

Knowledge Management for Sustainable Value Creation

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Abstract

The emerging field and technology of Knowledge Management ought to be informed by, and contribute to, the development and realization of environmentally and socially sustainable business strategies and practices. This paper examines Knowledge Management for preeminence in the New -- Sustainable -- Economy, reflecting on answers to the following questions:

- How is Knowledge Management redefined by the requirements of sustainable industrial practices?
- How can Knowledge Management contribute to Sustainable Value Creation in the new economy?
- What practical processes and systems are companies putting in place to support sharing and creation of knowledge for more environmentally and socially responsible business practices?
- What opportunities for advancing sustainability are provided by emerging knowledge management technology?

Knowledge management technologies -- and corporate applications of them -- are exploding. Driven by tremendous pressures for service quality, speed to market, and innovation, and by the availability of a new generation of exciting information management tools, companies are employing new technologies to leverage the intellectual assets of knowledge workers. This effort to harness the knowledge-creating capability of the organization is one of the key elements of the Information Revolution that is redefining the competitive landscape of business.

Simultaneously, another revolution is reshaping the fundamental structure of production and wealth creation. Based on the increasingly evident requirement for sustainable development, companies are finding new sources of competitive advantage, innovation, and value from integrating environmental considerations into business strategies, products, and processes.

This paper examines the mutually beneficial integration of these two phenomena:

1. The paradigm shift inherent in sustainable industrial practices lays a foundation for new organizational knowledge and learning processes -- primarily by extending the “unit of analysis” for knowledge management to include the entire life cycle of the product or service, across the entire extended value stream.
2. The pursuit of sustainability as a lever for sustainable competitive advantage contributes to creating strategic knowledge, new core competencies, and strategy innovation.
3. A sustainable industrial system adds new content and process requirements to the corporate knowledge management system.

Transforming our industrial system both requires and generates tremendous increase in individual, organizational, and societal knowledge, which knowledge management and creation technologies can potentially contribute toward. Companies proactively pursuing more environmentally sustainable products and production processes (like Volvo, Sony, and SC Johnson) are employing innovative technical and social knowledge management processes to enable their progress.

Knowledge Management for Sustainable Value Creation

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One of the hottest areas in industry right now is that of Knowledge Management. Driven by tremendous pressures for service quality, speed to market, and innovation, and by the availability of a new generation of exciting information management tools, companies are employing new technologies to leverage the intellectual assets of knowledge workers. New software technology hits the market daily, advertising capabilities like intelligent search, document management, data mining, Groupware, call center customer support and telesales, enterprise management, information retrieval, and graphic data display. A 1999 Pricewaterhouse Coopers Global CEO survey showed that 97% of more than 800 CEOs surveyed consider Knowledge management “critical.”¹ A recent survey using the Knowledge Management Assessment Tool jointly developed by Arthur Anderson and American Productivity and Quality Center (APQC) found 85% of organizations said their ability to strategically manage knowledge is weak, while 70% of these same organizations believe knowledge assets can fuel growth in both revenues and core competencies.² New ventures and blue chip corporations like IBM, HP, and Microsoft are scrambling to meet the demand. This effort to harness the knowledge-creating capability of the organization is one of the key elements of the Information Revolution that is redefining the competitive landscape of business.

What does all this have to do with sustainable industrial practices?

Simultaneously, another revolution is reshaping the fundamental structure of production and wealth creation. Based on the increasingly evident requirement for sustainable development, companies are finding new sources of competitive advantage, innovation, and value from integrating environmental considerations into business strategies, products, and processes.

This paper examines the mutually beneficial integration of these two phenomena from the position that Knowledge Management ought to be informed by, and contribute to, the development and realization of environmentally and socially sustainable business strategies and practices:

1. The paradigm shift inherent in sustainable industrial practices lays a foundation for new organizational knowledge and learning processes -- primarily by extending the “unit of analysis” for knowledge management to include the entire life cycle of the product or service, across the entire extended value stream.
2. The pursuit of sustainability as a lever for sustainable competitive advantage contributes to creating strategic knowledge, new core competencies, and strategy innovation.
3. A sustainable industrial system adds new content and process requirements to the corporate knowledge management system.

