public Policies and Climate Change* | Environment axis
 - *Environmental Management: From Environmentalism to Sustainability in Business* | Environment axis
 - *Sustainable Finance and Impact Investment* | Economy axis.
2. Structure and implement, as part of the MSM syllabus, a new semiannual activity regarding adaptation and disaster risk management with a strong practical approach, which will apply concepts and information discussed in several other disciplines.

This interdisciplinary activity will be composed of:

- a. **Conceptual and program introduction** in a four-hour class. We will present and debate:
 - Concepts of adaptation and risk of disasters, national and international history of the agenda and its relevance for the business sector.
 - The Framework and Tool for elaboration of business strategies on adaptation will be introduced to the students in this class.
 - Case of a company that has implemented the Framework and is implementing an action plan on adaptation.
 - The program and the activities planned for the semester.
- b. **Development of business adaptation plans** in groups throughout the semester:
 - Organized in groups, the students will choose one company per group for which the adaptation strategy will be developed.
 - The groups will run through the EPC Framework, step by step, following the semester working plan:
 1. They will study and apply, to fill out the EPC Tool, concepts from most disciplines of the course, not just those that discuss climate change, but especially:
 - * *Integrated Systems of Sustainability Management*
 - * *Concepts in Accounting*
 - * *Controllershship*
 - * *Strategy Management*
 - * *Corporate Governance*
 - * *Stakeholders and Value Chain Management*
 - * *Local Development*
 - * *Sustainability Strategy.*

2. Gather information in the company, with different collaborators, and in the field, with company's stakeholders.
3. Debate, make decisions and record the process.

Although each group will draw their specific working plan in the beginning of the process, they may stick to the following general timeline:

Step1 | Diagnosis - 2 months

Step 2 | Planning - 2 months

Step 3.1 | Actions and monitoring - 1.5 month

- During the semester, the EPC Tool will be the foundation for the work, supporting the implementation of the Framework and recording information, discussions and decisions.
- At the end of the semester, they will consolidate the adaptation plan and the recommendations for its implementation.

c. Presentation of the adaptation plans in the final class and in the companies:

- A final class will be dedicated to the presentation and debate of the adaptation and disaster risk management plans developed by the groups.
- Groups will present and debate the plans and the recommendations in a meeting with internal and external stakeholders of the companies.

Appendix 4 presents examples of concepts discussed in 12 subjects of the Executive Master's degree that are important inputs for EPC Framework.

Through the implementation of this proposal component, the four recommendations presented in literature (Rusinko, 2010) will be addressed, notably the work on the three dimensions of sustainable development (Unesco, 2004), curricular and co-curricular engagement (Ahren, 2009) and sustainability integration within, across and beyond the management discipline (Shriberg, 2002 and Steketee, 2009).

Recommendations 3 and 4 are not aimed at the Master in Sustainability Management (MSM), but to new courses FGV is launching.

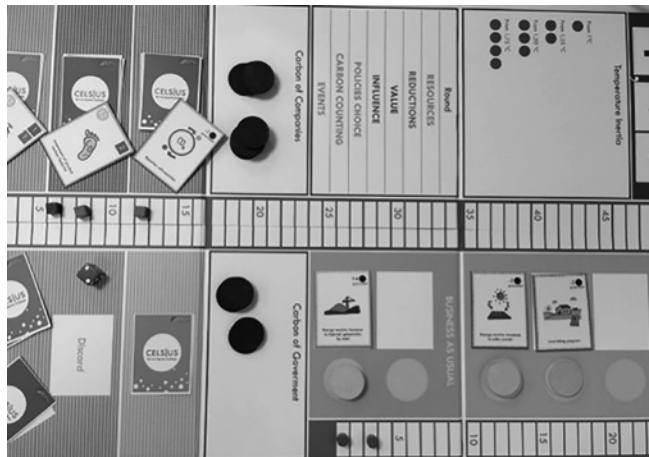
Recommendation 3. Systematize the experience and lessons learned and **expand the project to the Professional Master in Sustainability (MPA)**, to be launched in August 2016.

Once the proposal is implemented and tested in MSM, the plan is to adjust and replicate it to the new course, MPA. Also, there is the potential to expand the application of EPC's adaptation tool to other post-graduation programs at FGV.

Recommendation 4. Develop a board game on adaptation to climate change and disaster risk management based on the academic program, in order to condense the key concepts and foster learning through a **playful experience**.

In an effort to disseminate complex concepts and foster the discussion and reflection on sustainability subjects, GVces has been developing different learning tools. A board game is one of them. To work on the climate change agenda, with special focus on mobilization and engagement of stakeholders, GVces developed in 2012 the game *Celsius: The Two-Degrees Challenge* (Figure 5).

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Figures 5. Board game “Celsius: The Two-Degrees Challenge”
 Source: Authors

Since then, *Celsius* has been played with at least 36 companies, three of them applied it with their suppliers, 100 post-graduation students at FGV, 20 MBA students at Duquesne University, and 200 undergraduates at FGV. Moreover, the game was presented at a conference at the Duquesne University.

The game has proved to be effective in providing an enriching experience when played with groups with all levels of knowledge in the matter, from youths that have just heard about climate change to experts in the field. Throughout the rounds, the players, each one representing a company, decide in which projects to invest to generate value to their business considering at the same time, the greenhouse gas emissions that have to be reduced though coordinated efforts. In every occasion that *Celsius* was played, it fed great discussions about the political and economic challenges intrinsic to the climate change agenda, the relevance to partner with

and influence the public sector, and the roles and responsibilities of the private sector, government and society.

Inspired by this experience, the last component of this proposal is to develop a board game about adaptation to climate change and disaster risk management that leads players to try, in a short period of time, the reflections and decisions involved in the adaptation planning and management of climate risks.

The Figure below (Figure 6) summarizes the recommendations:

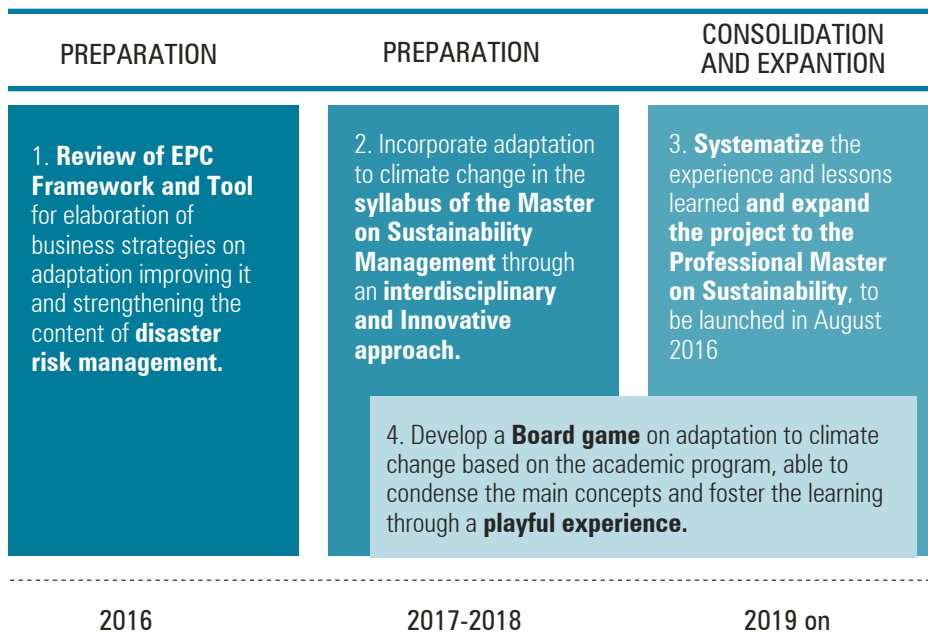


Figure 6 Summary of recommendations

Source: Authors

CONCLUSIONS

This paper sought to present the current status of adaptation to climate change and disaster risk management content in FGV´s Master in Sustainability Management, as well as make a series of recommendations to increase this content into this existing program and in new offerings. The recommendations presented here are in line with the literature review. By inserting content developed through the research center, FGV indicates long-term institutional support, legitimacy and validation for the study area (Christensen et al, 2007). Moreover, the three dimensions of sustainable development (environmental, social and economic) should be addressed simultaneously (UNESCO, 2004). In addition, adaptation and disaster risk management content would be connected to economic performance, strategic decisions and business operations, in an integrated manner (Russell, 2006).

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The recommendations would also favor social learning because the discussions resulting from the application of the Framework and the Tool would be expanded so that participants are challenged to include and consider a wider stakeholder network (Reed et al., 2010). Specifically, Recommendation 2 will fall into Rusinko's (2010) fourth quadrant, in which the integration of sustainability occurs through new structures, but with a broader, cross-disciplinary focus, including non-academic stakeholders.

Thus, the recommendations of this paper are based on GVces' own research experience on adaptation and climate change risk within the business sector, as well as on the literature review on management education and sustainability and disaster risk management. Considering the important role that FGV plays on the research and educational topics on climate change and sustainability, the opportunity to make the proposed adjustment in the existing offering – MSM – will hopefully contribute to prepare business managers to successfully manage and reduce climate change related disasters, thus reducing overall losses due to inaction and/or mismanagement.

For future research projects, the importance has been recognized of addressing more directly with SMEs, which are currently indirectly reached by the recommendations through the work with large companies, whose value chain usually includes SMEs, as evidenced by the projects run with seven large companies to elaborate their strategies on adaptation to climate change. Therefore, future research is needed to explore how to transfer the knowledge accumulated while working with large companies to local business and SMEs. The experience so far shows that the challenges faced by large companies are potentiated in the context of more limited resources of the SMEs. In this way, it is imperative to offer specific support to engage this group in the agenda and to prepare leaderships to actuate in these organizations. This could result in the adaptation of EPC's available tool in a flexible manner to ensure that even small companies can be integrated within the Climate Change framework.

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APPENDICES

Appendix 1. GVces' initiatives related to climate change and sustainability

In addition to the Business for Climate Platform (EPC), GVces has several other initiatives on the issue of climate change, which are described below:

- **Brazil GHG Protocol Program:** In 2008, the GHG Protocol methodology for corporate greenhouse gas emissions inventories was adapted to the Brazilian context by GVces and the World Resources Institute (WRI), in partnership with the Ministry of the Environment, the Brazilian Business Council for Sustainable Development (CEBDS), the World Business Council for Sustainable Development (WBCSD) and 27 Founding Members. The Brazil Program aims at stimulating corporate culture in order to elaborate and publish GHG emissions inventories, allowing participants access to tools and international quality standards. It also organizes workgroups with participating companies for the improvement of the methodology and for the development of new tools to account for GHG emissions according to the prevalent reality in Brazil. Currently, approximately 100 companies are participating.
- **GHG Emissions Public Registry:** This is a pioneer online platform in Brazil that helps organizations to produce and disclose their GHG emissions inventories. Its goal is to increase transparency in the disclosure of data, establishing sector benchmarks and sensitizing the public towards the issue of climate change.
- **The Climate Observatory:** GVces is part of the Climate Observatory, a network of NGOs that aim to discuss advances in climate change policies. The Observatory promotes meetings with business professionals and articulates

with the public sector so that the Brazilian government takes on its commitments and creates effective public policies for climate mitigation and adaptation. The network has an important presence at COPs and in the preparation of documentations for a consistent climate policy in Brazil.

- **Financial Sector and Climate Change:** Over the last few years, GVces has published several studies on the interaction between the financial sector and climate change. In 2010 and 2011, two studies were published analyzing banks' strategies and practices to manage climate change challenges: Privately-Owned Banks and Climate Change, and Brazilian State-Owned Banks and Climate Change. In 2012, GVces published the study "How to Advance in the Financing of a Low-Carbon Economy in Brazil". The report identifies products and services offered by the financial sector, as well as government incentives and regulations that support low-carbon practices in the agriculture and energy sectors, and points to the gaps that exist between the supply and demand of those funds. In early 2014, UNEP (the United Nations Environment Programme) launched an "Inquiry into the Design of a Sustainable Financial System" seeking to discuss innovation in public policies, regulatory framework and successful international initiatives capable of speeding up the allocation of resources by the global financial system to the Green Economy.
- **Supporting Climate-Friendly Public Policies:** At the request of the Secretary of the Environment and supported by UNEP, GVces produced a first draft of the Municipal Law on Climate Change in Sao Paulo, in partnership with ICLEI – Local Governments for Sustainability. Also, at the request of the Ministry of Development, Industry and Trade, GVces developed the technical background papers to support the design of a Low-Carbon Industry's Sectorial Plan, which is part of the Climate Change National Plan.
- **Green Credit:** GVces, in partnership with the British Embassy and the Brazilian Development Bank (BNDES), developed a tool to promote green credit in Brazil, by supporting the Brazilian Climate Fund (Fundo Clima) to account for and report GHG emission reductions from the supported projects. The tool is being used by BNDES as part of its decision-making process in funding projects under the fund's six subprograms, thus assuring that climate and environmental issues are taken into account.

Concerning GVces' broad teaching experience on sustainability and climate change and their connections with business and economics, in addition to the Master in Sustainability Management (MSM), there is also an **elective course for undergraduate students**, which is called "FIS – Formação Integrada para a Sustentabilidade" (Integrated Education for Sustainability).

The course is aimed at a practical sustainability challenge, which is decided based on GVces experience of the relevant sustainability agenda for the country and corporations operating in Brazil. Therefore, the sustainability content is driven by

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an empirical problem. Although a real sustainability challenge is at the center of the course, the course also aims at challenging participants to see reality through different perspectives. FIS is a transdisciplinary course and as such its content explores what is between, across and beyond disciplines. It favors the articulation of imagination and feelings, experience and tacit knowledge and concepts, theories, methodologies, contents. Other theories and approaches are used, such as Resilience Theory, Theory U, and Design Thinking. The learning process is based on a transdisciplinary approach that favors dialogue among disciplines, different areas of knowledge, academic and non-academic knowledge, and traditional wisdom. Also, it considers multiple dimensions of reality.

Furthermore, GVces is academically involved in the development of **two other Master's degrees at FGV**, one at the School of Economics, and the other at the Business Administration School. The first one, the Professional Master's degree in Economics (MPE) with emphasis on Sustainable Development, examines issues regarding environment, society and economy. Extremely impactful environmental issues to the economy, such as carbon economy, sustainable project financing and the formulation of public policies will be presented to the students. The workload includes Mathematics, Statistics, Microeconomics, Macroeconomics, Public Policies for Sustainable Development, Climate Change and Climate Economy. The second one, the Professional Master's degree in Business Administration (MPA) with emphasis on Sustainable Development, will also involve environmental issues, social responsibility and corporate strategies in order to achieve sustainable development.

Appendix 2. FGV Master in Sustainability Management, Subjects and Syllabuses

State of the World and Answers in the Legal and Institutional Fields

Presentation of the main current environmental issues. It is intended to demonstrate the relationship between different economic cycles, the use of natural resources and impacts on society and the environment, and the major challenges facing humanity to ensure the maintenance and improvement of quality of life, in developed or developing countries. It lists the set of legal and institutional responses at the multilateral level to address these challenges. International conventions and treaties on environment, human rights and labor relations are presented in evolution, as well as their incorporation into the Brazilian legal framework. Finally, the subject relates social and environmental issues to international trade.

Context: Business and Sustainable Development

The discipline aims to discuss the different conceptions of development and sustainability, as well as present the foundations of social and environmental responsibility in the context of business organizations.

Economy and the Environment

Analysis of the relationship between environment and economic system based on neoclassical environmental economics and the green economy. Reflection is on the main differences and limitations of these approaches. Introduction and discussion of relevant issues about economy and the environment, for example, environmental policy instruments (instruments of direct regulation and economic instruments) and the mechanisms of environmental management that incorporate economic incentives.

Sustainability and Strategy

Analysis of the influence of aspects associated with sustainability in business competitiveness, from the internal scenario of the organizations to the operation in international supply chains, through an - incremental and disruptive - innovation agenda in products, production processes and business models. Presentation of models that combine the increasing demand for sustainability with business competitiveness.

Systemic Thinking

Presentation of a planning method based on systems dynamics and scientific and socio-economic principles. Definitions of sustainability principles will be presented, using basic science, the ABCD methodology of The Natural Step and backcasting, as well as case studies.

Corporate Governance

Examination and discussion of concepts and practices of good corporate governance and its relationship to the strategy and business performance. Reflection about the relationship between sustainability issues and decision-making processes at the companies' senior management.

Public Policies and Climate Change

The subject includes studies of the main problems related to climate change at the international and national levels, focusing on the interface between economic development, mitigation and adaptation to climate change and the key challenges and responses generated in the field of public policy.

Accounting

Accounting importance: conceptualization and objectives; corporate and managerial accounting; postulates, principles and conventions. Financial statements: introduction; accounting mechanics; balance sheet; statement of changes in equity.

Controllership

Review of significant accounting reports published: Balance Sheet, Profit and Loss Statement, and Cash Flow Statement. Presentation of the Value-Added Statement. Application of financial analysis techniques to a publicly-traded company, exempli-

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fying the use of indicators obtained from accounting reports. Use of value creation indicators (economic profit). Description of assets and liabilities not recorded. Presentation of the Balanced Scorecard, which allows the incorporation of goals and sustainability indicators into the management of organizations.

Stakeholder Engagement and Value Chain

Presentation of all the models and standards of sustainability management, focusing on the management of relationships with stakeholders. Examination and discussion of ways to assess the materiality of sustainability issues, with tools such as social auditing and standardization of sustainability management. Overview of standards and certifications, such as AA1000 and ISO 26000. Models and stakeholder engagement processes: AA1000 and AA1000SES.

Environmental Management: from Environmentalism to Sustainability in Business

The course introduces environmental concepts necessary for the full understanding of corporate environmental management, such as natural resources, biodiversity, ecosystems, environmental services and pollution. It shows the development of environmental strategies in business organizations, their motivating factors and trends. Key approaches and environmental management tools in companies will be studied, analyzing their potential, weaknesses and major gaps in relation to sustainability management. The following topics will be addressed: i) the environmental impact assessment (EIA); ii) inventories of pollution sources (including greenhouse gases); iii) ecological footprint and derivatives (water footprint, forest footprint, carbon footprint); iv) life cycle analysis (LCA); v) eco-efficiency, pollution prevention, cleaner production (CP), industrial ecology; and vi) environmental management systems.

Strategic Management

Examination and discussion of sustainability issues that can be placed in strategic business decisions. The results of such decisions will be discussed based on the financial analysis of companies, with an emphasis on business viability in the long run. It begins with an introduction to the concept of strategy, its historical evolution and the industry analysis model. It then covers a resource-based view, the evolution of that view, the issue of creating shareholder value and sustainability, cost of capital, discounted cash flow, and finally, valuation of companies.

Integrated Management Systems of Corporate Sustainability

Identification of the key elements in the planning and implementation of integrated management systems of corporate sustainability; comparative analysis of consolidated management models with emerging models or in diffusion process (Sigma Project, Global Compact Management Model, ISO 26000 and others). Development of skills necessary for selection and integration of models, methods and tools for sustainability management.

Local Development

Introduction to local development concepts. Analysis of the integration of large enterprises into small towns. Reflection on dynamics and strategies of interaction between business, government and local communities. Opportunities, tools and conditions for local development.

Consumption and Marketing

Presents the history of the consumer society, its evolution into a hyper-consumption society and the impact on life quality and the environment. Discusses the concepts of green consumption, conscious consumption and sustainable consumption. Develops the debate on the role of consumers, non-governmental organizations, governments, businesses and social movements as transformation actors of the current model of economic development, with a view to promoting sustainable consumption actions. Discusses the role of Marketing in modern society, in relation to ethics and environmental issues, green, social, environmental marketing. It introduces the concepts of creating niche markets for sustainable products and goods. Develops the architectural concepts of brands that use environmental sustainability as an additional brand value.

Sustainable Finance and Impact Investment

Discussion of the impacts generated by financial institutions in society, and examination of how sustainability affects financial institutions, investors and creditors. Historical aspects and a motion analysis in financial institutions in Brazil and abroad, the risks hanging over the banking sector, with special emphasis on the Equator Principles and environmental policies. Discussions about the economic value of socially responsible investments and benchmarks are also included.

Research Methodology

The rules for developing a final research report; brief history of scientific research; the scientific method; the components of a scientific work; the structure and formatting of an academic work.

Negotiation Workshop

Introduction to negotiation; mutual gains approach; public dispute resolution; negotiation features. Consensus building: approaches to consensus building; positional bargaining and impasse; managing difficult conversations, joint fact finding, competition and game theory.

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Appendix 3. Initial exercise comparing the concepts and terminology of disaster risk management and adaptation to climate change.

4. Which disasters¹⁶ can be caused or intensified by climate change?

Hazards – PreventionWeb	Can be intensified by climate change?	Category as it appears in EPC Tool
Avalanche	Yes	Climate event
Cold snap	Yes	Climate event
Cyclone	Yes	Climate event
Drought	Yes	Climate event
Earthquake	No	-
Epidemic and Pandemic	Yes	Impact
Inundation (Flood)	Yes	Climate event
Heat wave	Yes	Climate event
Insect Infestation	Yes	Impact
Landslide	Yes	Impact
NBC – Nuclear, Biological, Chemical Disaster	No	-
Storm Surge	Yes	Climate event
Technical Disaster	No	-
Tornado	Yes	Climate event
Tsunami	No	-
Volcano	No	-
Wild Fire	Yes	Impact

5. Comparison between terminologies in EPC Tool and PreventionWeb¹⁷.

Some terms in the EPC Tool glossary	Terminology in PreventionWeb
Adaptation	Yes
Adaptive Capacity	As “capacity”
Exposure	Yes
Impact	No
Danger	Yes
Resilience	Yes

¹⁶ Source: <http://www.preventionweb.net/english/hazards/>. Visited on March 16, 2016.

¹⁷ Source: <http://www.preventionweb.net/english/professional/terminology/>. Visited on March 16, 2016.

Some terms in the EPC Tool glossary	Terminology in PreventionWeb
Risk	Yes
Sensitivity	No
Vulnerability	Yes

Appendix 4. Inputs from MSM's subjects to the adaptation to climate change planning Framework that will be implemented in the interdisciplinary activity proposed

Executive Master on Sustainability Management		Adaptation to Climate Change planning process	
Subject	Axis	Inputs to adaptation planning	Steps of adaptation Cycle
<i>Concepts in accounting</i>	Economy	- Financial statements: introduction; accounting mechanics; balance sheet; statement of changes in equity	1.3 Risks and opportunities 2.1 Adaptation options 3.1 Actions and monitoring 3.3 Communication
<i>Controllership</i>	Economy	- Value creation indicators (economic profit) - Assets and liabilities not recorded - Balanced Scorecard, which allows the incorporation of goals and sustainability indicators in the management of organizations	1.3 Risks and opportunities 2.1 Adaptation options 3.1 Actions and monitoring 3.3 Communication
<i>Strategic Management</i>	Economy	- Financial analysis of companies, with an emphasis on business viability in the long run - Elements of industry analysis model: creating shareholder value and sustainability, the cost of capital, the discounted cash flow, and finally, the valuation of companies	1.3 Risks and opportunities 2.1 Adaptation options
<i>Sustainable finance and impact investment</i>	Economy	- How sustainability affects financial institutions, investors and creditors - Risks hanging over the banking sector	1.3 Risks and opportunities 2.1 Adaptation options
<i>Environmental Management: from environmentalism to sustainability in business</i>	Environment	- Environmental impact assessment - Industrial ecology - Environmental management systems	1.2 Climate scenario 1.3 Risks and opportunities 3.1 Actions and monitoring

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Executive Master on Sustainability Management		Adaptation to Climate Change planning process	
Subject	Axis	Inputs to adaptation planning	Steps of adaptation Cycle
<i>Public policies and climate change</i>	Environment	- Problems related to climate change: interface between economic development, mitigation and adaptation to climate change	1.2 Climate scenario 1.3 Risks and opportunities 2.1 Adaptation options 2.3 Agreements, partnerships and resources 3.3 Communication
<i>Economy and Environment</i>	Environment and economy	- Environmental policy instruments (instruments of direct regulation and economic instruments) - Mechanisms of environmental management that incorporate economic incentives	1.3 Risks and opportunities 2.1 Adaptation options 3.1 Actions and monitoring
<i>Corporate Governance</i>	Social	- Concepts and practices of good corporate governance and its relationship to the strategy and business performance. - Relationship between sustainability issues and decision-making process in the senior management of companies	1.3 Risks and opportunities 2.1 Adaptation options 2.3 Agreements, partnerships and resources 3.3 Communication
<i>Local Development</i>	Social	- Reflection on dynamics and strategies of interaction between business, government and local communities	1.3 Risks and opportunities 2.1 Adaptation options 2.3 Agreements, partnerships and resources 3.3 Communication
<i>Stakeholder engagement and value chain</i>	Social	- Models and standards of sustainability management, focusing on the management of relationships with stakeholders	1.3 Risks and opportunities 2.1 Adaptation options 2.3 Agreements, partnerships and resources 3.3 Communication
<i>State of the world and answers in the legal-institutional field</i>	Transversal	- International and national conventions and treaties that concerns the economic activity - Brazil legal framework	1.3 Risks and opportunities 2.1 Adaptation options
<i>Sustainability Strategy</i>	Transversal	- Aspects associated with sustainability in business competitiveness. - Innovation agenda - incremental and disruptive - Models that combine the increasing demand for sustainability to business competitiveness	1.3 Risks and opportunities 2.1 Adaptation options

TEACHING DISASTER RISK MANAGEMENT: LESSONS FROM THE ROTMAN SCHOOL OF MANAGEMENT

ENSEÑANDO LA GESTIÓN DEL RIESGO DE DESASTRES: LECCIONES DE ROTMAN SCHOOL OF MANAGEMENT

ANDRÁS
TILCSIK¹

JEL: M14, I23, Q54

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ABSTRACT

This article describes how disaster risk management topics are taught at the Rotman School of Management at the University of Toronto and thus highlights opportunities for developing similar course modules on disaster risk management at other institutions. An undergraduate and MBA elective course, titled Catastrophic Failure in Organizations, contains four modules that are directly relevant to disaster risk management. The first module focuses on the need to move from risk indifference to risk sensitivity. The second module considers the importance of business continuity and crisis management plans and explores their common shortcomings. The third module uses a case study to examine the topic of prospective risk management. The fourth module focuses on the vulnerability of supply chains and other complex systems to disaster risk. The article describes the details of implementing these modules and discusses opportunities for further integration of disaster risk management topics in other parts of the curriculum.

KEYWORDS

Risk management; disasters; business continuity; business education.

RESUMEN

Este artículo describe cómo se enseñan los temas de la gestión del riesgo de desastres en la escuela de administración, Rotman School of Management, de University of Toronto y, de esta manera, resalta las oportunidades para desarrollar módulos de cursos de gestión de riesgo de desastres similares. Un curso de pregrado y uno electivo de MBA, llamado Falla Catastrófica en las Organizaciones, contiene cuatro módulos que son directamente relevantes para la gestión del riesgo de desastres. El primer módulo se enfoca en la necesidad de pasar de la indiferencia a la sensibilidad al riesgo. El segundo módulo toma en cuenta la importancia de la continuidad de negocio y los planes de gestión de crisis y explora las deficiencias que tienen en común. El tercer módulo utiliza un estudio de caso para examinar el tema de la gestión prospectiva del riesgo. El cuarto módulo se enfoca en la vulnerabilidad de las cadenas de suministro y otros sistemas complejos del riesgo de desastres. El artículo describe los detalles de la implementación de estos módulos y discute las oportunidades para una integración más profunda de los temas de gestión de riesgo de desastres en otras partes del currículo.

PALABRAS CLAVE:

Gestión del riesgo; desastres; continuidad de negocio; educación de negocios.

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INTRODUCTION

Given the potential importance of private sector organizations in managing disaster risk (e.g., Izumi, & Shaw, 2014; Jain, 2015; Surminski, 2013), business education can play an important role in reducing disaster risk and strengthening disaster preparedness. This article describes disaster risk management (DRM) content in the curriculum of the Rotman School of Management at the University of Toronto. It focuses, in particular, on Catastrophic Failure in Organizations, a recently developed course that brings DRM themes directly into undergraduate and MBA programs of study. In doing so, the article highlights a variety of opportunities for developing modules that focus on DRM themes and offers ideas for creating similar courses in business education in other institutions.

The Joseph L. Rotman School of Management (commonly known as the Rotman School of Management or, simply, Rotman) is the business school of the University of Toronto, a public research university in Toronto, Ontario, Canada. Rotman offers undergraduate, graduate, and Ph.D. programs and seeks to foster a new way to think that enables its graduates to tackle tomorrow's global business challenges. Rotman's undergraduate and graduate curricula occasionally touch on the topic of disaster risk management, but the treatment of this topic has traditionally tended to be implicit and somewhat haphazard. In 2014, however, the school introduced a new course, Catastrophic Failure in Organizations, which explicitly incorporates several core themes of disaster risk management.

This course contains four modules that are directly relevant to disaster risk management. The first module focuses on the need to move from risk indifference to risk sensitivity. The second module considers the importance of business continuity and crisis management plans and explores their common shortcomings. The third module uses a case study to examine the topic of prospective risk management. The fourth module focuses on the vulnerability of supply chains and other complex systems to disaster risk. This paper provides an overview of these modules and, in doing so, sketches the contours of a framework for thinking about DRM themes in the context of a business school course primarily focused on organizational failure. Finally, it considers others parts of the Rotman curriculum that touch on core DRM themes and discusses opportunities for bringing those themes more directly into the curriculum.

METHODOLOGY

Catastrophic Failure in Organizations was developed and, for three semesters, taught by the author. The description of DRM content in the course is based on his direct experience in creating and delivering the course as well as his teaching notes and reflections on student assignments and course evaluations for the course. The course itself is based on the author's reading of a broad set of academic literatures, including normal accident theory (Perrow, 1984, 1999, 2011) and related work in sociology (e.g., Clarke, 1999), research on cognitive and perceptual biases (e.g., Bazerman, 2004;

Chugh & Bazerman, 2007), and the literature on high-reliability organizations (e.g., Weick, Sutcliffe & Obstfeld, 2008).

CATASTROPHIC FAILURE IN ORGANIZATIONS: OVERVIEW

Course objectives

The Rotman School offers Catastrophic Failure in Organizations as a 12-week undergraduate course and as a 13-week MBA course. In both programs, the course is offered as an elective. In the undergraduate program, it is open to third and fourth-year students. In the MBA program, it is open to second-year full-time students in their final semester, as well as evening and morning MBA students who have completed their core curriculum requirements.

The course focuses on managing the risk of catastrophic failure in business organizations. Thus, it covers both disaster risk and a variety of other risks that threaten companies and their stakeholders. The basic premise of the course is that addressing the risk of catastrophic failure is a critical challenge for business organizations (Bazerman & Watkins, 2004; Roberts, Bea, & Bartles, 2001; Weick, Sutcliffe, & Obstfeld, 2008). From Hurricane Sandy to BP's Gulf of Mexico oil spill to the Fukushima Daiichi nuclear disaster in the wake of the 2011 Tōhoku earthquake and tsunami, numerous events in recent years have exposed the vulnerabilities of firms to catastrophic failure (Abramson & Redlener, 2012; Perrow, 2011; Tilcsik & Clearfield, 2015). This course seeks to train students to recognize the inherent vulnerabilities of business organizations to disaster risks and other catastrophic failures and help them manage such risks more effectively.

To do so, the course explores the shifting risk landscape in which businesses operate—a landscape of increasingly complex supply chains, changing climatic conditions, extreme weather events, security issues, growing urban populations, and sophisticated yet vulnerable financial and technological systems (Perrow, 1984, 2011). As the course explores this new risk landscape, it uncovers the human, organizational, and systemic factors that conspire to make business organizations vulnerable to catastrophic failure. First, it considers biases in human cognition and awareness that prevent people from thinking effectively about risks. Second, it examines why the risk of catastrophic failure emerges in complex large-scale systems (Grabowski & Roberts, 1997; Perrow, 2011) and why trends like climate change and the increasing complexity of supply chains are causing such risks to proliferate and intensify. Third, it considers how organizational barriers to learning and communication can set firms up for catastrophic failure (Edmondson, 1999; Gaba, 2000). Throughout the course, the instructor and the participating students identify opportunities for executives and corporate strategists to manage these challenges. Ultimately, the goal is to help students—future executives, entrepreneurs, investors, and consultants in the private sector—recognize the need for stronger catastrophic risk management in general and stronger disaster risk management in particular.

Instructional methods

Case discussions form the backbone of this course. Complementing the cases, lecture-style segments focus on relevant research findings that underscore and extend lessons from the cases. Simulation exercises focused on the management of catastrophic risk are also employed. In addition, three guest speakers share their experiences with students in the course. The first guest is the founder of a consulting firm focused on the management of technological and disaster risk. The second guest is a former Chief of the Major Investigations Division of the U.S. National Transportation Safety Board. The third guest is a former high-level Canadian government economist. Evaluation of student performance is based on class participation, individual reflection memos, and a long report providing an in-depth analysis of risks facing the industry or company of each student's choosing.

Enrolment

Catastrophic Failure in Organizations aims to immerse students in the daunting managerial challenges that low-probability, high-impact failures represent in a wide range of industries. Thus, the course was designed to have wide appeal to business schools students. It is suitable to students with an interest in general management, operations, supply chain management, corporate strategy, management, consulting, entrepreneurship, change management, health sector management, and business law.

Indeed, since 2014, the course has attracted a highly international group of Rotman students with a diverse range of professional backgrounds and intended career fields, including finance and banking, insurance, construction, healthcare, hospitality and tourism, digital technology, consumer products, mining, manufacturing, information technology, power generation, energy exploration, and real estate and property management, among many others. Some of these students will be working at large corporations; others are planning a career at small or medium-sized enterprises; still others are in the process of founding their own start-ups.

DRM CONTENT IN CATASTROPHIC FAILURE IN ORGANIZATIONS

Module 1. From risk indifference to risk sensitivity

The course begins with a discussion of successful and unsuccessful risk management using examples from the destructive effects of Hurricane Sandy in the New York metropolitan area. Students compare and contrast how three organizations in New York City—Goldman Sachs, NYU Langone Medical Center, and a small quantitative trading firm—managed hurricane risk and how they fared in the wake of the disaster. This set of examples serves as a springboard to a broader discussion of why business forecasts and decisions tend to ignore catastrophic risk and, in particular, disaster risk. We introduce the idea that, for many businesses, disasters represent a “gray rhino”—a highly probable and high-impact yet neglected threat (Wucker, 2016; see also Bazerman & Watkins, 2004). To understand why this neglect is particularly

dangerous in the contemporary risk landscape, students consider the paradox that, while supply chains have become more sophisticated and economically efficient in recent decades, they have also created new vulnerabilities and geographic concentrations of risk in hazard-prone areas (Jüttner, Peck, & Christopher, 2003; Wagner & Bode, 2006). The goal is to show students that systemic challenges are proliferating and reshaping the risk landscape for modern businesses, big and small.

This unit of the course concludes by recognizing that managing disaster risk is no longer the exclusive domain of risk managers in a small set of industries; rather, the ability to create risk-aware and resilient organizations is becoming one of the defining traits of successful firms across industries (Weick, Sutcliffe, & Obstfeld, 2008). And because disaster events have potentially immense implications for the communities in which a business and its stakeholders operate (Okuyama, 2007; Sarmiento, 1995; Tilcsik & Marquis, 2013), business decisions about risk are ethical decisions (Power, 2003) and, as such, should be viewed as an essential element of the social responsibility of business.

Module 2. Business continuity and crisis management plans

Many students who have worked at large corporations tend to be at least somewhat familiar with the paradigm of business continuity planning or crisis management planning. However, students whose work experience has been at small or medium-sized firms are typically less knowledgeable about the purpose and nature of business continuity plans. To bring all students to the same level, this unit begins by reviewing research findings that examines the vulnerabilities of contingency plans in a range of organizations (Clarke, 1999). The resulting discussion highlights the importance of effective business continuity plans and the dangers that the absence of such plans creates.

The next section of this module focuses on common shortcomings of business continuity plans. Though business continuity planning has been a dominant paradigm in recent years, research on the plans that firms actually develop provides little cause for optimism. For example, sociologists have shown that plans are often predicated on an implicit assumption that, save for the focal event itself, an organization will be in its usual, high-functioning state (Clarke, 1999; Perrow, 1999). A natural disaster, for instance, is expected to occur on an otherwise calm day on which all the resources necessary for a response will be available within the expected time frame. In reality, when crisis strikes, few organizations operate as effectively as they would on a normal day.

To highlight the most common pitfalls of business continuity planning, it is helpful to draw on comments by students who have first-hand experience in creating, practicing, or implementing continuity plans. Though this is rare in undergraduate populations, most MBA classes will have several students who have such experience in a range of industries. This creates a powerful opportunity for students to learn from one another and to exchange ideas across industries and types of organiza-

tions. A core takeaway from this discussion is that plans often fail to capture the complexity of disaster risk. For example, untested assumptions about the availability of resources and conflicting response claims reduce plan effectiveness, and unaudited plans are often more symbolic than operational (Clarke, 1999; Meyer & Rowan, 1977).

