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Communications of the Association for Information Systems



IT-enabled Sustainability Transformation—the Case of SAP

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Abstract:

This teaching case describes how SAP, a leading global information technology (IT) solutions provider, embarked on a large-scale transformation program to implement a dual sustainability strategy of: (a) internally transforming the organization, and (b) addressing a business opportunity by developing IT solutions that enable their customers to become more sustainable. This case provides students with significant information about the development of SAP towards sustainability, including the company's underlying motivation, their approach to change and related challenges, and their use of IT to enable the transformation. The teaching case provides an opportunity to critically examine the benefits and risks of using IT in an effort to improve the sustainability of an organization, and to develop appropriate models for sustainable strategies and IT implementation efforts.

Keywords: Sustainability, Information Systems, Information Technology, Business Transformation, Business Software, Software Provider, Green IS.

Editor's Note: A teaching note for this case can be obtained from stefan.seidel@uni.li. Only active faculty who are currently listed in the AIS Faculty Directory are eligible to receive the teaching note.

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I. INTRODUCTION

SAP is in a unique, dual position when it comes to sustainability. We have a moral obligation to start with ourselves and ensure that our business operates in a transparent and accountable manner, leaves a minimal environmental footprint... As the leader in business software, we also deliver solutions that help other businesses achieve clarity across their operations and better manage their sustainability performance.

Léo Apotheker, former CEO of SAP

In 2008, Daniel Schmid and Peter Graf presented their idea for a global sustainability project to employee representatives from SAP's supervisory board. It was the evening before the official kickoff-meeting, and the men knew it would be important to get the employee representatives' support right from the beginning. Transforming one of the world's largest software solution providers into a sustainable enterprise—one that is not only economically successful, but that is also socially responsible and has a low environmental footprint—would be a major transformational initiative that would involve all employees across all levels of the organization, and across all lines of business. Over the previous years, the notion of sustainability had become more and more important in SAP's business environment because customers had increasingly been demanding sustainability solutions, while the company had been required to increase the sustainability of their own operations. The global project that was about to be launched the next day aimed at creating a common understanding of sustainability and developing an overarching strategy. Daniel Schmid would later become the head of SAP's sustainability operations, and Peter Graf the company's Chief Sustainability Officer. Today, the sustainability-related change efforts are considered one of the company's largest transformations. While there was much enthusiasm about the topic, the journey lay ahead, and the team was confronted with challenging questions: What exactly did sustainability mean for a company such as SAP? What were the key enablers that would make a sustainability transformation work? What were the relationships between providing sustainability products and becoming sustainable internally? Which investments and innovations in information technology (IT) services and solutions were required to enable the transformation? And how could SAP leverage their competencies as an IT solutions provider in order to facilitate that internal transformation?

II. SUSTAINABILITY AND INFORMATION SYSTEMS

With the growing awareness for global crises such as rapid climate change, the social divide, and great economic imbalances, individuals, organizations, and governments have gradually recognized the need for sustainable development in living and in organizing, performing, and managing work (Senge, Smith, Kruschwitz, Laur & Schley, 2008). Not surprisingly, corporate sustainability transformations have become a driver for innovation (Haanaes, Michael, Jurgens, & Rangan, 2013). The notion of sustainability has evolved around economic, social, and ecological issues (Dyllick & Hockerts, 2002). Sustainability has been defined by the United Nations Brundtland Commission as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987), and concerns the delivery of economic, social, and environmental benefits simultaneously with classical organizational performance (Elkington, 1998).

