



knowledge gaps & future research

A Systematic Review of the Literature on
Business Adaptation to Climate Change
4 of 4



Network for
Business Sustainability

Business. Thinking. Ahead.

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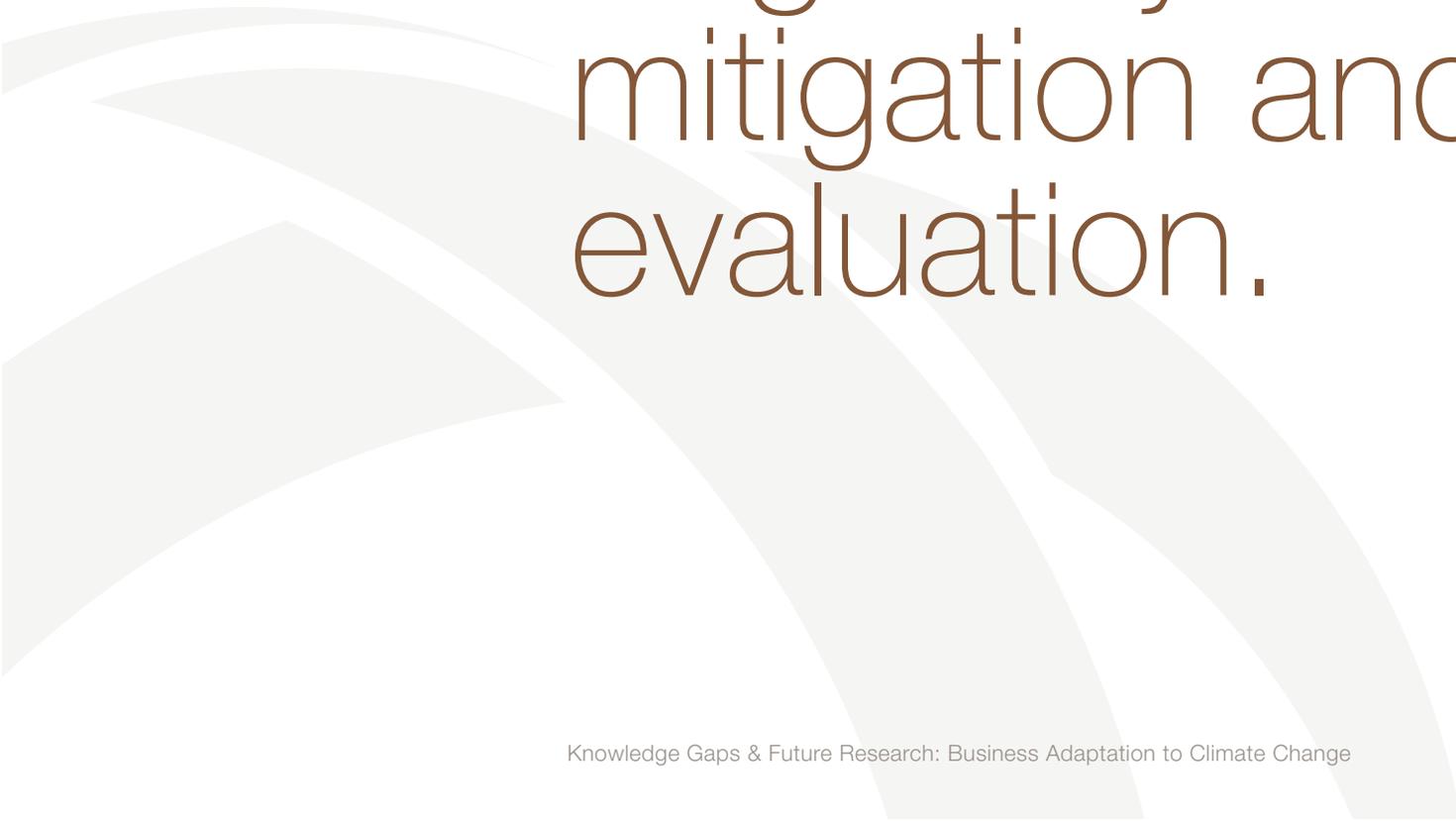
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Business Adaptation to Climate Change
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It's time for
business strategies
to go beyond
mitigation and risk
evaluation.