Student comments often highlight that many plans erroneously assume that critical resources—for example, transportation, communications, and IT systems, power, fuel, employees, external support, functioning backup locations, vendor services, well-maintained generators, and assistance from partners—will remain available in the wake of a disaster. Another common set of student comments tends to highlight the problem of unpracticed or unused plans. Because of factors like exercise fatigue and staff turnover, existing plans may remain unpracticed. In addition, in some cases, even well-practiced continuity plans are not actually used during disasters because those in control (e.g., senior leaders) might not have been involved in developing and practicing the plans. As a result, important elements of a planned response might be decoupled from actual implementation (Clarke, 1999; Meyer & Rowan, 1977; Tilcsik, 2010). Likewise, students often note that, because plans are usually updated in an incremental way, they continue to reflect an “imprint” of earlier assumptions that made sense when the plans were initially created but might have lost their validity and relevance if the environment has substantially changed since then (Marquis & Tilcsik, 2013).

Module 3. Prospective risk management

The basic premise of this module is that risk reduction (i.e., prevention or mitigation) is in many cases less costly in the long run than disaster response and recovery (McGuire & Schneck, 2010). In fact, prospective risk reduction might generate additional business value because the ability to continue operations despite major disruptions and radical uncertainty in the environment can not only protect a firm from environmental forces but also become a source of strategic advantage over competitors and thus function as a source of business value.

To consider the challenges and benefits of an anticipatory rather than a reactive approach to managing the risk of catastrophic events, students delve into the case of the Canadian energy company Hydro One (Mikes, 2010). The course uses a multimedia case study to help students learn about enterprise risk management at Hydro One and explore how the firm’s executives constructed an understanding of the company’s evolving risk profile in an industry that faces challenges like climate change, extreme weather events, and a shifting regulatory environment. More than one million households and more than one hundred large industrial customers depend on Hydro One for electricity, but weather events frequently threaten the company’s power transmission and distribution systems. Despite these threats, the company had some successes in preparing for and addressing unplanned outages.

From the narratives of Hydro One’s chief executive officer, chief financial officer, head of public relations, and chief regulatory officer, students come to understand

how this company attempts to anticipate risks in the medium to long run and how it identifies risk mitigation strategies. The case also offers a discussion ground for possible weaknesses in Hydro One's risk management process, such as high costs in terms of managerial time, the subjectivity of risk assessments, and a potential for excessive risk aversion. At the conclusion of the case discussion, students debate how Hydro One's chief risk officer might address these challenges and how the company can most effectively integrate disaster risk management into its strategies and organizational processes.

After the deep dive into the Hydro One case, we consider the general managerial and cognitive challenges that arise as businesses shift their focus from business continuity planning to proactively identifying and analyzing catastrophic risks. Students learn about the cognitive and organizational challenges that executives face when reasoning about the risk of extreme events. In particular, humans have inherent cognitive biases that wreak havoc on our ability to reason about infrequent but high-impact events (Barnes, 1984; Gilovich, Griffin, & Kahneman, 2002; Tversky & Kahneman, 1974). Not only are these biases persistent and widespread, they are activated precisely when we need to make decisions about rare, risky events and changing conditions (Chugh & Bazerman, 2007).

At this point in the course, students complete a short paper assignment to help improve their ability to recognize the role of cognitive biases in managerial decision making. For the assignment, they are given a selection of readings about cognitive biases in managerial judgment and decision making, and their task is to apply the concepts they have learned from these readings to analyzing a decision situation that they themselves have witnessed, been a part of, or have deep knowledge about, where the influence of one or more cognitive biases contributed to making a less-than-optimal decision. In identifying and analyzing the role of cognitive biases in this situation, students are asked to explain why they reached their conclusions and provide specific examples, observations, and evidence to support their analysis.

Module 4. The vulnerability of supply chains and other systems to disaster risk

This module begins with a discussion of how and why systems that underlie modern business operations—supply chains, the power grid, information technology, and communication systems—are steadily becoming both more complex and more interconnected (Perrow, 1984, 1999). Students learn about three properties of modern systems that make them especially vulnerable to the effect of disasters. First, the components of these complex systems can interact in unintended and unanticipated ways when an external force, such as a natural disaster, disrupts one part of the system (Perrow, 1984). Second, it is often difficult to comprehend these cascading effects because critical parts of the system are hard to observe directly (Perrow, 1984). Finally, modern systems are often tightly coupled, meaning that the failure of one part quickly exerts a significant effect on the rest of the system (Perrow, 1984). These factors create systems ripe for quick and unexpected transitions from normal opera-

tions to catastrophic meltdowns (Perrow, 1984, 2011). Discussion of these factors creates a basis for considering the vulnerability of three important types of systems to disaster risk: supply chains, the power grid, and communications systems.

Most business students are aware of the advantages of a just-in-time approach to supply chain management; few are familiar with the risks this approach carries. During normal operations, these systems tend to work well. However, just-in-time supply chains leave suppliers and downstream consumers open to supply shocks and large supply or demand changes that can emerge as a result of a disaster. Although supply chains tend to be much faster today than twenty years ago, they are not necessarily more resilient (Jüttner, Peck & Christopher, 2003; Wagner & Bode, 2006). Students then consider and discuss strategies for building more resilient supply chains. Increasing inventories, building in redundancy, and relocating critical facilities to lower-risk areas are often discussed as viable strategies at this stage. The instructor also highlights the benefits of coordinating with public sector organizations in reducing supply chain risk.

The discussion of supply chain risks tends to lead naturally to the recognition that the electrical grid is the cornerstone of the modern economy. Students also come to recognize that the availability of electric power is critical when businesses respond to a disaster and attempt to implement business continuity plans. Though the power system is highly vulnerable to natural threats, and the loss of electricity is crippling to most organizations, many students are unaware of the true costs and the full extent of effects that outages can have on operations. To illustrate these effects, students consider the cascading effects of the 2003 Northeast blackout: factories and airports were closed, cellular communication was disrupted, and several major cities, including Detroit and Cleveland, were under a boil-water advisory because the blackout crippled their water treatment plants (Amin, 2003; Anderson, Santos, & Haimes, 2007; Beatty, Phelps, Rohner, & Weisfuse, 2006; White, Roschelle, Peterson, Schlissel, Biewald, & Steinhurst, 2003).

Another example that tends to resonate with students is the dependence of information technology (IT) on continuous power supply. This is a critical issue because IT has become essential to most business operations and is increasingly important to the execution of business continuity plans. As a result, the impairment of IT systems can have disruptive, cascading effects. To make matters worse, many operators do not know how to operate in a “non-tech” post-disaster environment because non-tech methods are rarely practiced or tested (Clarke, 1999). A critical, actionable takeaway for students is that, given the heavy reliance on electric power, business continuity plans need to prepare for power loss and the steps that will be taken in the event that such a situation occurs. Many continuity plans, however, assume that power will remain available during a disaster, but this is clearly not the case. A closely related lesson for students is that effective communication is critical in disaster situations. Within the last decade, reliance on communications systems has increased significantly, and the failure of these systems leads to cascading impacts. For exam-

ple, in the discussion of business continuity plans and the essential role of the power grid, students often report having observed an overreliance on commercial cellular service, noting that the loss of this service would cripple operations.

DRM CONTENT IN OTHER PARTS OF THE ROTMAN CURRICULUM

One related course at the Rotman School that touches on core DRM themes is Business Sustainability Strategy, a recently launched MBA elective. This course relates primarily to the DRM theme of sustainable management and, secondarily, to the theme of generating business value from more effective disaster risk management. This course does not have an undergraduate version. Several MBA students who choose to take Catastrophic Failure in Organizations are also enrolled in Business Sustainability Strategy, and the faculty members teaching the two courses coordinate closely with each other.

The Business Sustainability Strategy course defines business sustainability as sustained resource efficiency that delivers enhanced corporate, community, and environmental resilience. It aims to teach students how to employ sustainability as an innovation platform to generate new growth, focusing on the design and delivery of business model innovation rather than only on technology. Students learn from both failure and success cases and examine how sustainable innovation is being implemented in both developing and developed countries.

This course is structured to take students on a practical journey of how companies design strategic intent around sustainability; how they employ this strategic intent to generate sustainability-led innovation; and how they design and deliver business models to market. Each class session includes industry examples presented by two to four industry executives, a question-and-answer session with the executives, and a summary of key learning points and takeaways by the instructor.

The overriding learning objective of this course is to expose students to practical examples of how executives build corporate cultures that embed sustainability and innovation as key strategic imperatives and how they design and deliver profitable business models to market. Though the topics of this course are not explicitly framed as topics in disaster risk management, they indirectly link to the DRM themes of sustainable management and generating business value because they focus on how private enterprises are generating value from sustained resource efficiency in the environment while potentially contributing to climate change mitigation and adaptation (Cutter & Gall, 2015; Schipper & Pelling, 2006; Thomalla, Downing, Spanger-Siegfried, Han & Rockström, 2006).

DEEPER AND WIDER INTEGRATION OF DRM CONTENT INTO THE CURRICULUM

Both of the courses described above are relatively new. Catastrophic Failure in Organizations was launched in 2014, and Business Sustainability Strategy in 2016. There are promising signs suggesting that both courses will remain part of the curricu-

lum in the long term. Catastrophic Failure in Organizations has already received two awards from the Rotman School and one award from the school's MBA student association. It is also one of the highest-rated and most popular undergraduate courses at Rotman. Its MBA version is currently capped at 40 students, and there is usually a waitlist to get into the course. Given this interest, Rotman will offer two MBA sections in 2017, bringing the total enrolment to 80 MBA students. The undergraduate enrolment falls between 50 and 60 students, one of the highest among elective courses. Business Sustainability Strategy is still in its infancy and had approximately 30 students in its first year, but student feedback on the course has been positive, and enrolment is likely to grow over time.

There are opportunities for the deeper integration of DRM content into both courses. Catastrophic Failure in Organizations, for example, touches on disaster risk metrics only indirectly. When it examines cooperation between private enterprises and public sector organizations, it briefly considers joint private-public risk assessments and the exchange of risk information with government entities, but it currently covers little ground regarding the integration of disaster risk metrics into strategic and investment decisions and forecasts. This is an important area for improvement. Likewise, in Business Sustainability Strategy, a greater focus on sustainable business initiatives that directly reduce disaster risk is a promising way to bring DRM content more prominently into the course. There is also an opportunity for a greater focus on reporting disaster risks as part of sustainability reports.

In addition, given Rotman's extensive finance curriculum, there is an opportunity to engage more deeply with the theme of risk transfer (Linnerooth-Bayer & Hochrainer-Stigler, 2015), particularly in existing courses focused on financial risk management. This would help students examine how various risk transfer activities and instruments help reduce disaster-related economic losses and why risk transfer may be a very costly approach in that it does not directly address the vulnerability of assets in question.

The most promising but also most challenging future opportunity is to bring DRM content into Rotman's first-year core curriculum, which covers each of the fundamental disciplines of business. This approach could bring some introductory DRM content to every student and might also create greater demand for subsequent elective courses that discuss DRM content. Three core courses in particular—Fundamentals of Strategic Management, Business Ethics, and Corporate Finance—are likely to be the best candidates for integrating introductory DRM content. Because of institutional constraints, however, changes to the core curriculum require substantially longer time and more bureaucratic work than changes to elective courses. One important mechanism for change might be the movement of faculty between elective courses. Instructors who have taught DRM themes in their own electives might be particularly open to integrating those themes into core courses in a lasting and meaningful way.

CONCLUSION

Business education can be a useful tool in strengthening disaster risk management efforts, particularly in the private sector. At the Rotman School of Management, Catastrophic Failure in Organizations is a recently developed course that brings DRM themes directly into undergraduate and MBA curricula. The course includes four main modules that are directly relevant to disaster risk management topics: a module on moving from risk indifference to risk sensitivity, a module on business continuity and crisis management plans, a module on prospective risk management, and a module on the vulnerability of supply chains and other complex systems. Though this course represents a promising first step, much work remains to be done. Integrating disaster risk management themes both more deeply and more widely into the curriculum is both a promising opportunity and a significant challenge.

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Teaching Disaster Risk Management: Lessons from the Rotman School of Management

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PROPOSAL TO INTRODUCE DISASTER RISK MANAGEMENT TOPICS IN MASTER PROGRAMS IN ESAN GRADUATE SCHOOL OF BUSINESS

PROPUESTA PARA INTRODUCIR TEMAS DE GESTIÓN DE RIESGOS DE DESASTRES EN LOS PROGRAMAS DE MAESTRÍA DE ESAN GRADUATE SCHOOL OF BUSINESS

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ABSTRACT

This paper aims to explain and present a proposal to introduce Disaster Risk Management (DRM) topics into ESAN Graduate School of Business Master's programs. Although disasters have cost Peru more than USD 7,600 million in the past 2 decades the business sector, particularly Small and Medium Enterprises, have not developed preventive or continuity plans mainly because they are not familiar with DRM topics. Taking this into consideration, the paper presents a detailed academic/curricular proposal for DRM topics such as business continuity, business ethics, corporate social responsibility, and sustainable management. Additionally, it introduces the idea of promoting Disaster Risk Management (DRM) topics to the Peruvian business community as a strategy to enhance the graduate education.

KEYWORDS

Disaster; Resilience; Risk Management; Business Schools; ESAN; Peru.

RESUMEN

Este artículo tiene por objeto explicar y presentar una propuesta para introducir los temas de Gestión de Riesgos de Desastres (GRD) en los programas de Maestría de ESAN. A pesar de que los costos generados por los desastres naturales en Perú suman más de 7.600 millones de dólares en las últimas dos décadas, el sector empresarial, en particular las pequeñas y medianas empresas, no han desarrollado planes de prevención o de continuidad. Esto se debe principalmente a que no están familiarizados con los temas de Gestión de Riesgos de Desastres. Tomando en consideración este punto, el documento presenta una propuesta académica y curricular detallada para temas puntuales GRD tales como continuidad de negocio, ética en los negocios, responsabilidad social corporativa y gestión sostenible. Adicionalmente, introduce la idea de promover los temas de Gestión del Riesgo de Desastres en la comunidad empresarial peruana como una estrategia para mejorar la educación de posgrado.

PALABRAS CLAVE

Desastre; resiliencia; gestión de riesgos; escuelas de negocios; ESAN; Perú.

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INTRODUCTION

In recent years, Disaster Risk Management has gained more importance due to the increases both in recurrence and magnitude of natural disasters, challenging our ability to anticipate and prevent such events. Governments have taken on a series of commitments making Disaster Risk Management a national priority, where all development actors assume specific functions. These actors include not only civil society but also the private sector, which historically has contributed little effort in this regard. Other consequences which businesses face as the result of disasters include the effects of closure or financial distress, which in turn may impact the community in terms of loss of jobs and unpaid debts, among others.

An important strategy which countries and civil society tend to overlook is the importance of coordinating and collaborating with stakeholders from a wide range of sectors and disciplines. This includes coordination among countries facing common disaster risks³.

The private sector plays an important role in building and providing for strong resilience in the community, taking into account that more than 70% of the economic investments made in developing countries come from the private sector (UNISDR 2013b). This may, however represent a difficult challenge for many emerging economies as small and medium-sized businesses constitute a significant part of their economy, making them more vulnerable to disasters with less resources for resilience. These businesses usually depend on a centralized market that in the case of a disaster will be equally affected. They have less access to financial resources and the possibility of having a Disaster Risk Management plan is limited. As a result, large enterprises that rely on these small and medium-sized enterprises as their suppliers of goods and services will be affected.

Enterprises in general, no matter their size, lack the incentives needed to develop and implement a Disaster Risk Management. This lack of incentive is reinforced by the fact that they do not see the potential cost, losses and consequences that a disaster can cause. To this end Business Schools provide for the possibility to engage their professionals in the shared responsibility of ensuring continuity to the business community in the event of the occurrence of a disaster.

ESAN Graduate School of Business was created more than 50 years ago. It is the first academic Graduate School of Business created in the Spanish speaking world. Founded in 1963, under an agreement between the governments of Peru and the United States of America (through the cooperation agency USAID). Its organization and implementation was entrusted to the Graduate School of Business of Stanford University, California. Since its creation, ESAN has maintained a strong commitment to train managers capable of generating change within their organizations and thus contribute to the development of society. This commitment fulfills the objective of introducing Disaster Risk Management in business.

³ Asian Development Bank. *Operational Plan for Integrated Disaster Risk Management 2014-2020*, April 2014.

ESAN will address four of the seven topics related to Disaster Risk Management: (1) Business Continuity Planning; (2) Business Ethics and Social Responsibility; (3) Strategic Investment and Financial Decisions; (4) Sustainable Management. These themes will primarily be mainstreamed into the MBA Program and the following Masters degree programs: Real Estate Management and Development, Supply Chain Management, Energy Management, Public Management and Project Management.

PERU'S SITUATION

Due to its diverse geographical conditions and climate, Peru is exposed to various types of disasters. Two groups of disasters which represent the great threats considering their extent and cost of damages include, first, exposure to earthquakes, tsunamis and volcanic activity; and second, to climate changes such as the El Niño Phenomenon which causes extreme rainfall, flooding, drought, frost, and hail, among others. Additionally, the country is faced with adverse geological phenomena such as landslides, mudslides, among others, which are very common.

In the past two decades natural disasters have cost Peru more than USD 7,600 million⁴ in damages. This amount only includes earthquakes and disasters caused by the El Niño Phenomenon; however there are unknown costs due to business interruption or closure, that affects the GDP in the region and the country. This analysis has only been done in recent years.

During the first three months of 2016, Peru suffered from the El Niño Phenomenon, with enormous damage caused by flooding and landslides. One of the most serious consequences was a one-week closure of the country's main road (Carretera Central) which connects the jungle and mountains with the coast from east to west. This road is the main transport route for mineral exports, coffee exports and agricultural products coming to the coast, and especially to Lima. The Exporters Association (Adex) reported that a total of 6 million USD⁵ were lost each day that the road was closed. This affected the mining export region which represents 6.4% of mining total exports.

The government took preventive measures when the occurrence of the El Niño Phenomenon was predicted for 2016, using funds from the country's budget to mitigate the damage of all kinds of natural disasters, which represented about 1,000 million USD. However, these actions taken were focused on attending to emergencies rather than preventing them. In fact, Peru has confronted this climatic phenomenon with greater resources from a fund established by the Government to deal with natural disasters. With the first manifestations of this climatic phenomenon began to be felt, the mechanisms of action were immediately activated to minimize the damage generated by heavy rainfall in the northern coast of the country, increasing flows

⁴ Presidencia del Consejo de Ministros (PCM), et al. *Plan Nacional de Gestión Del Riesgo de Desastres: PLANAGERD 2014-2021*. May 2014.

⁵ (01 de marzo 2016) "El costo de cerrar la Carretera Central: ¿Cuánto se deja de exportar al día?" *Diario Gestión*. Recuperado de <http://gestion.pe/economia/costo-cerrar-carretera-central-cuanto-se-deja-exportar-al-dia-2155534>

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and landslides in the mountains (central area of the country), and drought in the south-central region (Andes).

Government efforts were prearranged for public sector investment by providing for the functioning of social and productive infrastructure. However, the business sector took little or limited preventive and planning actions. This fact became apparent with the closure of the main road (Carretera Central) in March, where many trucks and passenger buses were stuck for days. Alternative routes were used as an immediate solution as many were left unprepared. This opened a discussion between the private and public sectors regarding the limited government investment in these routes.

Even though the private sector in Peru faces the same critical barrier to investment in Disaster Risk Management as other emerging countries, disasters caused by the El Niño Phenomenon are frequent, and have very similar consequences whenever they arise. Providing the private sector with valuable information in terms of possible situations that could arise during the disaster as well as their subsequent consequences is key. It is important to support the private sector's efforts in the response phase by focusing their efforts in minimizing the effects of the disaster after it has taken place; and resuming operations.

In this situation with the El Niño Phenomenon, Peru's private sector has the advantage of having some risk information available, but they still need to work on other barriers such as developing a long-term business perspective, understanding the difference between reaction to an event with Disaster Risk Management Plan, and the lack of access to funds to work and apply these plans.

ESAN's orientation towards business includes Ethics and Social Responsibility in all of the Masters degree programs offered by the School. However, Disaster Risk Management topics have not been developed in detail for these courses.

INTRODUCING DRM IN ESAN

ESAN is the most important Graduate School in Peru providing it with important access and relationships within the business and public sector actors in the country. The school offers programs not only for the business sector but has an important number of programs designed for other public institutions as well. The School aims to train leaders with competitive integrity, with critical and international vision by strengthening their competencies, knowledge and values; in an effort to fulfill the objectives of Disaster Risk Management in business.

Due to the fact that the nature, gaps and needs of the private sector in Peru are different, the efforts of ESAN should be concentrated on four of the seven themes presented within the framework of Disaster Risk Management. These include: Business Continuity Planning; Business Ethics and Social Responsibility; Strategic Investment and Financial Decisions; and Sustainable Management.

ESAN proposes an integral approach to promote Disaster Risk Management Plans that considers three main areas where ESAN has strength: Academic, Investigation and Business.

The academic approach

It aims to give the students a wider knowledge of Disaster Risk Management and includes it as part of their business topics. For that purpose 6 master degrees have been chosen for their nature, range and influence. These are: MBA Program and the following Master programs: Real Estate Management and Development, Supply Chain Management, Energy Management, Public Management and Project Management.

Within the academic approach four strategies are considered:

1. Include topics in the curricula:

The first step is to include Disaster Risk Management topics in the syllabi of courses related to the selected themes. This will introduce students to Disaster Risk Management in a specific course, and provide them with tools for the development of plans to not only prevent but to respond as well. The aim is to make them agents of change on Disaster Risk Management within their enterprises.

The MBA Program, the Master in Project Management and the Master in Supply Chain Management programs were chosen for having a natural link to the process of Disaster Risk Management. The MBA provides a strategic approach to the enterprise-wide level, while the specialized Masters of Project Management and Supply Chain Management programs have specific objectives related to the continuity of the operation and the specific development projects.

In this context, the Supply Chain Management Masters play a key role, since students focus on the processes needed to guarantee both the continuity of the enterprise as well as carrying out the important role of building and providing strong resilience within the community. Processes include managing the relationship with suppliers, logistics input and output, production of goods and services, distribution, foreign trade and customer relations.

Furthermore, the Master of Project Management provides the tools that businesses require to develop their plans at all levels. The projects are developed and implemented according to the sector, type and size of enterprise which is viewed as a strategic part of its management process. Disaster Risk Management Plans are not excluded from Project Management. Business Continuity Planning requires Project Management to be developed before and after the disaster occurs.

In the three Master programs chosen, Disaster Risk Management topics will be considered in traditional courses such as Finance, Marketing, Supply Chain and HR. These courses will also develop management skills by focusing on decision making in competitive contexts with deference to time and financial constraints, competition, and marketing decisions. These courses include:

- **Business Ethics:** all master programs in ESAN include in their curricula an Ethics and Social Responsibility course which aims to study the concepts and frameworks of analysis used to determine an organization's responsibilities to its shareholders. It evaluates business cases that are in the process of implementing Corporate Social Responsibility (CSR) Programs. Business Ethics and Social Re-

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sponsibility related to Disaster Risk Management will be included in the course topics in all master degrees, not only just those chosen for this project.

- **Business Plan:** This course provides students with the tools needed to evaluate potential business ideas. Students learn methods for business planning, how to assess the feasibility of promising ideas, and review aspects of the processes required to implement business plans. While most Business Plan courses devote a section or chapter related to contingencies, these typically don't include disasters as part of those required, and if so, only briefly. Students are asked to analyze and consider those risks and disasters that could affect their area of influence taking into account suppliers, clients, supply chains, and employees, among others. This course gives students the support they need to present a Business Plan in a thesis topic.
- **Business Strategic Simulator:** this course helps develop management skills by focusing on decision making in competitive contexts with time and financial constraints. Students learn how their decisions affect the business environment and influence the decisions made by other organizations. The course is taught using a simulator where students can plot several decisions and compete with their peers for the best results. Market, finance, availability of materials and supplies, among others; can be modified by the professor. Disaster effects and plans can be include within these variables.
- **Strategic Management:** this course aims to break parochial paradigms in an effort to redefine strategic options available to students. After completing this course, the participant will be able to conceptualize value on a regional or global dimension. Disaster Risk Management issues will be included to broaden students' way of thinking while allowing them to analyze new strategies in the event of a disaster.
- **Operation and Supply Chain Management:** this course gives the student the fundamentals, theories, and instruments needed for adequate supply chain management. The supply chain specialist must process constant requests from differing areas within an organization while being capable of making financial projections, effectively managing human resources, and generating low-cost efficiencies. In this scenario, students are asked to consider contingencies related to any possible disaster or problem. This section will now include a wider view and consider not only the contingency but a supporting plan to grant continuity of operations.
- **Financial Management:** students receive the tools required to develop and evaluate investment projects and make decisions in order to increase the enterprise's value within the financial market. Topics with a key focus in corporate finance Strategic Investment and Financial Decisions issues related to Disaster Risk Management will be included. Case study evaluations will consider search and creation of investment and trust funds.

Additionally, the ESAN Master program will develop a series of workshops that aim at helping students to develop essential management skills. This workshops can be complemented with Disaster Risk Management issues. Workshop topics will include:

- **Managerial Skills:** the objective is to evaluate and work on student's management skills.
- **Critical Thinking:** helps students rediscover their capacity for critical and questioning thought. They will learn why people resist unlearning old patterns and will learn to review and abandon paradigms, learn from difficulties, tolerate uncertainty, and resist the temptation to over-structure. Disaster Risk Management themes can be incorporated into this workshop, focusing on collaboration with, and working within the community.
- **Business Environment:** analyzes the environment in which companies operate in national and international contexts and within the global economy. It looks at how companies adapt to new global trends to ensure viability. The topics on Business Continuity Planning and Strategic Investment and Financial Decisions will be considered in this workshop.

Additionally, three Specialized Masters were selected due to their importance and strategic position within the economy of the country. ESAN has selected three masters degrees focused on specific topics: Real Estate and Urban Development, Energy and Public Management.

The Master in Management and Real Estate Development focuses on the field of urban and real estate development where the city's economy becomes more important when related to Disaster Risk Management. The goal is for students within their enterprises to participate in city planning with a focus on the continuity of the economy and the restoration of the community. A greater emphasis will be placed on Business Ethics and Social Responsibility, in all phases of planning Disaster Risk Management, taking into consideration the limited existing regulation and the potential for speculation, post disaster. These points are particularly important in Peru due to urban development of large cities, many of which are on the coast and exposed to major disasters such as earthquakes and tsunamis; with 54.6%⁶ of the country's population concentrated on the coast. Making the situation worse, most urban development has remained unplanned, with little involvement of the authorities. There is also a great informality in the construction of houses (called "auto contruccion") as well as land acquisition thru land invasions. This leaves the populations highly vulnerable.

In the Master in Management and Real Estate Development, the theme of Business Ethics and Social Responsibility will be considered in the following course:

- **Business and Social Responsibility Strategies:** a real estate project may have two approaches: a good opportunity for investment or, alternatively, for an en-

6 Presidencia del Consejo de Ministros (PCM), et al. *Plan Nacional de Gestión Del Riesgo de Desastres: PLANAGERD 2014-2021*. May 2014.

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trepreneur with vision, a real estate development with sustainable economic activity over time. This course discusses the comprehensive strategy needed to take the second option and successfully manage the organization. The important challenge of achieving profitability without sacrificing ethical principles and to exercise responsible corporate citizenship is stressed.

The Master in Energy Management was selected due to its focus on one of the most strategic sectors within the country. Energy is one of the main supports for the economy as well as for community continuity. The dynamism of the energy sector is critical to maintaining the growth of the economy within the country. By its strategic nature, the four DRM topics selected are included in the master program: Business Continuity Planning; Business Ethics and Social Responsibility; Strategic Investment and Financial Decisions; and Sustainable Management. Peru's energy sector faces a number of changes in production, transportation, energy use and environmental impact, and faces the challenge of establishing new energy sources; all areas which need consideration of Disaster Risk Management.

Regarding the energy industry in Peru, one of the most important projects for new energy sources in the country, Camisea Gas, experienced a natural disaster in one of its locations. Both its exploration and distribution plants are located in areas of high risk for disaster: Cusco and Pisco, respectively. In 2007, the Fractionation Plant of Pluspetrol Camisea suspended operations due to a 7.9 magnitude earthquake in the city of Pisco. The plant had a preventive stoppage, immediately after the quake started. Despite the magnitude of the event, staff and facilities suffered no damage, and operations resumed four days later. The gas supply had to be treated by other plants within the enterprise.⁷

Disaster Risk Management topics will be considered on the following courses:

- **Energy management companies and corporate governance:** this course provides a review of relevant practices that aim to implement corporate governance activities that allow to transparently show the risk prevention actions undertaken by the enterprise; including damages caused by disasters. It proposes alternatives for the recognition and specific risk management in the energy sector by governing bodies of companies, and shows the benefits of such practices.
- **Financial Evaluation of Projects for the Energy Sector:** this course provides tools for financial capital budgeting within the theory of value creation. It facilitates the acquisition of a solid understanding of the theoretical and practical basics of capital budgeting, risk and decision making under uncertainty. Strategic Investment and Financial Decisions issues related to Disaster Risk Management will be included in the evaluation of projects. Students will propose ways to incorporate the characteristic risks of the sector in the overall financial evaluation.

⁷ Pluspetrol Camisea SA. *Memoria Anual 2007*. Lima. Enero 2017

Meanwhile, the Master in Public Management, by its nature, is oriented to state officials and aligned with the requirements of state reform. Disaster Risk Management topics are being not only as guidelines for implementing the Disaster Risk Management, but also as a requirement of committed staff with a professional profile according to new concepts of managing for results.

2. International Week

Twice a year, ESAN organizes The International Week that consists of five, all-day intense study sessions during which students of the MBA and specialized master's courses participate. The aim is to update their knowledge on the latest management trends from prominent international professors coming from prestigious universities in the United States, Europe, Asia and Latin America. Interaction between Peruvians and foreigners of different backgrounds and cultures enhances everyone.

The International Week is one of the academic events with the greatest capacity to attract a large crowd at a regional level. More than 1,500 Wstudents participate each week, while more than 10% come from abroad. In each edition, this event increases its strength as the only one of its kind in the academic field, attracting a larger number of international participants each year, thereby producing a greater cultural exchange and the expansion of the network of contacts.

The teaching methodology is similar to the one used in regular courses, using case studies, interactive lessons, exercises, small group discussion and teamwork. More than 60 courses, 15 hours of contact (1.5 US credits or 4 ECTS-European Credit Transfer System) in 3 schedules (morning, afternoon and evening) are taught during this week.

Disaster Risk Management courses will be included in the program of The International Week, related to Business Continuity Planning; Business Ethics and Social Responsibility; Strategic Investment and Financial Decisions; and Sustainable Management; giving students the opportunity to know more about this topic based on the experience of international professors. Also, classes will be enriched by the experience of students coming from different regions of Peru and different countries.

3. Include a Disaster Risk Management Workshop in the curricula

A Disaster Risk Management Workshop will be added to the curricula of the 6 chosen Master programs. Each session will address a topic related to Disaster Risk Management, and will be reinforced with case studies of enterprises located in disaster areas. Greater emphasis will be given to the study of those areas most affected by disasters in recent years. The goal is for the student to sense the reality faced by businesses in affected areas, and to become aware of changes implemented after the disaster. This will give them the vision they need to develop a plan to build for and provide a strong resilience within the community.

For a clearer view of the reality faced by the business sector in their region, students will visit enterprises that are in these risk areas. The aim is for them to analyze

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the real situation that the enterprise has confronted in the face of disaster, and to witness first hand, the actions taken. Visits will be made to different sized organizations. Taking advantage of the fact that ESAN offers programs in different areas of the country, each faced with its own realities, will expose students with a business reality to which they can relate personally.

4. Promote Thesis topics

ESAN will promote Disaster Risk Management as thesis topics, for Investigation, Business Plan or Case Studies thesis. The aim is to give greater emphasis to the development and implementation of plans, and quantifying current losses in a disaster situation.

In the case of Business Plans, students should engage in issues of Disaster Risk Management from the initial business idea. For Investigation topics, students will be asked to investigate, in depth, the issues of Disaster Risk Management and its application within the country, not only at the government sector but also the private sector. For Case Studies, students will be asked to focus the case on Disaster Risk Management and to present a proposal with a Business Continuity plan.

Each thesis would need to consider four of the seven topics chosen by the school: Business Continuity Planning; Business Ethics and Social Responsibility; Strategic Investment and Financial Decisions; and Sustainable Management.

The investigation approach

One of the main problems faced in the implementation of Disaster Risk Management is the lack of information on the risks and consequences of disasters. Even more difficult is to quantify the resilience of the enterprise and the community. It is difficult for businesses to gain access to economic or financial information, the few numbers available being general and based on posterior consequence as opposed to providing for a clear estimate of what could be lost or the costs associated. For this reason, ESAN considers it important to develop other activities to help gather information. The investigation approach aims to access Disaster Risk Management information at the enterprise level, not only in its application but on the level of subject knowledge geared towards the business sector. This approach includes 2 schemes:

1. Development of study cases.

In addition to having very little information about the economic consequences of natural disasters, the few existing case studies of Peruvian enterprises are not focused on issues of Disaster Risk Management. Enterprise Case Studies will be developed taking advantage of the presence of ESAN in different cities in Peru, each belonging to the most important economic regions within the country. This will also help to recognize the economic reality of the region, differences between each region and the risks each faces. The diversity of situations, enterprises size and regional economies would provide valuable information for the development of specific cases. This will provide a more detailed view of the regional situation.

Two cities being considered which can possibly offer more information taking advantage of the fact that each provides for access to information on the economic effects of a recent disaster are: Arequipa and Ica. Both have suffered major earthquakes in the last 2 decades, in 2001 and 2007 respectively.

In the case of Arequipa, the region is the 2nd most important in the country, its capital is the second largest city in Peru, and has the second largest economy due to mining exploration, fine wool exports and a dairy products industry.

The Ica region as previously mentioned has the most important gas plants as well as the country's most important agroindustry exports area. New economic sectors have developed after the earthquake despite the damages, estimated at USD 600 million. The tourism sector has increased its investment and three, five stars hotels have been built since the earthquake in 2007. One of the most interesting cases is that of the Hotel chain Libertador Peru, which invested 30 million dollars in their hotel in Paracas, 30kms from the epicenter. The chain was in the middle of the acquisition process of this hotel when the earthquake struck. The hotel was completely rebuilt after it was affected by the earthquake and tsunami in August 15, 2007. The hotel was reopened on September 2009⁸.

Another event to consider is the El Niño Phenomenon which affected the north region of the country during the first four months of 2016, namely in the coastal regions of Piura, Lambayeque and La Libertad. The presence of this phenomenon during the first quarter of 2016 opened the doors to access of the latest information. El Niño (first quarter 2016) had moderate consequences compared to El Niño from the years 1982-1983. Trujillo, the capital city of La Libertad its capital, is the third largest city in the country with the second largest coastal population. The region's economy depends on agricultural activity particularly exports. The Piura region has developed a rich agricultural, fishing, mining and oil economy over the last 10 years, and has become a center of development, thanks to strong private investment. It has also developed a strong tourism industry in the coastal area, known for its pleasant tropical climate. In the case of Lambayeque, it is a commercial region given its links from the northern mountains of the country to the coast. Its economy depends on agriculture and minerals exports that come from the adjacent mountain regions.

The region of Cusco cannot be ignored, as it is the most important tourism destination in the country (Macchu Picchu ruins are located in Cusco), and is home to the main gas extraction area, Camisea gas, which represents 30% of the economy of the region⁹. Cusco is in a high risk area, affected mainly by earthquakes, landslides, frost and floods. It is also an area that has an important economic influence in neighboring areas which are regions of extreme poverty which are also exposed to major natural disasters as well.

8 (Miércoles 18 de marzo del 2009) En setiembre reabren el Hotel Libertador de Paracas. Diario Peru.21. Recuperado de <http://peru21.pe/noticia/260950/septiembre-reabren-hotel-libertador-paracas>

9 Instituto Peruano de Economía. Fichas Regionales 2015 Actualizadas. PBI Cusco 2015. 2015

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Cusco depends on the tourism sector. During the period of February to March 2010 it experienced severe flooding due to the heavy rainy season. The flooding cost a total of USD 224.6 million in damages. Figure 1^o shows a summary of the cost by sectors, even though the tourism sector was one of the less affected, it indirectly relies on other sectors such as transportation.

Table 1. Summary of the economic effects - rainy season in Cusco 2010 - in USD

Sectors	Total	Direct damages	Indirect damages	Percentage
SOCIAL	79,238,323	75,606,501	3,631,821	35.27%
Social	3,631,821		3,631,821	1.62%
Education and culture	8,323,605	8,323,605		3.70%
Health	3,893,216	3,893,216		1.73%
Housing	63,389,681	63,389,681		28.21%
INFRAESTRUCTURE	123,298,620	122,536,835	761,784	54.88%
Water and sewage	1,314,488	552,703	761,784	0.59%
Transport and Communications	119,846,860	119,846,860		53.34%
Electricity	2,137,272	2,137,272		0.95%
ECONOMIC	18,948,333	18,948,333	-	8.43%
Industry, Commerce and Services	549,442	549,442		0.24%
Agricultural and livestock	7,850,672	7,850,672		3.49%
Tourism	10,548,220	10,548,220		4.69%
Emergency attention costs	3,189,964		3,189,964	1.42%
TOTAL IN USD	224,675,239	217,091,670	7,583,569	100.00%

During this two month period, visits to the Machu Picchu ruins where closed, due to the damages to the railway, the ruins, and the partial destruction of the city, Aguascalientes, that supplies the tourism compound. During the previous year (2009) Machu Picchu received 17,496 tourists from the period February-March. In 2010 the ruins where closed, and could recover until 2012¹¹.

