

THE GREENING OF HIGHER EDUCATION'S ACADEMIC AGENDA:

TEACHING AND RESEARCH
ON CORPORATE SUSTAINABILITY
AND NATURAL CAPITAL



AUGUST 2013

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1. EXECUTIVE SUMMARY

“OVER THE LAST 50 YEARS, HUMAN ACTIVITY HAS ALTERED ECOSYSTEMS AT A FASTER RATE AND ON A LARGER SCALE THAN AT ANY TIME IN HUMAN HISTORY”

U.N. MILLENNIUM ECOSYSTEM ASSESSMENT

Environmental sustainability has rapidly become one of the largest issues facing society. Issues such as extreme weather events, volatile commodity prices, natural resource shortages, decreasing air and water quality, deforestation and biodiversity loss are increasingly visible through their impact on society and business.

Natural capital impacts, such as pollution and unsustainable demand for natural resources, are compromising nature’s ability to deliver economic growth and the problem is expected to intensify with the arrival of 3 billion new mass-affluent consumers by 2030. The primary production and primary processing sectors alone are estimated to have unpriced natural capital costs totalling US\$7.3 trillion, which equates to 13% of global economic output in 2009.¹

Trucost set out to examine the question - to what extent are higher education institutions specifically addressing natural capital as part of research and teaching curricula?

Natural capital, an extension of the economic notion of capital to goods and services delivered by the natural environment, provides much needed business context. Currently the value of natural capital (such as land for cattle ranching and farming, raw materials such as water and minerals, breathable air, pollination, pest control, and a livable climate) and our collective impact on the ability of nature to provide these services tends not to be factored into economic accounting. The result is that the available natural capital is being damaged and used at an unsustainable rate.

As awareness of the significance of natural capital and environmental sustainability has grown, companies, investors, governments, and civil society have increasingly demanded a work force that is skilled to better identify, understand, and provide solutions to these issues.

Trucost’s review of available research and teaching materials finds a 3-4 fold increase in the number of academic research institutions, publications and courses offered that are focused on sustainability and natural capital globally, over the last decade. Mainstream academic journals represent the largest segment publishing this research. Several examples illustrate effective ways that sustainability and natural capital are being used to advance academic research and student learning in the classroom. Still, research into natural capital and the study of business and the natural environment currently make up just a fraction of academic work, presenting an opportunity for academic institutions to contribute at the cutting edge of business management and scientific debates.

2. INTRODUCTION

2.1 CONTEXT

Environmental sustainability has become an increasingly evident concern. Issues such as extreme weather events, volatile commodity prices, natural resource shortages, decreasing air and water quality, deforestation, and biodiversity loss, appear routinely in the news and are impacting society and business in more intensive ways.

Growing visibility of environmental sustainability is not surprising. Increasing pollution and demand for natural resources are threatening the ability of nature to provide the natural capital on which society and business depend, for example land for cattle ranching and farming, raw materials such as water and minerals, breathable air, pollination, pest control and a livable climate. The term natural capital extends the economic notion of capital to goods and services delivered by the natural environment, providing much needed business context. Currently the value of these services, and our collective impact on the ability of nature to provide them, tend not to be factored into economic accounting and the result is that our natural capital is being damaged and used at an unsustainable rate.

This natural capital cost from primary production (agriculture, forestry, fisheries, mining, oil and gas exploration, utilities) and primary processing (cement, steel, pulp and paper, petrochemicals) sectors alone are estimated to total US\$7.3 trillion, or 13% of global economic output in 2009. The majority of these natural capital costs are from the emission of greenhouse gasses (38%) followed by water use (25%); land use (24%); air pollution (7%), land and water pollution (5%) and waste (1%).²

And our problem is getting larger. A surging global population is increasing our impact on natural capital. Between 1960 and today, the global population more than doubled from 3 billion to 7 billion people. Consumption is also rising, as more people from countries like China and India enter the middle class. By 2030, it is expected that there will be 3 billion new middle class consumers, most from Asia.³

As awareness of the significance of natural capital impacts and environmental sustainability grows, companies, investors, governments, and civil society need a work force that is skilled to better identify, understand, and provide solutions to these issues. Studies have found that over half of CFOs and CEOs state that they include natural capital concerns in their company's business-risk evaluations and forty-nine percent identified natural capital as a financially material issue for their business, linking it directly to operational, regulatory, reputational and financial risks.⁴ Companies are beginning to respond and the size of their teams focusing on sustainability issues is growing.⁵

This paper reviews how academic institutions are working to address this imperative through research and the education of future business leaders.