Organizational sustainability transformations can be described as a special case of organizational change efforts that are multilayered, complex, and that relate to environmental societal, governmental, organizational, regulatory, and individual factors at the same time (Elliot, 2011; Melville, 2010; Seidel, Recker, & vom Brocke, 2013). One of the key challenges in environmental sustainability transformations relates to the question of how green IT, sustainable computing, energy informatics, and other IT-based approaches can assist organizations in becoming more sustainable (Elliot, 2011; Melville, 2010; Watson, Boudreau, & Chen, 2010). Watson et al. (2010), for example, argue that information systems (IS) can contribute to sustainable business practices and processes by reducing logistics costs, facilitating virtual collaboration between distributed teams, supporting remote working, monitoring and analyzing environmental information, and providing information in order to facilitate decision-making under consideration of “green” choices. They particularly discuss the “transformative power of IS to create an environmentally sustainable society” (p. 2) and argue that IS can play a role in “solving global warming” (p. 2). IS are conceived as “formal, sociotechnical, organizational systems designed to collect, process, store, and distribute information” (Piccoli, 2012, p. 28). IT is thus the technical part of an IS, including software solutions.

Against this background, the story of SAP's sustainability transformation presents an interesting case: first, because its transformation affected both internal management and processes and external product and service development and delivery; second, because SAP's journey is largely driven through their own IT solutions; and third, because SAP's efforts to develop a comprehensive approach towards sustainability have been considerably successful.

III. COMPANY BACKGROUND

SAP has evolved from a small regional enterprise to a global market leader for enterprise applications. In 1972, the founders envisioned the development of standard application software for real-time business processing. A year later, the first financial accounting software was completed. Aiming to make their products ready to be operated in multinational settings, SAP designed them to be capable of handling different languages and currencies. In 1988, SAP GmbH (a limited liability corporation) went public and became SAP AG (a stock corporation), with shares listed at the Frankfurt and New York stock exchanges. At the end of 1991, SAP solutions had been installed at more than 2000 customers worldwide. The next technological development was determined by the rise of the Internet; the solution mySAP.com aimed to connect e-commerce solutions with traditional enterprise resource planning applications. SAP started to focus their efforts on the provision of web-based real-time data: they released the first version of the integration and application platform SAP Netweaver in 2004. After a period of a global economic turmoil that enforced personnel cutbacks and other cost-saving measures in 2008 and 2009, SAP recovered from the crisis and achieved exceptional results in 2011. In 2011, the company also launched expansion plans for emerging countries such as China, Brazil, India, and Russia. In 2012, the company, with over 65,500 employees working in locations in more than 130 countries, generated a total annual revenue (IFRS) of €16,22 billion primarily from software and software-related services. The EMEA region (Europe, the Middle East, and Africa) accounted for 46 percent of total revenue, followed by the Americas with 38 percent, and Asia, Pacific, and Japan with 16 percent. By 2013, SAP served over 248,000 customers in more than 180 countries.

IV. THE MOVE TOWARDS SUSTAINABILITY: A TALE OF INTERNAL AND EXTERNAL PRESSURES

By the time SAP launched its sustainability initiative, the notion of sustainability had become increasingly important in its business environment. First, costumers had been demanding sustainability solutions (external perspective) and, second, the company had been required to increase the sustainability of their own business practices (internal perspective) (Seidel, Recker, Pimmer, & vom Brocke, 2010). In a more recent interview, Daniel Schmid pointed to the still high expectations of SAP's customers with regards to sustainability (Seidel, 2013, p. 327): "Our customers expect us to help them with their sustainability efforts through our solutions. At the same time, they expect us to make our own operations more sustainable and to act as a role model for a sustainable company."

At the time SAP launched its sustainability initiative, it had been engaged in sustainability-related activities for several years on a local and regional basis. However, its corporate approach to sustainability was perceived as being rather reactive, fragmented, and slow. SAP's activities with respect to corporate social responsibility and citizenship were, for instance, seen as fairly traditional. With a growing demand for sustainable solutions, however, the organization started to believe that they were required to take a leading role in integrating sustainability into their business practices in order to be perceived as a credible provider of such solutions. In the years that had led up to the transformation project, SAP had been facing increasing customer demands for products and services for sustainability, not only for ecological or social reasons, but also due to cost pressure. Thus, the provision of sustainability solutions became a promising, and indeed essential, business opportunity. The company regarded not being seen as genuinely committed to sustainability, but trying to use the topic for "green washing" activities instead, as potentially damaging to its brand. The company's customers thus encouraged it to internally transform into a more sustainable business entity. One of their major customers, for instance, pushed the company to implement a global health and safety policy and a certified environmental management system. At the same time, SAP's own workforce had high expectations about sustainability and the financial market had exerted additional pressure on the company because investment indices required SAP to raise their sustainability standards by strengthening the anti-corruption measures and creating a human rights policy. It thus became apparent that, if SAP didn't comply with such standards, their market position could be endangered.