10 Instituto Nacional de Defensa Civil (INDECI), Cuaderno Técnico 7. *Evaluación del Impacto Socioeconómico de la Temporada de Lluvias 2010 en la Región Cusco*. 2010.

11 Instituto Nacional de Estadística e Información, Ministerio de Cultura - Oficina General de Estadística, Tecnología de Información y Comunicaciones. *Afluencia Turística Nacional Mensual Al Parque Arqueológico De Machu Picchu, 2004-2012*

2. Annual survey,

An annual national survey will be distributed to students and alumni of the master programs, in order to identify the levels of knowledge and application of Disaster Risk Management Plans in their organizations. The purpose is to assess, each year, the progress in the knowledge and application of Disaster Risk Management in enterprises in Peru.

This survey will be distributed to ESAN graduate students from the masters as well as to the alumni. Taking advantage of the fact that ESAN has one of the strongest and largest networks of alumni in master programs in the country, more than 15,000 graduates will be engaged. Another advantage is the scope of the School regionally, as ESAN offers programs in 13 main cities in Peru.

The results will be published and presented yearly, not only to the academic authorities but the business sector, in order to generate greater interest and awareness on the issues of Disaster Risk Management. ESAN aims to take advantage of the relationships developed with other key actors within civil society such as chambers of commerce, business associations and unions.

Additionally, the results of these surveys should open the door to greater partnerships between the state and the private sector, which could help develop public-private partnerships (PPP) not only in terms of infrastructure projects but other policy areas.

The business approach

In addition to a lack of awareness and a limited availability of information related to Disaster Risk Management, another shortcoming is the lack of incentives available for the private sector to implement a Business Continuity Plans within their enterprises.

Another issue to consider is the possibility of barriers which Business Students may face in their enterprises as they attempt to present or develop Disaster Risk Management Plans. The lack of demand on the topic and of knowledgeable professionals may be reflected in a lack of interest by students enrolled in the courses that include Disaster Risk Management concepts.

Economic incentives made available to enterprises in an effort to engage them as well as to acknowledge the importance of Disaster Risk Management cannot be offered thru the academic sector. However, public recognitions for good practice could be a strategy for introducing DRM topics to enterprises, while helping them to resolve their shortcomings. In the long-run, this recognition would help in promoting Disaster Risk Management in the private sector and within their community.

The Business approach aims to acknowledge and promote Disaster Risk Management best practices in the private sector by primarily focusing on the enterprise's social responsibility to the community, and its sphere of influence (clients and suppliers).

To achieve this objective ESAN proposes the launch a Disaster Risk Management Plan Competition.

The Competition will look to promote the participation of different sized enterprises, giving priority to small and medium enterprises which together represent a

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greater participation in the economy (more than 95% of Peru's economy) and are the most affected in the event of a disaster.

Other variables that will be taken in consideration will be to focus on different economic sectors and in different regions of Peru. Enterprises will be asked to present their experience, plan or activity related to Disaster Risk Management.

The cases presented by the competing enterprises must consider at least three of the four stages of Disaster Risk Management. Each enterprise will compete in their category and will be evaluated according to the following criteria:

- Effect within the community: this criteria aims to assess the effect of the plan within the area of influence of the enterprise; from a qualitative point of view. Social Responsibility geared toward the community is a crucial point in this criteria.
- Area of area of influence: this criteria aims to assess the quantified impact of the plan applied in the area of influence of the enterprise. The enterprise will need to present the quantified effects on their city, region and country.
- Community participation: this criteria seeks to understand to what extent enterprises are involving the community in their Disaster Risk Management Plans. Enterprises need to focus not only on their employees but the community around them.

Business associations and government institutions will be invited to promote and participate as partners in this Competition. Taking advantage of ESANs relationships with the Lima Chamber of Commerce, the largest business association in Peru, ESAN will invite the chamber to partner in the competition.

CONCLUSIONS

Disaster Risk Management can be integrated into the curricula as an essential topic within each course. However, if these topics and courses have no connection between each other, students will likely not be sensitive to its need and importance. Promotion should not only focus on the inclusion of a topic in the curricula and apply it as required, but to generate a commitment and a paradigm shift in its approach. Therefore, the ESAN proposals need to consider a transversal approach among masters programs selected: MBA Program and Specialized Master in: Real Estate Management and Development, Supply Chain Management, Energy Management, Public Management and Project Management.

It is necessary to strengthen the topics brought into the curricula by searching and gathering related economic information. The development of regional and specific disaster case studies will help to reinforce the topics to be taught in the new courses and in the curricula in general. ESAN programs in different cities of Peru will provide us with the possibility to gather information, and to study cases and surveys. It will also give the students the opportunity to analyze different situations and different solutions in each case.

Promotion of topics related to Disaster Risk Management in the private sector will strengthen the inclusion of topics in the curricula, helping to generate a greater knowledge and commitment within private organizations. It will be key to engage those professionals charged with the responsibility of ensuring both the continuity of their businesses as well as the resiliency of the community they serve, in the event of the occurrence of a disaster. Given that economic incentives cannot be granted by the academic sector; the ESAN proposal of public recognition will be crucial to support promotion strategies for organization commitment.

Any actions aimed at the implementation of Strategies of Disaster Risk Management need to consider the engagement of stakeholders and coordination of partnerships within other organizations, universities, and private sector associations such as chamber of commerce. ESAN has a great advantage due to its connections with the private sector and government, and with the multiple Universities and Business Schools that are already part of its worldwide network.

The next steps in Disaster Risk Management will focus on gathering statistical and economic (costs, etc.) information on natural disasters from the private sector, focusing on small and medium sized enterprises, as well as developing access and tools that can assist in the analysis of this information.

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Proposal to introduce Disaster Risk Management topics in Master programs in ESAN Graduate School of Business

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TRAINING THE NEXT GENERATION OF DISASTER RISK MANAGERS THROUGH SUSTAINABILITY RESEARCH AND TEACHING

ENTRENANDO A LA PRÓXIMA GENERACIÓN DE GERENTES DEL RIESGO DE DESASTRES A TRAVÉS DE LA INVESTIGACIÓN Y ENSEÑANZA EN SOSTENIBILIDAD

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ABSTRACT

Disaster risk management is an integral part of sustainability, and curricula that are focused on sustainability can be broadened to include disaster risk management. The David O'Brien Centre for Sustainable Enterprise at Concordia University researches and teaches disaster risk management through involvement in a collaborative project with the United Nations' Future Earth network to develop a Sustainable Financial and Economic System Knowledge-to-Action Network (SFES-KAN). The definition of 'sustainable' in this context includes disaster risk management. The SFES-KAN aims to align the current financial system with the UN's sustainable development goals by identifying research gaps and facilitating interdisciplinary research between academics, practitioners, and policymakers to fill those gaps. Our research on such topics as risk management and sustainable investing for the SFES-KAN project has translated into research on disaster risk management and has led to curriculum development on these topics. The goal of our paper is to provide other institutions with examples and strategic information on how to translate such interdisciplinary and solution-oriented sustainability research into research and curricula on disaster risk management.

KEYWORDS

Business Education; Disaster Risk Management; Sustainable Financial System; Knowledge Co-production.

RESUMEN

La gestión del riesgo de desastres es una parte integral de la sostenibilidad, y los currículos que se enfocan en la sostenibilidad pueden ser ampliados para incluir la gestión del riesgo de desastres. El David O'Brien Centre for Sustainable Enterprise de Concordia University investiga y enseña la gestión del riesgo de desastres a través de la participación en proyectos colaborativos de la red Future Earth de la Organización de las Naciones Unidas (ONU) para el desarrollo de una Red de "Conocimiento para la Acción" para un Sistema Financiero y Económico Sostenible (SFES-KAN). SFES-KAN busca alinear el sistema financiero actual con los Objetivos de Desarrollo Sostenible de la ONU por medio de la identificación de vacíos en la investigación y la facilitación de una investigación interdisciplinaria entre los académicos, profesionales y legisladores con el fin de llenar dichos vacíos. Nuestra investigación acerca de estos temas de gestión del riesgo e inversiones sostenibles, al igual que para el proyecto SFES-KAN, se ha convertido en investigación sobre gestión del riesgo de desastres y ha conducido al desarrollo curricular de estos temas. El objetivo de este artículo es el de brindar a otras instituciones ejemplos e información estratégica acerca de cómo traducir la investigación de sostenibilidad, interdisciplinaria y orientada a las soluciones, a investigación y currículos sobre gestión del riesgo de desastres.

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PALABRAS CLAVE

Educación de negocios; Gestión del Riesgo de Desastres; Sistema Financiero Sostenible; Coproducción de Conocimiento.

INTRODUCTION

Disaster risk management is an integral part of sustainability. While some disasters can be mitigated, others are unavoidable but must nonetheless be properly managed to reduce damages, losses, fatalities, as well as threats to communal, regional, and economic sustainability and long-term wellbeing.

The David O'Brien Centre for Sustainable Enterprise is a research centre in the John Molson School of Business at Concordia University in Montreal, Quebec, Canada which develops sustainable practices through academic research, student education, training and professional development, programs, and community outreach. The John Molson School of Business is a globally-minded business school that assumes a leadership role in making the world a more sustainable and ethical place. It currently boasts 9,222 students (including 7,768 undergraduate and 1,454 graduate students) and has over 46,600 alumni worldwide. Its faculty is known for award-winning and engaged professors, an innovative curriculum, cutting-edge research, enthusiastic alumni mentors, a unique work-study program, and more than twenty student-run community outreach initiatives.

Named after benefactor David O'Brien, Chairman of the Royal Bank of Canada and Encana, the David O'Brien Centre for Sustainable Enterprise (DOCSE) focuses its efforts on guiding organizations toward holistic sustainable strategies that are rooted in innovation and enterprise development. DOCSE explores issues related to sustainable enterprise, shapes curriculum development, and trains the next generation of researchers and business leaders. Its mission is to be the leader in developing business practices that support corporate social responsibility, environmental health and safety, environmental management, community, and greening activities in a holistic and systemic way.

The Centre's main goals are to advance scholarly research and develop practical solutions for creating sustainable enterprises; integrate sustainability into teaching, learning, and student activities; and to support initiatives that embed sustainability in organizations and communities. These goals are accomplished through three over-arching programs: research on sustainable enterprise, curriculum and student support, and outreach to organizations. Through these programs, DOCSE provides a variety of ways for faculty and students to participate in building and strengthening its efforts to promote sustainability at Concordia University, within the local community, and around the world.

This paper outlines the experience of DOCSE in implementing research and teaching on disaster risk management through its sustainability efforts, in particular

its sustainability research through a collaborative project with the United Nations Future Earth initiative. The research topics and research questions that have come out of this collaborative project have been integrated by faculty members at DOCSE and the John Molson School of Business into the University's business curriculum, including course offerings in risk management and sustainability, and may also be incorporated in a developing professional certification program. DOCSE's experience can be used as a model by interested business schools and universities looking to translate sustainability research into disaster risk management research and curricula.

The remainder of this paper is organized as follows: First, we provide a brief review of our methodology. We then summarize DOCSE's research and teaching activities, and explore five of our research areas in greater detail. Next, we highlight current and future curriculum development. The final section concludes, discusses the limitations of our study, and provides suggestions for future research.

METHODOLOGY

The paper presents a comprehensive review of DOCSE's research interests as a leader and partner in collaborative research on sustainable financial and economic systems. In developing this paper, we employed the following methodology: First, we reviewed our existent business school curriculum, explored related course offerings in other (non-business) departments, and interviewed various colleagues and students to (1) explore our current course offerings in the area of sustainability and disaster risk management, and (2) identify any perceived gaps in those course offerings. Second, we reviewed the course offerings of other leading business schools in North America and around the globe, with a specific focus on any disaster risk management and sustainability-oriented course offerings and how they compare to ours. Finally, we discussed the subject area of disaster risk management with our research partners in the SFES-KAN to identify how it can be addressed through both targeted research and teaching initiatives.

Through these efforts, we were able to identify both the local curriculum gaps in disaster risk management at our university and explore how disaster risk management can be framed as part of a broader global research and teaching network.

THE DAVID O'BRIEN CENTRE'S PARTICIPATION IN RESEARCH AND CURRICULUM DEVELOPMENT

SFES-KAN Research

The United Nations' Future Earth initiative seeks to encourage and facilitate collaborative, transdisciplinary research co-designed between researchers, practitioners, and policymakers in order to achieve the UN's Sustainable Development Goals (SDGs). To this end, Future Earth has created a series of 'Knowledge-to-Action Networks' (KANs) on various themes. Due to the fact that the financial and economic system underlies the ability to accomplish the SDGs (United Nations Environment

Programme (UNEP) Inquiry, 2015), a Sustainable Financial and Economic System KAN (SFES-KAN) was launched to foster co-designed research that will ultimately help align the financial and economic system with the SDGs. In 2015, the UN Sendai Framework for Disaster Risk Reduction and the UN Climate Change Conference in Paris (COP21) further highlighted the need to align the global financial and economic system with Disaster Risk Reduction (DRR) and the Post 2015 Agenda.

The SFES-KAN is currently led by the global headquarter office of the United Nations' Future Earth initiative, the regional Future Earth hub in Sweden, and DOCSE. The goal of the SFES-KAN is to address the financial and economic challenges to attaining SDGs. The KAN comprises of researchers from across various disciplines, practitioners, end-users, and stakeholders. Members identify knowledge gaps, facilitate the co-production of knowledge between disciplines, sectors, and stakeholder groups, and present co-designed solutions to sustainability challenges. Thus, the SFES-KAN requires that DOCSE collaborate with a large community of researchers and practitioners.

The SFES-KAN brings together researchers and practitioners from the natural sciences, social sciences, and the financial sector to research and design a more sustainable financial and economic system. A sustainable financial and economic system exists as part of a complex socio-ecological system whereby finance and economics are intricately connected to social and environmental factors. A financial and economic system is considered sustainable when it can cope with climate change, manage and reduce disaster risks, decrease vulnerability and increase resilience, solve social issues, and ultimately ensure that current and future generations have access to the same resources and healthy environment. DOCSE has taken a leadership role on the research aspects of the KAN, including outlining the importance of research on disaster risks and disaster risk management.

Ongoing research at DOCSE, the UNEP Inquiry, and other institutions has shown that a resilient economy can emerge from reforms in banking, insurance, and investing. Climate change, disasters, and other threats to sustainability can only be addressed if firms operate while managing the environmental and social consequences and risks of their business activities. Such practices benefit firms in that they help them preserve their assets and license to operate in the face of climate change, disasters, or future environmental regulations. Reconsidering disaster risks, particularly those becoming more frequent, increasingly destructive, and less predictable due to climate change, is essential.

Teaching and Curriculum Development

In addition to the research activities fostered and supported by the SFES-KAN, faculty members at DOCSE and the John Molson School of Business at Concordia University have taken important steps to make risk management and sustainability important and integral parts of the business school's curriculum. For instance, DOCSE introduced courses on risk management (including various aspects of disaster risk

management) at the undergraduate, MBA, M.Sc., and executive MBA level in 2014 and 2015. In addition, it started offering two new courses on sustainable investing at the undergraduate and MBA level in 2016. Risk management and sustainable investing are also taught as part of M.Sc. and Ph.D. seminars and many of our graduate students have chosen to write their M.Sc. and Ph.D. theses on these topics or work on faculty-guided MBA projects in these areas.

The new courses on risk management and sustainable investing are currently offered through the school's finance department and expand and complement the school's existent course offerings provided by the management, marketing, accountancy, and supply chain departments. Those course offerings include, among other things, business ethics, corporate social responsibility, sustainable management, the shared economy, and the social economy.

While disaster risk management as well as the development of insurance tools to protect firms against large scale (so-called 1-in-100 year) risks are important parts of the instructional material conveyed by the aforementioned new risk management courses, they receive relatively little attention in other departments. To overcome this lack of course offerings, the business school allows its students to take courses on actuarial finance and actuarial mathematics offered outside the business school by the department of mathematics. These courses provide students with the theoretical background used to price both smaller as well as large scale (disastrous) risks and to understand how those risks can be transferred.

Finally, in addition to training its local student body, the John Molson School of Business (and DOCSE specifically) developed a professional certification program on sustainable investing and emerging risk management which it offers online to participants around the globe. The program, entitled the Sustainable Investment Professional Certification (SIPC) Program, instructs its participants on the different screens used to select sustainable firms, critically reviews and examines the recent trend of divesting from fossil fuels, and educates investors on newly emerging risks such as the risks arising from climate change, water and food shortages, overpopulation, corruption, cybersecurity threats, human migration, natural and man-made disasters, political instability, and armed conflict. A similar certification program on sustainable real estate development is currently in the planning/setup phase.

SFES-KAN Research & Curriculum Topics

A great number of research and curriculum topics fall under the umbrella of Sustainable Financial and Economic Systems. The climate change and disaster risk management related research questions within these themes are intended to be a guide for both the SFES-KAN and for related course offerings at the John Molson School of Business. Briefly, these include:

Sustainable Investing: An increasingly popular practice, sustainable investing includes assessing sustainability factors in the evaluation of long-term firm value and financial returns.

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Climate Finance: With climate change creating material financial risk, greater standards need to be put into place to assess these risks and develop policies to manage them.

Emerging Risk Management: The emergence of risks, such as water stress and climate change-driven disasters, creates the need for a sustainable financial system that is resilient to unexpected events and unfamiliar conditions.

Stress Testing: Environmental stress tests, performed on specific financial instruments, institutions, and systems to determine robustness under different scenarios, need to incorporate environmental factors in their simulations.

Green Accounting: The value of the environmental resources and assets used by institutions needs to be properly accounted for in their financial assessments.

Islamic Banking & Ethical Finance: This unique banking structure needs to be evaluated in order to develop regulation and to determine areas that can benefit from this emerging banking alternative.

Equitable Financial Access: The green economy of the future requires the participation and willingness of the worldwide population. Of the major hurdles to overcome is the lack of equitable financial access for the poorer citizens of the world.

Sustainable Real Estate: The real estate industry needs to develop innovations that will lead to environmental gains, economic benefits, and better urban planning.

Climate Change-Driven Migration: As climate change forces the dislocation of humans worldwide, often in anticipation of or in response to disasters, there are economic and financial consequences that will need to be addressed.

Synthetic Biology & Food Scarcity: Synthetic biology, if used correctly, could have a potentially positive impact on the re-design of our agricultural and food production systems. There are high risks, some known and some unknown, with the new field of bioengineering and they will need to be carefully managed.

Intergenerational Finance: The purpose of sustainability initiatives is to conserve resources and protect the planet for future generations. Intergenerational finance is aimed at ensuring the well-being of these future generations by including mechanisms that recognize obligations to respect their rights.

Research Questions

To further the above research and curriculum themes, DOCSE has highlighted several specific research questions which fall under several themes relevant to

the SFES-KAN. These research questions represent areas of research that must be emphasized by the SFES-KAN network, including DOCSE. Addressing these research questions will help integrate sustainability and disaster risk management into both DOCSE's research activities and curriculum development. Some of the most pressing research questions identified include the following:

Sustainability: How can businesses incorporate sustainability and disaster risk reduction factors into their decision making? How can new business models be developed that are sensitive to climate change risks?

Risk Management: How can the financial sector be incentivized to identify vulnerabilities and pathways to resilience in the face of disaster risks into their risk management practices? Is regulation necessary to ensure firms apply stress testing against climate change and disaster-related scenarios?

Climate Finance: How can investments in climate finance promote projects that reduce the risk of climate change-related disasters? How can the shortfall in climate finance investments be eliminated? What are the emerging risks from climate change?

Transparency: Which regulations can promote greater business transparency and risk disclosure and how can they be implemented?

Green Infrastructure: How can a sustainable and disaster resilient infrastructure be developed? How can underdeveloped economies be restructured so that businesses can grow in a sustainable manner to reduce disaster risks and vulnerabilities in these regions?

Financial Access: How can financial access be expanded to those currently without? How can incentives be created so that financial institutions will invest in vulnerable and underserved areas? Are there lessons to be learned from alternative types of banking, such as Islamic banking, micro banks, and dwarf banks?

Development Aid: What are the strengths and weaknesses of the current official development assistance (ODA) system? How can donor countries be held accountable for their financial support pledges? How can ODA payments be better measured and tracked? How can ODA payments be better spent on public health and social issues?

Business Education: How should the education and training of the next generation of financial experts evolve so that they may integrate sustainability and disaster risk management into all their actions? What lessons can be learned from institutions that have successfully integrated sustainability and disaster risk management into their curriculum?

RESEARCH AND TEACHING AREAS IN GREATER DETAIL

In the following section, we review the research streams in which DOCSE is currently involved in more detail. The four faculty members and six postdoctoral/Ph.D. students currently affiliated with DOCSE actively engage in these and other research areas and integrate them in their course offerings. Because course offerings at the graduate level (in particular at the M.Sc. and Ph.D. level) have a strong research focus, our discussion below highlights the respective research activities at DOCSE. Course offerings at the undergraduate, MBA, and executive MBA level also cover these materials but do so more in the form of case studies, readings, and classroom discussions.

In addition, the following sections outline some of the existent current research and curriculum gaps.

Sustainable Investing

According to the World Economic Forum, Sustainable Investing (SI) is “an investment approach that integrates long-term environmental, social and governance (ESG) criteria into investment and ownership decision-making with the objective of generating superior risk-adjusted financial returns” (World Economic Forum 2011, p. 10). Recent years have seen a substantial growth in assets dedicated to investing in a “sustainable” manner. This is often referred to as ESG investing.

Factors that have driven the demand for SI include:

- Substantially increased demand for natural resources
- A general decline in both the credibility and financial capacity of governments, forcing businesses to tackle emerging issues such as climate change
- Increased stakeholder expectations for improved sustainability performance from both companies and investors
- A shift in the world’s center of economic gravity toward emerging markets, where sustainability-driven risks and opportunities are greatest
- Growing threats to social and political stability, driven by income inequality and public health issues
- Rise of sovereign wealth funds, especially in Asia

None of these factors (or companies’ responses to them) can be captured adequately via the traditional analysis of price/earnings ratios, balance sheets, or consensus forward earnings estimates. They are extra-financial factors that often have a major effect on a firm’s bottom line (see, e.g., BP, Volkswagen, BHP Billiton).

The growth of this field should not be too surprising, considering that investors dislike risk but seek higher returns. In 2009, Goldman Sachs wrote in a report on climate change, “we believe the equity market is only beginning to recognize the magnitude of impact the transition to a low-carbon economy will have on companies’ competitive positions and long-term valuations” (Goldman Sachs, 2009, p.2).

The main question that many investors ask is whether there are any trade-offs to sustainable investing, whether in terms of underperformance or higher risk. Increasingly, the evidence shows that there are none. In fact, investing in sustainability often exceeds the performance of comparable traditional investments.

The main focus of interested parties at this stage is data, or rather the lack thereof. The Governor of the Bank of England, Mark Carney, recently recognized this in a widely quoted speech when he stated that “the challenges currently posed by climate change pale in significance compared to what might come. [...] Once climate change becomes a defining issue for financial stability, it may already be too late” (Bank of England, 2015). He went on to suggest setting up a “climate disclosure task force” to create a voluntary standard for the information companies producing or emitting carbon should disclose. Such information would provide investors with a better idea of potential risks at a time when scientific evidence was showing that eventually climate change will threaten financial resilience and longer term prosperity.

The key word here is risk. Investors can cope with risk but intensely dislike uncertainty. The difference is subtle but critical. Risk can be modelled, mitigated, and managed. Uncertainty leaves investors blind and unable to deploy effective risk management tools or make credible long term plans. Efforts should therefore be directed towards developing ESG metrics that enhance disclosure and assist investors in managing their ESG risk exposures.

Climate Finance

Climate finance is attracting ever-growing amounts of attention. Climate finance flows rose from \$97 billion in 2010 to \$331 billion in 2013 (Climate Policy Initiative, 2014). Measuring and tracking these flows is challenging. Data is gathered from two primary sources: 1) existing databases, tracking initiatives, and studies compiled by various organizations; and 2) third-party expertise, when official numbers are lacking or do not appropriately portray the related flow. Often, researchers make their own estimates when no satisfactory official or third-party numbers are available.

The Climate Policy Initiative (Venice) releases annual reports on the landscape of climate finance. To support policy debates, these reports map the magnitude and nature of finance flows - the sources of finance, intermediaries involved in distribution, financial instruments, and final uses. The 2011 report notes that a large portion of the \$100 billion promised to climate finance in the Copenhagen Accord was already allocated prior to the Summit. With the majority of climate finance used for mitigation measures, only a very small share goes to adaptation and disaster resilience efforts. In addition, the proportion of funds earmarked for climate change adaptation has only slightly increased over the 2011-2014 period (Climate Policy Initiative, 2014).

A 2012 OECD report highlights key issues and questions that may be taken into consideration with regards to how the international community counts both public and private financial flows towards the \$100 billion commitment and how to track

these flows. The report makes four key recommendations to move forward on developing a robust climate finance tracking system (Clapp et al., 2012):

- Increasing transparency and setting clear definitions for climate finance under the UNFCCC framework
- Making decisions about what institutions or actors should be tracking and reporting, and with what frequency
- Exploring various avenues of tracking climate finance within a more comprehensive system under UNFCCC
- Moving towards more robust tracking and reporting on public and private sector flows

Stadelmann et al. (2013) note that existing data on private climate finance are limited and of very poor quality: definitions of ‘private climate finance’ are missing and data are hardly verified. They conclude that policy makers will first have to clearly define ‘private climate finance’ and develop systems for measuring, reporting, and verifying private finance numbers before they are used in international climate agreements. Similarly, a common understanding of key climate finance terminology is needed by knowledge producers, users, and other stakeholders to improve ongoing discussions on how best to track climate finance, clarify efforts to measure its effectiveness, and help identify where public sector interventions can best affect the scale-up of climate finance (Falconer & Stadelmann, 2014).

The IIED (International Institute for Environment and Development) lists eight unmet promises in climate finance funding. These broken promises include the lack of transparency, the unfairness of contributions, the imbalance of funding towards mitigation instead of adaptation, the lack of central coordination through the United Nations, the double-counting of promised funding, and the failure to live up to promised funding (Ciplet et al., 2012).

Barrett (2013) also finds evidence of inequity in climate finance noting that climate change creates an inverse distribution of risk and responsibility. Developed countries are responsible for the majority of emissions that cause climate change, but are forecasted to confront only moderate adverse effects. Least developed states, on the other hand, are much more vulnerable to the effects of climate change and related disasters and face significant threats to their livelihoods, assets, and security. There are many calls for a more equitable system that supports developing countries in climate change mitigation and, especially, adaptation climate finance (see Pittel and Rübhelke, 2013).

Pickering et al. (2015) note an absence of coordination. While reflecting on reasonable differences over what constitutes a ‘fair share’, the authors conclude that an intermediate degree of coordination may reduce shortfalls in overall funding.

Just as important as the climate finance flows, comprehensive policy incentives such as carbon pricing, standards and regulation, and dedicated funding instruments such as policy banks or funds are needed at the national and international levels (Spencer et al., 2015). The Institute for Sustainable Development and Interna-

tional Relations (IDDRI) finds a need to mobilize and redirect about a trillion USD of investment annually over the next 15 years to finance low-carbon, climate-resilient development consistent with the 2°C goal.

Further research efforts are required to establish a universal definition for climate finance, identify new climate finance sources, establish climate finance best practices, make donor countries pay out promised contributions, introduce fairness and proportionality into climate finance funding, and reduce the funding gap in climate finance, obtaining more climate finance funding from private sources.

Emerging Risks

Emerging risks are risks caused by unexpected events or unfamiliar conditions that affect firms, companies, and organizations, leading to increased volatility and uncertainty (Oliver Wyman, n.d.). Some of these risks are new or developing (e.g., cybersecurity risks), while others have been known for some time but are quickly evolving and becoming increasingly complex and interconnected (e.g., environmental risks). Emerging risks and their potential consequences are usually poorly understood, making them difficult to quantify. These dangers are not only increasingly likely to occur, but their potential impact is also growing.

Water stress and climate change are two examples of important and interconnected emerging environmental risks that present a material threat to financial systems. Climate change can result in changing precipitation and evaporation patterns, meaning some water-dependent industries may face water stress that could lead to increased operational, regulatory, and reputational risks. A sustainable financial system should be capable of addressing these issues and be resilient to emerging risks.

For example, a report of the Risky Business project (Risky Business, 2014), chaired by Michael Bloomberg (former mayor of NYC and founder of Bloomberg), Hank Paulson (former U.S. Treasury Secretary) and Tom Steyer (founder of hedge fund Farallon Capital Management), demonstrated the material risks posed by water and climate change. The report identified short-term climate threats to coastal property and infrastructure, agriculture, and energy which would significantly increase the cost of coastal storms, increase coastal property and infrastructure losses, reduce crop yields, and increase energy costs.

There are several key questions that need to be addressed both by researchers and in the classroom. For example, future research should identify which emerging risks present the most material impacts and how emerging risks are interconnected, improve our understanding of financial system vulnerabilities to emerging risks and how to improve resiliency through improved risk management practices, and identify methods and tools for reducing uncertainty around emerging risks.

Environmental Risk Management

Environmental credit risk management involves the consideration of environmental risk factors in banks' lending decisions, with the purpose of making better informed

lending decisions. Weber et al. (2010) show that the integration of a debtor's environmental performance as a decision criterion improves the predictive validity of the credit rating process and also the predicted financial performance of the borrowing firm. Weber et al. (2015) replicate these findings in a study of Bangladeshi banks.

Hu and Li (2015) conduct a comparative study on the usage of environmental credit risk management of banks in 12 countries of the Asia-pacific region. They group banks into three groups: the best performers (Canadian, American, and Japanese), average performers (Australian, South Korean, Chinese, and Thai), and the worst performers. Weber (2012) finds that Canadian banks are proactive in environmental credit risk management and are best-of-class globally. Basah and Yusuf (2013) study Malaysian banks and their managers to determine how environmental risk factors are treated differently according to bank and bank manager parameters. Their study finds a significant relationship between bank managers' racial groups, religious affiliations, bank types, and bank nationality towards credit evaluation. Weber et al. (2008) observes that European banks integrate environmental risk management in only the rating phase but not in other phases of the credit management process.

Environmental risk management practices also affect firms' cost of borrowing and debt financing. Bauer and Hann (2010) investigate their effect on the cost of borrowing using bonds. They find that firms with greater environmental issues have a higher cost of debt financing and lower credit. Conversely, firms with proactive environmental practices have a lower cost of debt. Sharfman and Fernando (2008) reach a similar conclusion noting that improved environmental risk management is associated with a lower cost of capital. In addition, they observe a noticeable shift from equity to debt financing for environmentally active firms. Clarkson et al. (2013) obtain contradictory results by finding that voluntary environmental disclosures do not lower the cost of capital borrowing but enhance firm value.

Despite the growing body of literature highlighting the benefits of environmental risk management, many industries are still resisting its usage. Clarvis et al. (2014) investigate the lack of integration of environmental risk into investment decision-making in the sovereign bond market. They present a framework, made in collaboration with partners such as the United Nations Environment Program Finance Initiative, that they hope will improve the financial rationale for considering environmental risk in the sovereign bond market. Similarly, Campbell and Slack (2011) find that U.K. sell-side brokerage analysts are extremely skeptical of the benefits of information contained in annual corporate environmental reports. The analysts rarely consider environmental risk in making their recommendations.

Environmental risk management also entails the need of environmental insurance for both bank lenders and firm borrowers. Katzman (1988) notes the need for pollution liability insurance in response to the environmental catastrophes of the time. Tol (1998) recognizes early-on the effects of climate change and the need for climate insurance. He points out that initially it will be difficult to insure for climate change because the associated damages will be hard to quantify. As time goes on, the need for such insurance will increase and insurance companies will shift the risk

to the insured. Gollier (2005) bemoans the lack of insurance for catastrophic environmental risks in the market and offers possible remedies. He cites ambiguity aversion as one reason when insurers overestimate the risk of catastrophic events thus pricing the premiums beyond what consumers are willing to pay for coverage. Possible solutions would be a redesign of the incentives for underwriters or as a last resort, a system of government-backed insurance similar in form to that of social security. Botzen and van den Bergh (2008) conduct a multi-national study of environmental insurance and conclude that there is an insufficient amount of insurance coverage against climate change and other environmental risks in the Netherlands. They note that the problem is twofold: not enough insurance is bought and not enough is sold. Botzen and van den Bergh (2009) look at climate change insurance for individuals and conclude that a profitable environmental insurance market could exist in the Netherlands. Schroder (2013) regards environmental insurance as a useful risk management tool in the real estate industry. She notes that conventional risk management tools do not address the environmental risks carried by buyers and sellers. Environmental insurance would transfer all the risk to a third-party insurer, thus removing it from the real estate transaction. She argues that all parties would see this as a positive assurance against environmental risks. Finally, Liedtke et al. (2014) sees an opportunity for insurers to make a contribution to managing climate change. Insurance policy-makers could make it mandatory for building owners to make their properties environmentally-certified. They could also require stricter environmental risk disclosures from those seeking coverage.

The disclosure of needed information for proper environmental risk management is generally lacking and researchers often disagree about its utility. Thompson and Cowton (2004) find an unfulfilled demand for environmental information and point out that banks rely heavily on annual corporate environmental reports as their main source of information for environmental risks. At the same time, Lajili and Zeghal (2005) argue that annual reports have limited usefulness in a Canadian context because of the lack of uniformity, clarity, and quantification, which makes comparisons difficult. Mol et al. (2011) examine the effect of new information disclosure policies in China. They note that even though the Chinese government enacted the Environment Information Disclosure Decree, national and provincial environmental protection bureaus are slow to comply with the new legislation. The researchers conclude that the situation is improving but that implementation is often incomplete or ineffective. Liu and Lin (2014) report a more positive situation for environmental disclosures in Chinese commercial banks. They find that improvements in the banks' environmental risk management behaviors are driven by external pressure from the community and non-governmental organizations.

Stress Testing

Stress tests are performed on specific financial instruments, institutions, and systems to determine robustness under different scenarios, though very few incorporate environmental factors into the simulations. Ally Financial subjects their investment

portfolios to market risk and counterparty credit risk. They use a variety of different models to project changes in market values due to changes in interest rates, credit spreads, and volatility (Ally Financial Inc., 2015). A typical bank-wide stress test applies unfavorable scenarios to determine the effects on variables such as its net income, balance sheet, risk-weighted assets, and capital adequacy (U.S. Bancorp, 2014). The U.S. Bancorp stress test is also limited in the types of risk investigated: credit risk, operational risk, interest rate risk, market risk, reputation risk, and liquidity risk. Regulators are interested in testing the performance of entire systems such as the banking system. The staff at the U.S. Federal Reserve regularly analyze the banking institutions under its jurisdiction (Flannery et al., 2015).

Many question the validity of these stress tests. Ong and Pazarbasioglu (2014) discuss the lack of credibility in many stress tests and the need for tougher testing scenarios. Borio et al. (2014) doubt the value of macro stress tests as early warning devices, i.e. as tools for identifying vulnerabilities during seemingly tranquil times and for triggering remedial action. Doumpos et al. (2015) find that the stress tests performed by the European Banking Authority on European banks have much room for improvement. Similarly, Bookstaber et al. (2013) identify shortcomings in current stress testing and offer a research agenda for their improvement. However, none of the recommendations involve the use of environmental variables in testing scenarios.

Very few papers actually address environmental factors in stress testing. Schoenmaker et al. (2015) incorporate an ecological dimension into the macroprudential policy framework of stress testing and applies this in the example of carbon emissions. Here, higher risk weights are set for carbon intensive and dependent sectors (transport, mining, energy) and carbon intensive and dependent companies within these sectors.

There is an increasing acknowledgement that environmental factors affect the global financial system. In 2011, Mercer released a report examining the strategic asset allocation implications of climate change so that investors capture risk more effectively, gain insights, and integrate them into their current investment processes. KPMG International (2012) converts 22 environmental impacts into financial value, drawing upon current environmental economic research to achieve a total environmental cost value. Robins (2014) reports that HSBC and other financial institutions have started to analyze the valuation implications of the low-carbon transition. The fifth theme of the One Bank Research Agenda involves the development of the Bank of England's response to fundamental technological, institutional, societal, and environmental change (Bank of England, 2015). There is a growing consensus that aggregate economic losses accelerate with increasing temperature and these future changes in climate will lead to significant reductions in global economic output. Physical risks, such as catastrophic weather events, could affect economic growth, particularly in developing countries, translating directly into financial losses through an increase in insurance claims (Lloyds of London, 2014).

CURRICULUM DEVELOPMENT IN LIGHT OF SFES-KAN RESEARCH

The SFES-KAN provides an excellent platform through which both research and curriculum development in the area of sustainability and disaster risk management can be fostered. The KAN comprises academics, practitioners, policy makers, and consultants who work in the area of sustainability, risk management, insurance, and policy development. DOCSE has hosted panel discussions with these parties at a UN-PRI conference in Montreal in September 2014, the *Our Common Future under Climate Change* conference in Paris in July 2015, and via a series of local corporate workshops that it organizes twice per year. The participants of these workshops have also been invited as guest lecturers to related courses offered by the John Molson School of Business at Concordia University.