Knowledge Management is a key driver and enabler for preeminence in the New -- Sustainable -
- Economy. This paper explores answers to the following questions:

- How is Knowledge Management redefined by the requirements of sustainable industrial practices?
- How can Knowledge Management contribute to Sustainable Value Creation in the new economy?
- What practical processes and systems are companies putting in place to support sharing and creation of knowledge for more environmentally and socially responsible business practices?
- What opportunities for advancing sustainability are provided by emerging knowledge management technology?
- What are the critical social system and cultural issues involved in turning knowledge management into a vital, dynamic, self-renewing learning system in support of sustainability?

Transforming our industrial system both requires and generates tremendous increase in individual, organizational, and societal knowledge -- Knowledge Management and Creation technologies can

make a significant contribution. Companies proactively pursuing more environmentally sustainable products and production processes (like Volvo, Sony, and SC Johnson) are breaking ground in employing innovative technical and social knowledge management processes to enable their progress.

1. Sustainability Paradigm Defines Knowledge Management Requirements

The paradigm shift inherent in sustainable industrial practices lays a foundation for new organizational knowledge and learning processes -- primarily by extending the “unit of analysis” for knowledge management to include the entire life cycle of the product or service, across the entire extended value stream.

Driven by greater understanding of interrelationships between industrial actions and downstream consequences on the environment and social fabric of communities; by greater transparency and consumer and shareholder concern regarding corporate responsibility; and, mostly in Europe, by Extended Producer Responsibility legislation cascading from one country to another, industry by industry; **corporations are increasingly managing in ways that consider the entire life cycle of their product or service, from “cradle to cradle.”** This integrated life cycle management perspective is influencing the way companies are designing their businesses, making strategic decisions, designing products and production processes, managing operations, dealing with suppliers, distributors, and customers, and planning for end-of-life of products. **This life cycle paradigm, when used as the primary unit of analysis for the design of knowledge management systems, will provide deeper understanding and control over the critical factors underlying the generation of value and results.**

For several decades organizations implementing Total Quality Management and Lean production have worked extensively with suppliers to operationalize process control and Just-in-Time manufacturing. Efforts at reducing time to market involved creation of cross-functional teams, often including customers and suppliers. **The shift driven by sustainability goals and the life cycle management paradigm is to focus on improvement and breakthrough at the level of the Entire Value Stream.** Simply by analyzing and focusing improvement initiatives on the entire value stream, new opportunities are revealed for business development, value creation to customers, product innovations, and waste reduction and cost savings, as well as reduction in negative environmental impact. This value stream focus includes not only the value adding materials production stream, but also the infrastructure of power and resources, the full range of stakeholders, and the intellectual capital and services involved.

Knowledge management systems that incorporate the entire value stream promise a myriad of benefits both immediately and in positioning for the future.

The third key concept driven by sustainability, and relevant for knowledge management, is that of industrial ecology. As companies move toward application of sustainability principles of industrial ecology, the framework for knowledge management expands to include other corporations and utilities with whom they might exchange resources like industrial “wastes” or by-products, cooperate for co-generation of energy, share logistics and transport solutions, and even level employment.

Experts in sustainability have also raised the importance of understanding our global and regional societal metabolism & ecological footprint.³ **If there truly are natural limits on resources, sinks, and loss of diversity, habitat, and regenerative capability, then a critical content component of knowledge management for our society, and for industry as one of the key acting institutions, is understanding and monitoring impacts on our societal throughput and metabolism and our global and local ecological footprint.**

As well as alignment with and restoration of natural systems, Sustainability includes social system issues and human prosperity. **Knowledge management systems informed by a sustainability paradigm will include considerations of social context and inputs, data on human system standing and impacts, and appreciation and analysis of social and intellectual capital as a vital corporate and societal asset.**

Finally, sustainability stimulates discussion and analysis of the “Total Cost/Value” dynamics of our industrial and societal activity, all critical framing for knowledge management systems. Research into sustainability helps illuminate the total cost and value picture, highlighting areas where current systems and practices externalize costs in a sub section cost model. Redefining the corporate cost model leads to strategic shifts, total system cost savings, and innovation, and thus ought to be a key consideration in the design of any knowledge management system.

