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Designing sustainability at BMW Group: The Designworks/ USA experience

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Abstract

THIS CASE STUDY DESCRIBES how an industrial design company developed a Sustainability Management System (SMS) standard, designed and implemented an SMS throughout its business, and then became the first company in the world to achieve third-party SMS certification. The case also describes ongoing development and challenges and examines how the SMS has facilitated the implementation of the United Nations Global Compact.

Company Profile

Situated in Southern California amongst more than 20 design studios operated by major automobile companies, Designworks/USA provides

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design and engineering services. Founded in 1972 as an independent design company, the firm developed expertise in designing vehicles — including automobiles, long haul trucks, railroad passenger cars, and construction equipment — as well as a wide array of consumer products such as cellular telephones, camera bodies, personal computer frames, ski goggles, and sunglasses. In addition, the company creates graphic designs for products that range from vehicles to snowboards. Its clients have included Atomic, BMW Group, Compaq, Heidelberg, John Deere, Gulfstream Haworth, Microsoft, Motorola, Nokia, Siemens AG, and Vivitar.

Designworks/USA began working with Munich-based BMW AG (which later became BMW Group) in 1985, when it was asked to design the seats for the BMW 8-series. The relationship grew and eventually BMW Group acquired 51% of the company in 1991 and the remaining share in 1995. Now a wholly-owned subsidiary of BMW Group, Designworks/USA continues to serve many other clients, which enables designers to leverage their experience with BMW Group to other types of products and allows BMW Group to learn from design projects beyond the domain of automobiles. Approximately half of the firm's design work is for third-party clients. Designworks/USA employs 80 people across its four design departments (Automobile Design, Product Design, Transportation Design, and Advanced Communications Design or AdCom), Engineering, Human Resources, Operations, Finance/Administration, and Marketing/Sales. In addition, the firm bolsters its design department with nearly 20 contractors. The \$15 million firm operates in a 77,000 square-foot facility an hour north of Los Angeles. In 1998, the firm opened a satellite office in Munich to facilitate communication with BMW Group and other European clients.

Designworks/USA has developed a standard workflow process to manage client engagements. Table 1 describes the objectives and main participants of each workflow element.

Table 1 | The Designworks/USA creative process

Element	Objectives	Main players
Define	Define the client's needs and demands, determine the project scope and primary participants.	Design Client
Understand	Investigate the possible user profiles and the current market situation in terms of brand identity, product positioning, distribution, and retailing. Based on these findings, identify opportunities and strategies for concept exploration.	Design Engineering
Explore	Idea generation and visualization.	Design Engineering
Refine	Benchmark the various concepts against the original program criteria to prioritize design ideas. Resolve design concept, complete preliminary engineering and prototyping. Liaise with material suppliers and manufacturers.	Design Engineering
Implement	Transfer the design idea to the manufacturing process.	Design Engineering Client Third-parties

Sustainability management: From BMW Group to Designworks/USA

BMW Group has long displayed a commitment to improving the environmental profile of their products. In the early 1970s, BMW Group introduced the first electric powered car, was the first car manufacturer to appoint an environmental officer, and worked with other companies to establish a hazardous waste disposal system. In the late 1970s, BMW Group introduced the first hydrogen powered car. By the late 1980s and early 1990s, BMW Group was using water-soluble paint technology, focusing on issues of disassembly and recycling of end-of-life vehicles, and extending its management principles to include environmental guidelines. From the mid-1990s to the present, BMW Group began using low-emission, water-borne paint technology and powder clear coat, produced a natural gas powered series-production car and a small production series hydrogen powered car, committed itself to sustainable environmental protection, and is currently focused on clean production, clean energy, and lightweight engineering.

BMW Group was the first automobile manufacturer to have an EMS in place at every one of its production plants.

With this achievement, the BMW Group turned its attention to improving the environmental performance of its business partners and its non-production facilities.

In 1999, BMW Group achieved a major milestone by implementing environmental management systems (EMS), which allow the company to identify and manage environmental risks and impacts, in all of its manufacturing facilities. Each of these facilities was certified to the International Organization for Standardization (ISO) 14001:1996 Environmental Management System standard, and some were also verified to be in compliance with the Eco-Management and Audit Scheme (EMAS). This completed a process begun in 1995 in Germany and Austria, and subsequently extended to all BMW Group production facilities worldwide.

Looking externally, the BMW Group began encouraging BMW dealerships in Munich and South Africa to be certified to ISO 14001. Internally, BMW Group was interested in deriving more value from their EMS efforts in a manner consistent with the company's commitment to continuous improvement. In addition, BMW Group sought to promote the concept of sustainable development within their organization. With over a decade of experience implementing EMS at their production facilities, BMW Group's environmental management team developed a clear understanding of benefits and limitations to the EMS process. Accordingly, discussions amongst BMW Group's Environmental Management Systems Representative Suzanne Dickerson and two representatives of WSP Environmental, Ed Quevedo and Andrea Sumits, at the 1999 Munich US/European EMS Workshop led to the idea of developing a Sustainability Management System (SMS). WSP Environmental North America, part of WSP Group plc, provides sustainability, environmental, and geotechnical consultancy services to corporate and public agency clients throughout North America, Europe, and across the Pacific Rim. BMW Group had worked with WSP to implement EMS at several of its production facilities. A series of discussions ensued at BMW Group's Munich headquarters to select a pilot site.