2.2 OBJECTIVE

Over the past twelve years that Trucost has been researching natural capital issues, we have observed a dramatic increase in the number of sustainability related publications in the popular press and academic literature. Because natural capital focuses on business and the natural environment, we were curious -- to what extent are higher education institutions specifically addressing natural capital as part of their research and teaching curricula?

To answer this question, Trucost reviewed the number of sustainability related academic publications and courses, and examined how natural capital is being incorporated into the academic agenda through several course examples. The following assessment is a meta-analysis that aggregates and builds upon research into aspects that have been completed previously by a number of organizations and individuals. The aim is to provide a more holistic review by combining and synergizing relevant research into higher education's green agenda and the extent that such institutions are focusing on natural capital.

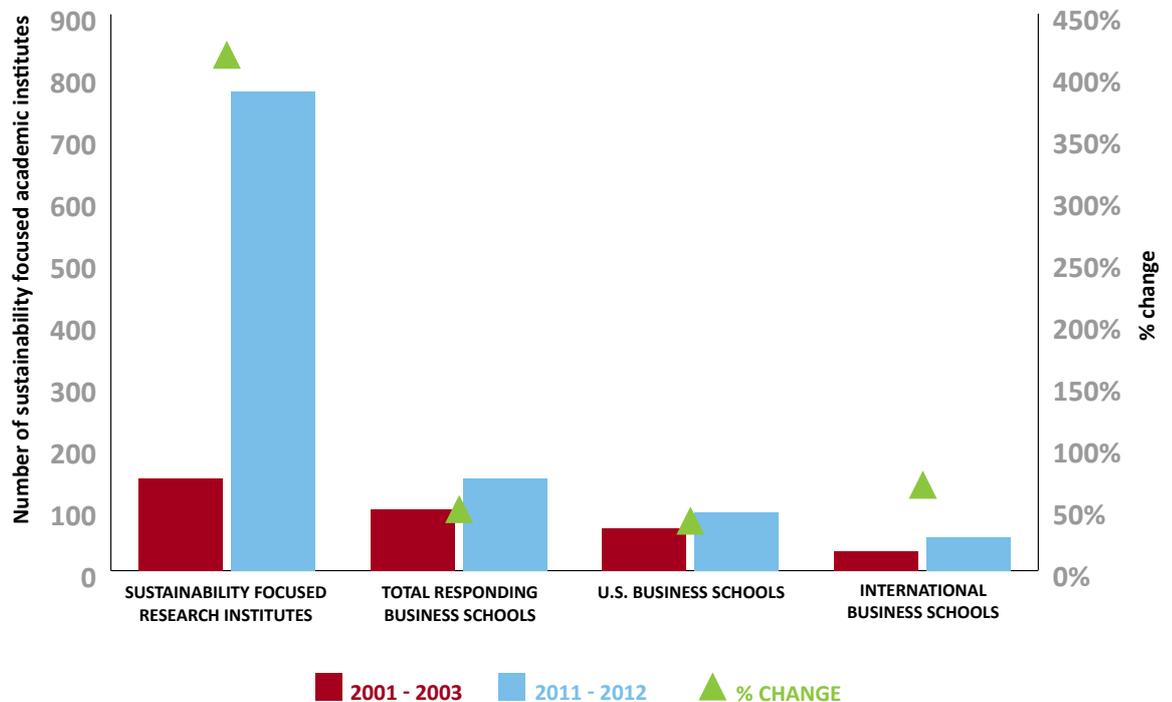
3. FINDINGS

3.1 NUMBER OF ACADEMIC RESEARCH INSTITUTIONS

There has been a dramatic increase in the number of academic institutions with sustainability programs, but few have transitioned to focus on natural capital.

