

A New Course on Sustainability Entrepreneurship

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Abstract

Entrepreneurship typically focuses on identifying opportunities for creating value for customers, ultimately yielding a profit for the founders and investors. Entrepreneurship courses and texts share this focus. Sustainability entrepreneurship takes a slightly different perspective, however, by emphasizing the additional goal of promoting sustainable living, in terms of social equity and environmental improvement. From an entrepreneurial perspective, such an emphasis presents opportunities in the form of innovative products, services, and production processes that alleviate social or environmental conditions, make more efficient use of energy and natural resources, and harness renewable resources that save costs, lower risks, and are less harmful to society in the long-run. At present, there is no suitable text on the subject. This paper proposes a framework, learning objectives, course outline, and content for a “Sustainability Entrepreneurship” course for graduate and undergraduate students.

Introduction

Entrepreneurship typically focuses on identifying new opportunities for creating value for customers or users and commercially developing those opportunities to establish a profitable business (Shane and Venkataraman 2000). The opportunities identified can be for new products or services, new markets, new production processes, new raw materials, or new ways of organizing existing technologies, as first pointed out by Schumpeter (1934). While Schumpeter recognized that entrepreneurs can be driven by non-economic motives such as a desire for creativity or power, economic theories of entrepreneurship generally emphasize the role of profit as one of the major underlying goals of entrepreneurs and investors in developing a new venture opportunity.

Sustainability entrepreneurship (SE) takes a slightly different perspective from the traditional focus of entrepreneurship by emphasizing additional goals of promoting sustainable living and environmental improvement. An emphasis on sustainability within entrepreneurship involves searching for opportunities for new products or services or new technologies or production processes that alleviate social or environmental conditions, make more efficient use of energy and natural resources, and harness new resources that are more abundant, cheaper to produce, and less harmful to society. From an entrepreneurial perspective, such an emphasis presents opportunities in the form of innovative production processes, cost savings, lower risks, and the potential to tackle the world’s critical problems. At present, there is no suitable text on the subject. This paper proposes a framework, learning objectives, course outline, and content for a “Sustainability Entrepreneurship” course for graduate and undergraduate students. It also offers suggestions on the coursework and evaluation of such a course.

What is Sustainability Entrepreneurship?

Sustainability is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission 1987). The Brundtland Commission defined sustainable development as the process in which the exploitation of natural resources, the allocation of investments, and the process of technological development and organizational change are in harmony with each other for both current and future generations. SE can be defined as the continuing commitment of business to behave in an ethical way and contribute toward economic development while improving the quality of life of the workforce, their families, and the local and global community, as well as future generations (World Business Council for Sustainable Development). From a SE perspective, entrepreneurs have a responsibility to their investors and shareholders but also to nature, society, and future generations.

SE can be regarded as involving the three Ps: people, planet, and profit (Crals and Vereeck nd). The first aspect, people, refers to an enterprise's treatment of its workforce, the protection of human rights, guarding against child labor and imposing self-restraint in desisting from following unethical labor practices. It might include creating jobs, which is a laudable goal but cannot be undertaken without simultaneously considering its impact on the third P, profit. The second aspect refers to the impact of the company on natural resources and the environment. Protecting the ecosystem is integral to an SE perspective in terms of becoming a major goal (alongside profit-making) for a company or a criterion for evaluating strategy. Thus, SE may be regarded as a process that creates enterprises that "can be contributory and restorative in their interactions with human and ecological systems" (Tilley 2007). The third aspect, profit, is the essence of a business enterprise. When broadly defined, profit relates not just to the financial returns of the enterprise, but to the allocation of the financial returns between investment in machines, infrastructure, R&D and other uses, and the distribution of the gains between those involved in the entrepreneurial process. The concept of SE is dynamic in the sense that the chief concerns regarding people and the ecosystem are likely to evolve over time. It could be argued that the first generation of companies practicing SE focused on employing processes that saved money while the second generation has focused on new ventures that make new products that contribute to enhancing sustainability.