Several factors led to the selection of Designworks/USA. First, it was acknowledged that design is a high leverage point over many sustainability issues. Designers are uniquely positioned to investigate and offer design alternatives that can influence the environmental, social, or economic impacts of products. Second, designers can bring a high level of creativity to developing and implementing an SMS. Accordingly, Dickerson and

BMW Group's Director of Environmental Protection Manfred Heller approached Chris Bangle, Chief of BMW Group Design, to suggest that one of BMW Group's design facilities serve as the pilot test site. Bangle agreed and approached Designworks/USA because it was unique among BMW Group's design facilities as it serves a wide range of industries and clients in addition to BMW Group. This was an advantage because the length of time it takes to design many of the consumer products that Designworks/USA designs is significantly shorter than the length of time it takes to design an automobile, allowing for a more rapid assessment of the success of the SMS. At this point Designwork/USA had no comprehensive approach to identifying and managing its environmental and social aspects. The company's experience would answer three key questions for BMW Group: (1) Can the EMS concept be extended into an SMS? (2) Can an SMS be made relevant and useful to a design consultancy? (3) To what extent can an SMS be adapted to suit BMW Group's other facilities and business operations around the world?

Developing an SMS Framework

Designworks/USA agreed to facilitate the pilot. Designworks/USA could readily see the advantages in a system that allowed them to manage their environmental impacts and was intrigued, as a small firm with a 'family feel', by the opportunity to deal more systematically with its employees. In addition, as a profit center, Designworks/USA was very interested in a system that allowed them to better manage their financial aspects. Anticipating that significant modifications would be required to accommodate the many differences between its aspects and impacts and those of an automobile production facility, BMW Group lent Dickerson to the initiative and sponsored the involvement of WSP Environmental.

The SMS initiative was initially led by a team comprised of Dickerson, Designworks/USA's Director of Finance Arnd Wehner, and WSP's Quevedo. The first task was to develop a framework to ensure that environmental, economic, and social concerns would be incorporated throughout the organization's decision-making processes. While no international standard for such a system existed, the team recognized the value

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The SMS standard requires the organization to develop procedures to:

- Identify and prioritize sustainability aspects and impacts
- Identify legal requirements related to sustainability concepts and to evaluate compliance
- Develop sustainability objectives and targets within each organizational function
- Identify and deploy education and training to ensure awareness and competence
- Regularly interact with stakeholders including regulators and the public
- Routinely audit the organization's management system against the requirements stipulated in the SMS standard
- Ensure that top management periodically reviews the SMS

in creating a framework akin to ISO 14001. Dickerson and WSP's Quevedo and Andrea Sumits took the lead in drafting A Sustainability Management System Guidance, which would become the standard against which the organization's management system would be audited. As such, we refer to this document as the "SMS standard." In part, it calls for Designworks/USA to implement the following elements:

- Create a sustainability policy
- Identify and prioritize SMS aspects and impacts
- Establish objectives and targets
- Develop programs to achieve objectives and targets
- Evaluate progress via periodic internal audits and management reviews

The SMS standard addresses the broader sustainability issues in a similar way that the ISO 14001 EMS standard deals with environmental issues. The SMS standard is based on the structure of ISO 14001, includes the same major elements, and uses common terminology and definitions (e.g., environmental aspects and environmental impacts). In addition, both standards afford the organization wide latitude to develop its own impact prioritization scheme.

Functionally, the SMS standard requires that roles and responsibilities for improving sustainability performance be defined, and that a host of documented procedures be developed and controlled.

While the SMS standard was built on the ISO 14001 framework to facilitate certification to both standards, it contains many unique elements, particularly with regard to integrating social issues into the management system process. The SMS standard incorporates two leading conceptualizations of sustainability. First, it incorporates the "triple bottom line" concept by requiring management decision-making to incorporate economic, environmental, and social impacts.¹³ The Global Reporting Initiative's 2002 Sustainability Reporting Guidelines promotes this approach, and many multinational companies have adopted it. Second, the SMS standard employs perhaps the most widely used definition of sustainable development, "development that meets the needs

¹³ John Elkington, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Gabriola Island, Canada: New Society Publishers (1998).

of the present without compromising the ability of future generations to meet their own needs.”¹⁴ Accordingly, the SMS standard defines sustainability as “a state of balance among the environment, society, and economy, achieved by creating a sense of shared organizational and personal responsibility for all future environmental, economic, and social impacts of the organization, which become the basis for actions calculated to meet the needs of the organization without compromising the future ability of others to meet their needs.” The “balance” called for in this definition is left to Designworks/USA to define.

The SMS standard extends beyond ISO 14001’s environmental scope by also including social and economic aspects into the management system. The SMS standard defines a social aspect as “elements of an organization’s activities, products, or services that can interact with society” and a social impact as “any change to the society, whether adverse or beneficial, wholly or partially resulting from an organization’s activities, products or services.” Economic aspects and economic impacts are defined in a parallel manner. The SMS standard also broadly defines an interested party as an “individual or group that is or may be concerned with or affected by the sustainability performance of an organization.”

Even within the environmental domain, the SMS standard departs from ISO 14001 in several substantial ways. For example, while the only performance level stipulated by ISO 14001 is that an organization’s environmental policy must include commitments to comply with all relevant environmental laws and to continuous improvement, the SMS standard includes “an expectation of progress in the management and consequent reduction of impacts or risks from the environmental, economic, and social impacts of the organization’s business operations.”

Initial SMS deployment

Implementation of the Designworks/USA SMS began in January 2001. To begin developing its SMS, management created an SMS Steering Committee, which was initially comprised of Designworks/USA’s Director

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¹⁴ World Commission on Environment and Development (the Brundtland Commission), *Our Common Future*. New York: Oxford University Press (1987), p. 43.