Through these interactions, DOCSE has been in an excellent position to establish a transdisciplinary team of experts with which it undertakes and leads the aforementioned research activities. In addition, these experts have been instrumental in establishing (and ultimately teaching in) the Sustainable Investment Professional Certification (SIPC) program provided online through the university and play an active role in the creation of a new professional certification program on sustainable real estate which DOCSE plans to launch in the near future.

In addition to incorporating the aforementioned research topics into its curriculum and developing new undergraduate and graduate-level courses (as has been one of the main missions of DOCSE and its faculty in the past), we envision the creation of another professional certification program that builds upon the highly successful SIPC program developed by DOCSE and now administered through Concordia's Executive Business Office as well as the Sustainable Real Estate program currently under development. Similar to these programs, the new program would draw upon the expertise of prominent experts in this field (many of which have already joined the SFES-KAN), would be offered online to a world-wide audience, and would teach both the theoretical underpinnings and practical implications of a sustainable financial and economic system, including disaster risk management.

CONCLUSIONS

DOCSE's participation in collaborative projects around building a more sustainability-oriented financial system has led to increased research in the field of sustainability and the development of sustainability curriculum at Concordia University's John Molson School of Business. Both DOCSE's sustainability research and the sustainability curriculum at the Business School have included disaster risk management as an integral part of sustainability.

More specifically, as part of the UN Future Earth SFES-KAN project, DOCSE's researchers are investigating a wide array of topics that fall under the 'sustainability umbrella', including sustainable investing, climate finance, emerging risks, environmental risk management, and stress testing. These research topics have become in-

corporated in courses offerings at the undergraduate, MBA, and executive MBA levels. DOCSE continues to expand these course offerings by introducing new courses and developing new certification programs.

Of course, sustainability is a broad theme and there are several relevant topic areas under the aforementioned umbrella that DOCSE has not yet explored. Furthermore, DOCSE's primary focus has been on managing risks that threaten sustainability and not simply disaster risk management. Future research at DOCSE may need to emphasize questions around deepening our understanding of disaster risks specifically and refining disaster risk management best practices so that Concordia may further develop its disaster risk management curriculum, including DOCSE's plan to develop a professional certificate or program around SFES research that would incorporate disaster risk management. Both DOCSE and the John Molson School of Business may benefit by learning lessons from peers who have also developed research and curricula on disaster risk management through sustainability-themed research and curriculum.

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MAINSTREAMING DISASTER RISK MANAGEMENT INTO MANAGEMENT EDUCATION: CASE OF THE MONA SCHOOL OF BUSINESS & MANAGEMENT¹

INCORPORACIÓN DE LA GESTIÓN DEL RIESGO DE DESASTRES A LA EDUCACIÓN GERENCIAL: EL CASO DE MONA SCHOOL OF BUSINESS & MANAGEMENT

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ABSTRACT

The purpose of this paper is to provide a background to and guide for mainstreaming Disaster Risk Management (DRM) into higher education and training institutions in Small Island Developing States (SIDS), with the aim of increasing awareness and understanding of the complexity of DRM issues in business and management, based on their general and specific vulnerabilities. SIDS are considered a special category within the discussion on DRM, given a number of vulnerabilities generally and specifically. Furthermore, little attention has been paid to the business impact of disasters in such settings. It is proposed that one major route to improving this situation is through the educational and training institutions, which play a major role in shaping thinking and practices in such settings.

KEYWORDS

Disaster risk management; disaster risk reduction; small island developing states; mainstreaming; business; SMEs; Jamaica.

RESUMEN

El propósito de este artículo es proveer un contexto y guiar en la incorporación de la Gestión del Riesgo de Desastres (GRD) en las instituciones de educación superior y de formación en los Pequeños Estados Insulares en Desarrollo (PEID) con el propósito de aumentar el nivel de consciencia y comprensión sobre la complejidad de los asuntos relacionados con GRD en los negocios y la administración, teniendo como base vulnerabilidades generales y específicas. LOS PEID son considerados una categoría especial dentro de la discusión sobre GRD debido a la cantidad de vulnerabilidades generales y específicas con las que cuentan. Se propone que una de las principales rutas para mejorar esta situación es a través de las instituciones educativas y de formación, quienes desempeñan un papel importante en la conformación del pensamiento y las prácticas de aquellos entornos.

PALABRAS CLAVE

Gestión del riesgo de desastres; reducción del riesgo de desastres; pequeños estados insulares; incorporación; negocios; PYME; Jamaica.

¹ The paper was initially prepared as part of the “Disaster Risk Management in Business Education” initiative organised by the Extreme Events Institute (EEI) at Florida International University (FIU). The initiative is endorsed by the United Nations Office for Disaster Reduction’s Private Sector Alliance for Risk Sensitive Investment (UNISDR-ARISE) and supported by the Federal Republic of Germany’s Ministry for Economic Cooperation and Development (BMZ).

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Mainstreaming Disaster Risk Management into Management Education: Case of the Mona School of Business & Management

INTRODUCTION: DISASTER RISK MANAGEMENT IN CONTEXT⁴

According to the International Federation of Red Cross and Red Crescent Societies (IFRC) a disaster is any event which severely ...*“disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own level of resources”*.⁵ Although disasters can result from natural hazards, Coppola (2015) argues that they do not occur naturally but are instead a direct function of the vulnerability of the affected region and its capacity to respond or recover from the damage caused by a natural or man-made hazard. This capacity to respond has been said to be directly related to the economic capacity of the affected country (Freeman et al., 2003) or, as in this case, region. Due to the reported fall out in economic activity that results from disasters, governments worldwide have focused on disaster management. However this is usually a post disaster mechanism which places substantial pressure on the financial resources of the country. Additionally, these strategies are usually ad hoc and provide only short term remedies.

Recently there has been a paradigm shift to more emphasis being placed on improving the resilience of those most vulnerable to disasters (Rogers & Tsirkunov, 2013). This new school of thought focuses on disaster risk reduction which involves pre and post disaster activities aimed at mitigating the impact of disasters on society. This change in thinking is fueled by the rising cost of disaster recovery and response. It has been noted that although natural hazards are becoming less deadly as persons in more economically stable regions have adapted their behaviour to accommodate these expected events, there is growing inability of nations to confine disasters within their own boundaries (Coppola, 2015). Furthermore, the proportion of poorer regions being adversely affected is growing with the number of people affected by any one disaster increasing. These trends are exacerbated by the increased frequency of these natural hazards. In the past, countries could prepare for a specified number of disasters at certain intervals, but they are now being forced to deal with multiple hazards often within the same period. These changing patterns have highlighted the need for more systematic and preventative approaches to responding to disasters.

Businesses, particularly those in the English-speaking Caribbean,⁶ have been slow in planning for and responding to disasters. The economic fall-out from the occurrence of natural hazards has negative implications for business continuity and prosperity. For instance, UNISDR notes the impact on competitiveness and supply chains and the associated losses (UNISDR, 2013). Small and medium sized firms are affected differently. However, risks associated with natural hazards are only one of

⁴ The authors are aware of the variances over the years, including the most recent shift from an emphasis on DRM to Disaster Risk Reduction. However, DRM will be utilised as per the specific directions of the project guidelines.

⁵ Available at: <http://www.ifrc.org/ar/what-we-do/disaster-management/about-disasters/what-is-a-disaster/>.

⁶ This refers to the Commonwealth Caribbean which comprises the following territories: Anguilla, Antigua and Barbuda, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, Puerto Rico, Saba, St. Eustatius, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos and the U.S. Virgin Islands. Also see, (Minto-Coy, 2016b)

the myriad challenges faced by businesses. It is perhaps for this reason that investors and businesses have been slow to recognise the need for DRM.

DRM initiatives do not sufficiently involve business as partners and there have been only a few detailed attempts to focus on the effects on business as a specific group. For instance, the potential impact of rising sea levels on Jamaica's capital city, Kingston, including on the main business district of New Kingston has been modelled (Lyew-Ayee & Hamad, 2011). Generally, however, where the impact on business is considered, it is mainly the tourism industry that is discussed or some glancing attention is given to the economy but very little direct attention is focused on the impact on business as a specific group. Both locally and internationally the focus has been on society in a development context, on employment and livelihoods, and at the individual level on specific groups, such as women.⁷ Firm level impact and implications for traditional business concepts such as management, continuity, social responsibility, risk and generating and protecting business value have been largely ignored.⁸

In the Caribbean, DRM is largely considered an issue for governments with businesses paying insufficient attention as it relates to the potential effects of disasters on growth projections and earning. This 'blindspot' or silence from business is seen, for instance, in the failure to equate costs relating to the increasing loss of productive hours from employees not being able to make it to work or terminating the work day prematurely due to the lack of water management. These issues are particularly pressing in a region which has not readily welcomed flexi-work week, mobile work or working from home, and where many MSMEs are inward looking so a heightened threat of a local disaster could send them into bankruptcy. The experiences in the region also mimic those overseas, although the effects are perhaps greater. For instance, the first two reports from the United Nations Office for Disaster Reduction (UNISDR)⁹ both focused attention broadly on governments and government bodies and the role of policy.

More recently however, there have been signs of a, mainly global, paradigm shift, with the increasing recognition of the importance of DRM and the need for the private sector to play a role in DRM and sustainable development. Regionally and internationally, companies including, PriceWaterhouseCoopers in the United Kingdom and Fujitsu Caribbean, are developing company-wide risk management plans which acknowledge all risks related to the business. These plans are aimed at mitigating three types of risks, corporate asset damage, activity disruption and collateral damage, which affect the company's ability to function in a time of a disaster.

7 See for instance the very comprehensive overview of the impact of climate change on Jamaica from the Climate Studies Group (2012).

8 For the Caribbean, the heavy reliance on development assistance and multinational engagements have tended to be focused on Government and its agencies with insufficient role for the private sector in such arrangements. Again, this is not unique to the region but a long practice in international relations which has in the main tended to be focused on interactions between states (governments). The resulting emphasis on development (not growth) funding has only more recently begun to shift with attention from agencies such as USAID on growing the private sector in the Caribbean.

9 Global Assessment Report on Disaster Reduction, Risk and Poverty in a Changing Climate (GAR09) and Revealing Risk - Redefining Development (GAR11).

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These larger companies are more experienced at assessing risk than even the public sector. However, such examples do not reflect the DRM efforts in most SIDS where economic activities are largely dominated by Small, Medium and Micro Enterprises (SMEs). Obviously businesses in most SIDS do not have the resources to implement such sophisticated DRM plans but perhaps it should be equally obvious that there is still need for a cultural shift in the thinking and operations of businesses as it relates to disasters and DRM in the Caribbean and beyond.

The paradigm shift is also evident in processes that have culminated in the framing of documents such as the Sendai Framework for Disaster Risk Reduction (2015-2030), the Sustainable Development Goals, marking the post-2015 development agenda and the formation of institutions such as the World Business Council on Sustainable Development. Other solutions to DRM have been discussed in the United Nations Office for Disaster Reduction's Private Sector Alliance for Risk Sensitive Investment (UNISDR-ARISE), the publication of the UNISDR's third report and the activism of the Extreme Events Institute and their collective support for the "Disaster Risk Management in Business Education" initiative which supported the research for this paper.

It is recognised that management education has a major role to play in this culture change required in the private sector and wider society. Indeed, the role of educational institutions and business schools more specifically, as change agents is not a new topic (Morsing & Rovira, 2011; Prandini, Vervoort Isler, & Barthelmess, 2012). As the institutions that generate information and lead the discussions and theoretical developments that inform the practice and thinking around business, business schools are excellent agents of influence and shapers of practices and policies in the private sector. As such they should be major players in efforts to increase awareness of DRM among both the business and private sector. The Sendai Framework, in particular, is a formal acknowledgement of the role of business schools in mainstreaming DRM and influencing behaviour change within businesses.

The purpose of this paper is to provide a background to and guide for mainstreaming Disaster Risk Management (DRM) into higher education and training institutions with the aim of improving understanding of disasters and the complexity of DRM issues in business and management. The particular area of focus is a developing and small island nation, which merits coverage in a discussion on Disaster Risk Management (DRM) or Disaster Risk Reduction (DRR) for a number of reasons. Key among these is recognition that states, including those in the Caribbean, currently face a number of environmental threats and peculiarities relating to business and management at the local and international levels that have heightened their vulnerability. These are considered in more detail in Section 3 of the paper and after a discussion of the methodology in Section 2. Section 4 reviews the particular approach to mainstreaming adopted here while section 5 reviews the case of the MSBM. Section 6 contains the main proposals for mainstreaming DRM in Management education and the paper closes with a conclusion in Section 7.

The paper highlights the fact that while DRM has not traditionally been considered within business schools as well as businesses, more generally, it is increasingly viewed as an area requiring significant investments and attention by businesses. Given the role of business schools in directing and shaping practices and theories as well as the consciousness of managers and business leaders, it is imperative that the momentum and impetus for achieving a culture change in business practice as it relates to DRM be instigated by these institutions. The paper's contribution is in its approach to considering DRM in Management Education. This is founded on an underlying value of the concept of 'mainstreaming' (Porter & Sweetman, 2005) or normalization given the reality of DRM as an integral and cross-cutting theme in business and management, as opposed to a separate and distinct area of focus. The paper also contributes to the development of experiences and understandings as it relates to small and vulnerable settings, as well as the role of education and educational institutions in responding to socio-economic challenges more generally but specifically, where this is a small institution faced with competing demands and obligations. The final contribution is the development of a set of recommendations – an action plan – for business education and training at the undergraduate and postgraduate levels that are mindful of the constraints and challenges related to size and capacity. As such, the recommendations contained in the paper are informed by how a reform agenda can be introduced in such contexts.

METHODOLOGY

The study is largely qualitative and the methodology is detailed as follows: the research team first undertook a review and wrote an initial proposal of DRM as a concept and practice particularly as it relates to small island developing states, particularly those of the Caribbean including Jamaica. The review and proposals were contextualised, hence undertaken against the backdrop of the Caribbean and Jamaica as a Developing region comprising a grouping of SIDS. As such, specific attention was paid to this categorization in the context of DRM, generally and specifically as it relates to the Caribbean. Desk research also allowed for a select review of the existing literature on DRM to glean some of the general ideas and themes in the area. Based on the review the research team adopted a broad approach to identifying specific courses and training programmes into which DRM principles and issues could be integrated, making practical suggestions on how integration or mainstreaming might be accomplished. The suggestions were tailored based on one or more of the seven thematic areas: (1) Business Continuity Planning; (2) Business Ethics and Social Responsibility; (3) Strategic Investment and Financial Decisions; (4) Generating Business Value; (5) Sustainable Management; (6) Disaster Risk Metrics; and (7) Risk Transfer.

The Mona School of Business & Management (MSBM) offers a good case study in the area for a number of reasons. Among these is the institution's location in Jamaica, with the latter being included among the listing of small island developing

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states¹⁰. The MSBM is the premier business school in the English-Speaking Caribbean, offering a suite of academic and training programs to Jamaica and the Region. The School has long been involved in the education and training of business leaders and managers, making it a major influence in directing business practices and thinking nationally and regionally.

DRM AND SMALL ISLAND DEVELOPING STATES (SIDS)

SIDS can be found in all major climate zones. They vary in size and geographical make up but are linked by certain characteristics. These include limited natural resources, geographic dispersion, dependence on external trade, and small land space. All of these characteristics expose them to external shocks especially as they usually depend heavily on a single revenue source such as tourism, agriculture or mining (Wright, 2013). The peculiarities of SIDS and the commitment to their sustainable development¹¹ have long been a focus of research in the social sciences with arguments being made on either side as to the relevance of this designation. It is not our intention here to review the gamut of this literature particularly as many of the themes related to SIDS have been excellently covered in chapter 7 of the *Global Assessment Report on Disaster Risk Reduction 2013: From shared Risks to Shared Value: The Business Case for Disaster Risk Reduction*¹² and are reflected in other documents such as the SAMOA (SIDS Accelerated Modalities of Action) Pathway of 2014. Rather, a more selective coverage is offered here.

The case has been made for the relevance of the SIDS concept within business studies in order to help to advance traditional theories and concepts in areas such as international business (Williams, 2015; Williams & Morgan, 2012; Wint, 2003). More recently, however, the focus on climate change and resulting risks have heralded a new thinking, reinvigorating the SIDS concept in ways which have helped to more definitively address the issue of the relevance of SIDS and refocus attention on the vulnerability of the Caribbean (see Appendix 1) and other regions. For example, the specific case of countries in the Pacific has been used to support discussions on the effects of climate change and the need for action at the global level. One of the major focuses of DRM programmes globally is SIDS (Barnett & Campbell, 2010; UNISDR, 2013). Exposure to external shocks, such as natural hazards, is usually very devastating for such economies as they are unlikely to have the economic capacity to recover from calamities or implement comprehensive disaster management plans (Rautela, 2006). An excellent review of some the main risks and challenges related to climate change in the Caribbean can be found in a 2012 publication by the Climate Studies Group, which categorises climate change variables and extreme events and their impacts on major sectors, agendas (development) and groups across Jamaica (Climate Studies Group, 2012).

10 <http://unohrlls.org/custom-content/uploads/2013/08/SIDS-Small-Islands-Bigger-Stakes.pdf>

11 <http://www.sids2014.org/samoapathway>

12 http://www.preventionweb.net/english/hyogo/gar/2013/en/gar-pdf/GAR13_PressKit_EN.pdf

Research has also highlighted the impact of disasters on Caribbean societies (Climate Studies Group, 2012; Granvorka, Strobl, Walling, & Berman, 2016) and noted the effect of natural disasters in curtailing the best made development plans (Minto-Coy & Berman, 2016). The disaster pattern is marked by hurricanes and increasingly prolonged periods of drought, interspersed with flooding from heavy rainfall, as well as earthquakes. UNISDR (2013) also identifies some of the specific qualities of SIDS that make them particularly vulnerable to disasters, including high levels of indebtedness, economic concentration, remoteness, narrow resource base and weak infrastructure. Additionally, the recent emergence of health threats never before seen, such as the Zika Virus, Chikungunya and the H1N1 flu virus have negative implications for workforce productivity, business continuity and health in the region.

DRM is particularly relevant to the region not only because of high-impact and high-profile events but also because of frequently occurring low-profile disasters; as well as flooding. Further, while the impact of a hurricane Katrina may have dented the US economy, arguably impacting more adversely on the national psyche, the impact of such a storm on a Caribbean city and its national economy is likely to be far greater (See Table 1 and 2).

Table 1. Estimated Fiscal Deficit from Storms in Select Caribbean States

Storm	Year	Country	Fiscal Deficit (mill. \$US)
Ike	2008	Turks & Caicos	21.1
Earl	2010	Anguilla	2.0
Thomas	2010	Barbados	0.7
Thomas	2010	St. Lucia	3.6
Thomas	2010	St. Vincent	4.2

Source: Adapted from Granvorka, et al (2016).

Table 2. Estimated Economic Impact of Recent Climate Extreme Events on Jamaica

EVENT	Year	Category	Cost (\$JB)	Impact (% GDP)
Hurricane Michelle	2001	4	2,52	0,80
May/June Flood Rains	2002	-	2,47	0,70
Hurricane Charley	2004	4	0,44	0,02
Hurricane Ivan	2004	3	36,90	8,00
Hurricanes Dennis & Emily	2005	4	5,98	1,20
Hurricane Wilma	2005	5	3,60	0,70
Hurricane Dean	2007	4	23,80	3,40

Table 2. Continuation

EVENT	Year	Category	Cost (\$JB)	Impact (% GDP)
Tropical Storm Gustav	2008		15,50	2,00
Tropical Storm Nicole	2010		20,60	1,90
		Total	111,81	

Source: Climate Studies Group. (2012: 2).

Measures to address DRM in the Caribbean include the streamlining of disaster management efforts. Each of the member states has national disaster management systems and organizations. These differ in size and scope according to the needs of the specific country. Additionally, Jamaica, Barbados and Dominican Republic have adopted strategies which demonstrate some forward thinking. Through inclusion or a proactive approach they have seen major success and to some extent have reduced the states' vulnerability to the risk of floods, storms and earthquakes. However, attention to concepts such as risk management, business or crisis communication and business continuity from a DRM perspective (Snedaker & Rima, 2013; Watters, 2014), as well as to how addressing DRM could affect competitiveness and create opportunities for the region has been scant or lacking. This even as other countries such as Canada have

MAINSTREAMING AS A CONCEPT

It is important to convey the specific understanding of the concept of "mainstreaming" that has guided the composition of this paper, that is, its use here is much the same as in public policy and development discourse.¹³ For instance, mainstreaming in education suggests purposeful efforts to integrate disabled and children with special needs into traditional classroom settings and activities within the school. Similarly the suggestion here is to include DRM in conventional subjects and practices, including training programmes of business schools. The aim of mainstreaming is for DRM to become a normal consideration in business education.

Such an approach is relevant for a number of reasons. Firstly, mainstreaming implies the inclusion of new material into existing programs not the introduction of new programmes. Secondly, it implies the inclusion is not done in a siloed fashion, particularly given the overarching and pervasiveness of DRM and its relevance to multiple areas of business performance and planning. Instead, what is argued for is a weaving of DRM into a number of existing courses and training programmes, specifically in the short term, with more focused topics being introduced over time. Thirdly, while templates are important, the suggestion here is that once there is an understanding that DRM as a general concept is to be worked into a programme,

¹³ This in much the same way as discussions on mainstreaming the diaspora into national development.

there should be some flexibility in program design and delivery which will allow for different DRM themes to be brought into specific courses as determined by the lecturer. Mainstreaming then, highlights the inter-linkages between DRM and other areas as opposed to being a distinct area of focus. Additionally, as the time frame for introducing new courses and programmes may be lengthy, the mainstreaming approach offers the ability to integrate DRM while the more costly investment in developing or formulating new courses or programmes, is considered over the long term. The approach to mainstreaming also suggests attention beyond in-class learning to all aspects of management education and training as well as other activities of the school. Finally, mainstreaming also provides for consideration the relevance of context. For example, the resources available for integrating DRM may be limited in a SIDS setting, and the types of disasters and the ways in which they impact a society may differ across regions.

For the Caribbean in particular, mainstreaming DRM is not only about immediate results but importantly about the sustainability of the region's economy and its ability to survive in an increasingly competitive and challenging global environment.

MONA SCHOOL OF BUSINESS AND MANAGEMENT: THE PREMIER INSTITUTION FOR MANAGEMENT EDUCATION IN THE CARIBBEAN

The University of the West Indies (UWI) is a regional university with main campuses at Cave Hill, Barbados; St. Augustine, Trinidad and Tobago and Mona, Jamaica and an Open Campus serving eighteen English speaking countries in the Caribbean. It was established in 1948 as a College of the University of London. It gained independent university status in 1962. The total enrolment across all campuses and sites for the 2014/2015 academic year was almost 500,000 of which 17,200 were in Jamaica¹⁴.

Mona School of Business and Management (MSBM) was established on August 1, 2012. It evolved from the merger of the former Mona School of Business (MSB) that had a 25 year history of delivering master's level business management education and the Department of Management Studies (DOMS) which had a rich 42 year history of delivering undergraduate and graduate management programmes. Currently there are approximately 5,500 students enrolled in both graduate and undergraduate programmes. MSBM is the premier business school in the Caribbean, offering a suite of academic programmes (both graduate and undergraduate) and training programs to Jamaica and the Caribbean. It has long been involved in the education and training of business leaders and managers across Jamaica and the Caribbean, making it a major influence in directing business practices and thinking nationally. Its role has been recognised publically and it has been the recipient of a number of awards and acknowledgements from the local business community.

The location of MSBM in a small island and developing state is also of relevance not only in the practical sense of widening coverage in DRM beyond large or devel-

¹⁴ <http://www.mona.uwi.edu/opair/statistics/2014-2015/Statistical-Review-2010-11-to-2014-15.pdf> 2010/11-2014/15

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oped countries and in so doing, broadening the coverage of experiences, but also more generally. The use of this institution as a case study is also recognition that small island developing states (SIDS), including those in the Caribbean, currently face a number of environmental threats and peculiarities relating to business and management at the local and international levels which have heightened their vulnerability and that their unique perspective is of value to the partnership.

MSBM is a key plank of The University of the West Indies (UWI - Mona's) value proposition to its constituents in Jamaica and the region. Specifically, its mandate is to be the arm of the University that facilitates effective business education and practices in the private and public sectors in order to advance the economic development agenda of Jamaica and the region by:

1. creating human capital through business and management education programmes,
2. delivering executive education and professional development training,
3. creating intellectual capital through the conduct of research and the dissemination of the findings,
4. providing management consultancy service, and
5. creating social capital through outreach activities in the wider society.

The School MSBM complements its unique academic programmes with cutting edge consultancy services and public policy research, the principal business objective being to provide decision makers with expert advice in handling their most critical strategic issues. It has handled a large portfolio of multidisciplinary projects in Jamaica and the region relating to leadership and management development, strategic thinking and management, project and performance management systems, and other areas of professional services and continues to contribute to the development of a particular ethos within the business community in Jamaica and the region.

Like most business schools of repute, MSBM conveys its unique perspectives and delivers cutting-edge business related content in its publication the **MSB Business Review** which was launched in 2010. In 2012 the magazine was renamed the **MSBM Business Review** to reflect the school's merger exercise.

Awards and Accolades

Over the years, the growth, development and academic achievements of the MSBM have been recognized through a number of awards and accolades.

In 2001, the School won the USAID, 40th Anniversary Award of Excellence for Education, and in 2004, it was admitted to Membership of the Association to Advance Collegiate Schools of Business (AACSB) International and in 2005, the School received the UWI's "Principal's Award for Outstanding Contribution to Public Policy".

The World Economic Forum (WEF) also selected MSBM as its partner institution for administering the Global Competitiveness Survey for Jamaica.

MSBM was awarded Best of Chamber (Small Enterprise) 2014 by the Jamaica Chamber of Commerce (JCC). The award is bestowed on "an outstanding member

company that has met the highest level of sector performance and best practices in the areas of corporate leadership, product and service quality, human resource development, marketing innovation, corporate citizenship and sustained growth". MSBM joins a long list of distinguished Jamaican firms, organisations and individuals to be honoured by the JCC. The Chamber is one of the oldest business associations in the hemisphere, and this was the 33rd staging of the awards.

MSBM was among the top three winners of the Project Management Organization of the Year (PMOY) award 2015. The School was recognized by the Project Management Institute (PMI) for excellence in project management. MSBM was awarded second place for project management excellence in relation to the opening of the MSBM Finance Lab, the first of its kind in the Caribbean.

Specific MSBM programmes have also received international recognition. The Project Management Institute (PMI) has named MSBM a Registered Education Provider (R.E.P.). The R.E.P. designation validates that an organization meets or exceeds PMI's rigorous quality standards and can deliver world-class, effective project management training and education.

In June 2011, the MSBM received accreditation from the Association of MBAs (AMBA) for a period of three years for achieving what AMBA describes as the highest standard in Postgraduate Business Education for its EMBA and MBA programmes. AMBA's accreditation is internationally recognised as the global standard for all MBA, MBM and DBA programmes. The programmes were re-accredited after another rigorous assessment in June 2014 for another three year period by the AMBA team. The re-accreditation by the AMBA is further proof that the MSBM has indeed become the centre of excellence in business and management education for the Caribbean.

Overview of Programmes and Structure of Programmes

MSBM offers undergraduate (B.Sc.) degree programmes in Management Studies, Accounting, Entrepreneurship, Human Resource Management, Marketing, Operations, Management Information Systems (Western Jamaica Campus (WJC)), Banking and Finance (offered jointly with the Department of Economics), Chemistry Management (Administered by the Faculty of Science and Technology) and Tourism Management.

Postgraduate degree programmes offered by MSBM include: the Doctorate in Business Administration (DBA), Master in Business Administration (MBA), Master of Business Management (MBM) programmes, the (MSc.) degree programmes in: Tourism, National Security and Strategic Studies, Enterprise Risk Management (ERM), Accounting, Computer-based Management Information Systems (CBMIS), Taxation, Telecommunications Policy and Management, Sports Business Management, and the Diploma in Business Administration and Sports Business Management. These programmes are offered in an excellent learning environment, using a pool of talented and highly qualified local and international faculty.

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Current Coverage of DRM in MSBM Programmes

An emerging focus on DRM directly and through the lens of sustainability is evidenced by ongoing research of members of faculty and the forthcoming Business and Management Conference, themed *Connecting the Dots: Enterprise, Entrepreneurship and Sustainable Development*.¹⁵

In terms of academic research a number of entities across the university campus conduct research in the area of disaster management (e.g. the Earthquake Unit, the Department of Geography and Geology and Mona GeoInformatics Institute) while at the MSBM, a major initiative is the research being conducted by Dr. Lila Rao-Graham and Dr. Maurice McNaughton through the Open & Collaborative Science in Development Network (OCSDNet), supported by Canada's International Development Research Centre and the UK Government's Department for International Development. This research is entitled *Towards a Knowledge Broker for Collaborative Disaster Recovery Planning in the Small Island Developing States of the Caribbean* and its aim is the development of a *knowledge broker*, an open source technical solution for the integration of silos of knowledge related to DRP dispersed throughout the Caribbean region (Rao & McNaughton, 2015). This project came about as the result of the recognition that many SIDS in the Caribbean are susceptible to natural disasters yet may lack the resources to develop comprehensive and effective Disaster Recovery Plans (DRP). Many SIDS are susceptible to the same types of disasters and have similar institutional structures and procedures in place for responding to them. However, there are many resources available for DRP, both locally and regionally, they currently exist as disparate silos. The authors recognised that if states collaborated and shared their existing data and the cost of the resources required to develop related plans it would lead to a more efficient development methodology, more complete DRPs, and more effective recovery coordination after a disaster event. The focus of the research, at the moment, is at the government level, however, its implications are also relevant to businesses and there is potential for the tool to be used in some of the programmes suggested herein¹⁶.

Despite this emerging focus, there is a general dearth of material and a lack of inclusion of DRM as a theme in existing offerings. This is curious considering the significant impact of natural disasters in the country and region. This finding is not unique to the MSBM and the Caribbean. As part of the preparation for this paper we conducted a (somewhat limited) benchmarking exercise of what other universities internationally offer in this domain. A University that has a number of offerings in this domain (although not specific to the business school) is the University of Hawaii which is already in partnership with Jamaica and UWI through their Pacific Disaster Centre (PDC) (<http://www.pdc.org/>). The University of Hawaii offers a number of short courses (<https://ndptc.hawaii.edu/training/catalog>) that are extremely relevant to our region (e.g. Natural Disaster Awareness for Community Leaders

¹⁵ <http://businessconf.msbm-uwi.org/>

¹⁶ <http://ocsdnet.org/projects/mona-school-of-business-and-management-the-university-of-the-west-indies/>

(AWR:310), Leveraging Tools for Conducting Damage Assessments, Social Media Engagement Strategies). The University also offers a Bachelor of Arts in Public Administration with a concentration in Disaster Preparedness & Emergency Management and a certificate in Disaster Preparedness & Emergency Management. One of the courses in this programme which could be of critical importance and whose topics could be included in the curriculum of a business school is Disaster Recovery and Business Continuation.

The general conclusion is that while not much exists within the MSBM at present, there are opportunities for the introduction and integration of DRM throughout the School. These suggestions are also in line with the School's focus on internationalisation with membership in the proposed network of international business schools offering the possibility of internationalising the School's programmes and networks. The following section offers suggestions for how this might be accomplished.

For the MSBM, mainstreaming DRM is not an end in itself but rather an important step towards affecting behaviour change and practice among businesses; raising awareness among public policy makers of the implications of disasters for business and including the policy makers as key stakeholders in DRM policy-making; and upending the apathy and lack of connected thinking regarding DRM and productivity within the region and beyond. The productivity issue is particularly important in the context of the high rates of migration of the most skilled and educated Jamaicans. For instance, estimates suggest that up to 80% of the most skilled and highest trained Jamaicans have migrated, mainly to the US, UK and Canada, since the nation's independence in 1962 (Minto-Coy, 2009, 2011, 2016a). The role of management education in Jamaica and proposals contained in this paper are, therefore, not only about Jamaica and the Caribbean in the present, but importantly about educating Jamaicans now for global impact in the future.

MAINSTREAMING DRM INTO MANAGEMENT EDUCATION IN JAMAICA

While the general findings indicate a lack of DRM related issues in management education across the board, there are also a number of opportunities for introducing and integrating DRM into existing programmes. This includes introduction via established business and management concepts such as risk and business continuity. This section offers suggestions for how this can be accomplished. However, as per the particular context, the approach suggested is a phased one with specific themes in the Sendai Framework, being included at different periods, as opposed to an emphasis in the short term to ensure that one or two themes are integrated.

With the above in mind, the proposals have been grouped and presented for the short, medium and long term. The designation is guided by the investment and finance literature (George, 1984) with 'short' referring to a period under 1 year, medium to 1-5 years and long term covering a period over 5 years. Since the MSBM has modern technologies for streaming and delivering programmes in a synchronous, asynchronous, online and/or blended fashion with partnerships across member in-

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stitutions to facilitate remote content delivery could be undertaken where the school does not have the resources to deliver a course unilaterally. Where this is the case, it is also anticipated that internal learning will also take place over time.

The specific programmes into which DRM will be integrated, the thematic area and mode of integration along with a figure representing the overall proposed approach are highlighted in Appendix 2. The courses selected naturally lend themselves to a consideration of DRM. They are also core courses or attract a large number of students (as electives). The aim is to increase the possibility that MSBM students, as well as those in other departments, undertaking cross- departmental or -faculty courses will be introduced to some aspect of DRM. Additionally, the adoption of a broad-based approach as suggested here is contextually relevant, allowing for the best utilisation of limited resources including financial, physical and human (an ever-present consideration for any business school but even more so for one in a SIDS).

The proposals below are meant to accompany the suggestions in Appendix 2

Immediate

The adoption of DRM as a consideration on overall business performance will be approached firstly, from the collation of training materials, course outlines, case materials and other existing resource on DRM. Such material will be identified by reviewing the practices within other business schools which currently include courses on DRM. Secondly, core courses currently taught within the School will be selected as the first points for introducing DRM. These courses will serve as a route to reach a majority of students. Thirdly, a special panel on “Sustainability and Management Education” will be convened at the MSBM’s Business & Management Conference to be held in Kingston, Jamaica, November 9-11, 2016. The panel will introduce the many ways in which business and DRM intersect. This will be facilitated by one of the authors in her role as conference co-chair and chair of the programme committee. The theme of the conference naturally lends itself to considering DRM and Sustainability.¹⁷ Finally, a research program that focuses on the impact of disasters on businesses, including small businesses, in Jamaica and the Caribbean will be developed. Execution will begin over the medium term with the aim being that the findings will strengthen the case for businesses to focus on DRM (e.g. determine precise losses and the number of businesses that have been wiped out by disasters) as well as, build local business cases for teaching and training purposes.

¹⁷ The conference will be held under the theme “Connecting the Dots: Enterprise, Entrepreneurship & Sustainable Development”. Conference website: <http://businessconf.msbm-uwj.org>.

Medium Term

Over the medium term, an internal workshop for business and management educators and trainers will be convened with the aim of raising the awareness of DRM and the ways in which it can be introduced within the existing curriculum. The assumption here is that the expertise to lead such a workshop already resides in the proposed network of international business schools. This will herald the introduction of DRM into select courses and training programmes. The Caribbean, even while it shares common issues with other regions, has its own specific experience with DRM. The region therefore has much to offer in the way of practical teaching cases on how businesses are affected, currently and can address DRM. Key to this will be the development of a number of teaching cases on DRM in SIDS and particularly on SMEs. The executive training programmes and direct impact on business will also be considered via a special workshop to provide targeted DRR training for SMEs and the private sector.¹⁸

The MSBM will also invite, through the ongoing visiting scholars programme, an academic expert in the area of DRM for 3 months to assist the school in an audit of its programmes and a review of the suggestions contained in the present paper in order to develop a road map for implementation. The scholar would also work with MSBM academics to develop case studies and research papers for publication in internationally recognised journals and thus, incentivising locally based academics to focus on DRM in their research as well.¹⁹

Other initiatives could include (i) the convening of an event (e.g. workshop or conference) aimed at drawing attention to DRM in business and management education and practice. This would contribute to the development and application of concepts, and the build-up of a network of researchers and a bank of material on DRM, while also providing a space for the private sector to be engaged in current and best practices around DRM in business. The conference could be hosted by a different region or partner should the decision be taken to have a recurring event each cycle. (ii) A survey of current industry surveys on current DRM practices among Jamaican and Caribbean based businesses to contribute to instructional material but also to raise awareness of DRM among businesses and assess the true state of affairs for Caribbean firms as it relates to DRM. (iii) Encouraging partnerships with other Business Schools in SIDS towards the exchange of information, best practices and development of technologies and strategies for DRM in business. (iv) The development of overview courses in professional management training programmes

¹⁸ Subsequent to submission, FIU has a programme – Disaster Resilience for SMEs that it is currently utilising in Florida and is seeking partners to run a similar workshop in the Caribbean. The MSBM could be this partner.

¹⁹ Again, this is an important consideration in the context of mainstreaming given the need to ensure that developments are also mindful of the everyday considerations of an academic institution from the point of view of the educators themselves, including promotion and publish or perish’.