Learning Objectives and Course Content

Since SE is an emerging concept, the authors' research indicated it is not yet offered as a course by universities in the US (although several schools now offer courses in social entrepreneurship). However, SE was introduced as a mandatory course in the engineering curriculum at Delft University, Netherlands, as early as 2001 (Bonnet et al 2002). This course approached sustainability in terms of the three Ps referred to earlier in this paper (people, planet, profit). The course is team-taught by engineering professors, social scientists, sustainability experts, and relevant practitioners, including account managers of the local Rabobank. The University of Victoria, Canada, also offers a course in Global and Local Sustainability and, according to their website, their entrepreneurship specialization "emphasizes a focus on sustainability" at the undergraduate and MBA level (Source: <http://www.business.uvic.ca/green/courses/bcom/>).

A course on SE would include several learning objectives; this paper identifies four important ones. The first objective would be to understand and imbibe the concepts of sustainability and sustainability entrepreneurship, and distinguish SE from traditional economic entrepreneurship as well as from social and environmental entrepreneurship.

Secondly, students of SE would need to learn about the ecological problems facing local and global communities and recognize opportunities that arise even in crisis situations, and ways in which those trends offer business opportunities for entrepreneurs. In order to recognize opportunities for developing SE projects, it is necessary to investigate and evaluate all the various aspects of the business and policy environment that have an impact on SE decisions. An evaluation of corporate behavior in the context of sustainability would also be valuable.

A third learning objective would be to enable students to evaluate the rewards and risks of undertaking SE, which would involve finding ways to measure the economic as well as social and environmental risks and rewards of a new venture. It would also involve measuring and comparing the short-term economic risks and returns of the venture with the long-term expected benefits. Students would appreciate the difficulties of measuring longer term environmental, human, and social benefits, and find ways to weigh those benefits along with economic benefits against the anticipated costs and risks.

An evaluation of the sources of funding and financial structuring of SE ventures would be a further learning objective of the course. While SE courses should introduce students to sources of non-venture capital early-stage financing, the current high level of venture capital involvement in "clean and green" technology suggests that SE courses should also include coverage of the venture capital investment process and enable students to understand the types of clean tech projects, in terms of their projected market, type and stage of technology, and geographical location, funded by venture capital. Students would also have to learn practical skills of developing a SE analysis and business plan.

The Concept of Sustainability Entrepreneurship

An important point of departure for a course on SE would be for students to understand what SE is. Using the framework developed by Young and Tilley (2006), it is possible to argue that SE can be distinguished from economic entrepreneurship as well as social and environmental entrepreneurship in terms of its emphasis, even though these different perspectives are interrelated (see Figure 1). For instance, SE emphasizes the economic efficiency and effectiveness aspects of economic entrepreneurship but includes inter-generational economic equity as an added consideration. Like social entrepreneurship, SE considers issues of social responsibility and socio-effectiveness but also brings in considerations for the future. While the concept of social entrepreneurship is subject to definitional ambiguity in terms of whether or not it refers exclusively or primarily to non-profit enterprises, it can be argued that SE is consistent with entrepreneurs striving simultaneously for profit and for improving local and global environmental and social conditions (Cohen and Winn 2007). In addition to issues of environmental stability and ecological equity considered by environmental entrepreneurship, SE emphasizes environmental sustainability. Thus, SE takes into account both social aspects and environmental

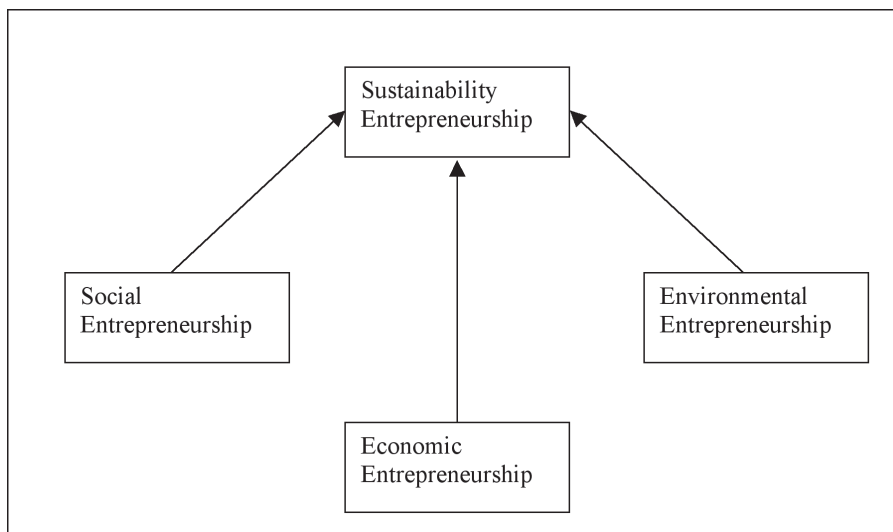


Figure 1, Adapted from Tilley (2007)

effects while also considering the long-term economic and business consequences of new venture opportunities, as indicated by Figure 1.