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of Finance and the Director of Operations. A year later, the committee structure was expanded to include a representative from each department. This section describes how Designworks/USA worked to implement the SMS standard by creating a sustainability policy, enumerating SMS aspects and impacts, developing an impact prioritization scheme, drafting action plans to address prioritized SMS aspects, and conducting their initial internal SMS audits. The section concludes with a discussion of the third-party certification process.

Sustainability policy

One of the first steps the SMS Steering Committee took was to develop a Sustainability Policy. The policy includes a commitment to continuous improvement of environmental, economic, social and ethical performance. Furthermore, the policy commits Designworks/USA to encourage all of its stakeholders – including suppliers, contractors, and clients – to implement similar practices. The SMS policy is available on the company’s website: www.designworksusa.com.

Environmental issues are directly addressed in many portions of the company’s SMS Policy, including a commitment to continuously improve environmental performance and to incorporate “responsible resource use” and “environmental protection” into products designed for clients. Furthermore, the policy calls for Designworks/USA to incorporate the BMW Group’s Environmental Guidelines into decision-making.¹⁵ Social issues are also directly referred to in Designworks/USA’s SMS policy. The policy commits the company to “meeting or exceeding all ... health and safety legal requirements” and to continuously improve social and ethical performance. The policy also requires Designworks/USA to incorporate social responsibility into product development and advanced communications consulting services.

SMS aspects

After developing the policy, each department was tasked with creating a comprehensive list of environmental, social, and economic aspects. These are defined, respectively, as elements of an organization’s activities, prod-

¹⁵ The BMW Group’s International Environmental Guidelines are incorporated in the BMW Group Sustainable Value Report 2001/2002, available at www.bmwgroup.com.

ucts, or services that can interact with the environment, society, and the economy. After listing their aspects, departments categorized each one as relating to environmental, social, or economic issues.

Identified environmental aspects include on-site issues such as solid wastes, emissions, effluents, and resource use, as well as environmental issues associated with products designed for clients, including those associated with their manufacture, use, and end-of-life disposition. Most environmental aspects associated with on-site activities, such as the modeling shop and general building operations, resemble those typically found in an ISO 14001 EMS. For example, Operations identified various waste streams and resources consumed as a result of their activities. More innovative environmental aspects related to the products the firm designs for its clients. For instance, the design departments identified as environmental aspects several opportunities during the project workflow process to suggest environmental criteria to clients, explore product life cycle impacts, and expand clients' environmental/sustainability thinking. A sample of identified environmental aspects and impacts are presented in Table 2. The Significance column will be explained below.

Department	Activity	Aspect	Impact	Significance
Design/ Engineering	Product options and attributes brainstorming	Identify opportunities to include environmental and sustainability criteria into product attributes and performance evaluation, and to expand scope of client's business considerations	Potential to reduce environmental impact of manufacture, use, disposition of products, and of product processes	26
Operations/ Shop	Paint booth	Spraying and paint removal activities, sanding and cleaning	Employee exposure, potential for environmental release, VOC emissions, dust and grit release	20
Purchasing/ Operations	Supplier relations	Environmental screening criteria applied to suppliers and vendors	Improved decision-making process and potential influence over environmental, social, and economic issues	25

Social aspects include on-site issues such as employee retention and turnover, optimal working conditions, gender and racial equity, workload and sufficient staffing, building evacuation and first responder training, indoor air quality, and general environment, health and safety (EH&S) awareness. The action plans also identified off-site social aspects. For example, child/forced labor and human rights screening criteria applied to suppliers/vendors and the dissemination of information and idea generation by teaching at local design schools. In relation to the design process, social aspects were not identified to the same level of specificity as were the environmental aspects. Some of the social aspects and impacts identified are presented in Table 3.

Department	Activity	Aspect	Impact	Significance
Human Resources	Hours worked	Workload, sufficient staffing	Employee satisfaction and health; quality of life	28
Purchasing	Procurement	Child/forced labor and human rights screening criteria applied to suppliers/vendors	Awareness of supplier/vendor organizational behavior	26
Designers	Teaching at local design schools	Dissemination of information and idea generation	Opportunities for environmental, social and economic awareness in design	24
Design/Engineering	Product options and attributes brainstorming	Identify opportunities to include environmental and sustainability criteria into product attributes and performance evaluation, and to expand scope of client's business considerations	Potential to reduce environmental impact of manufacture, use, disposition of products, and of product processes	26

The economics aspects identified were primarily related to four themes: (1) increasing revenue by increasing sales to niche customers interested in sustainability management; (2) reducing various business risks; (3) improving employee productivity; and (4) reducing operating costs. For example, an aspect related to Human Resources included improving incentives to employees for creativity, innovation, and business development. The corresponding economic impact is improving employee productivity. Business recovery (Operations) is an aspect associated with the impact of mitigating risks of downtime. Table 4 illustrates a few additional economic aspects and impacts that were identified.

Table 4 | SMS Aspects analysis: economic

Department	Activity	Aspect	Impact	Significance
Marketing	Develop success stories from use of environmental/sustainability considerations in projects	Use SMS as market advantage	Improve Designworks/USA's economic opportunities and performance, and contribute to advancing client base environmental and sustainability thinking	(Not rated)
Design	Teaching at local design schools	Dissemination of information and idea generation on "green design careers"	Improve recruiting	28

Aspect prioritization

All aspects were prioritized along the following seven dimensions: probability of occurrence; intensity; duration; legal and regulatory requirements; stakeholder concerns; leadership potential; and level of control. Each dimension was scored for each aspect using a five-point scale. In each case, a score of one represented the lowest priority or significance, such as the lowest probability of occurrence or the least intense impact. A score of five represents the highest priority or significance, such as an impact being of great concern to many stakeholders or where the impact presents an opportunity to demonstrate industry leadership. A score for each aspect was calculated by adding the seven sub-scores. While the

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Where commitment from management lagged, the process suffered.