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to introduce business and public sector managers to DRM as well as individual modules which then focus on each of the seven themes (including, Disaster Risk Metrics and Sustainable Business Management).

Long Term

In seeking to escalate DRM mainstreaming, the long term move would be to introduce DRM as a specific area of study with professional training programmes and certification of individuals within the private sector as DRM professionals in their respective organisations. Indeed, the opportunity is there for management schools, through consultancies, to offer such services (e.g. DRM audits) for industry leaders. The possibility exists for the creation of a market for DRM services, which would help to raise the profile of DRM as an opportunity area. Here a “training the trainers” approach could be adopted, where Business Schools train individuals who would then assist firms to apply Disaster Risk Metrics in their own organisations.

A number of excellent sources on DRM and the private sector have been emerging over the years (some of which have been referred to in this document). However, the literature and training material as well as academic content still require much development in quantity, quality and depth. Additional content could be generated from workshops and conferences as well as through publications including targeted journals and securing a book series with a global publisher. This could encourage the emergence of DRM as a legitimate area in management studies, with its own concepts, theories and approaches that will allow for testing and generalisations. Aligned to this will be the development of an online repository for DRM professionals and educators. Such a repository would house important information, including instructional tools, cases and other materials with considerations to the value of open vs. paid access. The availability of openly-accessible resources could aid in mainstreaming efforts and lessen the burden on lecturers to generate completely new tools individually. On the other hand, this would also have to be considered in light of a desire for sustainability. Such a repository can be developed through various levels of support (financial and the provision of content) through the present partnership and managed by the MSBM.

A final goal for mainstreaming would be to secure funding for a DBA scholarship in DRM, which would contribute to the development of specific expertise as well as research in the area of DRM/DRR in the Caribbean over the long run.

Risk Factors for Successfully Mainstreaming DRM in Management Education

Ownership and Support from Highest Level of the Business School. Successful mainstreaming of DRM will require the support and leadership of the highest level of the business school (the Executive Director). Support will particularly be necessary over the short term in order to signal to the academy the level of intent and likely implementation of some actions recommended here. Ownership and management

beyond the Board and Executive Director is also important. The Strategy Monitoring, Projects and Evaluation Unit will be tasked with overseeing the actual mainstreaming efforts and finalising the precise steps to be taken in actualising this paper.

Availability of Quality Material to Fit into Course Content. There is a likelihood that mainstreaming will be affected overtime by the extent to which instructional material and resources can be developed for the MSBM and other business schools to adopt and adapt.

Availability of Resources. Mainstreaming also requires attention to the practicalities of cost and the need for financial support beyond tuition fees particularly, in its early phases. The graduated approach to mainstreaming could assist, in the first instance, to alleviate (but not erase) some of the challenges around funding that a Business School in a small developing country such as Jamaica might face in designing course content.

Strength and Support of International Partnership. While the internal sustainability of the programmes will be important, there is no discounting the role of international support as envisioned, for instance, in the present proposal for a network of business schools in DRM. The role of the international partners may also be of particular importance in the case of SIDS where there has tended to be a reliance on external funding and knowledge exchange with such support acting to legitimize the adoption of new practices and thinking locally.

Monitoring and Evaluation

A level of flexibility is essential to the successful implementation of the strategies proposed in this paper. However, the proposals are not static and will be reworked over time, particularly given the time constraints in preparing the document. There should be periodic review following implementation by the Strategy Monitoring, Projects and Evaluation Unit, each review shaping the next set of proposals.

CONCLUSION

This paper aimed to offer a set of proposals for mainstreaming disaster risk management in management education. A particular approach to mainstreaming was adopted which suggests the integration of DRM themes on a phased basis. This approach also acknowledged that mainstreaming need not be about the adoption of new programmes but rather integration into existing programmes via e.g. course projects or through inclusion in those existing themes and modules which naturally allow for such inclusion. Additionally, the paper's detailing of the context and experiences as it relates to small and vulnerable settings such as SIDS, contributes to a broadening of understandings on the issues faced by these states.

A stages approach has been suggested with key steps categorised over the short, medium and long term. The proposals contained herein were considered mainly

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from the context of the proposing institution, the Mona School of Business and Management, in the Caribbean grouping of Small Island Developing States. As such, they are designed, as much as possible, to sit within the frame of existing supporting initiatives and ongoing programmes and, importantly, to be cognizant of the existing financial and other resource constraints faced by small institutions in small and developing settings. Hence, a final contribution of the paper is to the wider discussion of the role of education and educational institutions in responding to socio-economic challenges, and more specifically where this is a small institution faced with competing demands and obligations. Therefore, the set of recommendations – an action plan – for business education and training at the undergraduate and postgraduate levels is mindful of the constraints and challenges related to size and capacity. Nevertheless, the proposals are not completely outside the context of other developing or even developed states. As such, there is some resonance with other settings including the grouping of management education schools, more generally with proposals being made for exchange and cross-national learning and cooperation.

One of the major challenges foreseen in implementing this mainstreaming process is the need to ensure “buy-in” from the members of the faculty of the school who will be relied on to integrate this content. They must understand the importance and relevance of these topics and this may require some sensitisation. There is also need to ensure that those exposed to the content in an educational setting are motivated enough to implement what they have learnt in the businesses they belong to or will join. MSBM does have an advantage in that a number of students, especially at the graduate level, are currently working so they are well placed to begin implementation immediately.

Ultimately, the proposals have also been framed with an understanding that this paper is a living document. It is the intent of the MSBM to modify it over the course of this project and to document the MSBM’s rationale and technical justification for actions at each level of implementation. These suggestions are deemed to be important in raising the profile of DRM at the level of the education and training institutions with the ultimate aim being to influence the future business managers and employees to create the change among their organisations and colleagues. The project will also complement the business school’s ongoing efforts to engage key stakeholders, address pressing development and growth challenges and contribute to its role in identifying solutions to such challenges.

APPENDIX 1.

Table 3. An Analysis of the Factors Contributing to the Vulnerability of Caribbean States

Country name	NATURAL HAZARD EXPOSURE (based information from WMO, 2011)												
	Hurricane/Tropical Cyclone	Strong Winds	Storm Surges	Coastal Flooding	Flash Flooding	River Flooding	Land/mud Slides	Heavy Rains	Droughts	Thunderstorms/ Lightning	Earthquakes	Volcanic Eruptions	Tsunamis
ANTIGUA & BARBUDA	S	S	S	S	S	0		S	S	P	P	I	S
BAHAMAS	S	S	S	S	P				P	P	P		
BARBADOS	S	S	S	S	S		S		P	P	S	I	S
BELIZE	S	P	S	S	S	S	P		P	P	S		
CUBA	S	P	P	P	P	P	P		S	P	S		
DOMINICA	S	P	P	S	S	S	S		S	P	P	P	
DOMINICAN REPUBLIC	S	S	S	S	S	S	S	S	P	P	S		
GRENADA	S	S	S	S	S	P	S	S	S	P	P	I	
GUYANA	0	P	P	S	P	S	P	S	S	P	S	0	S
HAITI	S	S	P	P	S	P	S	S	S	P	S		
JAMAICA	S	S	S	S	S	S	S	S	S	P	S		
ST KITTS AND NEVIS	S	P	S	P	P	P	P	S	P	P	P	I	
ST LUCIA	S	P	P	S	P	S	S		S	P	S	I	S
ST VINCENT AND THE GRENADINES	S	S	S	S	S	P	P		P	S	P	I	S
SURINAME	P	P	P	P	P	S	P	S	P	P	P		
TRINIDAD & TOBAGO	0	P	P	P	S	P	P		P	P	S	P	

Table 1: Analysis of Country-level Exposure to Specific natural hazards (S= - significant, P - occurs; I – indirect).

Source: (Granvorka et al., 2016)

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APPENDIX 2. MAINSTREAMING DRM INTO MANAGEMENT EDUCATION

The shift from a narrow focus on the risks in DRM to highlighting the value of DRM implies a number of opportunities for new ventures and the development of innovative products and services around DRM. Included here are opportunities for the introduction of insurance products tailored to specific businesses and the development of more resilient infrastructure.

These themes lend themselves to a natural integration into the existing undergraduate courses, a sample of which and specific areas of integration noted below:

Table 4. Mainstreaming of DRM in Undergraduate Programmes

Entrepreneurship			
Strategic Planning for Entrepreneurship	Business Continuity Planning Business Ethics and Social Responsibility	Course work and field work	Medium Term
Social Entrepreneurship for Sustainable Development	Business Ethics & Social Responsibility Sustainable management Business continuity planning	Course content (E.g. what is the role of the private sector in building risk governance capacities?)	short-term
Quality Service Management	Business Ethics & Social Responsibility; Sustainable Management	Designing and managing for quality service	Medium-long term

Given the existing and upcoming MSBM graduate programmes there are a number of opportunities for introducing and/or expanding the already existing disaster and risk management topics in existing curriculum. Additionally, the MSBM recognizes that continued management education is important for success through the development the Professional Services Unit (PSU).

The PSU contributes to the economic development of Jamaica and the Caribbean region by providing creative solutions for improving the effectiveness and efficiency of private and public sector organizations. Currently, this is achieved through four pillars: (1) professional and executive development training, (2) general business consulting, (3) business cases and research databases, and (4) conferences, seminars, symposia and workshops.

Some of these are listed below:

Table 5. Mainstreaming DRM in Graduate Management Education & Executive Development Courses

Enterprise Risk Management (MSc)			
Course	DRM Theme	Mode of Integration	Time Frame
Risk Management in the Business Enterprise	Awareness of risks, identification of risks and Disaster Risk Matrix	Already an objective of the course so integration would simply be the inclusion of DRM as a specific business risk included here.	Short-Medium Term
Logistics and Supply Chain Management (MSc – NEW)			
Logistics Supply Chain Management and Sustainability	Sustainable Management	DRM included as a topic for Sustainable Management	Medium-long term
Supply Chain Management and Strategy	Sustainable Management, Business Continuity	Can be included under risk management	Medium-long term
MBA			
Operations and Project Management	Risk Management	Addition of topic	Medium-long term
Business Analytics	Risk assessment and Measurement	Included as an example domain for application of business analytics techniques	Medium-long term
Business Policy and Strategy	Disaster Recovery and Business Continuation	New Topic to be added	Medium-long term
Executive Development Programme			
Management Enterprise Risk	Risk Transfer	Included as a themes in existing modules	Short
	Business Ethics		
	Disaster Risk Metrics	Current modules focus on tools for risk assessment. Disaster Risk Metrics (DRM) could be introduced as one such module.	Short
		Deeper engagement training and utilisation and of the metrics	Medium– long term

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An overview of this proposed mainstreaming is represented in the figure below.

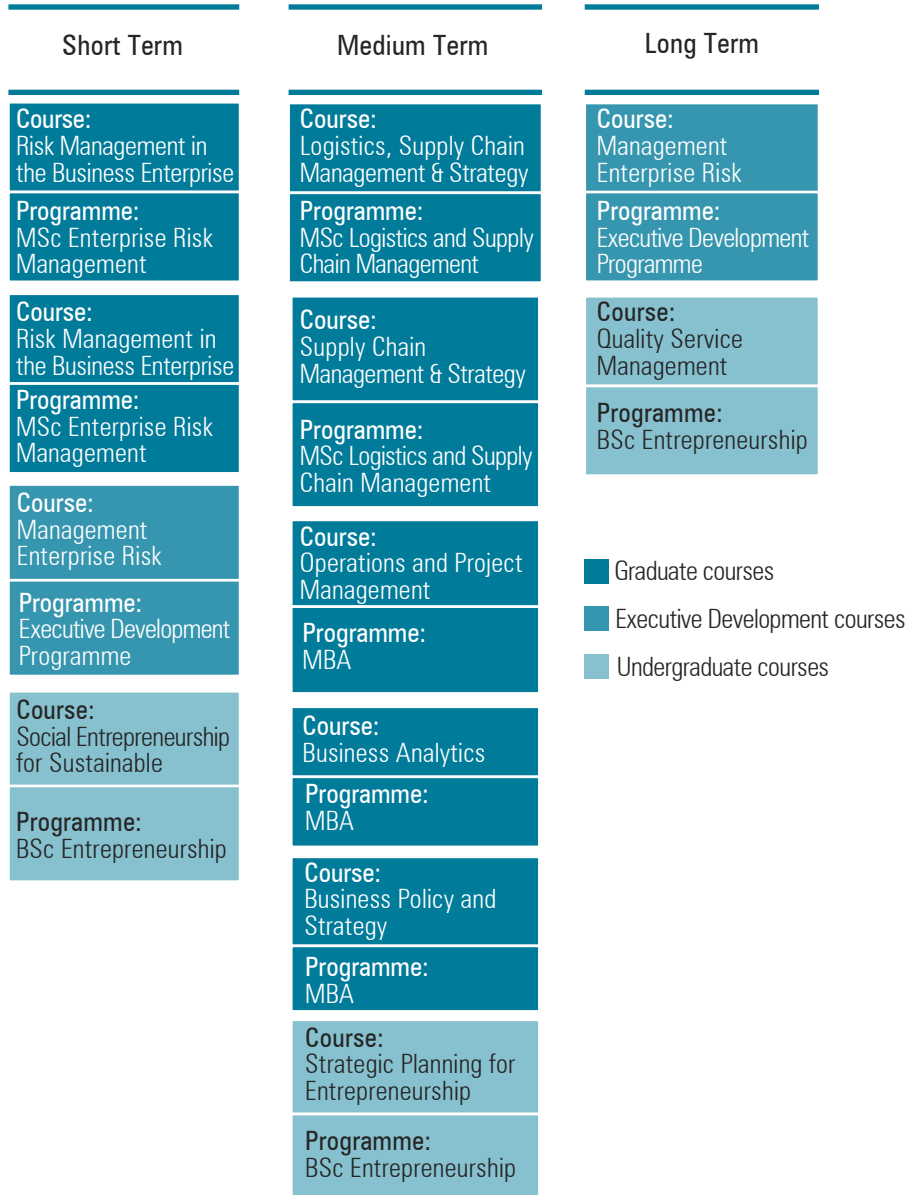


Figure 1. Proposed Approach and Timeline for Mainstreaming DRM

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BUSINESS EDUCATION AND CREATION OF AWARENESS FOR DISASTER RISK MANAGEMENT IN CHILE

EDUCACIÓN EN NEGOCIOS Y GENERACIÓN DE CONSCIENCIA SOBRE LA GESTIÓN DEL RIESGO DE DESASTRES EN CHILE

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ABSTRACT

This paper discusses the apparent disconnection between disaster risk management research and the lack of tools for business continuity after disastrous events in Chile. As disasters are a common occurrence in business development, local firms are becoming aware of the need for having tools for preparedness and mitigation of negative effects of disasters. Nevertheless, in Chile, this private awareness seems to be part of the business aptitude of large-sized firms rather SMEs. Some of the arguments presented here illustrate this gap between local firms and their need to integrate business continuity management into their business operations and their decision making to cope with disaster risks. In this vein, this document argues the need for innovative academic offerings in Chile and presents a proposal to advance in linking disaster risk management and business education at the University of Chile. This program is developed in the medium-term for each of its components, starting with undergraduate students and achieving major actions with public and private stakeholders in a progressive ladder of initiatives.

KEYWORDS

Business Education; Disaster Risk Management; Innovation and Business Continuity Planning.

RESUMEN

Este documento discute acerca de la aparente desconexión entre la agenda de investigación para la gestión de riesgos de desastres y la carencia de herramientas para la continuidad de negocios posterior a eventos de desastre en Chile. En tanto los desastres son una instancia común en el desarrollo de los negocios, las empresas locales son cada vez más conscientes de la necesidad de contar con herramientas para su preparación y para la mitigación de los efectos negativos de los desastres. Sin embargo, en Chile esta conciencia privada parece ser parte de la actitud de negocios de las empresas de mayor tamaño más que de las PYME. Algunos de los argumentos presentados evidencian este vacío entre las empresas locales y su necesidad de integrar la gestión para la continuidad de negocio en sus operaciones y toma de decisiones para sobreponerse a los riesgos de desastre. En este contexto, este documento argumenta sobre la necesidad de ofertas académicas innovadoras en Chile y presenta una propuesta para avanzar en la vinculación entre la gestión del riesgo de desastres y la educación en negocios en la Universidad de Chile. Este programa es desarrollado en el mediano plazo en cada uno de sus componentes, se inicia con los estudiantes de pregrado y desarrolla acciones de mayor envergadura con agentes públicos y privados en una secuencia progresiva de iniciativas.

PALABRAS CLAVE

Educación de Negocios; Gestión del Riesgo de Desastres; Innovación y Planeación de Continuidad de Negocio.

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INTRODUCTION

Latin America faces an increasing number of disasters related to anthropic, socio-natural and natural origins. In fact, since the 90's, these devastating events have been linked to a great amount of national loss, both human and economic. Some arguments that explain this situation are the process of continuing growth of cities in regions with a history of natural hazards, and the weakness of local planning tools to guide the appropriate location and organization of the economic activities, mainly in areas of exposure. A clear synthesis in terms of understanding the scope of this situation is stated by Wilches-Chaux (1992) and Chardon (2008) defining natural disasters as socially-constructed events rather than purely natural ones.

Economic activities are one of the dimensions strongly affected by the occurrence of an event of natural origin. However, the field is still open regarding the research of linkages between industrial location, private and public investments, and disaster risk in cities. That knowledge may be helpful in building resilient local businesses and regions (GAR, 2013). In recent years, authorities and investors have become more aware of the importance of taking into account extreme events as a real threat to business and the economy. This change in perspective consists of assuming that natural phenomena will cause structural and economic damage in both the short and long term.

In this context, considering the structure of Chilean economy and the performance of firms and entrepreneurs, one of the emerging questions is how to prevent, support and minimize the economic impact of natural and industrial disasters in affected regions, mainly in SMEs and the local labor market. Thus, risk management aims to organize and strengthen the joint work of different stakeholders located at regional level, such as social, political and business bodies. Then, the scope of work must be inter-agency and inter-sectoral, since collaborative and coordinated actions may help in developing effective risk management initiatives. In addition, as stated by Cardona (2008), a multi-tier governmental coordination is also important because the decentralization of initiatives benefit local government and communities in deploying context-specific actions oriented to manage risks, guarantee part of local investments and, ultimately, achieve effective results in the management of local risks.

The goal of this paper is to guide the higher education community toward improved understanding of disasters and the complex issues involved in disaster risk management. The Interdisciplinary Risk Disaster Reduction Program, the Vice-Presidency of Research and Development and the Department of Geography of the University support this initiative. The program is structured upon a seminar that will be grounded in a multidisciplinary perspective to be built in the medium term within the University. The key idea is to develop an innovative approach to mainstream disaster risk management content into undergraduate and graduate students, linked to risk management, geography and business, and other academic offerings within the University. As a result, we expect to generate a close relationship with public and

private stakeholders located in affected or potentially affected areas in Chile in order to channel business continuity and risk prevention tools.

In the following, this paper argues about the need of linking business education and disaster risk reduction. Then it presents the methodology used to understand the importance of developing innovative curricula offerings that integrate disaster risk management and business continuity in Chile. The following sections develop a conceptual framework for understanding the role of disaster risk management in business education within the specific Chilean policy context. The next part tests the framework for the case studies. And the final section contains the conclusions and recommendations for an innovative academic offering in Disaster Risk Management and Business Education.

LINKING RISK REDUCTION AND BUSINESS EDUCATION

Natural hazards and risk management literature seem to concentrate a research agenda on understanding triggering factors of the geographical space that causes events with negative consequences for human beings. Several knowledge bodies from social sciences show important advances in their quest of to relate the scope and extent of risk management. One such field of potential enlargement is with regard to local businesses and disaster risks reduction. In this vein, a sustainable development perspective may help in clarifying what factors should be considered to strengthen the economic development of communities in balance with their environment. On the one hand, local economic development initiatives may be linked in order to define the extent of actions required to strengthen local firms, their productive and technological strategies, their ability to generate employment, and the infrastructure necessary to ensure that the local economy does not collapse against any natural and/or industrial event that can unexpectedly and negatively affect a region. Then again, from a more private perspective, activities could be tied to the development of more comprehensive management tools articulated with the usual dimensions of business risks assessment -such as financial, credits and operational. From this perspective, academia and policy makers can provide a set of tools that facilitate companies to contextualize and evaluate their investments plans, their plant and facility location alternatives, and the quantification of key resources that enable them to prevent negative effects on business productivity due to any disastrous event caused by natural or human action.

In Chile, there is evidence of a lack of risk management practices in economic activities. This weakness is both in the private and public sectors. The former, tend to locate and build productive infrastructure investments in areas that are prone to earthquake risks, landslides or tsunamis. The explanation for this situation is the structure of our endowment economy and the location of resources typically found in fault zones, in coastal areas, or high-altitude mountainous regions. On the other hand, the public sector has not taken an active role in designing preventive man-

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agement tools regarding natural hazards. Usually, preventive actions are linked to signaling areas that have been previously affected by tsunamis. However, the population and the private sector do not have public tools to develop proper resilient skills against the outbreak of natural disasters.

In addition, the academic sector has mainly focused its research on the causes of disasters, but it is also necessary to advance initiatives for college students' education coupled with training strategies focused on entrepreneurs and workers, to develop management tools that combine and link the aspects of businesses and consequences derived from natural or industrial disasters. In this context, the main approach of this program presented by University of Chile is related to the theme of Business Continuity Planning: its importance and relevance and the need to include it into business management before and after shock events. In general terms, there are two key elements to take into account regarding the arguments of this proposal:

1. The difficulty of SMEs to incorporate tools for risk management and strengthen resilient business strategies within their geographical context. This situation contrasts with the position of medium and large businesses, that given their increasing returns to scale in their productive activities, may have enough surplus to incorporate risk, as a part of its board of business management indicators (KPI - Key Performance Indicators). This discussion is linked to the innovation theory and the actual capacity of SMEs to adopt new tools for managing and permanence of their business. Business innovation capability can constitute a significant factor in generating changes in the business strategies of local firms that are located in areas of risk. In this particular case, the example will focus on the Mining Industry in the Region of Tarapacá. Mining companies require security measures and international certifications of quality management and environmental standards to their suppliers. However, these investments are not translated into safer value chains and/or resilient activities to the effects of natural disasters. In fact, the 2014 earthquake exposed the disconnection between the different productive sectors established within the Region.
2. In a similar vein, it is interesting to discuss the need to institutionalize the management of natural risks from a long-term perspective, in contrast to the short-term view that dominates business management. Usually in Chile, when the population faces major natural events, that can mean the loss of human lives and infrastructure. Risk management mechanisms are activated from ONEMI². However, a proactive society is aware of the ongoing risks they may be exposed to. This approach requires the development of preventive measures to reduce losses of any kind. In this context, the private sector can also generate their own tools to catalog the type and the level of exposure to risks while designing an appropriate strategy to guide investment and/or develop preventive infrastructure to avoid a total business disruption after a disaster

2 ONEMI: National Emergency Office of the Interior Ministry, for its acronym in Spanish

occurs. Unfortunately, there are no recognized enterprises in Chile's SMEs that introduce this perspective, but rather many examples of investments located in risky areas. In this context, the second case study analyzes the situation of the Municipality of Caldera, in the Atacama region, which can potentially be affected by seismic risk and where firms are investing in risk-prone areas.

Finally, the proposal of disaster risk management in business education is a program that is developed in the medium-term for each of its components, starting with undergraduate students. The collaboration with the management school will be developed during the first year, since it is necessary to study the scope and coordination in academic curricula. Despite this fact, a first initiative will be the multidisciplinary course that will be recognized and credited by all the schools within the University. In the mid-to long-term, the plan is to develop a complete and multidisciplinary research agenda to take into account different dimensions of natural disasters. The first steps are outlined in the section related to the implementation of this initiative which is oriented to contribute to the understanding of how to build more resilient communities in those areas affected by natural and industrial shocks, and disturbances in several regions of Chile.

METHODOLOGY

Defining an academic offer oriented to Business Continuity and Disaster Risk Management

Research initiatives to achieve a better understanding of natural hazards and factors that trigger disasters in Chile are well established within different academic departments within the University of Chile. However, the social dimension of disasters is mostly related to housing and psychological effects, with few initiatives focused on economic aspects of natural or even industrial disasters. It seems to be an institutional matter rather than an academic oversight. In fact, most of the public programs of reconstruction after recent seismic events in Chile, like the 27F earthquake (2010), Tarapacá Earthquake (2014), Valparaíso's fire (2014), Atacama's landslides (2015), and Coquimbo's tsunami (2015), have had a strong focus on housing, infrastructure, fresh water accessibility, and infrastructure. The economic aspect of those public programs emphasizes investment in the rehabilitation of local firms, and re-capitalization and investment grants for new ventures at local level.

Several actions were conducted as a way of understanding this apparent gap and disconnection between the growing knowledge of natural disasters and the academic reflection that leads to the design of preventive economic public policies and/or business continuity.

The first action was the revision of the economic dimension in the reconstruction plans in affected regions. The issue was to answer if those events reshaped the location of economic activities or whether they gave way to the design of new public policies supported by negative experiences of local firms, so as to prevent future economic losses in similar situations.

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Secondly, the development of case studies with the previous information focusing on specific topics considering, as a background, the link between disasters and the development of economic activity in the affected areas. Those cases are set out below:

- **Tarapacá Region:** In April 2014, the region was affected by several earthquakes in conjunction with large-scale shock waves that hit the coast. In economic terms, the destruction of physical assets and lost markets -at least temporarily- mainly affected fishing, trade and agriculture activities, with consequences in employment, particularly low income families who suffered the most severe damage to their homes (Ministerio del Interior, 2014). In this context, mining is one of the key activities in the region, but it seems not to translate into actions or experiences from natural disasters to an upgrade along the value chain. Given this, it is interesting to review the demands of the mining industry to local suppliers of goods and services that result in the incorporation of innovations to improve the economic performance of the sector and discover which, if any, are related to prevention and/or mitigation of risk reduction.
- **Atacama Region:** In March 2015, the region faced an unexpected hydrometeorological event: the intensity of the rainfall caused floods and the overflow of Copiapo and El Salado rivers. Flooding in surrounding areas of lower slopes gave rise to an unprecedented disaster that killed 31 people, left 16 missing and more than 35,000 homeless, over 2,000 homes destroyed, as well as the destruction of public and private infrastructure (Ministerio del Interior, 2015). In this regional context, the review of Caldera, a coastal county within the region, is interesting since it may shed light on the diffusion of experiences related to the socioeconomic consequences of a natural disaster from an affected city to another potentially affected by an earthquake. Therefore, this case analyzes the role of investment in the social construction of risk, related to the four main industries developed in the area -aquaculture, fishery, mining and sanitary- according to the exposure to natural hazards and the vulnerability levels of each company associated with risk management. Underlying factors and their local and regional consequences are also determined.

After the revision of case studies and findings, semi-structured interviews were conducted with the Head of the Department of Business Management at the Universidad de Chile, the Head of the Strategic Programs at the National Agency for the Economic Development (CORFO)³, and the Manager of Programs at the Technical Cooperation Service (SERCOTEC)⁴. Those interviews were aimed at determining the scope of academic offerings related to risk management and business continuity planning at the

³ The National Agency for the Economic Development (CORFO) is a public body oriented to supporting and promoting the economic performance of SMEs. Its mission is to improve the competitiveness and the productive diversification of the country by encouraging investment, innovation and entrepreneurship, strengthening in addition the human capital and technological capabilities to achieve a sustainable and territorially balanced development.

⁴ The Technical Cooperation Service (SERCOTEC) is a public service aimed at supporting Micro and Small Enterprises and Entrepreneurs of Chile. One of its key goals is to develop and be a source of growth for Chile and Chileans.

graduate level. In addition, interviews were oriented to detect if the public sector, that is specialized in promoting economic activities and entrepreneurship, take into account natural disasters as a way to strengthen public tools and measures to assure the economic continuity of firms, and maintaining employment in affected areas.

With this background, a strategy was designed to introduce the importance of linking risk management initiatives and economic stability within the academic offerings at the University. The scope of work is of a progressive nature in the medium term and with actions suited for undergraduate and graduate levels supported by a research agenda that aims to be a permanent academic initiative.

LITERATURE REVIEW

Interestingly, the increasing volume of research on global warming, natural disasters and related issues has not been taken into account by the private sector and public services to the same extent and in terms of the design of context-specific tools to prevent, mitigate and/or rehabilitate economic activities in a resilient manner against disastrous events, both natural or industrial. In fact, several studies highlight aspects of private investments and its risks minimization, such as regulatory and institutional frameworks, business climate and financial facilities, among others (Coller Capital, 2013; The Economist, 2014). Similarly, some research emphasize the role of the insurance sector to avoid economic losses due to the negative effects of natural and industrial disasters (Joein & Luo, 2015; Carvallo, 2012; Pissera, 1997). While others focus on the sustainable development in Latin America regarding investment stability (PwC, 2014) and the impact that natural disasters have on firms, mainly on SMEs (Keipi et al, 2005; UNDP-GAR, 2013; Sarmiento et al, 2013; GAR, 2013). One of the key lessons derived from this work is to determine to what extend the private sector is prepared to keep economic activities in risky areas and display resilience assets, in order to maintain employment rates and recover production rates as quickly as possible after a disaster occur. This argument is even more relevant when executives from companies recognize that global warming and seismic events generate negative effects on firms' performance, as these risks are not part the overall business analysis.

In its economic strategy, Chile has promoted the formula where the private sector is the key agent to conduct the development of productive activities, while the public sector preserves that economy and operates under conditions of free competition. This strategy has meant that the role of government has focused mainly on promoting economic activities and innovation, so environmental issues and risk management -as opposed financial, credit and financial issues- are seen as delayed. One of the implications of that situation is a private sector that culturally has few skills and assets in overcoming their vulnerability in regions affected by earthquake, tsunamis, landslides and bush-fires, among others hazards.

Thus, improper handling of disasters has created a vicious cycle, because after a disaster has occurred, the reconstruction process does not take into account those factors that cause it in the first place. Furthermore, housing and facilities are main-

tained in a condition of vulnerable physical infrastructure. This creates the conditions for another disaster with perhaps even worse consequences (GTZ, 2006). In fact, according to the final report of the reconstruction process in Chile after the 27F earthquake (Ministerio del Interior, 2014), only a few settlements were relocated to safer places, but economic measures related to rebuild the previous economic infrastructure missed the opportunity to visualize new entrepreneurs or productive activities, with innovative processes and technics, so to embed a resilient local economy.

Impacts of disasters on development are significant because they result in high costs of rehabilitation and reconstruction, in lieu of effects in economic terms like lower production and retraction of activities, reduction of exports, increased imports, unemployment and migration. In this context, endowment economies, like Chile, show a propensity for investment projects located close to their sources of raw materials. For instance, an investment in fishing builds their processing facilities next to the coast, the same as ports and shipyards for the manufacture and maintenance of vessels. Similarly, mining operations locate their facility close to the pit or ore production, to reduce the cost of transport of materials, raw minerals and employees.

In this context, consideration should be given to both the assessment of and investment in location alternatives and business continuity planning for firms, from the perspective of innovation linked to the local development of economic activities. This is because risk management is a new tool for firms that imply new processes and new behaviors to cope with, in the event where future occurrence is unknown. However, despite the importance to link risk management and firms' innovation, this is not an easy task, since SMEs show evidence of weakness to adopt to and rapidly set up new means to operate.

Scholars studying the competency of firms to innovate, draw attention to weak absorptive capacity that characterize SMEs and their scale of production, business models and actual level of acquired knowledge. Those features are arguments that reveal SMEs limitations for effective integration in the value chain (Acs & Audretsch, 1988; Cohen & Levinthal, 1990; Malerba & Orsenigo, 1997; Shefer & Frenkel, 2005). Furthermore, it is necessary to understand how local conditions impact in the economic performance of firms, since they develop their activities in specific regions, with specific social and geographic settings. Thus, these firms' core market base have definite institutional situations, factor endowments and environmental challenges that can influence their economic linkages, investment in innovation and knowledge creation (Storper & Venables, 2004; Boschma, 2005; Huber, 2012; Zuñiga & Crespi, 2013). For instance, in the case of large firms, damages caused by an event can be absorbed by the firm, since they have been covering them with insurance or resources for emergencies or have developed storage facilities located elsewhere allowing them to keep their production. By contrast, for small and medium enterprises, it is less likely to have invested in protection plans and risk reduction.

Countries like U.S, Japan, Australia, have developed tools to support private sector preparedness and reaction after a seismic event (FEMA, 2011; Texas Department of

Information Resources, 2004; Ono, 2015; Queensland Government, 2011). What these experiences all have in common is the implementation of action programs aimed at making business resilient to events –natural or anthropic- stressing economic activity at the local level. These experiences are the basis that motivates the proposal of this document that seeks to incorporate a simple methodology to train students and SMEs in identifying potential hazards, their scope and impact within the firm, the design of a disaster plan, and the preparation of the necessary elements before the outbreak of risks and the identification of adverse events following actions.

POLICY OPTION OR POLICY CONTEXT

Due to economic and human losses suffered by the various regions in recent decades, institutions such as the Inter-American Development Bank (IDB), the Organization for Economic Co-operation and Development (OECD) and the United Nations Office for Disaster Risk Reduction (UNISDR) have conducted studies and developed strategies and methodologies for the awareness and sensitization of public and private investment agents.

These institutions recognize, as a common factor, that through the process of project planning no exposure to hazards is ever properly analyzed. It is therefore necessary to establish measures to provide for greater strength and resilience and that this investment is taken into account (Keipi et al, 2005; PwC, 2014). However, companies have made progress in terms of financial, legal and market backups (Deloitte, 2012; GAR, 2013). As a result, firms do not properly internalize their propensity to suffer from disaster risk and therefore must take measures to develop internal policies which are designed considering these issues.

The ISO 31.000:2009 is an international standard for risk management that can be adopted by both the private and the public sectors. However, it is not certifiable in Chile, since is not part of the verifiable standards by the National Institute of Standardization. Although it provides the basis for proper management (context, identification, analysis, evaluation and treatment of risk), it is not specific on the issue of disasters associated to natural events.

From a public perspective, at the regional and community level, the Constitutional Organic Law on Government and Regional Administration, according to Law No. 19,175, expressly assigns functions to the Intendant and Governors, to take all necessary measures to prevent and deal with emergencies or disasters, without prejudice to the relevant national authorities. The Organic Constitutional Law on Municipalities, Law No. 18,695, provides that Municipalities have the power to directly develop, or in collaboration with other organs of the state administration, carry out functions related to risk prevention and assistance provision in emergency situations.

At the municipal level, the design of planning instruments such as Intercommunal and communal regulator plans have the power to define restrictions to urban development areas that constitute a potential danger for human settlements. These are defined as “non-building zones” allowing only transitional activities, and pro-

tection to zones at risk of exposure to dangerous infrastructure. These “risk areas”, meanwhile, are seen as areas of exposure to natural and anthropogenic hazards, and activities that pose a risk to the community.

Regarding those requirements related to industry risks, the Environmental Assessment System determines those who are required to submit an Environmental Impact Assessment, as well as indicating what should be included in the base line of physical hazards presents in the sector where they are located or want to locate. Any project that is submitted to the Environmental Assessment Service must have a Contingency Plan for Prevention and Emergency associated with any risk.

The Law No 16.744 requires companies to implement strategies for the safety of workers in relation to risk of accidents at work and occupational diseases; however, this law exempts certain accidents due to “force majeure strange” not having any relation to the work.

In Chilean legislation, there are many public agencies charged with aspects related to emergency management. There are none, however, specifically related to firms’ resilience and/or risk preparedness. There is no doubt that this matter may be an area of future discussion, to the extent that companies are made aware of their priorities as related to the development of their economic activities. Some policy implications related to the review development for this paper take into account:

1. The need to institutionalize enterprise level risk management. This means that it is necessary to consider a broader notion of risk management that goes beyond the sway of economic cycles, commodity prices, or production goals. Nevertheless, there is a need to introduce comprehensive tools that facilitate the economic recovery of production units located in territories affected by disaster.
2. The need to differentiate policy instruments aimed at boosting productive development, in order to encourage the deployment of risk management tools, mainly in SMEs (SMEs).

It is key to become more sensitive to the need of advancing a research agenda and professional training in business continuity related to a whole set of tools for risk management –such as financial, credits, operational, natural and industrial hazards. Nowadays, the main focus of business schools is on economic areas of profit maximization, finance, and management to achieve productivity goals. However, a partial understanding of the sustainability of economic activity is related to a lack of consideration of the geographical environment, which could lead to negative effects on local employment and long-term investments.

CASE STUDIES AND FINDINGS

Case studies presented in this section show how the private sector has not yet become fully aware of the dimension of natural hazards in places where production

processes are located. In this regard, the case of the mining sector in Tarapacá region shows how large mining companies require that their service supplier achieve international certifications in management models. While the case of Caldera in the Atacama region shows how investments in certain productive sectors are materialized despite the level of exposure to natural hazards.

Tarapacá Region: Mining suppliers of services.