Students in SE courses must learn that SE is connected to other types of entrepreneurship, and while the outcomes of SE might be evaluated differently from the other types of entrepreneurship, the approaches and procedures of SE build from the other types. This learning objective should be accomplished early in the course.

Creating Sustainability Entrepreneurship Opportunities

Cohen and Winn (2007) argue that four types of market imperfections, namely, inefficient firms, externalities, flawed pricing mechanisms, and information asymmetries, play a part in causing environmental degradation. However, these imperfections also offer opportunities for the creation of radical technologies and innovative business models. Entrepreneurs tend to be more adept than large, established companies at exploiting new technologies and adopting new business models. Students in SE courses need to develop this mindset at the outset when studying how to create new business opportunities that will be economically viable but will not compromise the environment.

There is a pressing need for entrepreneurs to search for environmentally friendly technologies and products and identify the technologies that are going to succeed in providing sustainable solutions to current problems. Fossil fuels currently supply over 80% of the world's energy demands and that proportion is expected to remain constant until 2030 even as the total global energy consumption continues to escalate (Rosenberg and Dockendorf 2006). The sectors experiencing growth within the "green" or "clean tech" industry will vary over time with technological advances. Currently, the sectors predicted to grow include the solar, biomass fuel, and green building sectors as well as cleaner coal and nuclear power.

Students of SE would be required to study trends in consumption of different forms of energy (or some specific natural resource) around the world to determine the nature and magnitude of environmental and social problems, and to identify and evaluate alternative sources of energy or ways to enhance efficiency in energy consumption. The latter might involve a careful study of energy consumption in specific cases or circumstances of the target market, leading to the identification of opportunities such as a better design of

facilities and retrofitting existing buildings. The study might also enable students to spot other opportunities such as methods for cleaner use of coal, building new types of engines, and exploiting alternative sources of energy, like geothermal, wind, tidal, and solar power, or combinations of these energy sources. Such a study would help students to comprehend the broader concept of “opportunity” in SE and the fact that there are many entrepreneurial opportunities that are both economically sustainable and environmentally beneficial (Krueger nd). The opportunities may involve incremental or radical innovation in the product, process, or business model.

While entrepreneurship typically implies the creation of new ventures by individuals or teams of individuals, it has been argued that SE is an approach used more often by large companies that can afford such an approach and desire the reputation that can be gained from being regarded as ethical and socially responsible (Bos 2002). Many large companies like Nike, Levis, Philips, and Unilever now publish their yearly sustainability reports. Wal-Mart is regarded as being one of the most environmentally conscious companies in the US that has used existing technology to lower energy consumption (Doerr 2007).

However, the argument that SE is the domain of big business rests on two implicit assumptions: first, that business strategies aimed at sustainability are more expensive than those that do not involve considerations of sustainability. Second, that the benefits of SE accrue in greater measure to large, established firms than to start-ups. Both these assumptions are open to question. Thus, a course on SE can help students learn that individuals can be empowered to undertake entrepreneurial activities in harmony with the three P’s.

An important factor affecting SE decisions is the nature of government policy and the time horizon adopted by it. Federal and local government policy can actively encourage or discourage investment in SE projects by mandating requirements or offering incentives to encourage companies to take action. The US government has provided billions of dollars of subsidy over the years to help develop technology in ethanol, solar, and wind projects. The Brazilian government’s implementation of flexfuel laws for cars has significantly increased the use of ethanol in cars and reduced the nation’s reliance on oil. The overriding need is for government policy to remain stable over the long term so that entrepreneurs as well as large companies can make sound investment decisions that promote sustainability. For instance, Germany has a twenty-year environmental policy compared with much shorter term policies in the US. Japan too has provided enough continuity in its solar policies to stimulate production and use.