V. THE ANSWER: A DUAL SUSTAINABILITY TRANSFORMATION

How it began: creating a dual global strategy

In 2008, in order to properly address the opportunities and risks related to sustainability, SAP started to approach the issue of sustainability in a more structured way. Early on, there was an awareness that developing a strategy along with clear goals would be highly relevant for the company to become a sustainable organization. Daniel

Schmid said¹: “Coming up with a clear strategy and that strategy embedded in the overall [corporate] strategy. I think that is the biggest positive factor, driver that we have achieved.”.

In mid-2008, SAP launched a global project to create a common understanding of sustainability between the involved stakeholders, and to develop an overarching strategy. The executive board staffed the positions of the overall project manager and of six work-stream leaders, and gave the responsibility for the project to Peter Graf (at that time Executive Vice President of Solution Marketing of SAP), who later became SAP’s first Chief Sustainability Officer.

Because the company’s internal knowledge on sustainability was limited and fragmented, it extensively involved external sustainability strategy consultants during the first five months of the project. In order to ensure a frictionless knowledge transfer, the company did not differentiate between external and internal members, and the work was conducted in a joint effort. One of the first challenges was to identify and frame SAP’s sustainability activities. Daniel Schmid described the task in the following way: “In order to really...be successful on your long term and potentially never ending journey of sustainability you need to focus. You can imagine we have hundreds of thousands of great ideas of how and where we could improve.”.

Identifying key issues and narrowing down the complex topic of sustainability was considered a challenging process that was political in nature because the team also had to exclude ideas, which in turn led to some employees’ disappointment.

The company further decided to closely involve other key stakeholders including customers, NGOs, partners, and analysts to challenge and guide its approach to sustainability. In order to demarcate the topic and to better understand the specific challenges and opportunities, from August to October 2008, SAP conducted a series of interviews with approximately 100 leading companies and institutions in the field of sustainability covering all major industries and regions at a global level. The analysis was complemented by scientific and market data. This exercise resulted in the identification and ranking of eight sustainability topics; namely: (1) greenhouse gas; (2) energy management; (3) people, health, and safety; (4) product safety and stewardship; (5) water management; (6) raw materials optimization; (7) waste management; and (8) sustainability performance management as a cross-functional topic. Thus, the topics included ecological challenges (e.g., greenhouse gas) and economic (e.g., raw materials’ optimization) and social (e.g., people, health, and safety) dimensions.

Following this exercise, the company defined key indicators to measure their own sustainability performance. These metrics were based on the feedback of external and internal stakeholders and on SAP’s own expectations with respect to measurability, targets, and benchmarks. In November 2008, SAP published their first sustainability report, which included key measures of its corporate environmental, social, and economic performance, and products and services that were intended to contribute to more sustainable operations of their customers. The sustainability report was updated until 2011, before it was integrated with the web-based annual report (www.sapintegratedreport.com) in 2012. At the end of 2008, SAP raised its sustainability “from a rather tactical to a strategic level” (www.sapintegratedreport.com). In December of 2008, the executive board approved the sustainability strategy and adopted sustainability as a two-fold, long-term strategic element. The first pillar was to enable customers to become sustainable through software solutions offered by SAP; the second was SAP’s internal transformation towards sustainability. From this time on, SAP’s sustainability efforts enjoyed strong commitment and support from the top management, headed by Léo Apotheker, who was seen as the chief sponsor of the sustainability-related efforts. At the time of writing this case in 2013, SAP’s sustainability efforts were supported by both co-CEOs, Jim H. Snabe and Bill McDermott.