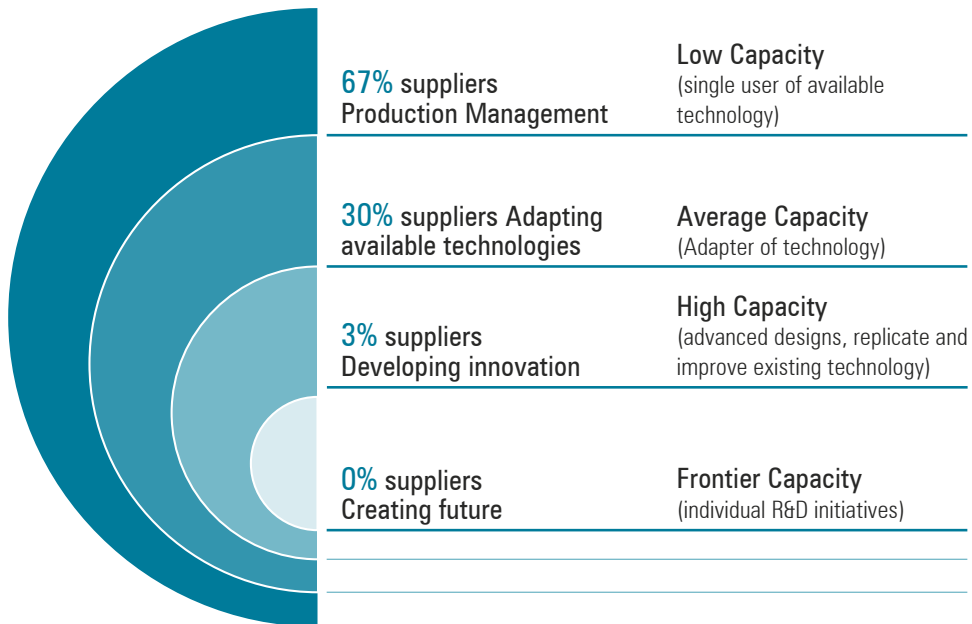
The mining industry is one of the major sectors in Chile, and accounts for an important economic source of production both locally and globally. Indeed, Chile represents one third of the global production of copper. The mining industry accounts for 12% of the national GDP, nearly 60% of the total exports of Chile are explained by mining, and about 50% of the mining suppliers sold more than US\$ 1 million, in 2012 (Salas, 2014; FCh, 2014). Nevertheless, this general picture of the sector does not represent the internal composition of the suppliers of services, as key agents of the mining industry's growth. The number of mining suppliers has been increasing from 3.443 firms in 2007 up to 5.998 firms in 2012.

Accordingly, the internal composition shows that medium-sized and large firms are increasingly relevant, with a participation of 27% and 34% of mining suppliers, in 2010 and 2012, respectively. On the other hand, micro-enterprises and small-sized firms group around 65% of mining suppliers. Geographical distribution shows that 23% of firms are located in the mining regions -known as Tarapacá, Antofagasta and Atacama. Antofagasta, comprises 12% of total mining suppliers. (FCh, 2012; 2014). In this context, the effective productive integration within the mining sector requires a greater participation in the areas of technology and knowledge management to strengthen its competitive advantages. However, local suppliers are not able to meet these challenges, especially in light of their limited learning and innovation capabilities (Urzua, 2007; Urzúa, 2013a). Indeed, 97% of mining suppliers can be classified as average or low capacity in the use of technology.

Thus, as depicted in figure N°1, most local suppliers operate in a context of production management and adaptation of available technologies. While only 3% of firms show advanced conditions that facilitate the development of innovation processing and/or the advanced design to improve existing technology. Nevertheless, there are no local suppliers whose activity is focused on expanding the knowledge frontier in mining, as seen in the figure below. In sum, the vast majority of Chilean mining suppliers tend to be less capable of developing new knowledge or innovations in their overall sector that will have positive effects on the mining industry and its value chain.

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Figure 1. Innovative capabilities of mining suppliers in Chile.



Source: Adapted from Urzúa (2007)

In particular, mining companies of the Tarapacá Region have been implementing suppliers' development programs since 2012, in order to upgrade their collective service firms' innovation capabilities. There are two industrial experiences related this task. One of them is the training program "Más Proveedores Tarapacá" (More Suppliers Tarapacá) conducted by the Industrial Association of Iquique. The other experience is developed by BHP-Billiton in Chile, and their scope is to upgrade technological competencies and innovation capabilities of local firms throughout its "World Class Supplier" program.

In Chile, BHP-Billiton defined two key challenges: (1) to develop 250 Chilean-based resource-industry suppliers into 'world-class' global resource-industry suppliers by 2020, and (2) to foster the technical and managerial upgrading of the company's suppliers, by developing innovative solutions to address challenges identified as critical by BHP, for its operations in Chile (Bravo-Ortega & Muñoz, 2015). The program engages local suppliers to develop innovative solutions to manage at least one aspect of mining identified as critical, such as water, energy, human capital, maintenance, dust control, acid mist control or leaching. The program of world class suppliers is structured through a systematic process that takes into account challenges associated with identification, selection process, portfolio management, and the commercial escalation of mining solutions developed by suppliers (Urzúa, 2013b).

Those suppliers' development programs are similar in their scope and the requirements to those of local firms, like quality certifications -ISO 9.000 and 14.000-; Health; Safety; Environment and Community certification (HSEC). The key requirement from mining companies is to get credited suppliers of services in their availability of an integrated management model that establishes the necessary balance between production processes, health and safety of both workers and the community, and the constant interaction with the environment. However, local suppliers of services perceive it to be of extreme difficulty to raise the level of transactions with mining companies despite the various actions that have been made and the different programs that have taken place. This has increased their frustration, and has fostered a negative attitude among mining companies.

In 2015, several earthquakes in conjunction with large-scale waves hit the coast of the Tarapacá Region. There is no exhaustive cadaster of firms exposed to this natural disaster in different economic sectors within the region. Nevertheless, something interesting to highlight is that of the apparent disarticulation of economic sectors in the region and how this aspect determines the diffusion of innovation adopted by firms. Particularly, with the focus of improving their Key Performance Indicators (KPIs) and to reduce their operational risks, mining companies invest in initiatives where suppliers upgrade their competencies. Those training programs enable suppliers to achieve certifications of international standards, but this acquired knowledge does not flow to the whole range of local suppliers linked to construction, trade and transport, which are common services required by mining companies and who were also affected in its assets and economic solvency after the earthquake.

Atacama Region: Caldera city.

The case of the Caldera consolidated urban port area is known for the arrival of national and international investors during the 80s, and the local activities related to the exploitation of maritime resources. It has been established that 63% of investments are in exposed areas, mainly tsunami risk, due to the historical configuration of the city. As it relates to risk management, SMEs associated with the aquaculture and fishery industries are those with a higher level of vulnerability; medium-sized and large firms associated with mining and sanitary industries have generally a medium to low level of risk vulnerability. In addition, the fragility of investments varies according to each company's resources invested in the security of their business. There do not appear to be integrated strategies for reducing the risk that strengthen the value chain.

Highlighting this problem, the case focuses on assessing how risk is constructed in the urban area of Caldera, from the point of view of economic activities taking place and its role in the increasing or decreasing risk. As a regional context, the wealth of natural resources in the Atacama region has allowed the arrival of private investments in four major industries: aquaculture, fisheries, mining and sanitary industry. Those investments provide for a greater contribution to the local GDP, which

in turn, has influenced the growth of the city's exposure to risky sectors, where complementary facilities to these industries (fuel supply, ports, etc.) and minor manufacturing industries are located. The mining activities have spread so quickly in the last decade, that it has led to the arrival of workers to the commune area, and therefore, a greater demand for services such as those in equipment and construction (I.M. Caldera, 2010).

The coastal area of Atacama region has geomorphological, climatic and meteorological characteristics typical of a desert environment (Soto et al., 2012). This creates conditions for the presence of four major natural hazards as described in table number 1.

Table 1. Type of natural hazards in Caldera City

Type of Natural Hazard		Factors base	Triggering factors
Geophysical	Seismic	Active faults, Subduction of tectonic plates	Quakes
Hidrological	Flood overflow channels	Basin types, hierarchy and density of drains, soil permeability, channelization and flow	Rainfall
Oceanographic	Tsunami	Depth, shape and slope of the platform	Tsunamigenic quakes
Geomorphological	Landslides	Slope and slope orientation	Rainfall

Source: Orellana, 2015

Local production activities are linked to investment in the primary sector, such as extraction and cultivation of aquaculture resources. The rest of investment projects are related to the export of mining products and activities to process fisheries and aquaculture products. The majority of these projects are located in the urban area of Caldera, as shown in table number 2.

Table 2. Investment projects in urban area of Caldera

Type of industry	Number	Percentage
Aquaculture	27	47.37%
Mining	14	24.56%
Fishery	8	14.03%
Sanitary	3	5.26%
Others	5	8.77%
Total	57	100%

Source: Orellana, 2015

Overall, 36 of the 57 investments that are in operation and run related to aquaculture, fisheries, mining and sanitary industry present in the urban area of Caldera are located in areas of exposure, as shown in table number 3.

Table 3. Exposition to natural hazards in Caldera City

Projects exposed		
Hazards	Number	Percentage
Tsunami	33	57,89%
Landslides and tsunami	1	1,75%
Flood overflow channels and tsunami	2	3,51%
Without exposition	21	36,84%
Total	57	100%

Source: Orellana, 2015

On one hand, more than a half of investment projects are only located in areas prone to the risk of tsunami, 1.75% are in areas prone to the threat of landslides and tsunami and 3.51% in areas with potential flood threat by overflow channels and tsunami. On the other hand, as shown in table number 3, taking into account investment projects located in areas of exposure, productive activities of the aquaculture industry are more common as potentially affected, with 63.88%, followed by mining reaching 16.66%. Fisheries and sanitary industries represent a small percentage.

Table 4. Investment projects in urban area of Caldera

Type of industry	Number	Percentage
Aquaculture	23	63.88%
Mining	6	16.66%
Fishery	4	11.11%
Sanitary	3	8.33%
Total	36	100%

Source: Orellana, 2015

Regarding the size of investing firms, 71.05% are micro and small-sized firms, as shown in table number 5. This is a key factor, as small and micro enterprises in this area generally do not have continuity plans or insurance covering damage due to disasters, or characterized as a seismic event, indicating a possible that they cannot return to work.

Table 5. Projects exposed to natural hazards by firm size

Firm size	Number	Percentage
Large	6	15.79%
Medium	5	13.16%
Small	12	34.21%
Micro	13	36.84%
Total	36	100%

Source: Orellana, 2015

Economic activities in the Caldera urban area show a high level of vulnerability and potential fragility of investments. In fact, almost one half of the investments show a high level of exposure to natural hazards, while only 7% of investments show low levels of exposure. In terms of business preparedness, 90% of them would not find themselves sufficiently prepared for an emergency and/or disaster (Orellana, 2015). The possibility of facing optimal and efficient post-disaster recovery is hampered because skills are not suitable, augmented by the lack of public sector preparation tools. In this sense, investors have not considered the exposure to threats as critical to the security of their business and productive units. This case has been endorsed by the various local governments that have driven the investment allocation without clear policies of land use aimed at strengthening greater resilience of investment in the firms and employees established there.

CONCLUSION

As previously discussed, the University of Chile is particularly interested and committed in addressing: Business Continuity Planning, especially after the evidence found in case studies in mining and Caldera city. Our intention is to mainstream Disaster Risk Management content into a seminar with a focus on training, research and SMEs engagement at different academic levels, within regular undergraduate and graduate programs.

This program is threefold, oriented to cover different aspects of local understanding of risks' events and their effects on local business performance. Thus, the seminar is divided into specific initiatives listed below, in order to distinguish the scope and extend of each:

- 1. Undergraduate initiatives:** The scope of this initiative will be the local preparedness of small businesses exposure -their assets, employees and operations to natural and industrial hazards.
 - Within the course of Regional Analysis of the undergraduate curricula of Geography, a specific module will be considered and developed to achieve a better understanding of the systemic aspects of risks at regional level.

- The design and implementation of a multidisciplinary course “Curso de Formación General (CFG)” imparted by the Interdisciplinary Risk Disaster Reduction Program, open for students of all undergraduate programs at the University, hosted at the Faculty of Architecture and Urbanism, in order to develop specific topics of research on the theme of Risk Management, including Business Continuity Planning, during a semester.
- 2. Graduate initiatives:** The scope of this initiative will be based on topics proposed for the undergraduate level, but with an emphasis on the concept of business continuity planning, risk reduction actions and the design of risk management measures focused on SMEs preparation and for the mitigation of negative consequences of disruptive events. Initially, these topics will be considered within the structure of the Diploma in Management for Disaster Risk Reduction offered by the University.
- 3. Public Sector Initiatives:** The scope of this initiative will be based on topics proposed for at the graduate level, engaging participants who are professionals of regional or local public organizations. Topics are linked to methodologies aimed at developing the economic analysis of risks and preventive mechanisms, within the training program of ONEMI.
- 4. Research Agenda:** The scope of this initiative is to incorporate local business strategies in order to tackle natural and industrial risks and to evaluate how those actions are effective in terms of SMEs’ resilience and continuity, according to their context.
 - To design and implement a Business Continuity Planning Observatory, that takes into account, on a regular basis, the development of a georeferenced local business cadaster of affected areas; the monitoring of risk management tools’ implementation; the identification of best practices and lessons learned derived from unsuccessful experiences. Initially, Caldera and Iquique will be the two localities considered to pioneer this initiative, through case studies centered on:
 - d. SMEs current business situation and the kind of management tools developed,
 - e. the distinction of local hazards affecting local business,
 - f. the existing institutional atmosphere to enhance risk management tools aimed at contributing to local business continuity, and
 - g. the detection of best practices related to this content.
 - To design and develop workshops and seminars to achieve private sector awareness as to the link between local risks and Business Continuity, and to develop training opportunities related to risk management tools, and to the importance in developing a shared value perspective along the value chain and the diffusion of best practices.
 - To develop regular opportunities to transfer knowledge and tools aimed at SMEs’ risks management and mitigation strategies, in tandem with local authorities, municipalities, and industry associations.

Ultimately, the deployment of each of these initiatives will contribute to the achievement of a more resilient local economic development strategy for localities affected by natural and industrial shocks and disturbances in several regions of Chile. In implementing this program, the University of Chile seeks to achieve a leading position in an unexplored field of work in Chile. Each initiative defined above will favor academic and social learning, providing for the interaction of varied stakeholders interested in implementing or designing context-specific disaster risks management tools.

In a proactive perspective, one of the major tasks for the University is finding the appropriate coordination environment where academic work is invigorated with the practical knowledge of practitioners who have the acquired background knowledge, skills and qualifications to execute the implementation of quality and risk management tools in the private sector. Thus, the integration and cross-fertilization of formal and practical (tacit) knowledge is vital to the achievement of strong results in both students' training and business continuity after disastrous events.

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MAINSTREAMING DISASTER RISK MANAGEMENT FOR FINANCE: APPLICATION OF REAL OPTIONS METHOD FOR DISASTER RISK SENSITIVE PROJECT

INCORPORACIÓN DE LA GESTIÓN DEL RIESGO DE DESASTRES A LAS FINANZAS: APLICACIÓN DEL MÉTODO DE OPCIONES REALES PARA PROYECTOS SENSIBLES AL RIESGO DE DESASTRES

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ABSTRACT

This paper discusses the application of real options analysis for a project that is in the process of construction and was affected by a natural disaster. The use of the analytical method has become a way of thinking in making decisions that should be taught to business school students. The case in this paper is based on an MBA thesis at the University of Gadjah Mada that was intended as a showcase for application of real options to address real business problems. It shows one of the strategies in mainstreaming disaster risk management in the business school that also answers the needs of businesses in the disaster-prone country.

KEYWORDS

Real options; disaster risk management; business continuity plan; disaster response.

RESUMEN

Este artículo discute la aplicación del análisis de opciones reales a un proyecto en proceso de construcción que se vio afectado por un desastre natural. El uso del método analítico se ha convertido en una manera de pensar cómo la toma de decisiones y debe ser enseñada a los estudiantes de escuelas de negocios. El caso de este artículo está basado en una tesis de la Maestría en Administración (MBA) de University of Gadjah Mada, que fue concebida como una plataforma para la aplicación de opciones reales para abordar los problemas de las empresas reales. Este caso muestra una de las estrategias de incorporación de la gestión de riesgo de desastres en las escuelas de negocios que, de igual manera, responde a las necesidades de las empresas en países propensos a desastres.

PALABRAS CLAVE

Opciones reales; gestión del riesgo de desastres; plan de continuidad de negocio; respuesta a desastres.

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INTRODUCTION

Indonesia is an archipelago country with a population of more than 230 million people, lying on the equator with more than 17,000 (seventeen thousands) islands, and a part of pacific *ring of fire* with many active volcanos (129). These geographical, geological, hydrological, and demographical characteristics make Indonesia one of the countries most vulnerable to natural disasters such as earthquake, tsunami, volcano eruption, tornado, floods, draughts, wildfire, landslide, etc. Such disasters have caused many casualties and economic damage.

Statistics from the National Disaster Management Authority (BNPB) shows that in January 2016 alone, it recorded 174 disaster events that caused 20 casualties and missing people, 733,650 people have been displaced and 2,931 units of damaged homes. Figure 1 depicts how vulnerable Indonesia is to such disasters, as we can see the area highly affected by disasters (area in red) dominates the map, and the Java island where 70% of population is living, is also the most vulnerable area.

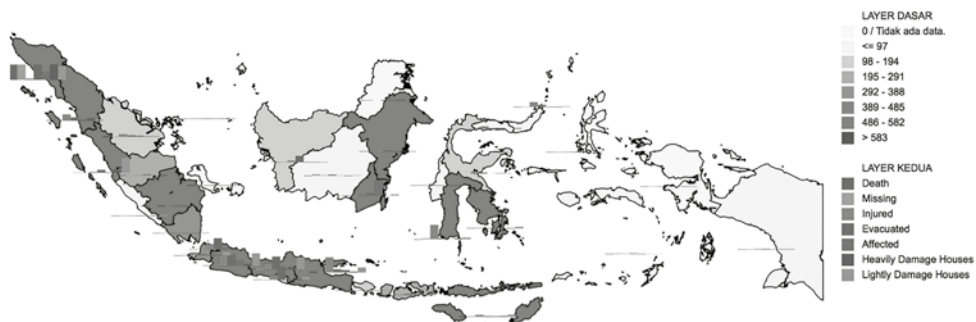


Figure 1. Number of Disaster Event and Victim 2000 – January 2016
Source: BNPB (National Disaster Management Authority).

Moreover, despite its potential (rich with natural resources, demography bonus, tourism destinations, etc.), it seems that many kinds of disasters threaten the country. Figure 2 shows the statistics of frequency of disasters from 2000 until January, 2016. It indicates that floods are the most frequent disaster (31.4%), followed by tornados (20.7%), landslides (16.7%), wildfire (12.6%), and draughts (8.9%), with the rest including terrorism, earthquakes, tsunamis, climate change, volcano eruptions, famine, disease outbreaks, etc. All of these disasters undoubtedly cause a vast amount of economic losses, affecting the continuity of businesses and ultimately people's welfare.

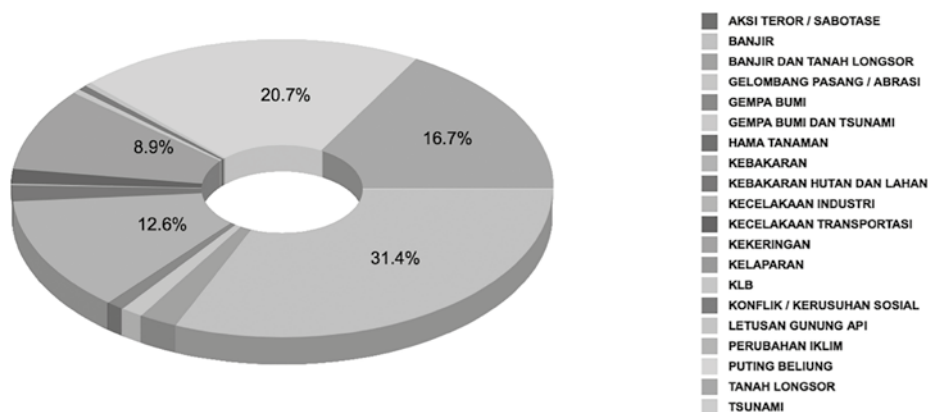


Figure 2. Disaster Category from 2000 – January 2016
Source: BNPB (National Disaster Management Authority).

Losses caused by disasters undoubtedly affect business life and the economy. In the UNISDR's Global Assessment Report on Disaster Risk Reduction 2013, disaster losses take many forms; direct losses, indirect losses, wider impacts, and macroeconomic effects.



Figure 3. Disaster Losses on Business and Economy
Source: UNISDR and PwC, copied from Global Assessment Report on Disaster Risk Reduction 2013.

For those businesses located in a country that is vulnerable to disasters, investment decision making is becoming more complex. A feasible investment could turn out to be unfeasible when an unfavorable event such as a natural disaster occurs. However, it does not necessarily mean that the feasibility study conducted prior to the initiation of the investment project was wrong. A feasibility study of an investment project that used discounted cash flows method (DCF) is assuming that the decision environment is stable and fixed, yet we know that more often than not, that is not true. What is frequently overlooked is to identify the management options also known as real options (to shutdown, to expand, to change price, etc.) to alter the course of the return on investment.

This paper will address the application of the concept of financial reengineering for a disaster-risk-sensitive investment project, namely real options analysis, and specifically, shutdown options. An illustrative business case² will showcase how to analyze available management options on a project, affected by a disaster during the middle of its life cycle. The management options available in this situation include the shutdown option, where the owner of the project has to decide whether to continue operation of the project until its planned life, or to terminate the project.

In addition, this paper will show the integration of such analysis in a Financial Management Course included in the Master of Management Program (MBA Program-MMUGM), Faculty of Economics and Business, Universitas Gadjah Mada. The case presented in this paper is a joint research project between a student in the study program and the author. A portion of the research was written as a thesis by the student³, demonstrating that the topic of disaster management can be incorporated with financial management concepts.

Universitas Gadjah Mada (UGM), located in Yogyakarta was rocked by an earthquake in 2006 and in 2010 experienced the Merapi Volcano eruption. The area has established some initiatives to help the affected people, which include the establishment of: The Disaster Early Response Unit (DERU-UGM) in 2006, followed by the Disaster Study Center (Pusat Studi Bencana, PSB-UGM), and finally the Master of Disaster Management program which operates under the Postgraduate Program of UGM. A Brief description of one of the initiatives, DERU-UGM, will be discussed.

METHODOLOGY

This paper uses a business case to illustrate the decision making context to identify decision alternatives (management options); to select analysis tools to determine required data to perform the analysis; and to give recommendations on policy.

The business case overviews a company operating a project that was hit by a disaster during the middle of the project's life, requiring changes to the underlying assumptions and estimates used in the feasibility study of the project. Real options

² The business case presented in this paper is fictional (the names, places, numbers, etc.), but it offers real dilemmas and decision making context that is based on real business case.

³ Thanks to Evi Novita Dewi, MBA for her contribution to this business case, and part of the business case is her master thesis in MM-UGM.

analysis using Monte Carlo simulation modelling were performed to select the best decision alternatives that the company's management had to make.

To make a simulation model, we have to understand the decision-making context, such that simulated variables and decision variables are properly incorporated in the model. The best simulation must first predetermine the alternatives in order to determine the best alternative. This results in a policy recommendation, and provides the ability to explain why such a recommendation is given. The reason for using a simulation model to solve such a business case in the MBA program is that it does not require students to be mathematicians nor to have to formulate the complex real problem using mathematical expressions. With the help of simulation software such as Oracle Crystal Ball (an add-in for Microsoft Excel), students should be able to translate the real problems onto a spreadsheet and perform the simulation to analyze each decision alternative.

The integration of DRM into MMUGM's curricula is carried out by several strategies; (1) introducing application of business concepts in core courses such as marketing management, operations management, financial management, and human resource and organization management to deal with disaster-related problems or the impact of a disaster on a business. The application can be introduced by discussing relevant cases or by creating project assignments; (2) master thesis that takes a real disaster-related business problem as the main theme. Result of the latter is more and more cases can be developed that can be utilized to enrich the first strategy. This paper mainly describes the second strategy implementation.

The author will show the structure of curricula in MM-UGM and identify courses that could be used to disseminate Disaster Risk Management concepts as well as to perform a comparison analysis of curricula in other study program at UGM that specifically deals with disaster management, namely Master of Disaster Management. In addition, the author will describe UGM's initiative to a disaster response; disseminate the disaster awareness, and creating a disaster preparedness program through the establishment of Disaster Early Response Unit (DERU-UGM).

LITERATURE REVIEW

The business case used in this paper is related to a highly sensitive disaster risk investment project. This integrated approach requires understanding not only of financial management concepts but also knowledge such as marketing (to measure market confidence index that leads to demand estimation after the disaster or recovery stage), disaster management (how long the recovery plan will take), and economics (price of the commodity, demand analysis, etc.). The key theme of this case focuses on utilizing financial reengineering techniques to resolve business problems.

Investment decision analysis that uses methods such as Net Present Value (NPV), Internal Rate of Return (IRR), and its variation; Modified Internal Rate of Return (MIRR) is often called **traditional analysis** and is based on the discounted cash flows method (DCF). These are perhaps the oldest methods used in today's mod-

ern financial world. The use of these methods always assumes that all factors being considered are fixed and certain; the cost of capital, estimates of cash flows, project investment's life, selling price, cost of inputs, etc., are non-stochastic variables. In the real world, these variables are often changing during the project's life. In addition, manager has several options (a right or a privilege, not an obligation) to change the value of the variables, for example terminating the project earlier due to unfavorable outcomes or bad situations. In such a case, the manager alters the project's life; the project's life is no longer a fixed variable that cannot be changed. Such alternatives of decisions are called real options, and the method is called real options analysis (see for example the definitions and examples in the standard financial management textbook of Brigham and Ehrhardt, 2014).

Types of Real Options

There is actually infinite variation of real options. The types of real options listed below are just a list of popular, frequently discussed, and modeled real options.

Investment timing option. It is an option to start immediately or to postpone an investment project. By postponing, one could gather more information that eventually reduces the risk and losses. However, the consequences of the postponement may include higher cost of capital, more expensive inputs (i.e. due to inflation), and momentum loss (demand is vanishing because consumer prefer competitors'/pioneer's product than ours).

Growth option or expansion option. After a successful investment, frequently firms eager to continue or to expand the existing investment. Examples include: increasing production capacity to take advantage market momentum (higher demand); diversifying existing product lines; expanding the market, etc. The growth option may be considered as a new investment when taking into account the new market size, initial investment to expand, additional cost of capital that might change because of new financing strategy, and so on.

Contracting option. This is a typical investment decision in a new technology or product when there is uncertainty about the product's long term (or short lived) lifecycle. For example: instead of building one's own production facility a less risky alternative is to give the production order to another company.

Flexibility option. Flexibility to change the design of a product or facility, its price, its feature, required inputs to produce it, etc., highlight examples of valuable options that generate a firm's competitive advantage.

Shutdown option or abandonment option. Suppose that in middle of the investment's life, an unfavorable event is taking place (i.e. disaster, disease outbreak, economic crisis, etc.), as a result, demand is falling while cost is increasing. Under such circumstances, a manager has to make a quick yet strategic/long-term decision of whether or not to continue the operation of the business or investment. Careful consideration should be taken in employing this option as shutting down the business also means closing future opportunities.

Many other types of real option and examples of modelling techniques can be found in the literature. See example in Mun (2002) and, Sipp and Carayannis (2013).

Real Options Analysis for Disaster Risk Related Strategic Investment

Sipp and Caravannis (2013) consider the real options analysis in decision making as not only a method or technique, but also as a new paradigm in decision-making. As a new paradigm, the decision making carried out by a manager in an investment decision making is not merely practicing algebra of the DCF method (i.e. go ahead if $NPV > 0$). Additionally he should execute the four-strategic theme outline by Bowman and Hurry (1993), namely sensemaking, resource allocation, strategic positioning, and learning.

- **Sensemaking** references managers attempt to make sense of and interpret past situations and utilize their intuitive beliefs to inform their future decisions.
- **Resource allocation** refers to the fact that firms invest in their business to maximize operating efficiencies and build competitive barriers.
- **Strategic positioning** refers to the fact that firms invest today to create opportunities for tomorrow and thereby attempt to sustain performance across the unforeseeable future.
- **Learning** refers to the acquisition of knowledge for the future (which should the drive strategy formulation).

In the context of disaster risk related investment, the four-themes of strategic decision making might be exemplified by a manager asking the following questions:

- **Sensemaking**: do we have experience of unfavorable situations/events in the past that might occur again now and or in the future? Based on our knowledge, can we mitigate, reduce, or even eliminate the risk? How? What is the likelihood of the events? What options do we have now?
- **Resource allocation**: is the existing investment yield the best rate of return for the firm? Do we have investment alternatives? Should we continue or stop the investment? Are there resources remaining to expand the investment? Should we invest or divest on a project/business/investment?
- **Strategic positioning**: Is the expected value of future business opportunities worth more than existing investment value? Should we take advantage of future business opportunities or minimizing risk? Maximizing expected return or minimizing risk? What are other non-economic values we should strive for? (Social welfare, safety use of our product, safe working conditions, sustainable improvement of standard of living, etc.).
- **Learning**: what did we learn from our past failure? Are we ready to cope with a disaster? What should we prepare for? Have we done what we didn't do in the past that could prevent us from experiencing unfavorable outcomes?

The answers to the aforementioned questions could be manifested in variables value that we should take into account in real options analysis.

Learning from the past as outlined above will help us in sensemaking. The sensemaking will guide us to perform strategic resource allocation optimally. Optimal resource allocation is a reflection of our strategic positioning. Thus, the four-strategic theme should not be considered as steps in decision making, but rather as a paradigm in decision making; a way of thinking.

Copeland and Tufano (2004) outlined the use of real options method to analyze an investment decision, which is more often a multistage decision, rather than a onetime decision. According to the authors, they state that compared to financial options, the term 'option' in real option has a clearer meaning that its decision alternatives which have to be decided or chosen by a manager. The binomial models in options valuation such as the famous Black-Scholes-Merton model for financial options is formulated in a complex and unintuitive algebra, while real options can easily be illustrated in a spreadsheet for simulation.

Application of real options analysis for disaster management can be found, for example, in the work of Gaudard and Romerio (2015). The paper highlights the contribution of real options' approach in managing a natural hazard risk, especially in showing how to determine the timing of different types of interventions. By utilizing decision trees, the paper provides a clear and concise presentation of the dynamics of the hazardous events. It also reveals the potential of real options analysis to improve emergency management.

Another example the use of real option to disaster management is a paper Woodward, Gouldby, Kapelan, Khu, and Townend (2011). Woodward et al. identified the sources of flood risk such as climate change and socio economic changes, and then used real options method to help decision making to select the most appropriate long-term flood risk related intervention investment given the future uncertainties.

Andersen in Kreimer, Arnold, and Carlin (2003) also state that real option concept is the vanguard of strategic risk management, and it provides interesting new ways to respond to idiosyncratic non-marketable (firm specific) economic exposures. He adds that new business opportunities planned by economic entities, but not implemented, could be conceived as an options portfolio that gives a country economic flexibility and enhances its development path. Non-marketable economic exposures which are of a competitive advantage typically relate to firm-specific, non-tradable, intangible factors such as knowledge about disaster mitigation strategy that makes a firm less vulnerable to the disaster while reducing income volatility. Having such knowledge also means that future business opportunity could be gained, i.e. making expansion strategy a viable option.

Mainstreaming disaster risk management in the school of management can be carried out by introducing real options concept into courses and thesis. For example, it can be found in the Master of Science in Engineering and Management Thesis at the Massachusetts Institute of Technology. A thesis written by Maseda (2008) discussed expansion design of an emergency department for hospitals. A flexible design of ED was proposed, creating flexibility options for the hospital to cope with demand in excess of their capacity to treat patients, particularly during a disaster

event. The thesis identifies, characterizes and quantifies parameters that should be considered in ED expansion projects. Such mainstreaming practices will not only increase understanding and the development of disaster risk management body of knowledge, but also prove useful for institutions that manage the risk (i.e. the hospitals) and provide invaluable benefit for society.

POLICY OPTIONS FOR MAINSTREAMING DRM INTO FINANCIAL COURSES

The Master of Management Program at Universitas Gadjah Mada has carried out several strategies in mainstreaming disaster risk management into its curricula and extra curricula activities, including activities carried out by the Executive Development Program (EDP-MM) that offers non-degree training or an education program for human resources in governmental offices, corporations, NGOs, as well as conducting community development.

The First Strategy

The first strategy is introducing real business cases into relevant courses. However, bookcases that discuss disaster risk management are quite rare, especially those that already classified such subjects of management as marketing management, operations management, financial management, and human resources and organizational management. Lecturers were asked to look for cases in the form of research papers, white papers, reports from relevant institutions, newspaper/magazine articles, web articles and so on that are suitable for particular topics in the subject. However, the teaching materials are scattered among lecturers so that the delivery of the materials in the class discussions vary or are non-standard.

The lack of papers or cases related to DRM has been coped with via several initiatives, both in the program study level and at the university level. The following initiatives have been carried out in order to gain more updated knowledge about DRM, especially those concerned with investment decisions. Additionally, cases will be developed that will be introduced into class discussions:

Executive Development Program (EDP-MM)

It is a non-degree program for executives of firms, employees, and professionals from various industries. The program is managed under the Master of Management, Faculty of Economics and Business, Universitas Gadjah Mada (EDP-MM). The EDP-MM has convened three series of refresher risk management for executives of banks since 2014. Each series has a different theme. Besides the refresher program, EDP-MM is also responsible for business case development by initiating case writing grants for its lecturers.

Disaster Response Unit – Universitas Gadjah Mada (DERU-UGM)

DERU-UGM was established as a response to Yogyakarta's earthquake on May 2006. DERU stands for Disaster "Early" Response Unit," to indicate that this unit is intend-

ed to provide early response to a disaster, such as rescue, evacuation, fulfillment of basic needs, protection, management of refugees, and recovery of affected infrastructures. The organization of DERU is under a direct command of the president of the university and is managed by a manager in directorate of research and community service. Its members consist of students, lecturers and professors from 18 Faculties with different expertise, and the university's staff members. Most serve as volunteers when a disaster strikes.

Since 2008, the term "early" in the DERU abbreviation was removed, it has evolved into a disaster management unit that not only provides immediate responses and recovery but also has continuous and sustainable programs such as mitigation and preparedness. Recovery programs are carried out after the immediate response program. The purposes are to restore society's public routine that has stopped when the disaster occurs, reconstruction of infrastructures in the post-disaster-regions, and improvement and restorations of every aspect of public service in the post-disaster-regions. The programs are usually synergized with activity Field Work Experience⁴. Mitigation activities include potential hazard mapping, installation of an Early Warning System, evacuation route planning, and business continuity planning for local businesses (small and micro enterprises) in the affected area. The latter will be further explained as a business case in the next section of this paper. Preparedness programs include training programs for volunteers and the community in order to increase awareness of the disaster, to prepare readiness for disaster response, and to reduce the risk impact.

The programs and activities conducted by DERU-UGM provide invaluable experiences and lessons learned in disaster management. In some cases, the real problems found in the field are brought into class discussions which enrich both students' and lecturers' knowledge about the disaster management.

The Second Strategy

In the MMUGM, the total credits a student must take to pursue an MBA degree is 42, which consists of 11 core courses, three concentration courses, and a master thesis. Students who choose finance as their study concentration will take following courses:

1. Financial Management (3 credits)
2. Portfolio Management (3 credits)
3. Multinational Financial Management (3 credits)
4. Financial Risk Management (3 credits)

Other disaster risk management topics are discussed in other study concentrations, such as Business Continuity Plan which is discussed in Operations Management (including topics such as product design, process design, business process reengineering, and supply chain management).

⁴ Field Work Experience (KKN/Kuliah Kerja Nyata as in Indonesian language) is a 3-credit course that all undergraduate students of UGM must take. A community service program requires groups of students to go into area in needs for 1-2 months. Each group usually consists of 30 students from different faculties. Students are required to make an activity plan that utilize their knowledge/area of study, carry out the plan, and to measure the results.

Derivative instrument valuation, i.e. financial options, is taught in Financial Management, Multinational Financial Management, and Financial Risk Management. However, real options as the extension of financial options, is only thought of in Financial Management. Attaining the objective of mainstreaming DRM topics into the curricula, especially topics related to disaster risk sensitive investment analysis, is a challenging task because of the limited number of relevant courses. To cope with this challenge, MMUGM encourages its students who want to deepen their knowledge and to gain experience in performing the analysis to choose a thesis topic that is related to disaster risk sensitive investment analysis. Consequently MMUGM must provide professors and lecturers who are capable of being thesis supervisors. The thesis is an applied research project designed to solve a real business problem. By doing so, students have ample time to study the topic while discussing the methodology with their supervisor. They also explore and cultivate more appropriate methods of analysis, techniques, and managerial implications of their findings. Because the thesis is based on real business problems, the result is not only the thesis itself or the graduate, but also business cases related to disaster risk management that can be used to support the implementation of the first strategy earlier.

FINDINGS

Results of the First Strategy Implementation

EDP-MM Activities and Results

The first series of the refresher risk management program was held in May 2014, in Amsterdam, Rotterdam, and Brussels. The event was held in collaboration with the Rotterdam School of Management (RSM) at Erasmus University. The main theme was property bubbles and the impact of Greece's economic turmoil on emerging markets. The speakers were not only academicians or economists, but also professionals in the financial industry. One such speaker was from AXA Financials who explained about risk management of new financial instruments and a new asset class (i.e. property) in emerging markets, which also includes the transmission of economic turmoil in Euro economies on emerging market economies such as Indonesia. There was further discussion about global disaster i.e. SARS outbreaks and swine flu and their impact on the economy and financial sectors.