Evaluating the Rewards and Risks of SE

Students in SE courses need to understand that while the goal of sustainability is socially desirable, not every SE idea is an SE opportunity. Timmons and Spinelli (2003, 224) identify several risks of a new venture: technology risks, market risks, management risks, competitive and strategic risks, and financial risks. Risk considerations are integral to financing innovation, because investors part with something certain at the outset (their investment) in order to get back something uncertain in the future (their return on investment). The trade-off between risk and return is one of the most fundamental components of financial theory and practice. In the case of SE projects, these are harder to evaluate since they require measuring not only the economic risks and rewards but also the social and environmental risks and rewards of a new venture over the long-term. Thus, students in SE courses can acquire tools developed in economic entrepreneurship that can be applied to the evaluation of SE opportunities. In order to learn these skills, students might be required to evaluate the sustainability benefits of a specific venture (by way of a case study or a sample business plan) in terms of its impact on environmental protection, social justice, and long-term human survival, and compare that with the venture’s expected profitability and growth. This is often referred to as “managing the triple bottom line” (Dixon and Clifford 2007, 26).

By focusing on SE, new ventures can potentially gain in several ways, including:

- lower dependency on depletable resources
- higher utilization of regenerating or renewable resources
- superior insight into market opportunities and preferences
- efficient production due to superior technologies and better skilled staff
- efficient internal business dynamics
- higher motivation of employees and attractiveness for new employees

- lower burden from changes in environmental and social legislation
- risk control (lower risk of environmental accidents, bad publicity)
- basis for building a positive image and reputation
- corporate social responsibility
- business partnership with other sustainability entrepreneurs and global players

Students would be asked to evaluate the extent of these benefits for a specific project and compare those with the initial capital costs and risks of a SE project. The initial costs are likely to depend on the nature of the project, mostly in terms of its level of innovation and technological requirements. Initial costs would be high in projects that involve radical innovation in terms of developing new technologies, for instance, hybrid technologies or those involving effectively harnessing solar power and other renewable energy sources. On the other hand, SE opportunities can be based on incremental innovation, traditional, existing, or low cost technologies, and those involving innovative business models. For example, Kiva, an internet-based micro-finance startup that aims to promote entrepreneurship and sustainable development in sub-Saharan Africa by connecting lenders and borrowers via the internet, was started with relatively little capital (www.kiva.org).

Financing SE

As with all forms of entrepreneurship, financing considerations are important to SE. In the Timmons Model of the entrepreneurial process (Timmons and Spinelli 2003), the key is to find a balance between the entrepreneur/team, opportunity, and resources. Financial resources are significant, because without financing the entrepreneur will not be able to commercialize the innovation/opportunity. Timmons and Spinelli's business plan template (p. 229) includes sections on the financial plan and the proposed investment offering. The financial plan presents forecasted financial statements (income statements, balance sheets, and cash flow statements), breakeven calculations, and cost control. The offering section details the desired financing, the securities being offered, the company's capitalization table, and the use of funds. These issues must be considered if SE is to lead to a viable business.

A course on sustainability entrepreneurship should provide coverage on the financial plan, the company offering, and the risks facing the new venture. This section will discuss how considerations of financing sources, financial forecasting, determining financing needs, and risk analysis can be applied to SE. Typical sources of financing for new entrepreneurial ventures are: a) the entrepreneur/team, b) friends and family, c) angels/private investors, and d) venture capitalists. As a new venture develops from the seed stage to start-up and expansion stages, it will often proceed step-by-step through these financing sources. Each subsequent stage of development typically requires larger amounts of financing than the preceding stage, and the financing sources are ordered from least amount of funds (entrepreneur/team) to the greatest (venture capitalists).

SE courses, as with most entrepreneurship courses, will typically involve early-stage entrepreneurship. Thus, sorting opportunities from ideas, developing business models and value propositions, and writing business plans will be central parts of such courses. Perhaps SE courses should focus on non-venture capital financing since this will match with the stage at which the students typically find themselves. While SE courses should include components of non-venture capital early-stage financing, the current high level of venture capital involvement in green technology suggests that SE courses should also include coverage of the venture capital investment process.

The Venture Capital Industry. Venture capitalists (VCs) are professional money-managers who invest other peoples' funds into high-growth private firms. VCs provide money, advice, and contacts that help an early-stage startup develop into a firm that becomes: a) an ongoing concern via an Initial Public Offering, or b) a viable candidate for a merger or acquisition by another firm. These "exits" provide the VCs' investors with a (hopefully) high return on investment, and in turn, handsome compensation to the VCs. (Many, or most, venture-backed startups do not achieve these positive exits and either end up in bankruptcy or in the limbo of the "living dead.")