Institutionalizing sustainability: the Sustainability Council

In March 2009, SAP announced their new sustainability strategy (Kisker, Mines, & Lisserman, 2009). Since then, sustainability-related efforts were governed by a sustainability council where executive board members cooperated with representatives from across SAP operations. The council guided the overall efforts, decided on projects, and approved budget allocations. SAP’s sustainability organization was then led by Chief Sustainability Officer Peter Graf, who reported directly to Jim H. Snabe, member of the executive board and now co-CEO, and Bill McDermott, also co-CEO. As Chief Sustainability Officer, Peter Graf was both responsible for the company’s internal

¹ All quotes where it is not indicated otherwise originate from our case research that examines the actual developments at SAP, involving causal conditions, challenges, and enablers of SAP’s transformation towards a sustainable organization. The empirical and theoretical analysis of this case is described in Seidel et al. (2013). Some of the quotes shown in the following were edited slightly for grammatical clarity and language consistency for the purpose of this teaching case.

transformation and for addressing customer demands through the provision of sustainability software. In an interview, he described the resources that were involved in these efforts as follows (Raftery, 2009):

Without development we have about a hundred people who are driving this and do nothing else in their job, and this does not count the developers... All in all SAP makes a big commitment, in this year alone it is a couple of ten millions of Euros towards sustainability.

The company implemented a new cross-functional sustainability organization that was lean but well-linked to the rest of the company. The aim of operating with dual reporting lines was to integrate sustainability into all SAP business areas, as Peter Graf explained in the same interview (Raftery, 2009):

We decided to set it up as a matrix. That means the developers that are working on sustainability stay in development... [and] the sales people stay in sales and so forth. However, the leaders of these groups have a dual reporting line into the function of the business as well as into me as the sustainability officer.

Daniel Schmid said the following about the need to set up a matrix (Seidel, 2013, p. 328): “We needed a matrix organization as opposed to one big department in order to avoid that people would say: ‘Ohh, I do not care about sustainability—that is Department XYZ, they are taking care.’”. That is, the company’s sustainability efforts were institutionalized in the organization.

At the time of writing, the sustainability council was no longer in place, and there were direct reporting lines from the chief sustainability officer to the co-CEOs and other steering committees (e.g., for integrated reporting) staffed with senior executives.

Internal transformation: Sustainability Operations

A unit called sustainability operations was created to facilitate the internal transformation process. Figure 1 shows the organizational chart as of 2009.