Research on
adaptation
needs to be
multi-sectoral and
multi-disciplinary.

executive summary

Future work on business adaptation to climate change should find a common definition, gather empirical data, and develop tools.

SUMMARY

This report discusses knowledge and research gaps in the area of business adaptation to climate change, and makes recommendations for further research that could meet the needs of both academic and business practitioners in the field. Future work would focus on three main areas: finding a common working definition of adaptation; gathering more empirical and industry data on adaptation; and developing tools for business adaptation.

BACKGROUND

There is a growing consensus among researchers and policy makers that adaptation is a central strategy in dealing with the impacts of climate change. Adaptation is most commonly described as ‘adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities’ (IPCC).

In 2008-2009 the Network for Business Sustainability commissioned a systematic review to synthesize the current state of research and practice of business adaptation to climate change. This report, the fourth in a four part series, discusses the knowledge gaps in the field and future work necessary.

FINDINGS

Some businesses are incorporating climate change into their business models and strategies, but mostly only in terms of mitigation strategies or risk evaluation. In general, there is currently a:

- Lack of consensus on the meaning (definition, theories, etc.) of business adaptation to climate change.
- Lack of information pertaining to business adaptation (case studies, best practices, etc.).
- Lack of tools for business adaptation commitment within the organization.

IMPLICATIONS FOR MANAGERS

Managers need to create an environment conducive to adaptation study and practice:

- Establish sectoral and cross-sectoral platforms for sharing knowledge and concerns on the issue. Share information about adaptation strategies and practice with researchers, to advance learnings.
- Derive a common definition of business adaptation to climate change.
- Develop tools to evaluate risks, opportunities, and adaptation strategies.

IMPLICATIONS FOR RESEARCHERS

Researchers need to promote and support adaptation practice:

- Conduct primary research on firms and their adaptation practices. Develop case studies, lessons learned, and best practices. Focus on neglected sectors and on drivers, strategies, barriers and gaps.
- Conduct interdisciplinary work on metatheoretical development. Amalgamate information on business risks, opportunities, and adaptation strategies across sectors to derive generalizations.

- Derive a common definition and shared understanding of business adaptation to climate change, via consultation and fieldwork. This will in turn facilitate the development of theories of and tools for risk modelling, opportunity evaluation, and adaptation identification.
- Develop tools to address concerns of businesses of particular sizes, sectors, and geographies.

METHODS

A systematic review of multiple and varied resources – from the public sector, the private sector, and academia, dating from 1997 to early 2009 – revealed 201 sources pertinent to business adaptation to climate change. An interpretive narrative synthesis was employed to distil the large volume of varied data into accessible and intelligible frameworks. By analysing the findings, we identified gaps in the literature and made recommendations of potential further research that could meet the needs of both academic and business practitioners in the field.

OTHER REPORTS FROM THIS STUDY

This is the last report in a four-part series. The other reports are available from nbs.net: Report 1: Concepts & Theories; Report 2: Current Practices; Report 3: Case Studies and Tools; and Study Methodology.

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¹ The contents of this report do not necessarily reflect the opinions of Oversight or Advisory Committee members.

introduction

This report identifies the knowledge and research gaps from 201 sources on business adaptation to climate change and makes recommendations for further research.

There is a growing consensus among researchers and a number of policy makers that adaptation should be a central strategy in dealing with the impacts of climate change. In 2008-2009 the Network for Business Sustainability commissioned a systematic review to synthesize the current state of research on business adaptation to climate change, in order to identify and advance the theory and practice in this field.

Three major questions were explored:

- Are businesses incorporating climate change into their business models and strategies? If so, how? And do differences exist across business units in terms of risks, opportunities, processes, and outcomes?
- Are certain sectors ahead of others? If yes, what drivers account for these differences, and what lessons can the leading industries offer the laggards?
- What tools and processes do businesses use to evaluate the opportunities to be gained from adapting to climate change? Are there any examples of businesses creating a competitive advantage by building adaptive capacity?