SMS standard calls on the company to “consider inviting interested parties to participate in the prioritization of its sustainability aspects,” Designworks/USA conducted this process in-house, with the assistance of BMW Group and WSP. Designworks/USA management indicated that they may invite interested parties to participate in this process in the future. After scoring each aspect, each department focused its efforts on those aspects with the highest scores, and set to work developing objectives and targets for many of these.

Objectives, targets, and action plans

After identifying and prioritizing aspects and impacts, each department created an SMS Action Plan. This document listed several prioritized aspects and described an objective for each one. To achieve each objective, one or more targets were established, and an individual was assigned the responsibility for meeting the target by a particular deadline. These plans are revised frequently following the SMS discussions that begin each department’s weekly meeting. After a few targets were met, each department added other aspects, objectives, and targets to their SMS Action Plan.

Participation and support of management was critical in the process of creating action plans. Director of Transportation Design Greg Brew, who serves as his department’s SMS Lead and sits on the SMS Steering Committee, noted “An enthusiastic Director allows people in the department to be into it, to become involved.” Where managers were particularly committed to the implementation of the SMS, for example in Transportation Design and Operations, action plans were prepared, action plan items were diligently addressed, and corrective action items from SMS audits were promptly implemented. Where commitment from management lagged, the process suffered. For example, the manager of one of the largest design departments neither attended nor sent a representative to SMS Steering Committee meetings where the action plans were coordinated. Consequently, the SMS action plans did not reflect the work or concerns of his department. He also declined to involve his staff in the weekly discussions of SMS. As a result, his design staff had not been thinking about incorporating SMS into their design processes due to their lack of exposure to, and consequent minimal understanding of, the

Designworks/USA SMS processes. As the company has become more energized and committed to the SMS, this manager has recently begun to participate and involve his staff members, who are beginning to understand and enthusiastically embrace SMS as part of their work.

A few items from various departments' SMS Action Plans are presented in Table 5. The actual documents include additional columns to denote the person responsible and the deadline associated with each target.

Table 5 | SMS Action Plan excerpt

Department	Aspect	Category	Objective	Targets
Design/ Engineering	Identify opportunities to include environmental and sustainability criteria into product attributes and performance evaluation, and to expand scope of client's business considerations	Environmental & Social	Build capacity within design and engineering groups to enable effective assessment and coaching of clients on product environmental and sustainability issues	Develop product sustainability assessment tool for use in initial tutorial and on defined client projects
Operations	Consumption of electricity from building usage	Environmental	Educate workforce to reduce energy consumption (i.e. turn off lights and computers at night, computers, space heaters, lessen use of screen savers)	Train all employees
Purchasing	Environmental and social aspects of suppliers and vendors	Environmental & Social	Screen suppliers and vendors to understand their environmental and social issues and their management commitment	Develop questionnaire, including environmental and child/forced labor issues based on SA 8000 and send to top 100 vendors and all new vendors
Design	Dissemination of information and idea generation on "green design careers"	Economic & Social	Propagate SMS thinking in Design Schools curricula via teaching program commitment, with goal of enhancing recruiting and expanding design and engineering	Identify at least five design schools (or in house design firms in our client base) to be targeted with teaching program Prepare teaching materials for use by design and engineers in teaching program Deliver at least 4 teaching sessions
Marketing	Selection and marketing to clients with social and environmental commitments and priorities	Economic	To make new prospective clients aware of our SMS policy	Include environmental innovation component in new sales presentation Include environmental component in Branding

In December 2001, Designworks/USA became the first industrial design firm in the world to be certified to ISO 14001. Two months later, Designworks/USA became the first company in the world to achieve third-party SMS certification.

Internal audits

The SMS standard requires that an internal audit be conducted annually to ensure that business operations and decision-making throughout the organization conform to both ISO 14001 and the SMS standard. The internal SMS audit team, which consists of volunteers from several departments, developed separate SMS audit reports for the Design/Engineering, Marketing/Communications, Supply/Finance, Human Resources, and Operations departments. The audit scope includes examining the policy, aspects, objectives and goals, the development of each SMS Action Plan, compliance with legal and other requirements, and the extent to which each department applies SMS to customer relations and onsite activities. Internal audits have been conducted semi-annually since August 2001.

Certification and registration

Designworks/USA sought to have a third-party organization certify that its management system fully adhered to both the SMS standard and ISO 14001. Leveraging its experience with ISO 14001 and EMAS certifiers, BMW Group and WSP initially identified ten certification bodies, and used a systematic qualification process to initially reduce this number to three and subsequently select TÜV Süddeutschland. In December 2001, Designworks/USA became the first industrial design firm in the world to be certified to ISO 14001. Two months later, Designworks/USA became the first company in the world to achieve third-party SMS certification.

Outcomes and impacts

According to Director of Human Resources Sheila M. Walker, the SMS has focused the company on its long-term vision by increasing management commitment to long-term objectives and preserving support for programs even in tight budgetary times. This section describes various outcomes of Designworks/USA's SMS implementation. We begin by discussing some of the firm's internal projects, consider its work with its external stakeholders including clients and suppliers and finally look briefly at the application of SMS across BMW Group.