The second series was held in May 2015, in Tokyo-Japan, in collaboration with the International University of Japan (IUJ). The main theme of this series, specific and typical of Japanese expertise was Business Continuity Management (BCM). Participants included 15 top executives of leading banks in Indonesia who had a chance to learn and to discuss with experts in the field of BCM from an insurance company (especially about disaster risk transfer). Other topics included learning innovation in disaster intervention technologies in the NEC Innovation Center, and best practices of BCM in Mizuho Bank.

In late 2015, because of uncertainties in the US Fed's rate as rumor indicated that quantitative easing would be ended, the Indonesian rupiah (IDR) had depreciated significantly against the US Dollar. MMUGM was then exposed to exchange rate risk, which was an unprecedented event in the program. Its international refresher risk management program that was usually held abroad was no longer feasible to run, given that the design of the program was deemed too expensive and demand participation would be challenging in the local currency. To cope with this situation, the management of MMUGM then looked for options and tried to change the program design. Finally, the program series was held in Jakarta, featuring the topic that had become the main interest of the current situation: "Global Economic Slowdown and Its Impact on the Indonesian Banking Sector". The main target of participants remained the same: top executives of financial companies. The event was held in a luxurious hotel in Jakarta. An invited international speaker from RSM, a professional international banker from Deutsche Bank, and an economist of UGM were featured. This processes which we have passed through is a simple example of real options analysis, mainly the flexibility options.

The results of the lessons learned from the programs and experts in the field of risk management allowed participants to gain the latest knowledge and to be exposed to the latest technologies designed to address and to mitigate the impact of a disaster. This achieved our stated goal related to the purpose of teaching and mainstreaming disaster risk management in MMUGM, namely in the form of cases provided those companies who practice it.

DERU-UGM Activities and Results

Since the establishment of the unit, it has contributed to providing immediate responses to disasters such as the earthquake in Padang (2009), volcano Merapi eruption in Yogyakarta (2010), floods in Jakarta (2013), volcano Sinabung eruption (2014), floods in Kudus (2014), floods in Bekasi (2014), volcano Kelud eruption (2014), landslide in Banjarnegara (2014), and many other disasters in Indonesia. Involvement of students and lecturers from different expertise areas has helped to bring about such missions successfully. Moreover, since DERU-UGM is no longer just an early response unit, but as a disaster management unit, it has started some continuous and sustainable programs, looking for best alternatives of mitigation and business continuity planning for the small and local business community, and preparedness programming.

Regarding the BCP, it is also provided an example as a simple real options analysis for identifying the most cost-effective strategy in disaster risk reduction. For example, in the case of the Merapi volcano eruption in 2010, DERU-UGM in collaboration with BNPB and local government, has successfully designed and carried out a program that enabled affected people to continue their business after the disaster. The business of the affected people is a dairy farm. DERU-UGM saved about 10,000 dairy cows that in normal days could produce 15 L/cow, generating revenue of IDR 4,000/L. That is about a business value of IDR 600 million (USD

50,000) per day or USD 18 million in a year. On average, every family has 3-5 dairy cows, so the program saved about 2,000 families' economy. This is an example of a business case that is developed from what DERU-UGM has experienced in. The business case covers topics ranging from operations management (supply chain management and location strategy) and financial management (feasibility study of the BCP and real options analysis).

Results of the Second Strategy Implementation

The second strategy is focusing on thesis writing for students who are interested in deepening their knowledge on disaster risk reduction analysis, and to be more specific, on disaster-risk-sensitive investment analysis. During 2015, the author advised three students of MMUGM who chose this topic as their main thesis theme. Not all of the theses take natural disaster as the underlying problems. Economic turmoil and uncertainties such as the fall of commodity prices of more than 70% recently became a disastrous event for firms, causing previously feasible investment projects to becoming infeasible, should management take no intervention to alter the situation. The latter issue is recently becoming more interesting as a major thesis topic in finance. However, there are more similarities than differences on the impact caused by both types of disasters, so determining how to analyze the problems and how to find the solutions are also similar. In most cases, because we have to find or choose the best alternative for strategies on a multistage decision making process, real option analysis is found to be an appropriate methodology to tackle such issues.

AN EXAMPLE OF BUSINESS CASE: SHUTDOWN OPTIONS ANALYSIS

GasFactory (GF) is a state owned company that is assigned by the Government to provide gas (compressed natural gas/CNG) supply to industry such as with fertilizer, cement, and an electricity power plant. In carrying out the assignment, GF was seeking a buyer, and finally collaborated with ElectricPower (EP), an Independent Power Producer (IPP) that also owns a strategic business unit (SBU), namely Fertilizer Co. (FC) that needed gas supply and electric power to fire up the machineries for its production. The gas purchased by EP distributed from the gas plant is not only intended to supply its SBU, but also other industries in the area (an industrial estate). The gas plant also functions as a gas storage and regasification terminal. In case of an excess production from the gas wells/terminals, the gas will flow into the storage plant, and will flow (after the regasification process) to the IPP when it operates on a peak load. The business agreement between GF and EP stated that EP will buy at least 10 BB-TUD (Billion British Thermal Unit per Day) at price of USD 3 per MMBTU (Million British Thermal Unit), and if the purchase is less than that amount, EP has to pay 75% of 10 BBTUD (75% x 10000 MMBTU x USD 3 = USD 22,500/day), no matter how much gas is actually consumed. Such agreement is known as a Take-or-Pay (ToP) clause.

In order to supply a sustainable and stable gas to the plant (EP), GF had to build a gas plant facility located near its clients' facilities. This was a huge investment made

by GF, worth USD 43 million. The project's life was expected to be 15 years since the commencement of operation. However, the ToP clause only effectively provided that the gas flows from the gas terminal of GF to the gas plant was at least 30 BBTUD, otherwise the buyer, EP, only pays as much as its actual consumption. The investment was made in 2012 and completed in 2013.

The business investment that GF made is very risky. Financial risk is assumed to be under the control of the Government as it provided project financing at a subsidized rate, which was below the commercial market rate. Because it was fully financed by debt and secured by the Government (in contrast to corporate financing which optimal capital structure and limited debt capacity will inhibit the company to fully finance its project by debt, project financing can do so), the cost of capital was equal to the cost of debt, at a fixed rate of 8%.

Unfortunately, since the start of operation of the gas plant, the gas flow from gas field was not as much as expected. It was less than the *ToP* terms such that the clause of the agreement could not be implemented; at max the flow could only reach 25 BBTUD. The main problem on the supply side (from the gas producer) of the natural gas is that there was uncertainty regarding the regulation so that new investment needed to develop the gas field was postponed. As a result, the production rate was insufficient to supply the gas plant. Moreover, the world natural gas price has fallen significantly recently, making the gas producer demotivated to increase its investment in developing the gas field. This is another reason for the steady declining gas production rate. This situation has been persisting until now. Because the area was a developing area, not many industries were relocated to the industrial estate yet, so that the demand for gas was still lower than 20 BBTUD (on average the actual demand was only 5 BBTUD). The result is that the Take-or-Pay clause in the agreement between GF and EP could not be implemented. It was expected that the demand would grow at a higher rate in the following years, as more and more industries began operating in the area. Yet, one year after the operations, the area near where the gas plant is located, was hit by a flash flood causing tens of people killed, hundreds were evacuated, infrastructures were damaged, and many businesses collapsed. Since the planning and construction design stages of the gas plant, GF has implemented Business Continuity Plan (BCP) such as selecting location of the gas plant at the hilly side area so that tsunami could not damage the facility. Also, a disaster recovery plan was executed by creating system redundancy: a dual backup operations (on-site backup and off-site backup office operations), and so, the facility is safe from the disaster. Even though the gas plant was unaffected by the disaster, the demand for gas from EP dropped significantly. However, EP believes that soon after the disaster, relief had been distributed, and the recovery and reconstruction plan had been carried out. The demand also will recover and grow even higher.

The Management Options

Operating costs mostly consist of fixed costs, because the cost is more related to the production capacity than the production rate. On average, with the current capacity,

total annual operating cost is USD 2.5 million, with 3% increase every year, and an overhaul cost of 6% of initial investment cost every 6 years. This situation has led to a dilemma for both GF and EP. On GF's side, continuing the operation would only generate more losses if the reconstruction process is slower than its expected. Yet stopping the operation means closing the opportunity to recover the sunk cost, and losses assume that the reconstruction, running more smoothly and quickly so that the demand from EP could be even larger than it was in the past. Moreover, because the project is an assignment from the Government that GF must do, the management also has to consider the negative multiplier effect if the project is stopped (i.e. unemployment, slower regional economic growth, etc.). If management of GF decided to shutdown, the question is when? Now? In the the next 3 years? 10 years? Never?

On the other side, EP is also facing a situation dilemma. If GF decided to shut down its operation and the market recovery worked well, then it could not take advantage of business opportunities in the future. Therefore, management of EP is thinking about acquiring the gas plant facility from GF. The question is how much it cost?

As explained above, both GF and EP have the choice of decision alternatives. The alternatives are management options that have economic value; the management on each side has to select an alternative decision that would maximize its corporate value. Such options are known as real options, and therefore to answer the business problems, we have to value each option and then choose the best one.

Analysis

The standard tool for analyzing the project feasibility is capital budgeting analysis, such as net present value (NPV), internal rate of return (IRR), and modified internal rate of return (MIRR). However, these tools are only well suited in the early stage of the project plan (before the project started). The aforementioned identified problems are problems that arose in the middle of the project's life. Real options analysis, especially the shutdown options, provide a strategic path of thinking as outlined by Bowman and Hurry (1993).

Sensemaking. The fall of commodity prices as well as the disaster had caused unfavorable outcomes, yet the events are unprecedented ones for the industry. The management has no historical data as to how fast the recovery will be or the economic losses. However, judging from the experiences of the country in responding to such disasters (Aceh's tsunami and Yogyakarta's earthquake), the recovery could take about 1-2 years, considering that the recent disasters that hit the business area were relatively small compared to the other two giant disasters. The implementation of BCP saved valuable assets, so that there was no serious damage to the production facilities. Assuming that the low commodity price will last during the project's life, management could not expect the *take-or-pay* clause in the agreement will go into effect. However, what management should concern itself with is the expected future demand of gas. This depends on the recovery of the affected businesses. Based on estimation, the demand for gas will remain low, at about 5 BBTUD. How-

ever, there is a chance that as soon as the affected area recovered from the disaster, the demand could reach 25 BBTUD, yet this is very unlikely. The most likely demand is about 6 BBTUD which is based on the initial feasibility study which will yield a positive NPV. The following graph shows the probability distribution of possible quantity of demand.

From Figure 4, we can see that the probability that the demand will be more than 6 BBTUD is greater than the demand will be less than 6 BBTUD. It indicates that there is still a chance that this investment project would remain feasible.

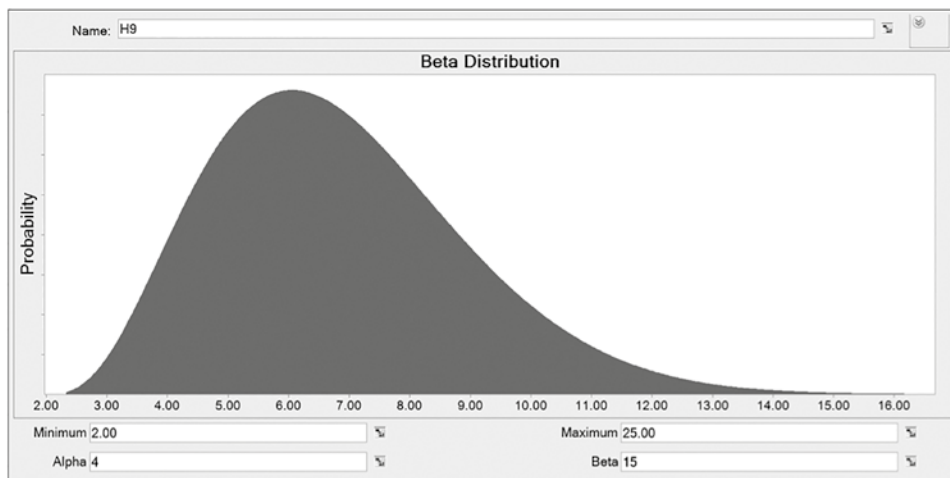


Figure 4. Probability Distribution of Demand

Resource Allocation. From the GF's point of view, the current situation indicates that the existing investment project is not feasible as the revenue is not sufficient to cover the initial investment and operating cost. With the sales quantity of just 5 BBTUD, the NPV is -USD 3.23 million provided that the sales will remain constant until the end of the project's life. GF's management has several options, (1) to continue the operation until the end of the project's life, (2) to terminate the operation in order to cut losses or, (3) postponing the decision in terminating the project's life at year 7 (three years from now). The assets are depreciated on a straight-line basis so that the salvage value when the project is terminated would be equal to the initial investment value subtracted by the cumulative depreciation. The manager has to decide which option would maximize the NPV by taking into account future business opportunities.

Strategic Positioning. If GF's management decided to terminate the project, either at year 4 (now) or at year 7, it would lose the opportunity to gain more revenue in the future provided that the recovery from disaster runs successfully. Moreover, by terminating the project, there would be no economic multiplier effect as this project is not only about maximizing GF's profit but also for the sake of social welfare. There-

fore, decision option (1) to continue the operation, should remain on the table, even though the current situation is unfavorable.

Learning. Since the event is an unprecedented one for both companies, they have to learn from other companies, countries, histories, and the experiences of others. For example, to determine the probability distribution of demand, we have to take into account the disaster management, the mitigation plan, and the recovery plan, as well as the preparedness of the affected people. Moreover, options for not terminating the project would give management the opportunity to gather more information while avoiding having to close the future business opportunities too early.

Results

The complete spreadsheet of the Monte Carlo simulation of the real options analysis is available on the following hyperlink:

<https://www.dropbox.com/s/nbh9x0t1czyey1i/Real%20Option%20with%20Crystal%20Ball.xlsx?dl=0>

The results of the options analysis are shown on Figure 5, 6, and 7 for real option 1, 2, and 3 respectively. Figure 5 shows the result of the first option analysis (to continue the operation until the end of the project's life), and tells us that continuing the operation will give a chance to gain positive NPV (the probability of achieving positive NPV is 30%) with the maximum losses of about USD 9 million. Comparing the first option with the others, we can observe that it is the best in terms of probability of achieving $NPV > 0$, and also maximum possible losses. The recommendation based on the results is that the management of GasFactory should continue its operation, and when new updated information is available in the future, the distribution probability of demand should be updated to reflect the latest development of the recovery.

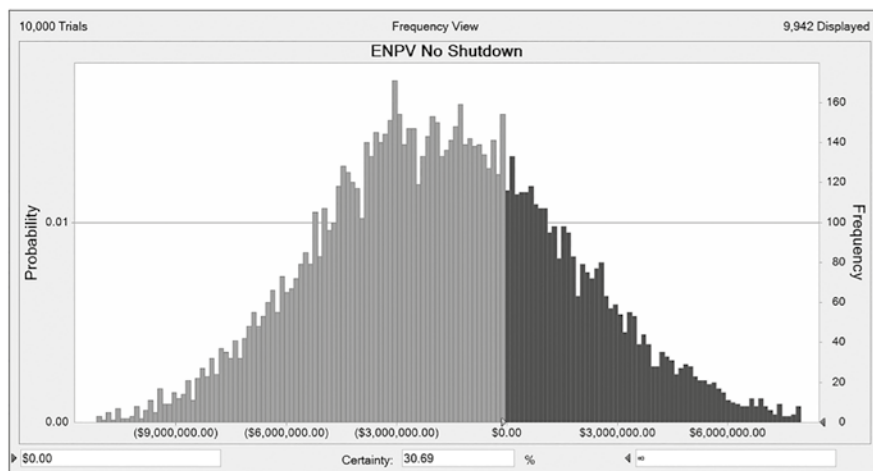


Figure 5. Probability Distribution of Expected NPV for the First Option

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for Disaster Risk Sensitive Project

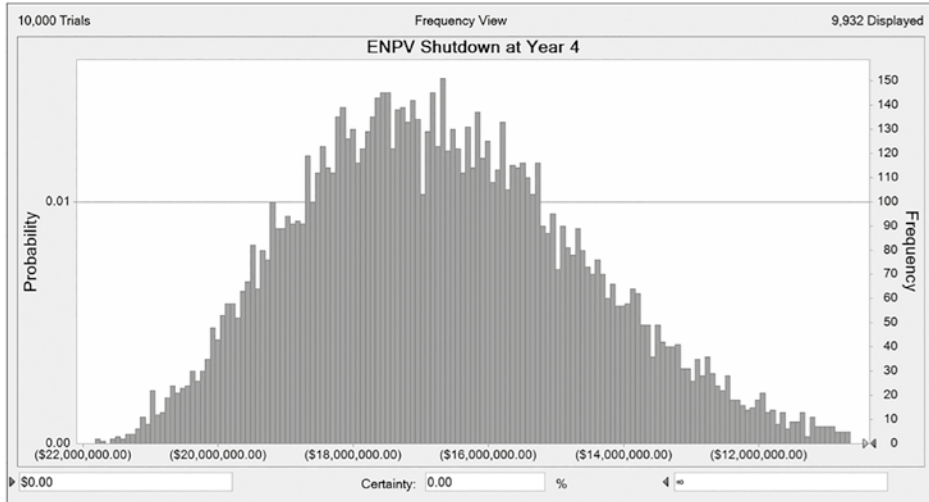


Figure 6. Probability Distribution of Expected NPV for the Second Option

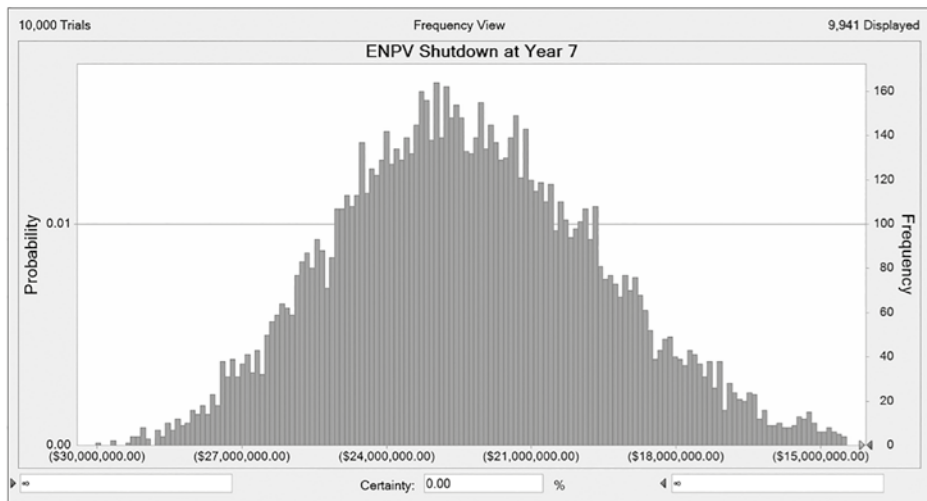


Figure 7. Probability Distribution of Expected NPV for the Third Option

Figure 5 shows the result of the first option analysis (to continue the operation until the end of the project's life), and tells us that continuing the operation will give a chance to gain positive NPV (the probability of achieving positive NPV is 30%) with the maximum losses of about USD 9 million. Comparing the first option with the oth-

ers, we can observe that the first option is the best in terms of probability of achieving $NPV > 0$, and also maximum possible losses. The recommendation based on the results is that the management of GasFactory should continue its operation, and when new updated information is available in the future, the distribution of probability of demand should be updated to reflect the latest development of the recovery.

RECOMMENDATION

Real options analysis can be very useful in selecting the best alternative of decisions, or choosing the most appropriate intervention in the case of disaster risk management. The method is used not only as a mathematical or statistical tool, but also as a paradigm in decision making. By incorporating the method in analyzing disaster risk sensitive investment or as a project in the financial management course and master thesis, students are expected to be able to practice the four-strategic themes in decision making; sensemaking, resource allocation, strategic positioning, and learning.

In addition, business case development can be further cultivated from extra curricula activities and programs, such as those carried out by the Executive Development Program and DERU-UGM. The business cases should be brought into class discussion and if possible, to be further investigated as a master thesis by MMUGM's students.

CONCLUSION

Master of Management, Universitas Gadjah Mada (MMUGM) will continue its initiatives in developing business cases based on real problems using Indonesian setting. The illustrative case used in this paper is an example of one of the initiatives to incorporate disaster risk management issues into school of business' curricula. The real options analysis is not only a decision making tool but also a paradigm on how to deal with risks or uncertainties, including those man-made or natural disasters. The case also illustrates an example for the needs of businesses in a disaster-prone country like Indonesia, which needs to work in partnership with business schools to find solutions.

Specific business cases with a central theme of disaster risk management are already available from the activities and programs performed by the Executive Development Program (EDP-MMUGM) and Disaster Response Unit (DERU-UGM). Students who are interested in this topic could write a thesis based on recent issues in disaster risk management. The written cases could then be used as a learning process for further discussion and development in response to current real business issues.

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Mainstreaming Disaster Risk Management for Finance: Application of Real Options Method for Disaster Risk Sensitive Project

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MAINSTREAMING DISASTER RISK MANAGEMENT IN HIGHER EDUCATION

INCORPORACIÓN DE LA GESTIÓN DEL RIESGO DE DESASTRES A LA EDUCACIÓN SUPERIOR

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ABSTRACT

Universities should actively participate in disseminating and fostering a culture for disaster risk management (DRM) among students and the community. Particularly in countries with high levels of risk, education plays a key role in raising awareness on the importance of preventing and implementing conscious risk management. Though the incorporation of DRM into the curricula, education programs become a mechanism to prepare students from a perspective of strengthening of values, citizenship, and social sensibility towards how disaster represents a disruption of the functioning of a community and impairs business activity. This paper presents the proposal for the integration of DRM of a private university in Mexico, one of the countries particularly susceptible to extreme hydrometeorological and geological events. The proposal includes a concentration area for undergraduate business students, a mandatory introductory course for all business majors, and for the business community an executive education program for SMEs.

KEYWORDS

Disaster risk management; higher education; Mexico.

RESUMEN

Las universidades deben participar de manera activa en la diseminación y promoción de una cultura hacia la gestión del riesgo de desastres (GRD) entre los estudiantes y la comunidad. Particularmente en países con altos niveles de riesgo, la educación desempeña un papel importante en la creación de conciencia sobre la importancia de prevenir e implementar una gestión consciente de los desastres. A través de la incorporación de la GRD en los currículos, los programas educativos pueden convertirse en un mecanismo para preparar a los estudiantes desde una perspectiva de fortalecimiento de valores, ciudadanía y sensibilidad social acerca de cómo los desastres representan una disrupción al funcionamiento de las comunidades y un perjuicio a la actividad de las empresas. Este artículo presenta una propuesta para la integración de la GRD en una universidad privada en México, uno de los países particularmente susceptibles a eventos hidrometeorológicos y geológicos extremos. La propuesta incluye un área de concentración para alumnos de pregrado en negocios, un curso obligatorio para todos los programas de negocios y, para la comunidad empresarial, un programa ejecutivo para PYME.

PALABRAS CLAVE

Gestión del riesgo de desastres; educación superior; México.

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INTRODUCTION

The catastrophic events in Japan and Thailand in 2011, and in the United States in 2012 highlighted the challenges and uncertainty raised for businesses derived from their negative impacts (UNISDR, 2013a). These emergency situations are understood as exceptional events of nonmilitary nature that threaten the lives and health of the population, environment, materials and cultural values, and which call for urgent action (UNISDR, 2013b). These exceptional events, such as natural disasters or collective public health threats, significantly threaten the normal course of business operations (Smith, 2009; WHO, 2007). This disruption not only needs to be at a local scale; globalized businesses can also be affected if their markets, suppliers, or partners in other parts of the world are hit by exceptional events (United Nations, 2013).

In such situations, vulnerability to a threatening event is not limited to the potential physical damage, but also acquires a social character (Cardona, 2004). Vulnerability makes reference to the capacity to respond and recover from the impact of an exceptional situation (Cardona, 2004; IFRC, n.d.), representing the susceptibility to damage in case a destabilizing phenomenon occurs (Cardona, 2003). Small and medium-sized enterprises (SMEs) are often the most vulnerable in disasters (Liu, Xu and Han, 2013; United Nations, 2013), when all or most of their capital could disappear (United Nations, 2013a).

A situation of hazard such as the exceptional situations above mentioned, can lead to risk, understood as the potential for the materialization of unwanted, negative consequences of an event (Conrow, 2003). Since risk can only exist in the future and represents a probability, the inability to manage risks can jeopardize not only lives, but the country or region's economic growth, leading to substantial economic costs and large-scale loss of property, infrastructure and belongings (World Bank, 2014).

Risks may be created over years before a disaster manifests (UNISDR, 2015a). According to the Global Assessment Report (GAR), a disaster is a disruption of the functioning of a community or society involving the loss of life, disease, and negative effects on economic or environmental conditions (United Nations, 2013). The "combination of the probability of an event and its negative consequences" is known as a disaster risk (UNISDR, 2015a, Disaster Risk section, para. 1), which makes evident two main facts: that a geographical area where a community is settled is exposed to a hazard; and that the infrastructure, assets, and other processes and services are vulnerable (UNISDR, 2015a).

According to the World Disasters Report (2015), for the period of 2005 - 2014 there were a total of 3,809 natural disasters around the world, mainly floods, with a toll of 764,204 deaths primarily from earthquakes. The far-reaching ramifications of disaster risk for businesses in this complex and unpredictable reality in which disaster risk is becoming, if slowly, part of the business landscape (UNISDR, 2013b), call for a shift from unplanned responses to a more proactive, systematic and integrated way of managing risk (World Bank, 2014). Disaster risk management (DRM) is "a

systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies, and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (United Nations, 2009, p. 10).

The above may be even more imperative for a country like Mexico, where micro, small and medium-sized enterprises (MSMEs) represent the backbone of the economy, accounting for 98.5% of all business units in the country (INEGI, 2014). Over 45% of these businesses are in the service sector, 35% in commercialization, and 17% in manufacturing, generating approximately 73% of formal employment (Banco de México, 2015; INEGI, 2014).

Due to its geographical location, Mexico is particularly susceptible to extreme hydrometeorological and geological events (CENAPRED, 2014). For 2014, hydrometeorological events alone accounted for 84.9% of total losses and damages in the country; and for this same year the impact of natural disasters surpassed that of the previous 15 years, which was 2,147 million USD for 2000-2014 (CENAPRED, 2015). In this context, business disaster preparedness acquires greater relevance considering that approximately 65% of MSMEs in Mexico are family businesses (ProMéxico, 2014).

It must be kept in mind that the adverse impacts of an event caused by climate change or climate extremes depend not only on these events themselves, but on the conditions of exposure and vulnerability (IPCC, 2012; UNISDR, 2015a). According to the INFORM Risk Index, Mexico is ranked with a medium risk level, but is ranked high for the hazards (events that can occur) and medium for the lack of coping capacity (lack of resources to alleviate the impact) dimensions (INFORM, 2016). And while it must be acknowledged that the Mexican government has created institutions for the prevention of disaster risk, such as the National Center for Disaster Prevention (CENAPRED) and the Operative Center for Attention of Contingencies (COPAC), as well as the implementation of initiatives such as the National Risk Atlas and the Early Warning System for Tropical Cyclones (SIAT-CT), there exists a lack of a culture of prevention for disasters or for disaster risk management in the country (Indesol, 2015).

Therefore, it is a matter of urgency that the capacities of MSMEs are developed to manage disaster risk. Higher education institutions can play a key role in the task of embedding in business-owners an awareness on how to prevent, cope and recover from disasters, and their role within their communities to identify potential hazards and to engage in emergency management.

NEW ROLES OF THE UNIVERSITY

The engagement of universities in their local communities has transitioned from providers of basic research and teaching to active participants in the process of creation, diffusion and transfer of knowledge (Boyles, 2012). This is particularly the situation for a large and growing number of universities that have acquired a unique role in public strategies concerned with promoting economic and social development.

This scenario poses challenges for universities as they must engage in activities outside of the traditional realm of teaching and research.

This structural change in the university's traditional mission of teaching and research expands to a third task to embrace the third mission, in which the university produces knowledge with social and economic perspectives in mind (Laredo, 2007). In this context, the concept of university social responsibility (USR) evolves from the concept of corporate social responsibility, incorporating new issues about the university's relationship with society, such as the revision of the curricula in light of socioeconomic and environmental challenges that we face today (Vallaey, 2014).

The objective of USR is to build a better society through transforming and strengthening community potential, through strengthening civic commitment and promote local and global sustainable development (Abdel-Hameid and Badri, 2016; Vasilescu *et al.*, 2010). One of the threats for sustainable development (SD) are the risk and vulnerability issues related to disasters. The link between (SD) and disasters are in terms of loss of human lives and loss of environmental services, but also both in terms of direct and indirect economic losses (GDRC, 2003). Vulnerability to disasters appears as a function of human action or inaction, as well as behavior (GDRC, 2003).

Disaster education is a key element in formulating appropriate disaster reduction risk strategies, in order to enable societies to become engaged in the adoption of suitable and conscious risk management and reduction of vulnerability (GDRC, 2003; Shaw, Mallick, and Takeuchi, 2011). In this sense, and as Clarke (2003) expressed, universities are critical actors for effective mobilization of the imagination, creativity, skills and talents of people, by using the knowledge and understanding on how to build economic strength and social harmony.

To effectively integrate sustainable development (SD) into teaching and learning practices at universities, Shaw *et al.* (2011) suggest a full integration of SD into the curriculum; student-centered activities and assessments; trans-disciplinary teaching; and teaching that emphasizes SD as an ongoing process. Thus, education programs become a mechanism to prepare students from a perspective of strengthening of values, citizenship, and social sensibility (Gaete, 2011).

DRM IN THE AGENDA OF MEXICAN UNIVERSITIES

In Mexico, particularly after the devastating earthquakes of 1985, the Federal Government created the National Commission for Reconstruction and the National System of Civil Protection; the latter emerging as an "organized group of structures, functional relations, methods, and procedures involving all levels of government and engaging the private sector and non-governmental and civil society organizations" (World Bank, 2012). Since then, efforts have been made to strengthen the linkages between disaster prevention and the education sector in Mexico, however most focusing at the elementary school level (Dettmer, 2002).

In higher education, different Mexican institutions include disaster management as part of their program offerings, either as undergraduate degrees or as certificate

courses focusing on different aspects of disaster risk management and prevention. As of date, the following are available as shown in Table 1 below:

Table 1. Disaster Management Academic Offerings in Mexican higher education institutions

Higher education institution	Level	Focus	Website
Colegio Latinoamericano de Educación Avanzada	Undergraduate degree	Resilience + vulnerability + DRM	http://www.cleaedu.com/pdf/carreras/papc.pdf
Escuela de Administración Pública	Specialization	Vulnerability + DRM	www.eap.df.gob.mx/gird2014
Instituto Nacional de Salud Publica	Certificate course, graduate level	Vulnerability + DRM	http://www.inspvirtual.mx
Instituto Mora	Certificate course, graduate level	DRM	http://goo.gl/efJg8E
Universidad Nacional Autónoma de México	Certificate course, graduate level	DRM	http://www.pctierra.unam.mx
Universidad de Colima	Undergraduate degree	Resilience + vulnerability + DRM	www.uco.mx/docencia/facultades/fciencias/ambienteyriesgo
Universidad de Guadalajara	Undergraduate degree	DRM	http://goo.gl/Bq9yBs
Universidad Hernán Cortés	Certificate course, graduate level		http://uhc.edu.mx

Source: UNISDR, 2015b.

Universities also take part in disaster risk prevention and management initiatives. In 1997, the states of Oaxaca and Guerrero were affected by hurricane Pauline, in which over 1,278 communities were devastated and damages were estimated at almost 300 million Mexican Pesos (Foro Ambiental, 2016). The Universidad de Loyola called upon the people of Guerrero to aid after this disaster, a call to which a large part of the population responded (UNIREN, 2016). From this initiative, in 1999 the Mexican Philantropy Center (CEMEFI, for its acronym in Spanish) gathered different Mexican universities to create an organization for disaster relief assistance, known as UNIREN - University Network for Disaster Prevention and Attention (UNIREN, 2016).

UNIRED currently is integrated by 15 universities throughout the country, which promote volunteering and educate students in disaster prevention and management. Particularly for students directly involved in UNIRED, workshops are held on different aspects of disaster risk management and relief. Also, UNIRED organizes together with other organizations seminars and training sessions open to academics, public officials, the private sector, and society in general (UNIRED, 2016).

A PROPOSAL FOR INCORPORATING DRM IN HIGHER EDUCATION IN MEXICO

Tecnológico de Monterrey is an independent, privately supported, non-profit institution of higher education in Mexico, founded in 1943 by a group of visionary Mexican businessmen. It has grown into a multi-campus university, with presence in most states in the country. Taking advantage of its national presence, Tecnológico de Monterrey has been part of UNIRED for the last 19 years, with 19 of its campus participating in this network.

At Campus Monterrey, in particular, the School of Business, Social Sciences and Humanities (ENCSH) has established its mission to: *“educate business leaders to have an entrepreneurial spirit, a humanistic outlook and who are internationally competitive, distinguished by their global vision, innovation and adaptability.”* (ENCSH, 2011). Alongside its mission and adopting even more active USR initiatives, the School of Business aims at incorporating DRM as part of its education and training programs.

The School’s intention is to mainstream these DRM content themes into the following:

- a. The design of an elective introductory course for students of all programs to engage new students to this knowledge area;
- b. the design of a concentration area of study available for students of different undergraduate business programs in Accounting, Finance; Business administration, Economics; International business; and Marketing;
- c. a multidisciplinary case contest for students of business programs and students of other universities participating in Stream 4; and
- d. the design of an executive learning program for local SME’s.

These proposed initiatives are explained below.

Introductory elective course to DRM

The objective would be focused on the student being able to develop a conceptual understanding about risk, vulnerability and disaster management. Content would include:

- Key concepts for disaster risk management and vulnerability
- Political, social and economic perspectives of risk and vulnerability
- Disaster management and resilience

- Disaster response
- Post-disaster recovery

Concentration area for undergraduate business students

The objective is to offer a minor in disaster risk management specialization, providing the student the multidisciplinary knowledge and skills required to approach and address the management of disasters in complex environments.

Suggested course requirements are:

Course 1: Introduction to Disaster Risk Management

Course 2: Disaster Management and Resilience

Course 3: Disaster Risk Reduction and Development Planning

Course 4: Disaster Response and Post-Disaster Recovery

Course 5: Project on Disaster Risk Management I

Course 6: Project on Disaster Risk Management II

DRM case competition

The objective of the contest would be to provide a tool for undergraduate business students from different countries to present alternatives of solutions related to disaster risks management; rewarding to those who present better alternative of solutions, under the following criteria:

Call for participation: Students from third year enrolled in business management undergraduate programs will be invited to register teams comprised of students and one faculty member (it could be one or more teams from the same higher education institution, as long as all members of the team fulfill all participation requirements).

Process: The case presentation process will consist of the following:

- An initial virtual component (phase one) and one final face-to-face component (phase two) held at Campus Monterrey.
- First phase: On Tuesday, October 25th of 2016 a call for cases will be published, and teams should send the electronic format of solution proposal, according to the delivery format, by Friday December 2th of 2016. The list of teams to reach the final phase will be published on the contest webpage on Monday, December 5th of 2016.
- Second phase: On January 6th, 2017, details on the final event to be held in Monterrey, Nuevo Leon, will be published. Finalist teams must attend the final event at Campus Monterrey, to be held February 10th and 11th, 2017.

Evaluation: A jury will be integrated by professors from ENCSH and business representatives in the area of risk management. The jury will study the solution proposals of the cases and will select those which they consider stand out in quality according to the admissibility criteria guidelines and evaluation criteria established on the call for cases.

It is worth noting that as of date there are no case competitions in Mexico that address natural risk management, therefore, our interest in launching this initiative is to generate knowledge, and at the same time, create consciousness among participants on how to formulate viable alternatives as solutions in case of a disaster. Indeed, some events that address DRM are organized by the National Center for Disaster Prevention (CENAPRED), which works hand in hand with the Universidad Autónoma de México (UNAM) (CENAPRED, n.d.).

In addition, other initiatives have taken place around DRM by different organizations. In October 2015, Tecnológico de Monterrey, Campus Querétaro, in collaboration with CENAPRED and the Jewish community in Mexico launched a contest for the creation of a videogame to explain how to proceed in case a natural disaster occurred (CONACYT, 2015). In 2014, in the competition Startup Bus, the team Bridgefy, integrated by five Mexicans, won second place by developing an application that helps people in case of connectivity problems when a natural disaster strikes (FORBES, 2016). Also, the Mexican Association of Insurance Institutions (AMIS) holds a contest among undergraduate students to design messages focused on the acknowledgement of the relevance of risk prevention (AMIS, n.d.).

Executive education program for SMEs

The objective of the executive program on DRM would be for participants to understand and evaluate principles and practices of disaster risk management and reduction, and to understand disaster resilience, risk mitigations and recovery policies.