2. Sustainability Contributes to Creation of Critical Knowledge

The pursuit of sustainability as a lever for sustainable competitive advantage contributes to creating strategic knowledge, new core competencies, and strategy innovation.

Companies proactively integrating environmental and social responsibility into strategies and practices are creating new knowledge that advances their competitive positioning and likelihood of achieving truly “Sustainable Advantage.” Embracing sustainability as a critical strategic driver has stimulated new knowledge and contributed to strategy innovations. For example, Patagonia, upon committing to entirely organic cotton to reduce the environmental impact of the raw materials of their products, built direct relationships with growers, deepening their knowledge and capability of managing the entire production stream of clothes manufacturing. Interface a leading carpet manufacturer, driven by goals of becoming a more sustainable, is changing the company’s value proposition to customers to lease, rather than sell, carpet. Gary Hamel highlights the importance of radical changes that redefine the competitive landscape to value creation: “those extraordinarily successful companies that managed 25% plus growth rates in shareholder returns grew by radically changing the basis for competition in their industries.”⁴

Volvo, and other companies are developing detailed information on likely future market drivers and legislative trends, and managers at Shell and TransAlta Utilities worked to create data based future scenarios to guide strategic decisions.

Additionally, the proactive pursuit of sustainability stimulates creation of knowledge, products, and solutions at the “nexus of innovation and value creation in the new economy:” *integration of Managerial/Production, Natural Systems, and Human Prosperity.* Finally, sustainability incorporates intangible advantages, advancing ability to compete on knowledge and intellectual capital. For example, companies with a greater purpose and corporate responsibility performance often report higher employee satisfaction and retention, leading to bottom line advantages.

3. Sustainability Changes the Content and Process of Knowledge Management Systems

A sustainable industrial system adds new content and process requirements to the corporate knowledge management system.

Sustainability requires special content and processes for Knowledge Management. For example, Volvo has for over 15 years collected data on life cycle impacts of automobiles, working with suppliers, other corporations, universities, and research institutes. ABB, in pursuing ISO 14001 certification, worked extensively to understand environmental impacts and stakeholder requirements in each community. Pursuing sustainability often requires a web of networked relationships -- which then defines the knowledge management system parameters.

Conclusion:

Transforming our industrial system both requires and generates tremendous increase in individual, organizational, and societal knowledge, which knowledge management and creation technologies can potentially contribute toward. Sustainability will require changes in thinking and assumptions, breakthrough technological innovations, and new social system competencies. Managing and creating the organizational and societal knowledge required to reach sustainability will demand high levels of collaboration and new, multi-faceted communities of practice.

Companies and organizations proactively pursuing more environmentally sustainable products and production processes are employing innovative technical and social knowledge management processes to enable their progress. Volvo has extensive data base and core of experts in life cycle analysis; Sony has created training cells on product disassembly and ensures knowledge is transferred to designers; BMW design teams have permanent members from the recycling function to ensure learnings are incorporated into product design; Monsanto has invested in a “Knowledge Management Architecture” system to support sharing of knowledge across research and development teams; JM Bygnadds, a Swedish construction company; has an data base rating suppliers and materials against environmental criteria that is easily accessible to the project manager and procurement personnel on the job site; Nortel uses their Intranet site to provide information on Design for the Environment, and SC Johnson has a structured knowledge system for integrating environmental considerations into product design. Governments and NGOs are also applying knowledge management technology to support goals related to sustainable development. For example, the World Bank, based on the perspective that knowledge management is 80% brainpower, 20% technology, is working to create a living map all of its knowledge about economic development; a data base is being created on “Urban Knowledge Engineering” to incorporate knowledge on topics like land use planning, urban renewal, pollution, transportation; and Greenpeace satellite mapping moved a Russian pulp and paper mill to phase out ancient forest use.

Sustainability concepts, systems, and practices offer high leverage improvement opportunities to organizations designing knowledge management systems. Additionally, Knowledge Management technology can contribute significantly to the evolution and application of knowledge for implementing

strategies and practices that are more environmentally and socially sustainable. Preeminence in the new economy will increasingly require sustainable industrial practices -- it will be greatly enabled by the technologies for knowledge management.

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