As of 2012, 775 academic institutes and centers have been identified as having a focus on sustainability.⁶ However, only 20% of these have a focus on natural capital. The number of sustainability focused academic institutes has more than quadrupled since 2003 (See figure 1). Of the 600 business schools surveyed, the number of schools responding has increased by 49% during the same time period, including a growth of 69% from international business schools.

FIGURE 1: NUMBER OF SUSTAINABILITY FOCUSED ACADEMIC INSTITUTIONS

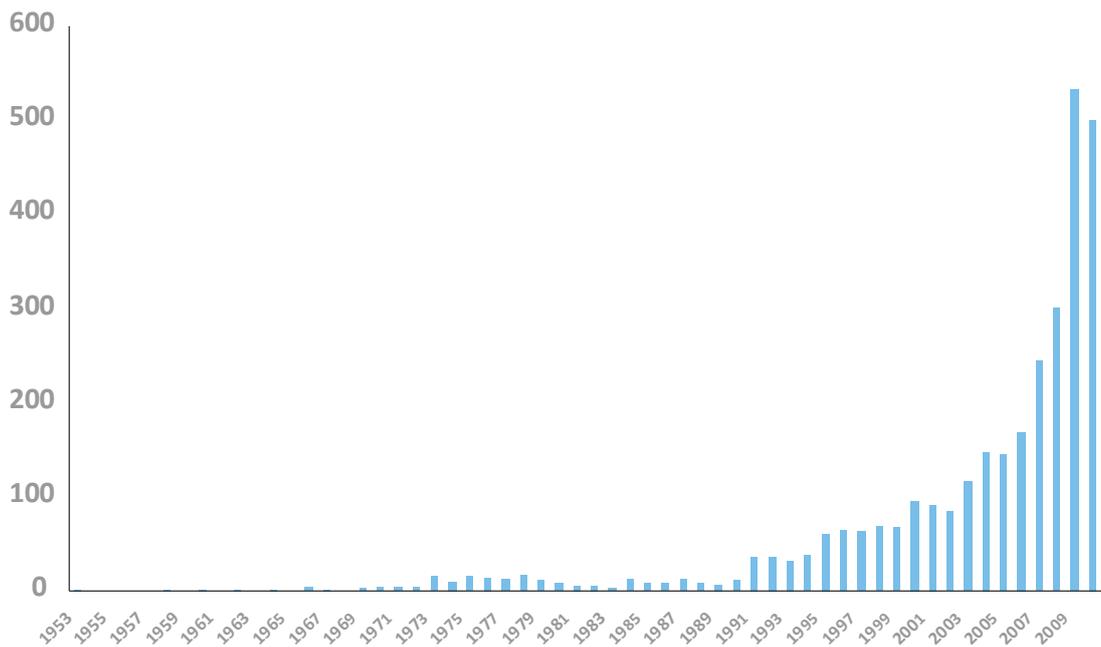


3.2 NUMBER OF RESEARCH PUBLICATIONS

There has been a significant increase in the number of academic publications focusing on sustainability, but only a small percentage focus on natural capital.

A recent detailed review of published academic articles by Linnenluecke and Griffiths identified 3,117 publications focused on “corporate sustainability” between 1953 and 2011. The review found that the number of publications produced has grown exponentially (see figure 2).⁷

FIGURE 2: NUMBER OF SUSTAINABILITY FOCUSED PUBLICATIONS



SOURCE: LINNENLUECKE, M. K., & GRIFFITHS, A. 2012.

This finding is supported by data from the Aspen Institute’s Beyond Grey Pinstripes as illustrated below in Figure 3. The research shows that during the last decade, the number of sustainability focused publications produced biennially has increased by almost 200%.

Natural capital research publications, focusing on business impacts on the natural environment, have also grown considerably in recent years. This is shown by the results of a recent review of 874 articles in this field published in specialized or traditional (non-specialized) journals between 1975 and 2010 (See Figure 4).⁸ A sign that natural capital/business and natural environment publications resonate with a broad audience, it is interesting to note that the majority of growth in such publications has occurred in mainstream journals (non-specialized). See Appendix for a listing of journals where the most business and natural environment articles have been published.