Multiple biographic databases and resources were searched – including academic studies, industry reports, think tank research, case studies, and newspaper articles – dating from 1997 to early 2009. We used a standard process for systematic reviews: definition of eligibility criteria; search for eligible titles and abstracts; selection of titles and abstracts that may be eligible; selection of

eligible reports from review of full documents; and data extraction and synthesis of the material into a report. The search revealed 201 pertinent sources. An interpretive narrative synthesis method was employed because we considered it the most appropriate to achieve the overall goals of this systematic review, particularly that of distilling an enormous amount of widely varied data into an accessible and intelligible framework for practitioners seeking to advance best practices and understand new developments in this emerging field of theory and practice. (The detailed methodology is described in a separate document, available from nbs.net.)

The research findings are available in four reports (all available from nbs.net):*

1. Concepts & Theories
2. Current Practices
3. Case Studies & Tools
4. Knowledge Gaps & Future Research

This report, “Knowledge Gaps & Future Research,” identifies knowledge and research gaps in the literature based on the systematic review of 201 sources on business adaptation to climate change and makes recommendations for further research that could meet the needs of both academic and business practitioners in the field. (Industry-specific gaps in practice are discussed in Report 2, “Current Practices.”) This report finds three groups of gaps, and associated areas identified for future work:

*EthicScan has an extensive slide library called An Educators Resource Tool Kit, which covers climate change for 25 industry sectors or activities.” Link: www.ethicscan.ca/whatsnew/index.html

- Lack of consensus on the meaning of business adaptation to climate change
- Lack of information pertaining to business adaptation
- Lack of tools for business adaptation

These knowledge gaps, along with recommendations for further research, are elaborated on in Report 4. Some sectors are however further ahead than others on climate change adaptation and these leading sectors (e.g., Insurance, Tourism, and Agriculture) can serve as examples for the lagging ones.

Taking all four reports together, this study captures the current status of this critical subject of business adaptation to climate change and establishes a foundation for future work by both academic and business communities.

recommendations

This report finds three groups of knowledge gaps and associated areas for future work.

THEORY

It is difficult to create common understanding or successful models concerning adaptation for several reasons: 1) climate change is not linear and presents much uncertainty; 2) business adaptation is an area as varied as it is diverse; 3) basic definitions about perception and use of resources are not consistent across sectors; and 4) this area of research is in its infancy. Advances in theory will help address these issues.

At the conceptual level, the lack of a consensus surrounding the meaning of business adaptation to climate change has made risk modeling, opportunity evaluation, and adaptation identification difficult in theory and practice. Further discussion on how adaptation can be defined for business is recommended. Moreover, consultation and fieldwork on how the business community understands adaptation may yield data on the common and shared understanding of business adaptation by practitioners with the view to developing a broad definition that reflects the meaning of climate change to this segment of society.

Theoretically, more interdisciplinary work needs to take place in metatheoretical development and discussion. As the field currently stands, researchers coming from a wide range of disciplines, are developing theory without reference to other methodologies and as such there is limited critical reflection between scholars on business adaptation theory. Thus, it is recommended that further work engage in theoretical development from an interdisciplinary perspective.

Other recommendations:

- Develop more interdisciplinary theories. Increase the amount of critical reflection between scholars on business adaptation theory.
- Amalgamate information on business risks, opportunities, and adaptation strategies across sectors towards generalizations.
- Reach consensus on the definition of adaptation, which will make risk modeling, opportunity evaluation, and adaptation identification easier both in theory and practice.
- Base new theories on rigorous field work on how businesses understand adaptation.

SECTORAL AND CROSS-SECTORAL ANALYSES

The scope of primary research on companies and their adaptation practices is exceptionally narrow (Berkout et al. 2004a, Pew 2006, Carbon Disclosure Project 2008), making any generalizations regarding lessons learned and best practices difficult to ascertain. There has been no attempt by the academic community to amalgamate information on business risks, opportunities, and adaptation strategies across sectors towards universal generalizations. This may be due to the difficulty in creating universalization in an area as varied and diverse as business adaptation, or it may be due to the fact that this area of research is in its infancy. We recommend that further investigation into the causes of this knowledge gap be undertaken.

Where sector studies exist, they are the most comprehensive in the Insurance, Tourism, Agriculture, Energy, Construction and Building, and Water sectors. For other sectors, there is no information on the drivers of business adaptation and very limited information on strategies, barriers, and industry gaps (see Table 8, Report 2). As such, it is recommended that the research community engage in further research work and analysis of business adaptation in these sectors.