Applying SMS to building operations and personnel management

Several projects have implemented SMS issues into Designworks/USA's onsite activities. A recent example is the process used to renovate the

facility's roof. The typical process is to remove the existing tar, which is often landfilled, and then add new tar. According to Lead Fabricator Craig Eggly, after Operations informed several contractors about its SMS initiative, one of them suggested a new coating system. By encapsulating the existing roofing material and creating a white surface, this system eliminates the need to landfill the existing material, dramatically reduces the noise, dust, and fumes associated with the project, and the resulting rooftop achieves EPA's Energy Star rating. As a result, Designworks/USA will reduce the amount of energy required to cool its building, and will thereby reduce its energy costs. In addition, installing this technology qualified Designworks/USA for a rebate from its electric company that fully offset the additional cost of this technology over the conventional technique, which amounted to several thousand dollars.

A second internal project that incorporates SMS issues is the installation of some major new machinery used to create prototype models. Contractors were sent information about the SMS and were asked to generate ideas about how the installation can promote SMS objectives. Contractor proposals included a variety of ideas, such as re-using the doors and other structural components that would be removed in the installation. In addition, contractors offered ideas to ensure that the residual construction debris would be recycled rather than land-filled. The project incorporated several such ideas, which simultaneously increased contractors' labor costs but reduced capital and material costs.

To date, the social considerations that have been factored into the internal thinking of Designworks/USA have dealt primarily with human resources and occupational health and safety issues. For example, the issue of gender and racial equity was considered in the context of a formal compensation assessment program that was launched under the SMS. The program used an external salary survey and developed salary structures based on market value and then benchmarked each employee against this structure. Each person was considered according to his or her experience and education. Adjustments were made for the few individuals who fell below the appropriate level in the new salary structure. This program was implemented in large part to ensure that Designworks/USA was providing remuneration parity regardless of gender, race, or ethnicity. The company is also improving its performance appraisal process by involving multiple review partners, and is seeking permanent resident status for its key employees. It is also considering ways to reduce noise levels in the workshop and is working to enhance its employee recognition program.

The SMS process has empowered staff to work with management to discuss, explore, and resolve a wide array of issues, ranging from ideas to reduce waste, to improve the working environment, to bolstering employee satisfaction.

Designworks/USA has begun implementing the SMS into its design and engineering work.

SMS implementation has also encouraged several departments to actively develop some products even in advance of customer interest.

Applying SMS to client engagements

As a consultancy, the extent to which Designworks/USA is able to effect change in product design is to a great extent dependent upon its relationships with its clients and the willingness of each client to improve the sustainability attributes of its products. Some clients share Designworks/USA's commitment in this area and have been pleased to work with them to improve the sustainability profile of their products. Other clients have been skeptical of the benefits or have been disinterested in sustainability improvements to their products. The length and depth of the relationship between Designworks/USA and any particular client will affect the extent to which they can work in partnership to generate and implement design alternatives that may require the client to alter some aspects of how it does business. Designworks/USA tailors its approach to how it seeks to educate and influence its clients toward more sustainable design choices. Faced with a disinterested client, designers may recommend the use of high quality, environmentally-preferable materials without focusing on the environmental attributes of the material.

Designworks/USA has begun implementing the SMS into its design and engineering work. For example, the firm is working with a guitar manufacturer to evaluate the use of certified wood and a waste wood composite. In addition, Designworks/USA is working with a vacuum cleaner manufacturer to reduce its motor size, identify recycled materials that maintain a high quality feel, and develop a marketing plan to focus customer attention on performance attributes (e.g. high suction power, low noise levels) instead of motor size. The firm is also working with a construction vehicle manufacturer to consider alternative materials to facilitate their end-of-life recyclability. Social issues are not yet being systematically integrated into the design process.

SMS implementation has also encouraged several departments to actively develop some products even in advance of customer interest. For example, the firm is working with the California Department of Conservation to design an "e-bin," a recycling bin that employs used materials already being collected for recycling but for which there are currently few or no secondary markets. One essential design criterion is that the bin must be iconic: it must maintain its fundamental design attributes while being scalable for home, office, and industrial use. In addition, the e-bin will be designed from a cradle-to-cradle perspective, which means it must be recyclable. By seeking

to utilize materials currently entering the municipal waste stream, and by working in partnership with the California government, this project includes environmental, social, and economic dimensions of the SMS. This project seeks to design an environmentally and socially beneficial product, and has been instigated by employees rather than clients, with the intention of identifying interested clients once the product concept is further developed.

Applying SMS to suppliers and contractors

Designworks/USA's Sustainability Policy commits the company to encourage its suppliers to share its SMS goals. So far, the company has taken four steps toward achieving this objective. First, questionnaires were developed to gather information and gain commitments on some environmental, labor, and human rights practice of Designworks/USA's suppliers and contractors. The questionnaires sought a commitment to comply with Social Accountability 8000 (SA 8000), a voluntary standard that addresses several labor and human rights issues.¹⁶ Despite a poor response rate, the information obtained has reportedly influenced supplier selection on several occasions. In a second, related, initiative some departments have taken steps to work with their suppliers to address SMS issues. For example, Operations asked its major suppliers to reduce the size of their packaging, and has been successful in its attempts to have many of them substitute polystyrene packaging "peanuts" with those made of cornstarch.

Third, Designworks/USA wrote to its principal contractors to inform them about the SMS initiative and noted that all future tenders must include descriptions of the measures that will be taken to ensure that the environment is adequately protected throughout the project. The letter also noted that Designworks/USA is seeking to identify contractors "who demonstrate an understanding of environmental issues and who have effective systems for management of environmental risks and prevention of pollution." A fourth step was creating an annual vendor (supplier) open house, the first of which occurred in September 2002. In addition to introducing how both BMW Group and Designworks/USA are implementing SMS, an interactive panel discussed challenges and opportunities associated with sustainability management.