FIGURE 3: NUMBER OF SUSTAINABILITY FOCUSED PUBLICATIONS⁹

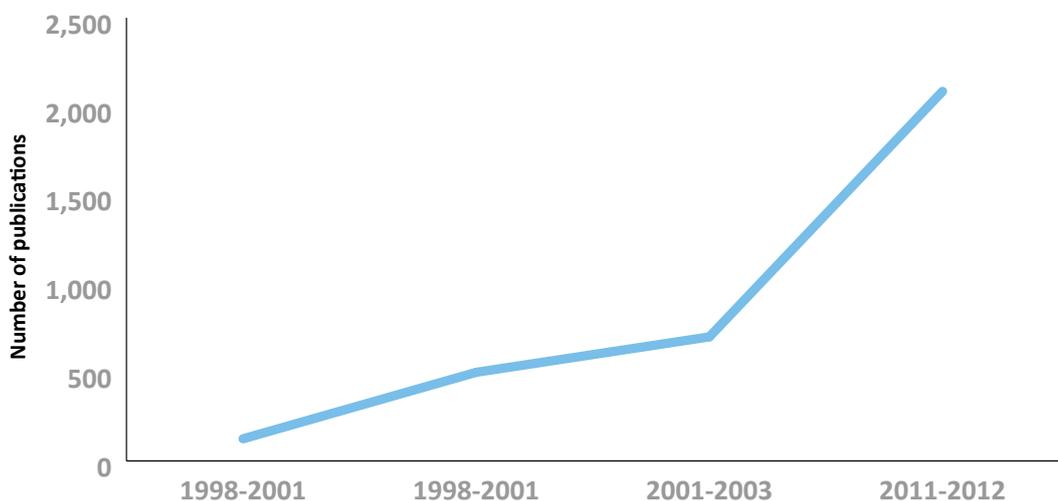
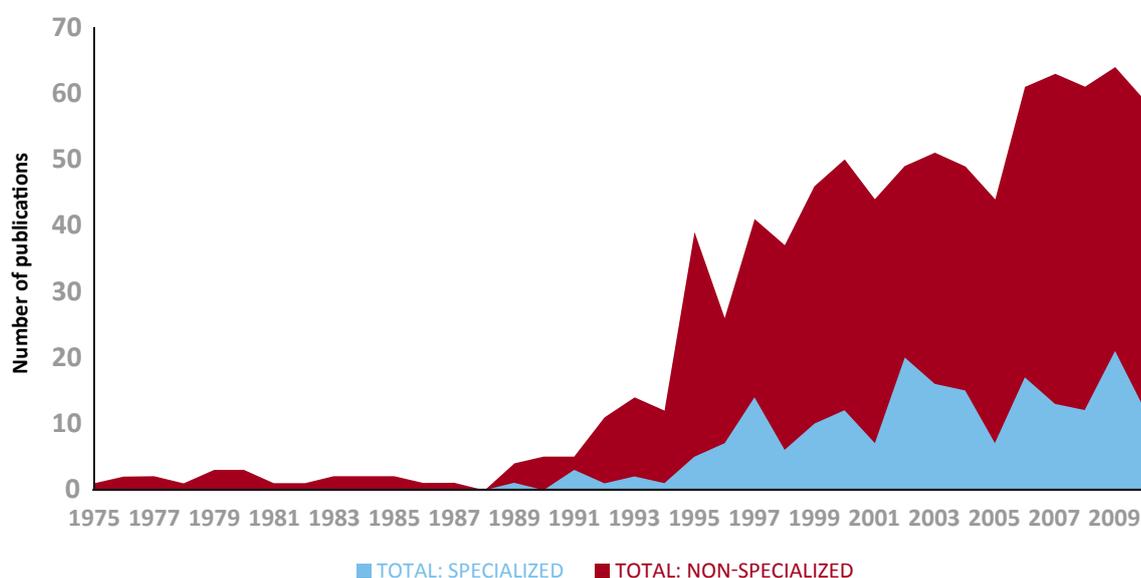


FIGURE 4: NUMBER OF BUSINESS AND NATURAL ENVIRONMENT PUBLICATIONS PER YEAR¹⁰



While research into natural capital has grown, it still only makes up 10% of the sustainability publications identified by Beyond Grey Pinstripes in 2011-2012.¹¹ This presents open research opportunities in the field of business and natural environment at the cutting edge of business management and scientific debates.¹²