CASE STUDIES AND BEST PRACTICES

The most significant knowledge gap in the literature is the lack of case studies, lessons learned, and best practices. As the field currently stands, there has been no systematic methodical attempt to develop business adaptation case studies across all sectors. The literature tends to feature short summary cases, often from

industry reports, on potential adaptation responses businesses could undertake. In general, there is very little information on how businesses actually incorporate climate change adaptation into their operations. It is recommended that future research engage in field work and primary research into the adaptation strategies of actual companies that face risks, opportunities, or both from climate change in order to develop case studies as well as to identify lessons learned and best practices. In Report 3, Section 1, the reasons for the knowledge gap in case research, lessons learned and best practices, were hypothesized to be threefold: 1) businesses are yet to undertake adaptation measures despite real risks and vulnerabilities to climate change possibly due to lack of knowledge, inadequate risk modeling, and poor information on future climate change variability; 2) businesses that have taken on adaptation measures have done so only recently and it is too early to gather empirical findings or literature in this area; and 3) the focus of business remains short-term and on GHG mitigation. It is recommended that future research look into either affirming or refuting these hypotheses.

Other recommendations:

- Make available information on both industry leaders and laggards in adaptation.
- Broaden the scope of primary research on, to make generalizations on best practices possible.
- Study the drivers of business adaptation, about which we know very little.

TOOLS

Finally, the tools available for business adaptation are limited, most focusing on risk. While advancements have been made by governments, more sophisticated tools need to be developed to address the highly particular concerns of businesses of particular sizes, sectors, and geographies. Tools, to date, remain at a high level of generality, and it is suggested that more research be done into creating specific tools that meet the needs of adapting businesses.

SUMMARY OF KEY POINTS

In relation to the research questions set forward in the Introduction, the following knowledge gaps exist:

Lack of consensus on the meaning of business adaptation to climate change

- The lack of a consensus surrounding the meaning of business adaptation to climate change has made risk modeling, opportunity evaluation, and adaptation identification difficult in theory and practice.
- Rigorous field work is needed on how the business community understands adaptation.

Lack of information pertaining to business adaptation:

- There is very little information on how businesses actually incorporate climate change adaptation into their operations
- There is a lack of case studies, lessons learned, and best practices regarding climate change adaptation – both across sectors and at the firm level.

Other recommendations:

- Develop businesses tools for risk assessments, evaluating potential opportunities, and developing adaptation strategies at the firm level.
 - Develop tools available to evaluate opportunities to be gained from adapting to climate change (there is currently only one such tool).
 - There is a need to have more consistent information about industry leaders, and particularly laggards.
 - Interdisciplinary and cross-sectoral research and cooperation on climate change adaptation is needed.
 - More information on drivers, strategies, barriers, and gaps is needed – particularly in the forestry, fishing, mining, manufacturing, retail, health, and ICT sectors.
 - There is a need to broaden scope of primary research on companies and their adaptation process, resulting in better and more applicable lessons learned and best practices derived.
- ### **Lack of tools for business adaptation:**
- Outside of risk management frameworks, there are few tools that businesses can use for adaptation to climate change.
 - There is a need to develop business tools for use in assessing risks, evaluating potential opportunities, and developing adaptation strategies at the firm level.

about the network for business sustainability

MISSION

The Network for Business Sustainability enables business sustainability by fostering collaboration between industry and academia.

VISION

We envision a world where Canadian enterprises contribute to prosperous economies, healthy ecosystems and strong communities.

OBJECTIVES

1. Build and grow a community of researchers and practitioners of business sustainability.
2. Develop a database of state-of-the-art business sustainability knowledge that is relevant to practice.
3. Create opportunities to develop new knowledge that spurs innovation in enterprises.

ACTIVITIES

The Network funds projects to move knowledge between the communities of research and practice, organizes events that bring the members of those communities together, and enables ongoing interaction and knowledge exchange through online tools.

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For more information, please visit nbs.net

about the network's leadership council



Note: The contents of this report do not necessarily reflect the opinions of the Network's Leadership Council.