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Designworks/USA is seeking to identify contractors "who demonstrate an understanding of environmental issues and who have effective systems for management of environmental risks and prevention of pollution."

¹⁶ SA8000 contains provisions dealing with child labor, forced labor, health and safety, freedom of association and the right to collective bargaining, discrimination, disciplinary practices, working hours and remuneration. The standard is available from Social Accountability International's website, <http://www.cepaa.org>.

Several designers have supported Saratoga High School's initiative to become the first high school to receive ISO 14001 certification for its EMS.

Guido Prick described the success of the Designworks/USA SMS as "a role model for the future of all EMS's within the BMW Group."

Other stakeholders/outreach

Designworks/USA has identified additional key stakeholders with whom they can share their SMS initiative, and has focused these efforts on educating and partnering with their community. For example, several designers have supported Saratoga High School's initiative to become the first high school to receive ISO 14001 certification for its EMS by educating students about sustainable design, design careers, and the role of designers in society. Designers and engineers have also lectured on sustainable design at several engineering and design schools including the Art Center College of Design in Pasadena, the California Institute of Technology, and the Engineering Department at California State University, Long Beach. Designworks/USA's Nadya Arnaot, Soren Petersen, and Sheila M. Walker participated in the Newbury Park High School career day, discussing design and engineering careers and emphasizing the company's SMS philosophy. In addition, Greg Brew, Director of Transportation Design, has been working on regional sustainability planning with the Ventura County Sustainability Council.

Applying SMS across BMW Group

Initially, BMW Group is looking for Designworks/USA to integrate its SMS into its internal operations and to its design projects for third party clients outside the automotive sector. BMW Group management, which is considering implementing SMS in other BMW Group facilities and business lines, has learned a great deal about the challenges and opportunities involved in implementing an SMS from the Designworks/USA experience. According to BMW Group's Guido Prick, who is responsible for environmental management in production worldwide, BMW Group is pleased with the Designworks/USA SMS efforts and preliminary results. He described the success of the Designworks/USA SMS as "a role model for the future of all EMS's within the BMW Group."

Based on the Designworks/USA experience, BMW Group is planning to roll out the SMS initiative to its Rolls Royce manufacturing plant in Goodwood, England in 2003 and subsequently to convert every BMW Group production facility's EMS into an SMS. Despite the vast differences in the operations between a design consultancy and a manufacturing facility, Prick does not anticipate that the challenges in implementing the SMS at the latter to differ much from those experienced by Designworks/USA.

BMW Group's Dickerson expects that implementing an SMS will actually be easier in a production facility because they feature more repetition, fewer creative processes, and a structured management system already exists. She also noted that the social aspects will be more important because manufacturing sites tend to be much larger.

Ongoing SMS development

Designworks/USA is engaged in many ongoing projects to enhance its SMS. Below, we describe efforts to further integrate SMS into the design process, the organization's performance evaluation and compensation scheme, and efforts to make the SMS more accessible to all employees.

Tools to integrate SMS into design

A principal aim of the SMS is to incorporate environmental, economic, and social concerns into Designworks/USA's design process by factoring these concerns into the creative process. A preliminary tool has already been developed to help screen prospective clients to understand their level of interest in sustainability. Table 6 describes how the company intends to incorporate sustainability into each element of the design process.

Table 6 |
Incorporating sustainability considerations into the creative process

Element	Means of incorporating sustainability considerations
Define	Build discussion of sustainability into initial discussion with client. Bring clients attention to sustainability issues that might arise in the design process and discuss brand attributes of sustainability.
Understand	Consider life-cycle impact of various design alternatives.
Explore	Gather information on alternative materials and design solutions.
Refine	Ensure technical feasibility and further refine material choices and design.
Implement	Seek to ensure sustainability-based choices are implemented in product manufacturing.

Designworks/USA developed a performance appraisal system that includes evaluating SMS performance and commitment and it is developing a bonus scheme based on a balanced scorecard approach that will include SMS criteria.

Several tools are being developed to assist the design and engineering departments to reduce the environmental impact of the products developed for clients. Each tool will support one phase of the design process. For example, in the “Understand” phase, designers need to be able to identify the design areas with the greatest potential to improve a product’s SMS performance. As such, several commercial Design for Environment (DfE) and Life Cycle Assessment (LCA) software tools are being evaluated. In the “Explore” phase, Design and Engineering need access to a wide variety of the latest materials, processes, and technologies to assess how they meet various design criteria including SMS aspects. Engineering has begun to accumulate knowledge about environmentally preferable materials and is developing an online database and a library of physical samples to share with designers and clients. To support the “Refine” stage, the engineering department plans to develop a tool to integrate DfE and Design for Disassembly concepts. To date, the tools under development focus on environmental considerations.

Integrating SMS into performance management and compensation schemes

Like most consultancies, Designworks/USA operates on the business model of hourly billing. As such, strong incentives are provided to maximize design and engineering staff members’ billability. A consequence of these incentives is that work that is not client billable is often de-prioritized. Given such incentives, it has been difficult at times to encourage staff to focus on SMS and other knowledge generating projects. To better align employee incentives with management’s desire to maintain profitability while progressing longer-term projects, Designworks/USA developed a performance appraisal system that includes evaluating SMS performance and commitment and it is developing a bonus scheme based on a balanced scorecard approach that will include SMS criteria.