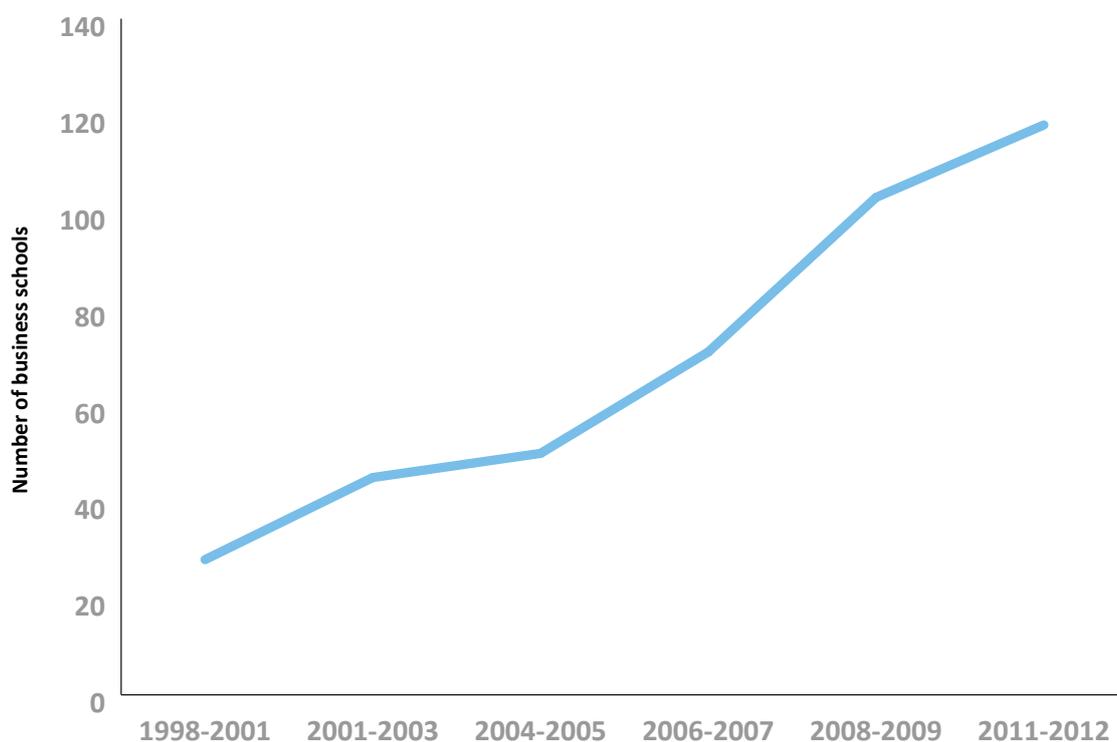
3.3 NUMBER OF BUSINESS SCHOOL COURSES

The number of business school courses that incorporate sustainability themes has also grown significantly, though the proportion of courses focusing on natural capital remains small. As shown in Tables 1 & 2 below, more than 5,250 business school courses being offered were identified as integrating sustainability in 2012, up from 1000 in 2003. In addition, the number of business schools that require MBA students to take a course dedicated to social and environmental sustainability issues has increased over 300% from 28 institutions in 2001 to 118 in 2012 (see figure 5).

TABLES 1 & 2: NUMBER OF COURSES INCORPORATING SUSTAINABILITY AND NATURAL CAPITAL

	COURSES INCORPORATING SUSTAINABILITY		COURSES INCORPORATING NATURAL CAPITAL
2001-2003 ¹³	1,000	2011-2012 ¹⁴	897
2011-2012 ¹⁵	5,263	% of total	17%
% change	426%		

FIGURE 5: NUMBER OF BUSINESS SCHOOLS REQUIRING A SUSTAINABILITY FOCUSED COURSE



Almost a fifth of the courses (897) identified in 2012 included natural capital themes in their classroom content. Several example courses highlighting how natural capital has been incorporated into course teaching material are provided below.

3.4 LEADING EXAMPLES OF COURSES INTEGRATING NATURAL CAPITAL THINKING

Courses from Dartmouth (Tuck), Duquesne (Polumbo) and Northwestern (Kellogg) provide excellent examples highlighting best practice for integrating natural capital into business school courses.