VCs and their investors are not the only beneficiaries of this process. In 2005, US VC-backed companies employed more than ten million workers, generated \$2.1 trillion in revenues, outperformed non-venture-backed

firms, and were concentrated in heavy R&D industries; venture-backed companies contributed 16.6% to the US GDP and 9% of US private-sector employment (Global Insight 2007).

Venture Capital and Clean Technology Investment. According to Cleantech Venture Network LLC, clean technology, or “clean tech,” is new technology and related business models offering competitive returns for investors and customers while providing solutions to global challenges. While greentech or envirotech represent the technology of the past that presented limited opportunity for attractive returns, clean tech is driven by market economics and offers greater financial upside and sustainability. Clean tech is driven to find superior performance at lower costs, to reduce or eliminate negative ecological impact, and to improve responsible use of natural resources.

VC investment in clean tech doubled from \$1.3 billion in 2005 to \$2.6 billion in 2006 (Stack 2007). According to John Doerr, the preeminent US VC and partner at Kleiner Perkins Caufield & Byers, clean tech investment opportunities facing VCs lie in the three C’s: cars, coal, and conservation, implying that the biggest opportunities for reducing greenhouse gas emissions are to reduce reliance on gasoline-powered cars and coal and to increase conservation. Interestingly, Stack (2007) tabulates that energy, transportation, and recycling and waste industries received the largest amounts of VC funds in 2005 and 2006. Doerr notes that VCs are in a great position to foster development of new technologies and products in these areas because financing innovation is the essence of what VCs do.

Venture capital will play a significant role in stimulating SE, and so deserves coverage in a SE course. However, part of the VC investment process is to develop a viable, stand-alone business—VCs get returns only when there is an “exit.” Since successful innovation requires commercialization and market success, and being market-oriented is central to the definition of clean tech given above, then how to build a business must be part of the learning outcomes that students obtain in a SE course.

Conclusion

This paper has contributed toward developing the learning objectives, course outline, and content for a Sustainability Entrepreneurship course for graduate and undergraduate students. With the growing awareness of the role of business in promoting sustainability, in terms of social equity and ecological improvements for future generations, courses on SE are becoming increasingly relevant. Since the concept of SE is fairly new, any course on the subject would have to start by explaining the concept and how it differs from competing concepts of entrepreneurship. Another important learning objective would be to appreciate the complexity in evaluating the costs and benefits of a SE opportunity. Since the purpose of education is to learn rather than to teach, students can best learn by being directly involved in working with companies engaged in achieving sustainable development and SE.

Sample syllabus

A. Course Overview and Description:

This course addresses various aspects of SE and the opportunities available to startups and large businesses to establish sustainable enterprises in the global environment. It explores the opportunities that entrepreneurs create, the challenges they encounter, and the ways in which they exploit opportunities to contribute toward enhancing the long-term ecological system while simultaneously starting and sustaining a profitable business. This course also examines the role of government policy, private investor preferences, technological advances, and public opinion in affecting the economics of SE.

B. Prerequisites:

Bus 283: (Fundamentals of) Entrepreneurship or instructor’s consent.

C. Required and recommended texts, readers, or other reading materials:

There is no textbook for this course but students will be given a list of readings to accompany the course, including the list of references at the end of this paper. The students will actively select articles from a list provided by the instructor that they will present to one another, choose company reports on sustainability from a list of companies suggested by the instructor that they would present to the class, select issues that they would present to the class

and also do projects on entrepreneurship and sustainability, probably focused initially on energy conservation, co-generation, on-site renewable energy and green energy.

D. Student learning objectives for the course:

This course aims to develop students' entrepreneurial awareness and skills in the context of sustainable development. By the end of the course, students should be able to:

- Understand the concept of SE and appreciate its importance
- Assess the global business and ecological environmental trends and the opportunities those offer for SE
- Evaluate the risks, rewards, and feasibility of SE projects
- Evaluate the modes and sources of finance of SE projects
- Prepare a sustainability analysis
- Prepare a business plan for a new business venture that enhances sustainable development and expects to become profitable