Making the SMS more accessible

Several employees noted that the initial SMS documents used language that was difficult to comprehend, which both impeded participation and dampened enthusiasm in the SMS initiative. The use of technical language may be partially due to the SMS being initially created primarily by BMW Group’s environmental department and its consulting partner, WSP. It may

also be due to insufficient employee training to create a common understanding of some of the more technical concepts of the SMS, such as the differences between aspects and action items, or how the prioritization scheme works. A few Designworks/USA employees have been working to translate the SMS procedures and elements into simpler language to make it more accessible to their colleagues. One employee noted that the language seemed overly legalistic, which may be the result of gaps in culture (between Munich and California) and in company cultures (between BMW Group and Designworks/USA). Increasing accessibility is more than re-writing the actual text; it also involves providing ongoing training. At times, this is accomplished using real-life examples. For example, at a company-wide meeting, Eggly illustrated the environmental impacts of excess packaging by showing a real example of how a supplier packaged a cord using several packaging layers. He explained the various types of waste this practice generated, including material consumed in manufacturing the packaging itself and the additional environmental impacts associated with transporting its unnecessary volume. This example will also be used to help educate other suppliers of Designworks/USA's desire to eliminate excessive packaging.

Challenges and opportunities for future SMS development

Designworks/USA's SMS is still in the early phase of implementation. It has been in operation for less than two years. While Designworks/USA accomplished a great deal in a short period of time, the company faced a number of implementation challenges, some of which have been resolved, some of which are under active consideration and some of which remain of concern to some staff. Elements of the SMS represent a pioneering effort, such as seeking to integrate environmental criteria into the design of third party clients' products and contemplating the scope of social issues that fit within the sustainability concept. As such, there are few companies to learn from and no ready-made examples to apply. Given this, it is not surprising that many opportunities are available for further program refinement and implementation.

Some challenges will be met through ongoing initiatives. For example, one designer noted that while he was attempting to integrate SMS concepts into client discussions, often he was asked questions he was not pre-

Encouraging its third-party clients to value sustainable design remains one of Designworks/USA's biggest challenges to both provide a financial return on its SMS investments and stimulate continued staff interest in enhancing the SMS.

pared to answer. This resulted in his conducting follow-up research to prepare a response several days later. To some extent, this predicament will be mitigated as designers and engineers accumulate expertise about the sustainability implications of design choices, bolstered in part by the SMS tools currently being developed.

Another challenge identified is the reluctance of clients to pay Designworks/USA to research ways to improve the sustainability profile of design alternatives. On some occasions, Designworks/USA conducted this analysis anyway, absorbing the cost as an investment in developing their SMS capabilities and in exposing the client to the benefits of integrating sustainability concerns into the product design.

While management has asked that SMS be an agenda item in each department's weekly meeting and requires the attendance of departmental representatives at SMS Steering Committee meetings, as discussed earlier, the willingness of department managers to do so has varied. The engagement of management with the SMS will be encouraged by the integration of SMS as a component of performance reviews. As the organization is becoming more energized by the implementation of the SMS, it appears this problem of early resistance from some quarters is being overcome.

Designworks/USA is still developing a plan to tap external sources of sustainability knowledge, including identifying and sending staff to appropriate training and developing partnerships with universities to increase contact with professors and student intern candidates. In one such effort, Nicole Kranz, a graduate student from the University of California's Donald Bren School of Environmental Science and Management was hired to assist in the development of SMS tools, organize the supplier open house, and work on several SMS Action Plan items. By the end of her 3-month internship, it was felt that she was among the most knowledgeable individuals at the company about its SMS. In an effort to institutionalize her knowledge, she produced a final report to the SMS Steering Committee.

While Designworks/USA has recognized the above issues, the organization also faces several challenges and opportunities to improve the effectiveness and comprehensiveness of its SMS. Like many design firms, the company culture encourages creativity, innovation, and inspiration, and this led to challenges in getting the staff to document and follow procedures. BMW Group and WSP stepped in to provide initial drafts of the for-

mal SMS documentation. While this facilitated the timely implementation of the SMS, apparent gaps remain in the knowledge about the relationship between some of the SMS documents. For example, after the initial development of comprehensive aspect/impact registries and a prioritization scheme, several departments do not rely upon the prioritized aspects as the basis for adding new items to their SMS Action Plans. Instead, they favour the use of a more creative process, brainstorming sessions, to add new action items or decide which ones to address next. While this process is aligned with the company's culture of creativity, it undermines the systematic process the SMS is meant to facilitate and suggests the need to better integrate creative work processes into a systematic management system. For example, this creativity could be channelled into identifying additional SMS aspects, or enhancing the aspect/impact prioritization scheme or sustainability policy. Such changes would then flow through the SMS in a systematic way to add new or reprioritize existing action items.

While the company has focused its SMS performance monitoring on process metrics (e.g., implementing SMS Action Plan items, following up SMS audit issues), few results metrics have been developed. The latter might measure, for example, the cumulative lifecycle environmental benefits of product design changes their clients have implemented due to the Designworks/USA SMS program. With regard to the internal social impacts of the SMS, the company is developing an employee survey. In addition, metrics – such as employee recruitment success rates and employee turnover – already collected for other purposes could also be used to assess the results of SMS implementation.

To date, the integration of social issues into the design process has remained primarily an idiosyncratic process that relies on the awareness of individual designers. Indeed, most occasions where social issues have been included in design work can be attributed to the insight, enthusiasm, and persistence of individual designers. As such, systematically incorporating social aspects of product design into the design process – in a manner similarly envisaged for environmental aspects with the new SMS tools – represents another opportunity for future SMS development.