COURSES:

Academic institution: Dartmouth College – Tuck Business School

Professor: Anant K. Sundaram

Course title: Business and Climate Change

Course type and curriculum contribution: Elective, requiring prerequisites of courses/training in Managerial Economics and Corporate Finance. Tuck requires at least one course that explores the ethical and social (including environmental) challenges of business.

Course objectives:

“...to explore: (i) whether CEOs and CFOs of shareholder value-maximizing companies should care about climate change and the emerging climate economy; and if so, (ii) why they should; (iii) how they might; and (iv) what they can learn from the many forward-thinking companies that are getting in front of this issue.”

Example of how natural capital is integrated into the classroom experience:

Fossil Fuel Beta (FFB)¹⁶ Assignment: In this assignment, students use provided data on company stock returns and company greenhouse gas emissions so they can calculate the FFB of a set of firms in various industries, and are asked to interpret their findings. The goal of the assignment is for students to understand, and develop arguments for why some companies have a neutral (or, even positive) FFB while others have a negative FFB. Through this assignment students will develop frameworks to assess the market value consequences of firms' exposure to climate change, their fossil fuel use, carbon footprints and GHG emissions; and use economic analysis tools to assess impacts of likely regulatory responses to climate change. Students should ultimately be able to assess what the implications are for company leadership, and their management of the effects of energy use and carbon intensity on company cash flows and cost of capital.

Academic institution: Duquesne University – A.J. Palumbo School of Business Administration

Professor: Thomas J. Nist

Course title: Advanced Financial Problems

Course type and curriculum contribution: **Elective, part of an MBA concentration in finance.**

Key Course objectives:

"I. Critically evaluate financial problems as presented in case studies by assessing situations and data provided by the case and researching other facts relevant to addressing the issues that are raised in the assigned case."

And "VI. Demonstrate a level of proficiency in the following areas:

- a. Assessing the financial performance of a firm*
- b. Evaluating alternative cash flow scenarios*
- c. Evaluating a potential merger/acquisition opportunity*
- d. Optimizing the capital expenditure plan for a firm*
- e. Supporting strategic business challenges with financial analysis*
- f. Estimating the working capital needs of a growing firm*
- g. Forecasting the impact of changes in production strategy*
- h. Evaluating a recapitalization proposal*
- i. Addressing the unique issues that arise for multinational companies*
- j. Evaluating corporate risk management approaches"*

Example of how natural capital is integrated into the classroom experience:

Crawford Chemicals Assignment: Carbon risk management is examined as a complex financial problem facing business decision-makers through the examination of a detailed case study of Crawford Chemicals. In the study, an environmental dilemma is presented (the growth of carbon dioxide, its role in climate change, and need for government intervention through cap & trade or alternative carbon pricing schemes), company carbon emissions are introduced as a potential measure of risk, and Crawford Chemical's carbon emissions, financial situation, and cost of emission reduction activities are presented. Students are asked to; identify and analyze the environmental, reputation and regulatory risks facing Crawford Chemicals; identify what the key variables are for developing an strategic action plan; determine the alternative decisions available to Crawford Chemical and what their tradeoffs are; and provide a

recommendation on what Crawford Chemical should do. This case provides opportunities for students to; consider the implications of the company's financial situation and position in the chemical market; assess the implications of the competitive market landscape, and the elasticity of the chemical industry (supply and demand).

Academic institution: Northwestern University – Kellogg School of Management

Professor: David Chen

Course title: Impact Investing

Course type and curriculum contribution: Elective, counts toward the following program focus areas: Finance, and Social Enterprise.

Key Course objectives:

This course will explore the breadth of investment & fund strategies in the emerging field of Impact Investing from the vantage point of institutional money managers. Reviewing questions including:

- Can capital markets and financial innovations be applied to catalyze & solve social & environmental opportunities?
- What if the financial creativity that created the CDO (collateralized debt obligations) and ABS (asset back securities) was directed at addressing the massive market opportunities in climate change, resource constraint, and bottom-of-the-pyramid?
- Can an investment strategy focused on impact (creating positive change in the environment and society) also generate superior financial returns?
- How are institutional investors responding or catalyzing these strategies?