E. Course requirements

Student sustainability plan/report presentation and critique (10%): Students will each present a sustainability plan/report from a given company or governmental entity and a brief one-page critique. Students should send an electronic copy of the plan critiqued to the professor before the class so that he/she can distribute it electronically to the other students prior to class. The written one-page critique can serve as the basis for the classroom presentation. Sources include: Climate Leaders (<http://www.epa.gov/climateleaders/partners/ghggoals.html>), those listed on the Chicago Climate Exchange as members (<http://www.chicagoclimatex.com/content.jsf?id=64>), or those listed as Climate Action Leaders (in the case of California <http://www.climateregistry.org/MEMBERS/ClimateActionLeader/>) or comparable registry in another state or country (e.g., European Union). Organizations not included in the preceding lists should be cleared with the instructor because too many companies just lump any efficiency program, safety, training, or CSR effort together and call it "sustainability." Since environmental sustainability as a business opportunity is the focus of the course, students would be advised to investigate opportunities in clean tech, which has become popular, with companies like GE trying to turn this area into a competitive advantage. For clean tech, see <http://www.jointventure.org/programs-initiatives/climateprotection/climateprotection.html> and click on clean tech companies, VCs, and research. Students could profile one or more of these companies.

Group project business plan and presentation (20%): Groups of students will work together to propose entrepreneurial solutions to pressing environmental or social problems. Examples of such projects could include products or services that will contribute toward reducing energy consumption, conserve energy and water, water purification and filtration, improve waste management, scrap reduction, or utilize alternative energy sources. Social entrepreneurship directed at solving social problems (e.g., microfinance for poor business people) is another possibility.

References

Black, B.S, and R.J. Gilson. 1999. Does venture capital require an active stock market? *Journal of Applied Corporate Finance* Winter: 36-48.

Bonnet, H., D. Hoogwater, J. Quist, J. Spaans, and C. Wehrmann. 2002. Sustainable entrepreneurship in engineering curricula at Delft University of Technology: Context, approach, results, and recommendations. In *Engineering Education in Sustainable Development – Proceedings*, ed. KF Mulder. Delft: TU Delft. 351-360.

- Bos, A. 2002. Sustainable entrepreneurship in a changing Europe: Pedagogy of ethics for corporate organizations in transformation. In *EuroDiversity: A business guide to managing differences*, eds. G.F. Simons, D. Min, et al. Oxford: UK and Wobrun; USA: Butterworth-Heinemann.
- Brundtland Commission. 1987. *Our common future report of the World Commission on Environment and Development*. Oxford: Oxford University Press.
- Cohen, B., and M. Winn. 2007. Market imperfections, opportunity, and sustainable entrepreneurship. *Journal of Business Venturing* 22 (1): 29-49.
- Crals, E., and L. Vereeck. n.d. *Sustainable entrepreneurship in SMEs: Theory and practice*.
- Dixon, S., and A. Clifford. 2007. Ecopreneurship – a new approach to managing the triple bottom line. *Journal of Organizational Change Management* 20 (3): 326-345.
- Doerr, J. 2007. Keynote address at the Silicon Valley Leadership Group's Clean & Green Conference, Santa Clara University, September 26.
- Global Insight. 2007. *Venture impact*. 3rd ed. National Venture Capital Association and Content First, LLC: Washington, DC.
- Krueger, N.F. n.d. *Sustainable entrepreneurship: Broadening the definition of opportunity*.
- Rosenberg, A., and M.B. Dockendorf. 2006. Green entrepreneurship. *Kauffman Center for Entrepreneurial Leadership Clearinghouse on Entrepreneurship Education Digest* 6 (12).
- Schumpeter, J.A. 1934. *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Shane, S., and S. Venkataraman. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review* 25: 217-226.
- Stack, J. 2007. Cleantech venture capital: How public policy has stimulated private investment. White paper, Environmental Entrepreneurs and Cleantech Venture Network, LLC.
- Tilley, F. 2007. Conceptualising sustainability entrepreneurship. Summary of a talk delivered at the First World Symposium on Sustainable Entrepreneurship. University of Leeds, UK, 15-17 July.
- Timmons, J., and S. Spinelli. 2003. *New venture creation: Entrepreneurship for the 21st century*. 6th ed. New York: McGraw-Hill/Irwin.
- Young, W., and F. Tilley. 2006. Can business move beyond efficiency? The shift toward efficiency and equity in the corporate sustainability debate. *Business Strategy and the Environment* 15 (6): 402-415.