Content of the program are suggested as follows:

- Module 1:** Foundations and Key Concepts for Disaster Risk Management
- Module 2:** Disaster Management and Resilience
- Module 3:** Infrastructure Asset Management
- Module 4:** Governance of Sustainability
- Module 5:** Management Law (natural resources, human rights, international law...)
- Module 6:** Disaster Response and Post Disaster Recovery
- Module 7:** Project on Disaster Risk Management

CONCLUSION

Due to the country's high susceptibility to natural hazards, and particularly to hydrometeorological and geological events, a crucial step for Mexican higher education institutions is to take more preactive and proactive participation in generating a culture for disaster risk prevention and management. Raising public awareness for disaster prevention is even more important in countries such as Mexico, where SMEs represent an important part of the economy. Universities in particular have the opportunity to reach out to businesses and contribute with training services, alongside their mission of educating students and generating research for expanding DRM knowledge transfer to the communities they are embedded in.

Universities need to share experiences with other higher education institutions on the implementation of DRM curricula to enrich the knowledge base and identify better ways to design programs. Universities are one of the parties responsible for educating and developing future entrepreneurs of the country, therefore, the importance of introducing this subject in the curriculum is essential as it is to create and develop awareness of the future workers.

Something interesting, and at the same time can become a limiting factor, is to observe and measure how these types of initiatives in the university are accepted by the students or participants. And, whether in reality, they created an awareness in such a way that in a near future they will be able to implement more initiatives and to have a preactive and proactive participation around DRM. Future research should focus on how to measure the impacts of DRM programs.

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SUSTAINABILITY EDUCATION IN INDIAN BUSINESS SCHOOLS: A STATUS REVIEW

EDUCACIÓN PARA LA SOSTENIBILIDAD EN LAS ESCUELAS DE NEGOCIOS INDIAS: INFORME DE LA SITUACIÓN

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ABSTRACT

Sustainability issues, given their potential scale of impact and urgency, have captured the imagination of both corporations and academic institutions everywhere. This paper examines how such problems and their potential solutions have been incorporated into higher education, particularly business school education in India. With over 3,600 business schools in the public and private sector, business education in India has proliferated. However, students by and large still remain unexposed to sustainability and disaster management concepts in their curriculum. The underlying factors for this include, lack of institutional capacity, issues related to faculty motivation and incentives, lack of recruiter interest and limited availability to high quality resource material. Further, while several schools in India focus on sectors relevant to sustainability, inter-organizational linkages have not developed and business school generally operate independently. This paper examines the way forward to deeply integrate sustainability principles into the core curriculum of business schools. Measures suggested include creating communities of practice among academia and industry, building a resource base of teaching materials for easy access by faculty, and several measures to strengthen institutional capacity.

KEYWORDS

Sustainability; disaster management; environmental management; education; sustainability curriculum; India

RESUMEN

Debido a su alto potencial de impacto y urgencia, los asuntos relacionados con la sostenibilidad han capturado la imaginación tanto de las empresas privadas, como de las instituciones académicas en todas partes. Este artículo examina cómo dichos problemas y sus soluciones potenciales han sido incorporados en la educación superior, particularmente en la educación de negocios de India. Con unas 3,600 escuelas de negocios en los sectores público y privado, la educación de negocios en India ha proliferado. Sin embargo, los estudiantes, en general, siguen sin tener contacto con conceptos de sostenibilidad y gestión de desastres en sus currículos. Los factores subyacentes a esta situación incluyen la falta de capacidad institucional, los problemas relacionados con la motivación e incentivos de los profesores universitarios, la falta de interés de los reclutadores y la limitada disponibilidad de material de consulta de alta calidad. Además, mientras que varias escuelas de negocios de India se enfocan en sectores relevantes para la sostenibilidad, los vínculos interorganizacionales no han sido desarrollados y las escuelas de negocios operan en general independientemente. Este artículo examina el camino a seguir para integrar principios de sostenibilidad de manera profunda a los currículos básicos de las escuelas de negocios. Las medidas que se sugieren incluyen la creación de comunidades de prácticas entre la academia y la industria, la construcción de materiales pedagógicos de fácil acceso para profesores universitarios y diferentes medidas para fortalecer la capacidad institucional

PALABRAS CLAVE

Sostenibilidad; gestión de desastres; gestión ambiental; educación; currículo de sostenibilidad; India.

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INTRODUCTION

Sustainability issues, especially with respect to environmental management, and especially disaster management, are increasingly influencing both boardroom strategies and corporate profits. While corporations have responded to broad sustainability concerns even earlier, the last two decades have seen a significant increase in the level as well as the scope of businesses' engagement with sustainability matters. This can be attributed to: an improved understanding of the mutually-reinforcing nature of business and ecosystem cycles; the growing power of civil societies; a proliferation of local/national regulatory policies; and multilateral agreements. Consequently, there is greater appreciation of the positive and transformational role that corporations need to play in a resource-constrained, sustainably-challenged world. This is even more critical given our experience that left unattended, sustainability issues may eventually morph into industrial or humanitarian disasters in the long run.

As a result of the above, global environmental concerns, such as climate change, biodiversity loss, natural resource depletion, atmospheric pollution, industrial pollution, global poverty etc., have become important inputs for decision making at the firm level. While industrial sustainability has been intensively discussed in the developed country contexts, in the context of the developing countries these may differ in terms of methods as well as outcomes. Further issue of environment and industry competitiveness is particularly important in the case of developing countries such as India as several studies have pointed out that improvements in environmental performance can actually improve the overall performance of the industry.

Apart from an increase in general levels of awareness amongst industry and citizens, three other developments in the Indian economy have made it impossible for Indian firms to ignore the environmental impacts of their operations. First, the quantum of losses associated with poor environmental performance is staggering. Second, the current government's focus on manufacturing is likely to exacerbate the environmental pollution in the country. Third, the legislative framework in India has changed in recent years. The 1994 amendments to the Companies Act make it mandatory for firms to spend, in every financial year, at least two per cent of the average net profits, subject to certain qualifying conditions towards corporate social responsibility activities, defined to include environmental and disaster mitigation initiatives. Growing pressures from civil society, and adoption of best practices in reporting have also meant that there is more intensive scrutiny of the sustainability impacts of business' operations in India.

Given the strategic importance of environmental management from a national perspective, it is necessary for the business schools in India to take a more proactive role in creating managers and business leaders who have a good understanding of how to incorporate environmental issues into corporate decision making.

METHODOLOGY

This study was carried out in two phases. The first was to do a survey of existing literature and analyze the curriculum of schools teaching sustainability using secondary sources, primarily the websites of the concerned institutes. This was supplemented by conversations with faculty teaching sustainability or allied courses across the identified schools. Given the limitations of time it was not possible to independently verify all the information available on the web by directly contacting the schools in all the cases.

BUSINESS EDUCATION IN INDIA: AN OVERVIEW

Business education in India is of relatively recent vintage with the first fully independent business school being set up in the sixties. Interestingly though the premier business schools of India were set up as Institutes of Management rather than business schools recognizing the fact that management went beyond just running a business. However, since then, the growth of business schools has mirrored the economic growth of India. In 2015, India had over 3,600 business schools compared to less than 1,000 business schools in 1988. The numbers in themselves do not fully reflect the quality of management education in India as these institutions vary greatly in terms of both academic infrastructure as well as faculty resources.

Business education in India is organized at three levels; the first, namely premier schools such as the Indian Institutes of Management, are set up through a special act of the Indian parliament offering both two-year and one-year Post Graduate Diplomas in Management. The second category comprises schools affiliated to the state, central or independent universities. The third category includes schools set up by private foundations and societies. Most such institutions function under the regulatory control of the All India Council for Technical Education. While programmes offered by these schools are generally referred to as Post Graduate Diplomas in Management, the two year programmes in business management offered under the university system are called Master of Business Administration.

SUSTAINABILITY EDUCATION IN BUSINESS SCHOOLS: A STATUS REVIEW

Traditionally, the key narrative in management education in India, as elsewhere in the world, has been one of maximizing shareholder value. However, in the last two decades an alternative perspective built around sustainability, corporate governance, and corporate social responsibility has been emerging. And that has been reflected in the curriculum redesign of a number of institutions across India.

Sustainability education initiatives in the in India's business schools can be traced back to the early 90's when the premier business school in India such as the Indian Institute of Management at Ahmedabad and Calcutta decided to offer envi-

ronmental management courses as electives in their post graduate courses. Since then many more schools have incorporated environmental management courses into their curriculum. Such initiatives have also been strongly influenced by the directives from the higher education regulatory agencies and the judiciary. For instance, the University Grants Commission, the controlling authority for Universities in India, mandated that an environmental management course must be taught in the MBA programmes offered by universities.

A survey on Corporate Responsibility education in India among top ranked 104 schools by Partners in Change concluded that while corporate responsibility education had made some progress, significant steps were further needed (Partners in Change, 2007). A second study on the status of ethics, corporate governance and environment education concluded that of the 107 schools surveyed “ethics was offered by 64.49%, corporate governance by 31.78%, CSR by 10.28% and environment and sustainability by 14.02% of the business schools surveyed (Srinivasan, Srinivasan & Anand, 2012).

The content and pedagogy of sustainability courses also vary greatly between business schools. The most common approach has been to introduce standalone courses in sustainability or allied areas such as corporate governance, ethics, corporate social responsibility, green operations etc., Much of these initiatives have been individual faculty driven. A second approach now being adopted by a few schools is to introduce compulsory core courses as a part of the first year core curriculum as in the case of schools like IIM Ahmedabad, Xavier School of Management Jamshedpur, Xavier Institute of Management Bhubaneswar, IIM Lucknow and others. In many of these instances multiple courses on environment are offered. However, in most instances the courses are strongly driven by faculty interests and their future depends on continued faculty interest, something that is difficult to sustain, given the wide variations in student interest and institutional support. Even where environmental courses are offered, these are currently done in a very disjointed manner and not integrated with the functional areas. Also in the absence of a concerted effort and lack of adequate focus by the business schools themselves the impact of these pioneering efforts is limited. A third approach has been to introduce masters level programmes in sustainable business management as given in Table 1. An early attempt at starting a sustainability programme was from Symbiosis University in 2008 by way of an integrated Energy and Environment program. The most recent have been the launch of Post Graduate Programmes in sustainability by two premier institutions: Xavier University and the Indian Institute of Management Lucknow (IIML). However most of these programmes have remained small and have not been scaled up.

Table 1. Sustainability & Environmental Management MBA Programmes in India

	MBA Programmes	Institutions
MBA- Environmental Management	<ul style="list-style-type: none"> • Environmental Management Environmental Change & Management • Industrial Safety & Environmental Management (PGDISEM) 	<ul style="list-style-type: none"> • Amity Institute of Energy and Environment, New Delhi • Annamalai University, Cuddalore • Cochin School of Business (SCMS Cochin) • Department of Environmental Management, Bharathidasan University • Chhatrapati Shahu Institute of Business Education and Research, Kolhapur • Institute of Management and Technical Studies (IMTS), Noida • NorthPole Institute of Distance Education, Rajkot • Sam Higginbottom Institute of Agriculture Technology and Sciences (SHIATS) Allahabad • Swami Vivekanand Institute of Information Technology (SVIIT), Patiala • VPGR Institute of Technology, Chennai • Indian Institute of Social Welfare and Business Management (IISWBM), Calcutta • NITIE, Mumbai
MBA- Sustainability	<ul style="list-style-type: none"> • Business Sustainability • Sustainable Development • Green Business • Sustainable Management • Business Strategy & Sustainability • Business Ethics & Sustainability • Lean Sustainable Supply Chain • Sustainability Management 	<ul style="list-style-type: none"> • Institute of Management and Technical Studies (IMTS), Noida • Teri University, Delhi • Silver Bright Institute of Management (SBIM) • The Global Open University, Nagaland • The Indian Institute of Management, Lucknow • SP Jain School of Global Management, Mumbai • Birla Institute of Management Technology (BIMTECH) • Xavier University Bhubaneswar (XUB) • Indsearch, Pune
Energy Management	<ul style="list-style-type: none"> • Executive PGP- Energy management • Energy and Environment • Energy Policy • Energy Management • National Management Programme (NMP)/ PGP-EM (Energy Management) 	<ul style="list-style-type: none"> • Management Development Institute, Gurgaon (MDI) • Symbiosis International University • Department of Management Studies, Indian Institute of Science (DOMS IISc) • Indian Institute of Social Welfare and Business Management (IISWBM) • Birla Institute of Management Technology (BIMTECH) • Management Development Institute, Gurgaon

Table 2 gives a select list of sustainability related electives offered by various business schools.²

Table 2. Sustainability & Environmental Management Electives (Select list)

Sustainability & Environmental Management Electives (Select list)		
Electives	Asia-Pacific Institute of Management (AIM) <ul style="list-style-type: none"> • Business Ethics & Corporate Governance 	Rajiv Gandhi Institute of Management, Shillong <ul style="list-style-type: none"> • Sustainability, Corporate Social Responsibility & Ethics
	Christ University Institute of Management, Bangalore <ul style="list-style-type: none"> • Sustainability and Environmental Management Law, Ethics and Corporate Social Responsibility 	Rajagiri Centre for Business Studies (RCBS) <ul style="list-style-type: none"> • Environment Management • Business Ethics & Corporate Governance, • Sustainable Development & Corporate Governance
	Indian Institute of Management Ahmedabad (IIMA) <ul style="list-style-type: none"> • Carbon Finance • Environment Management • Managing Energy Businesses • Managing Sustainability 	School of Management for Infrastructure and Development studies (MINDS), <ul style="list-style-type: none"> • Energy Trading • Environmental Management
	Indian Institute of Management, Bangalore (IIMB) <ul style="list-style-type: none"> • Corporate Strategy and Environment • Strategy and the Sustainable Enterprise • Social Enterprises • Inclusive Business • Corporate Governance • Green Business • Environmental Economics 	Shailesh J. Mehta School of Management (SJMSOM) <ul style="list-style-type: none"> • Environmental Management
	Indian Institute of Management, Calcutta (IIM-C) <ul style="list-style-type: none"> • Ethics • Corporate Social Responsibility • Environmentally-Sound Business Practices and Leadership 	XLRI-Jamshedpur <ul style="list-style-type: none"> • Introduction to Sustainable Development and Corporate Sustainability • Advanced Environmental Management and Green Marketing • Introduction to Social Entrepreneurship
	Indian Institute of Management, Indore (IIM-I) <ul style="list-style-type: none"> • Green Business Management • Business of the Bottom of the Pyramid • Marketing to Bottom of the Pyramid Customers 	NMIMS – School of Business Management <ul style="list-style-type: none"> • Corporate Social Responsibility Ethical Issues in Management • Social Development & Introduction to Social Entrepreneurship • Disaster Management • Environment Management
	Indian Institute of Management, Kozhikode (IIM-K) <ul style="list-style-type: none"> • Environmental Management • Green Supply Chain Management & Practices • Corporate Governance & Corporate Social Responsibility 	NITIE, Mumbai <ul style="list-style-type: none"> • Sustainable Development • Environment and Safety Legislation • Green Marketing • Environmental Management • Sustainability
	Indian Institute of Management, Lucknow (IIML) <ul style="list-style-type: none"> • Corporate Governance & Strategy • Business Sustainability and Externalities Markets • Business and Society • Green & Sustainable Computing 	Institute of Rural Management (IRMA), Anand
	Indian School of Business (ISB) <ul style="list-style-type: none"> • Leaders and Sustainable Development 	Social Entrepreneurship <ul style="list-style-type: none"> • Values and Ethics in Management • Corporate Social Responsibility • Sustainability and CSR Compliance Mechanisms
	Lal Bahadur Shastri Institute of Management (LBSIM) <ul style="list-style-type: none"> • Business Ethics & Corporate Governance (PGDM) • Business Sustainability & CSR 	SCMHRD, Pune <ul style="list-style-type: none"> • Concepts and Applications in Sustainability • Corporate Social Responsibility • Sustainable Marketing • Sustainable Supply Chain • Social Entrepreneurship • Corporate Governance and Ethics • Microfinance and Social Banking

² Please note that this is not a comprehensive list and has been compiled through an internet search.

Three alternate programmes that focus almost exclusively on business and sustainability are given in the following section. Such programmes indicate a growing demand for sustainability-oriented business education.

Case Study 1: Xavier University's School of Sustainability (XSOS):

XSOS launched the MBA in Sustainability Management in June 2015. Traditionally, the idea of building sustainability into a business school curriculum has been to add electives onto a core curriculum. XSOS has integrated sustainability as the core and added the functional areas as (add-ons). This is somewhat of a paradigmatic shift from the way MBA programmes in sustainability are generally conceived elsewhere. This programme focuses on five key areas namely (1) Human Development; (2) Sustainability, Leadership and Entrepreneurship; (3) Climate Change and Natural Resource Management; (4) Sustainable Energy; (5) Policies, Laws and Governance. In the second year students specialize in any of the four functional areas including Accounting and Finance, Marketing, Human Resource Management, Operations Management and Information Systems. This is complemented by capstone projects and a six-week program on Sustainability Discovery, where students are encouraged to explore sustainability issues in the community.

Case Study 2: IIML's Post Graduate Programme in Sustainable Management (PGP-SM):

Launched in 2015, the PGP-SM covers the subject areas of environmental, social, and economic sustainability of businesses, change-management, Policy and institutional analysis, and cross-sector collaboration. Core sustainability courses taught in this are given in Table 3:

Table 3. Core Courses in the PGP-SM Programme of IIML

Core Courses in the PGP-SM Programme of IIML

- | | |
|---|---|
| • Communication for Sustainable Management | • Environmental Law and Policy |
| • Environmental and Resource Economics | • Sustainable Marketing Concepts |
| • Principles of Sustainable Management | • Externalities and Externalities Trading |
| • Business Certification for Sustainability | • Lifecycle Management |
| • Creativity and Innovations for Designing Sustainable Solutions | • Social Entrepreneurship |
| • Basic Decision Making Techniques for Sustainable Management | • Sustainability: Measuring & Reporting |
| • Accounting for Sustainable Management | • Research Methods for Sustainable Management |
| • Financial Decision Making for Sustainable Management | • Stakeholder Analysis and Management |
| • Designing (Sustainable) Organizations | • HRM for Sustainable and High Impact |
| • Human Dimensions of Sustainability (Human Rights, Justice and Ethics) | • Environment and Social Risk Analysis and Management |
| • Systems Thinking | • Sustainable Supply Chain Management |
| | • Environment Finance and Sustainable/Impact Investment |

Case Study 3: MBA in Business Sustainability (TERI University):

The MBA in Business Sustainability at the TERI University covers a variety of courses, including Principles and Concepts of Sustainability, Climate Change and Development, Sustainability Reporting and CSR, Sustainable Business Strategy, Business and Society and Environmental Economics. Core sustainability courses taught in this are given in Table 4:

Table 4. Core Courses in MBA in Business Sustainability (TERI)

Core Courses in MBA in Business Sustainability (TERI)

- Climate change and development
- Energy policy and management
- Sustainable business strategy
- Environmental economics
- Financial intermediaries, institutions and regulations
- Corporate governance - challenges, evolution and future direction
- Business ethics
- Contemporary issues in change management
- Community relationship

While all the three institutions have an enviable track record in designing and delivering high quality post graduate programmes it is too early to predict the success of these new initiatives.

SECTORAL SCHOOLS

India also has several schools with a specific sectoral focus such as Rural Development, Forest Management or allied areas. While such programmes are not conventional MBAs, they offer significant coverage of sustainability areas. Examples of such institutes are the Indian Institute of Forest Management (IIFM), Institute of Rural Management (IRMA), and the Disaster Management Institute (DMI) offer courses with significant coverage over sustainability and disaster management topics. A good case in point is the Indian Institute of Forest Management, established 1982 by the Indian Government (under the Ministry of Environment, Forests and Climate Change). IIFM offers a PG diploma in Forestry Management, with a primary focus on sustainable management of natural resources.

COURSES IN DISASTER MANAGEMENT

Disaster management in India received significant attention from the government as well as stakeholder groups in the wake of the Bhopal gas tragedy in 1984, consid-

ered the world's worst manmade industrial disaster. The following period saw the introduction of new legislation for environmental protection. Simultaneously there has also been greater appreciation of the need to better manage natural disasters of varying magnitude that impact the Indian subcontinent on a regular basis.

While courses on crisis and disaster management have been taught as part of other programmes, the exclusive focus on Disaster Management as a business school course is a recent development. India is particularly vulnerable to disasters because of its geo-climatic and socio-economic conditions. With the enactment of the Disaster Management Act in 2005 by the Indian Government, events emanating from both natural and manmade causes as well as those due to accidents and negligence are now categorized as disasters. A high powered committee by the government has classified disasters as related to (a) water and climate; (b) geology; (c) chemical, industrial and nuclear; (d) accidents; and (e) biological. For a comprehensive list of these please see Table 5.

Table 5. Disasters as classified by the Indian Government

Water and climate related disasters	<ul style="list-style-type: none"> • Floods and drainage management • Cyclones • Tornadoes and hurricanes • Hailstorm • Cloud burst • Heat wave and cold wave 	<ul style="list-style-type: none"> • Snow avalanches • Droughts • Sea erosion • Thunder and lightning • Tsunami
Geological related disasters	<ul style="list-style-type: none"> • Landslides and mudflows • Earthquakes 	<ul style="list-style-type: none"> • Dam failures/ Dam bursts • Minor fires
Chemical, industrial and nuclear related disasters	<ul style="list-style-type: none"> • Chemical and industrial disasters • Nuclear disasters 	
Accident related disasters	<ul style="list-style-type: none"> • Forest fires • Urban fires • Mine flooding • Oil spills • Major building collapse • Serial bomb blasts 	<ul style="list-style-type: none"> • Festival related disasters • Electrical disasters and fires • Air, road and rail accidents • Boat capsizing • Village fire
Biological related disasters	<ul style="list-style-type: none"> • Biological disasters and epidemics • Pest attacks 	<ul style="list-style-type: none"> • Cattle epidemics • Food poisoning

Source: High Powered Committee Report-1999, quoted in NIDM, 2013.

As in the case of sustainability, several institutions also offer courses on Disaster management. A select list such institutes is given below in Table 6:

Table 6. Schools with Disaster Management Programmes

M.A./ M.Sc. in Disaster Management	Tata Institute of Social Sciences
PG Diploma in Disaster Management	Indira Gandhi National Open University,
P.G. Diploma in Natural Hazards Disaster Risk Management	Indian Institute of Remote Sensing, Uttarakhand
MBA in Disaster Management	Guru Govind Singh Indraprastha University
MSc in Disaster Mitigation	Sikkim Manipal University, Sikkim
MA in Disaster Management	Annamalai University, Tamil Nadu
M.Sc. in Disaster Management	The Global Open University, Nagaland Indian Institute of Ecology and Environment

Source: NIDM 2014 and other sources, compiled by the author.

CHALLENGES IN INCORPORATING SUSTAINABILITY INTO BUSINESS SCHOOL CURRICULUM

While the efforts detailed in the previous sections are laudable, it is fair to say that there have not been enough efforts by business schools to mainstream sustainability or disaster management concepts into the curriculum by integrating them with core functional area courses. By and large it appears that, business schools have introduced sustainability themes into MBA curriculum more out of political concerns and correctness, rather than conviction. Even as this trend is slowly changing, it is interesting to note that while being sustainable is often profitable to business, whether it is worthwhile for business schools to engage in sustainability initiatives is still a moot question. The overall progress has been stymied due to a variety of reasons:

- *Absence of an enabling infrastructure and incentive system at the business school level:* Sustainability is not seen as a main stream functional area by business schools. This translates into reluctance to recruit faculty specialized in these and allied areas.
- *Challenges of integrating sustainability concepts into core MBA curriculum:* An integrated approach, i.e., integrating sustainability concepts across courses in a meaningful manner is ideal, given the interdisciplinary nature of the sustainability problem. However, given the constraints identified earlier, stand-alone courses are a most commonly adopted practical trade-off. Adding one more subject, even if a critically important one such as sustainability, calls for

rejigging the existing curriculum. Further, opportunities for cross disciplinary programmes are not sufficiently leveraged as many Indian business schools which are generally standalone schools.

- *The challenge of faculty motivation:* The lack of industry connection implies that those who teach (faculty) do not practice and those who practice (industry) do not teach, with a few exceptions. As a faculty colleague pointed out “our professors that have gone through the education system and gotten a PhD on a very narrow topic and then are rewarded for publishing on that topic - there is not really an incentive for them to have the broader view. Especially for young faculty who are trying to pursue tenure, I think this is a challenge... there is so much on the line for them as far as their career success (goes), do they have the freedom to think about the whole system and do more than just their topic?”
- *The challenge of faculty incentivization:* For young faculty too there is not much incentive to integrate sustainability concepts into their regular classes. A colleague noted “You really want to be a great teacher. And student evaluations are really important for promotions and tenure. So if you are going to take a risk to teach about something you don’t know much about, it is difficult for professors to teach about sustainability.” Similar issues exist with faculty research too.
- *The challenges of harmonizing curriculum:* The sustainability problem is diverse and complex and can be addressed in myriad ways. This complexity also finds its way into the manner in which the curriculum design happens in the institutions surveyed. As noted before the content and pedagogy for the delivery of sustainability courses also vary greatly between business schools. Further programmes in allied areas may have significant sustainability inputs. For examples most MBAs in Corporate Social Responsibility would have some courses on environmental management. Similar is the case with MBA in Human Rights, Social Development etc., even though they have not been identified as MBA’s in sustainability in this paper.
- *The challenge of funding:* In emerging economies such as India social issues have a bigger influence on the other dimensions of sustainability. But research in social areas can be difficult, time-consuming and requires money. Except for faculty in a few business schools most others faculty have little bandwidth in terms of resources. As a faculty put it “So for an institute like mine, which is a private institute, very often it is on my time and my dime.”
- *Shortage of appropriate resource materials for teaching:* While copious material exists on business and environment in a developed country context there is very little on issues that concern firms in emerging economies such as India. Most material available in the context is written from an engineering/pollution control perspective and hence unsuitable for use in a business school. Further, even the material that exists in different institutions has not been inventoried so far and thus remains unavailable to the vast majority of teachers.

- *Challenges of building inter-institutional collaborations:* While there is a great deal of expertise in sectoral schools with respect to managing some of the key sustainability challenges, there is very little inter-institutional collaboration between these and conventional business schools. There is an urgent need to allow these linkages to come up and develop communities of partnerships in the area of sustainability.
- *Challenges of community engagement:* Many sustainability problems are rooted in the community these institutions operate in. So there is a strong argument for setting up community engagement and public-private partnerships.
- *Challenges of student perception and recruiter apathy:* The perceived lack of recruiter interest translates into low levels of student interest in many sustainability related courses, especially those offered outside the top business schools.

RECOMMENDATIONS

To summarize, sustainability education suffers from what could be characterized as an unhealthy amount of skepticism all around. Both faculty and students are circumspect about pursuing opportunities in the sustainability and disaster management spaces because career options are not easily visible or well defined. Faculty are cynical, partly because career growth is not so very well defined. This is exacerbated by the fact hardly any journals publishing interdisciplinary research would find themselves among the top rated journal lists of business schools. There is also a great deal of institutional level skepticism because such courses have limited student appeal and hence are not easily scalable, adding to the institutions' costs.

Our analysis of the current status indicates that a three-pronged approach is necessary to strengthen sustainability education in Indian business schools, namely:

- Efforts at building institutional capacity, in terms of faculty resources and skills, access to financial and non-financial resources, and creation of a critical mass of interested faculty within each business school
- Building a resource base of teaching material, including cases, articles, videos, teaching notes, etc.
- Building communities of practice by networking faculty in allied institutions to quickly transplant successful experiences between business schools and help evolve collaborative curriculum development efforts.

Strengthening Institutional Capacity

As noted before, the lack of institutional capacity is a strong barrier to the introduction of sustainability and disaster management courses into business school curricula. Institutional capacity here refers to resource constraints in the areas of finance, materials and faculty. This is felt most acutely in the case of teaching faculty. The average business school operates with limited faculty and no possibility of establishing dedicated faculty for environmental courses. It is therefore necessary to upgrade the skills/knowledge levels of the existing faculty so that environmental issues can

be covered in an adequate manner by faculty from other functional areas. Institutional capacity may also be strengthened by providing some amount of budgetary support for procuring appropriate material, and for developing teaching material by the concerned faculty.

Building a Resource Base of Teaching Materials

There is an urgent need to develop adequate teaching material in the form of case studies, articles, simulations and multi-media resources on topics related to disaster management. An indicative list of possible topics is given below.

- Issues Management
- Crisis Management
- Disaster Management
- Management of large and medium scale industries
- Management of small scale industries
- Multinational firms in the developing country contexts
- Stakeholder management
- Technology choice and evaluation
- Public-private policy interfaces
- Successful experiences in strategic environmental management
- Use of economic and regulatory instruments
- Environmental partnerships (inter-firm and private-public)
- Corporate environmental management systems and strategies
- Environmental negotiations
- Environmental appraisal of new technologies and projects
- Environmental Marketing
- Green Manufacturing

Creating Communities of Practice

A third approach to promote sustainability related education in business schools is to network all faculty involved in teaching environmental courses in business schools with others interested in introducing similar courses. This networking can be achieved by facilitating collaborative research on curriculum development between different participating institutions, in particular between premier institutions such as IIMs and other second level institutions.

In the final analysis the key question is can business schools help innovate and incubate solutions to some of the biggest sustainability challenges that we face? Our experience so far indicates that we can. For example, several innovative ideas as well as best practices in sustainability have emerged in the business school context, such as base of the pyramid approaches. Further, the most challenging sustainability problems that humanity faces are located in the developing and emerging economy contexts, and there is a need to involve local institutions in helping co-create appropriate and effective solutions to meet these challenges.

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APPENDIX: LIST OF INSTITUTIONS SURVEYED

University/Business School	Courses Offered
Teri University	MBA in Business Sustainability
Kurukshetra University, Kurukshetra	PG Diploma in Environmental Impact Assessment and Auditing
The Indian Institute of Management, Lucknow	Post Graduate Programme in Sustainable Management (PGPSM), EFPM-Sustainable Management
Department of Environmental Management, Bharathidasan University	Department of Environmental Management- MBA program
Institute of Management and Technical Studies (IMTS), Noida	MBA- Sustainability
Northpole Institute of Distance Education	MBA - Disaster Management MBA - Environmental Management MBA - Sustainable Development Management
Chhatrapati Shahu Institute of Business Education and Research, Kolhapur	MB. (Master of Environment Management) M.Sc. (Environment and Safety)

APPENDIX: Continuation

University/Business School	Courses Offered
Chhatrapati Shahu Institute of Business Education and Research, Kolhapur	M.B.A. (Master of Environment Management) M.Sc. (Environment and Safety)
SP Jain School of Global Management	MBA- Business Strategy & Sustainability
The Global Open University, Nagaland	MBA (Environmental Management)
	MBA (Global Peace and Security)
	MBA (Disaster Management)
	MBA (Sustainable Development)
VPGR Institute of Technology- Distance Education	MBA in Environmental management
Management Development Institute, Gurgaon (MDI)	Executive Post Graduate Programme- Energy Management
Symbiosis International University	Master of Business Administration (Energy and Environment)
Department of Management Studies, Indian Institute of Science (DOMS IISC)	MBA Energy Policy
Indian Institute of Social Welfare and Business Management (IISWBM)	MBA (Public System)-Environment Management, Energy Management, MSW-Disaster Management, Environment and Sustainable Development.
SCMS Cochin School of Business (SCMS Cochin)	Post Graduate Diploma in Management Environmental Change & Management
Birla Institute of Management Technology (BIMTECH)	Lean Sustainable Supply Chain, Energy Management- PGDM
IFIM Business School	PGDM-Business Ethics & Sustainability
IndSearch Centre of (i-cosm)	MBA in Sustainability Management
Uttarakhand Open University	PG Diploma in Disaster Management
Maharaja Krishnakuma- rsinhji Bhavnagar University	PG Diploma in Disaster Management – 2 years
MDI-Gurgaon	National Management Programme (NMP)/ PGP-EM (Energy Management) Programme
Centre for Disaster Management Studies. Guru Govind Singh Indraprastha University, Delhi.	MBA – Disaster Management
NITIE, Mumbai	Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM)

APPENDIX: Continuation

University/Business School	Courses Offered
Bhoomi College	PG Diploma Course- Science and Management for Sustainability
The Indian Institute for Sustainable Enterprise (IISE)	Postgraduate Certificate Program in Sustainable Enterprise
Silver Bright Institute of Management (SBIM)	Postgraduate in Sustainability Management
Chhattisgarh University	Post Graduate Diploma in Sustainability (Distance Learning)
School of Management for Infrastructure and Development studies (MINDS) Affiliated to VTU	Energy trading courses, Environmental Management
Xavier University Bhubaneswar (XUB)	MBA in Sustainability Management (MBA – SM)
The Indian Institute for Human Settlements (IHS)	Bachelors of Urban Practice (BUP), the Masters of Urban Practice (MUP) and a PhD programme.
Teri University	LLM specialization in Environment and Natural Resources Law and Infrastructure and Business Law
Kurukshetra University, Kurukshetra	Environmental Studies- M.Sc. Environmental Science M.Tech. (Energy and Environmental Management)
University of Hyderabad, Hyderabad	Post-Graduate Diploma in Human Rights (PGDHR)
Tata Institute of Social Sciences	M.A. / M.Sc. in Climate Change and Sustainability Studies MA Ecology, Environment and Sustainable Development
Sambalpur University, Odisha	P.G. Diploma in Environmental Education and Management (PGDEEM) P.G. Diploma in Industrial Safety and Health (PGDISH) through Distance Education mode
The Indian Institute of Management, Lucknow	Corporate Governance & Strategy -PGP, Business Sustainability and Externalities Markets-Elective, Business and Society
The Indian School of Business (ISB)	Leaders and Sustainable Development
Rajiv Gandhi Institute of Management Shillong	FPM Sustainability, Corporate Social Responsibility & Ethics
Shailesh J. Mehta School of Management (SJMSOM)	Elective-Environmental Management
Institute of Management, Nirma University	MBA Integrated Course-Introduction to Ethics & Corporate Social Responsibility
Lal Bahadur Shastri Institute of Management (LBSIM)	Business Ethics & Corporate Governance(PGDM) Elective-Business Sustainability & CSR

APPENDIX: Continuation

University/Business School	Courses Offered
K. J. Somaiya Institute of Management Studies and Research (SIMSR)	Environment Conscious Manufacturing-operations Business Ethics and Corporate Governance PGDM _ Corporate Social Responsibility
Research and Entrepreneurship Education	Electives-Corporate Social Responsibility Business Ethics & Corporate Governance Environment Management
Asia-Pacific Institute of Management (AIM,	PGDM(IB) Business Ethics & Corporate Governance
Loyola Institute of Business Administration (LIBA)	PGDM -Ethics, Disaster Management, Centre for Business Ethics and Corporate Governance
Rajagiri Centre for Business Studies (RCBS)	Environment Management Business Ethics & Corporate Governance, Sustainable Development & Corporate Governance
Christ University Institute of Management	Law, Ethics and Corporate Social Responsibility (MBA) Electives on Sustainability and Environmental Management
Disaster Management Institute. (DMI)	Training Programme on Disaster Management
Amity University Institute of Disaster Management	12 weeks' full time Programme. 24 weeks' part time Programme.
IIM-A	(Electives Courses) Carbon Finance Disaster Management Environment Management Managing Energy Businesses Managing Sustainability
IIM-C	business ethics and courses related to ethics, CSR, environmentally-sound business practices and leadership-PGPPM
XLRI-Jamshedpur	Introduction to Sustainable Development and Corporate Sustainability Advanced Environmental Management and Green Marketing Introduction to Social Entrepreneurship
IIM-K	Environmental Management Business Ethics Social Transformation in India Green Supply Chain Management & Practices Corporate Governance & Corporate Social Responsibility Green & Sustainable Computing Marketing for a Better Society

APPENDIX: Continuation

University/Business School	Courses Offered
SVKM'S NMIMS – School of Business Management	Finance Area Business Environment and Strategy Business Environment and Strategy Corporate Social Responsibility Ethical Issues in Management Social Development & Introduction to Social Entrepreneurship Corporate Social Responsibility Disaster Management Environment Management
NITIE, Mumbai	Electives: Sustainable Development Environment and Safety Legislation Legal and Ethical Issues in Business Green Marketing Environmental Management Sustainability
VGSOM, IIT Kharagpur	MBA-BUSINESS ETHICS
IRMA, Anand	Post Graduate Programme in Rural Management Social Entrepreneurship Values and Ethics in Management Corporate Social Responsibility Sustainability and CSR Compliance mechanisms
SCMHRD, Pune	MBA Concepts and Applications in Sustainability Corporate Social Responsibility Sustainable Marketing Sustainable Supply Chain Social Entrepreneurship Corporate Governance and Ethics Microfinance and Social Banking
Goa Institute of Management	PGDM-The Social Responsibility and Action (SRA)
LN Welingkar Institute of Management, Mumbai	Ethics & corporate Governance
The South Indian Education Society (SIES) -The Indian Institute of Environment Management	Post Graduate Diploma in Environmental Pollution Control Technology Post Graduate Diploma in Sustainable Environment Management (One Year Part Time)
Jankidevi Bajaj Institute of Management Studies in Mumbai	P.G diploma in Corporate Social Responsibility

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