Example of how natural capital is integrated into the classroom experience:

Financial vehicle project: For the final course project, students create a financial vehicle (e.g. investment firm, fund or instrument) capable of fitting within the asset allocation of portfolios invested in by institutional investors (public equities, fixed income, hard assets, private equities, alternative assets, etc.) while also delivering positive social/environmental impact. This assignment provides students with the challenge of; defining and assessing market opportunities; developing an investment hypothesis including how financial and environmental benefits will be generated; identifying critical risks and conducting due diligence; and establishing methods for measuring outcomes (financial and environmental/social).

4. CONCLUSIONS & IMPLICATIONS

KEY FINDINGS

There has been significant growth in the integration of sustainability into the work of academic institutions, highlighted by a 3-4 fold increase in the number of research institutes, academic publications and courses focused on sustainability in the last decade.¹⁷ However, research into natural capital, or the study of business and the natural environment currently makes up just a fraction of academic work by business schools on sustainability. Only 17% of the sustainability courses and 10% of the publications identified by Beyond Grey Pinstripes in 2011-2012 had a focus relating to natural capital themes (e.g. environmental performance, pollution, natural resource use, etc.).¹⁸ This finding is supported by Goodall who discovered that just 9 published articles reference “global warming” or “climate change” out of approximately 31,000 articles published between 1970 and 2006 in the top-30 business and management titles.¹⁹ This current research lacuna is an opportunity for academic institutions to make contributions at the cutting edge of business management and scientific debates.²⁰

The existing literature into natural capital and business has focused on empirically examining the relationship between a company’s environmental and/or social performance and its financial performance.²¹ As has been further suggested by Linnenluecke and Griffiths, many other interesting research questions remain which would make solid contributions to the corporate sustainability field including: how companies are valuing ecosystem services, and if companies that value ecosystem services are better at managing risks and delivering financial returns.

5. APPENDIX – NUMBER OF BUSINESS AND NATURAL ENVIRONMENT ARTICLES BY JOURNAL

Table 2 Distribution of B&NE articles by journal

<i>Journal</i>	<i>No. articles</i>
<i>Journal of Industrial Ecology</i>	36
<i>Academy of Management Journal</i>	29
<i>Business Strategy & the Environment</i>	27
<i>Academy of Management Review</i>	25
<i>Organization & Environment</i>	25
<i>Strategic Management Journal</i>	25
<i>Journal of Business Ethics</i>	20
<i>Accounting, Organizations and Society</i>	19
<i>Accounting, Auditing and Accountability Journal</i>	17
<i>Journal of Cleaner Production</i>	17
<i>Journal of Environmental Economics and Management</i>	17
<i>California Management Review</i>	16
<i>Greener Management International</i>	15
<i>Production and Operations Management</i>	12
<i>Harvard Business Review</i>	10
<i>Journal of Management Studies</i>	10
<i>Administrative Science Quarterly</i>	9
<i>Journal of Economics and Management Strategy</i>	9
<i>Management Science</i>	9
<i>Ecological Economics</i>	8
<i>Journal of Business Venturing</i>	8
<i>Organization Studies</i>	8
<i>Organization Science</i>	7
<i>Policy Sciences</i>	7
<i>Advances in Environmental Accounting and Management</i>	6
<i>Journal of Marketing</i>	6
<i>Journal of Operations Management</i>	6
<i>Sloan Management Review</i>	6
<i>Academy of Management Executive</i>	5
<i>Advances in Public Interest Accounting</i>	5
<i>American Behavioral Scientist</i>	5
<i>Corporate Governance</i>	5
<i>Corporate Social Responsibility and Environmental Management</i>	5
<i>European Accounting Review</i>	5
<i>Journal of Law and Economics</i>	5

SOURCE: HOFFMAN, A. AND S. GEORG (2013) "A HISTORY OF RESEARCH ON BUSINESS AND THE NATURAL ENVIRONMENT: CONVERSATIONS FROM THE FIELD," IN S. GEORG AND A. HOFFMAN (EDS.) BUSINESS AND THE ENVIRONMENT: CRITICAL PERSPECTIVES IN BUSINESS AND MANAGEMENT, VOLUME I (OXFORD, UK: ROUTLEDGE): 1-58

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JULY 2013

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