Finally, Designworks/USA can better leverage its efforts by further disseminating its novel approach to implementing sustainability. To be sure, Designworks/USA has informed its customers and vendors about its SMS,

and it has shared its initiative in a few conferences. However, the company could publish a formal internal or external SMS report, integrate its SMS initiatives in its client brochures, and promote its efforts through the company website.

SMS & the United Nations Global Compact

United Nations (UN) Secretary General Kofi Annan proposed the UN Global Compact to challenge world business leaders to take more responsibility for improving the social and environmental dimensions of the global economy. The Global Compact is based on nine principles in the areas of human rights, labor, and the environment, drawn from the Universal Declaration of Human Rights, the International Labour Organisation's Fundamental Principles on Rights at Work, and the Rio Principles on Environment and Development.

BMW Group, the parent company of Designworks/USA, is one of the major international corporations that have formally committed to the UN to implement these principles. As part of its participation in the Global Compact Learning Forum, BMW Group wrote a case study describing its Clean Energy Project in Germany, which implements the three environmental principles.¹⁷ The current case study is a second step BMW Group has taken to share its practices with other companies interested in the Global Compact. Below, we analyze how the Designworks/USA SMS implements several Global Compact principles.

SMS & human rights and labor principles

A few of the aspects identified and actions initiated under Designworks/USA's SMS directly address the Global Compact's human rights and labor principles. For example, the consideration of promotion, hiring and performance review practices in order to facilitate gender and racial equity and the attempts by Designworks/USA to improve their understanding of their supplier's practices in relation to a number of human rights, particularly child and forced labor. Together these efforts touch on Principles

¹⁷ BMW Group's Clean Energy Project case study, prepared for the UN Global Compact is available at <http://65.214.34.30/un/gc/unweb.nsf/content/ppsubs.htm>.

1, 2, 4, 5 and 6. Many other social-related Designworks/USA SMS initiatives are socially useful, in that they seek to improve community and government awareness of sustainability issues or improve employee satisfaction. However, while clearly valuable, these initiatives do not directly address the Global Compact's six principles related to human rights and labor.

One way to progress the realization of the Global Compact principles relating to human rights within the company would be to harness the SMS process to increase the range of social issues incorporated in Designworks/USA's design process. Just as recommendations on environmentally sound design options are considered a part of the SMS, the company could use the SMS to develop a systematic way for designers to consider the human rights impacts that their products may have. Designers have considered issues of accessibility for the elderly and people with disabilities as part of the design process for some time. In North America this was a particularly 'hot' issue for designers in the 1980s and 1990s. Driven mainly by a desire to avoid litigation this movement was predominantly reactive and client driven, rather than proactive. SMS could provide a framework for a more systematic investigation and consideration of human rights impacts, positive and negative that may arise from certain design choices. SMS aspect identification allows designers to think more broadly than the legal requirements and to proactively consider the broad human rights impacts of the products they design. This approach would result in a more systematic consideration of human rights issues in the design process, particularly if tools for this purpose similar to those currently being refined by Designworks/USA for use in relation to environmental issues were developed for human rights issues. Embracing a more systematic approach to injecting social considerations into the design process builds upon the current efforts of individual designers in the areas of accessibility and privacy. Taking this approach would allow a much greater realization of Principles 1 and 2. It would seek to employ client influence as a major instrument to leverage Designworks/USA's SMS competencies to further promote the Global Compact principles.

SMS & environmental principles

Many features of the Designworks/USA SMS support the Global Compact's three environmental principles. This case study has provided many examples

SMS could provide a framework for a more systematic investigation and consideration of human rights impacts, positive and negative that may arise from certain design choices. SMS aspect identification allows designers to think more broadly than the legal requirements and to proactively consider the broad human rights impacts of the products they design.

that illustrate how Designworks/USA has embedded environmental concerns into its SMS. As with its social initiatives discussed above, many of Designworks/USA's environmental initiatives go well beyond the Global Compact's three environmental principles.

As mentioned earlier, the SMS approach – akin to the ISO 14001 EMS process – requires each department to identify and prioritize its sustainability aspects and impacts, including environmental ones. Objectives and targets are developed for prioritized aspects, and these become the focus of ensuing SMS activity. This proactive process is a classic example of a “precautionary approach to environmental challenges,” as required by Principle 7.

Not only is Designworks/USA undertaking initiatives “to promote greater environmental responsibility” – as called for by Principle 8 – through its efforts to minimize its onsite environmental impacts, but a major thrust of its SMS is to work with clients to reduce the environmental impact of their products. As described above, the company is also taking an increasingly active role to reduce the environmental impact of its supply chain, including both material suppliers and contractors.

Designworks/USA's SMS activities also directly relate to Principle 9, which calls on companies to strengthen the market for environmentally friendly technologies. The efforts of its Purchasing and Operations departments to reduce the company's onsite environmental impacts have led them to request contractors and suppliers to recommend environmentally superior technologies. The roofing example provided earlier is a case in point. In fact, Designworks/USA was the first customer of this new technology, and its order enabled the contractor to procure the specialized equipment required for its application. This is facilitating the diffusion of this energy-saving technology to the contractor's other customers in the area.

Designworks/USA has also encouraged the contractor to show its site to prospective customers of this technology. Greater potential to diffuse environmentally friendly technologies is available from the ongoing work of the Design and Engineering departments. As they embed more environmentally superior materials and design concepts into their product designs, these technologies will be disseminated to many of Designworks/USA's clients.

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