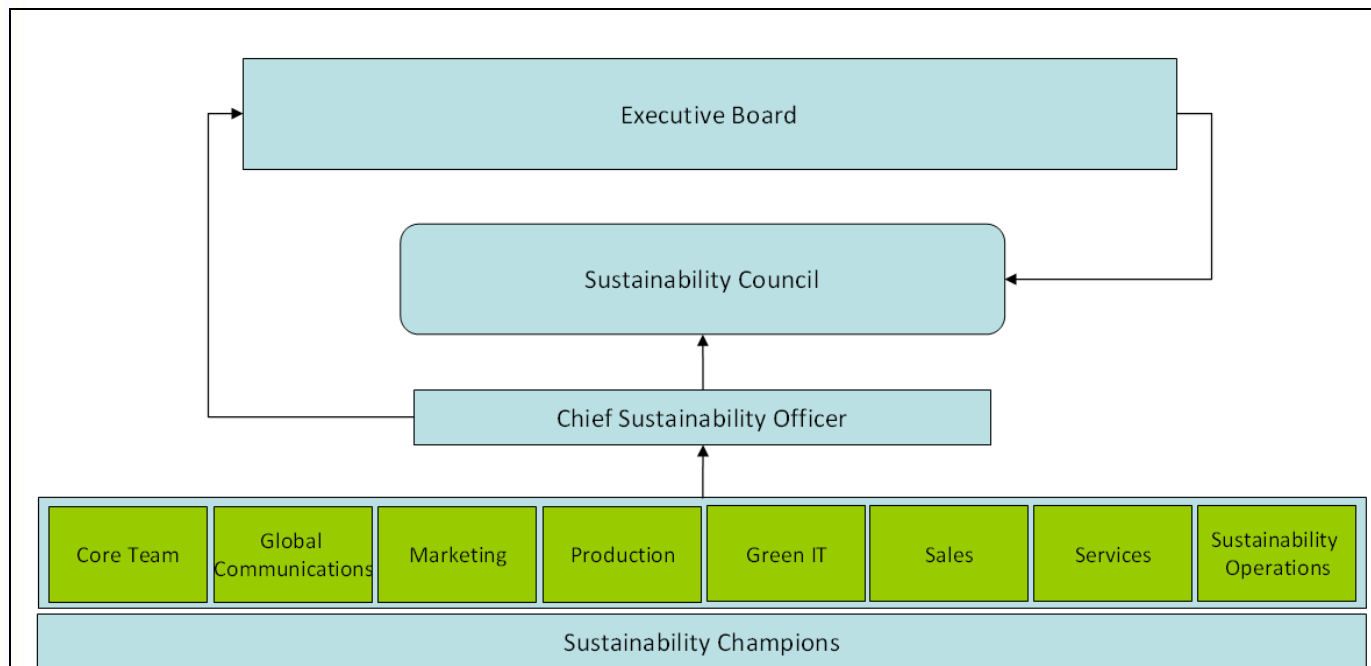


Figure 1. The Organizational Setup of 2009 (Source: SAP)²

Daniel Schmid described the main task of sustainability operations as making SAP “walk the talk...[in order to] transform SAP into a role model for sustainability”. Sustainability operations was structured in accordance to the three dimensions of the triple bottom line (Norman & MacDonald, 2004); namely, the environmental, social, and

² As of 2013, the sustainability council does not exist anymore. Instead, there are direct reporting lines from the CSO to the co-CEOs and steering committees comprised of senior executives, for instance, for integrated reporting.

economic dimensions. A manager headed each dimension. In addition to these dimensions, the fourth pillar of sustainability operations was change management, to address the profound transformation the company had to undergo in order to reach their sustainability targets. A network of change agents—so-called sustainability champions—was installed to implement the strategy in local settings throughout the company, and to facilitate the overall transformation process. The recruitment of champions was based on a two-step process that was initiated in March 2009 following the announcement of the sustainability strategy: interested employees were invited to apply via an internal website and were then selected on approval of their respective managers. The initiative was a great success, and Daniel Schmid said (Seidel, 2013, p. 328): “After 24 hours, we had to close the list, because we had more than 250 respondents.”.

Sustainability champions had the role of multipliers and front runners that communicated and facilitated the implementation of SAP’s strategy. They received dedicated training and support, for example, through telephone conferences on a fortnightly basis. In order to support the sustainability champion’s decentralized, bottom-up activities, the company implemented a social software portal. Sustainability champions dedicated 10 percent of their working time to sustainability-related issues—a share that turned out to be well-balanced according to an internal evaluation in 2010. The amount of time was found sufficient to spread the word of sustainability and, at the same time, left room for other work activities. In 2010, the champions and their direct managers were asked whether they wanted to continue their work. Some of them quit for different reasons, including changed priorities, heavy workloads, or disagreement with the strong business orientation of SAP’s sustainability efforts. In 2012, this network consisted of about 120 employees covering all regions and lines of business.

Simultaneously to setting up the champions network, sustainability operations closely involved other organizational units by managing and canalizing the company-wide efforts and sharing the responsibilities. As a result, there were now specialists in many lines of business (e.g., in facility management or in the purchasing department) responsible for implementing the sustainability strategy.

Getting everybody on board

Right from the beginning, there was organizational support for SAP’s sustainability transformation from the top management, from all lines of business and from many employees (bottom-up support).

First, top management sought to ensure strategic commitment and organizational latitude to change day-to-day operations. Those responsible for the sustainability initiative deemed the strong management commitment to be crucial because they saw it as enabling the allocation of resources for such a long-term project. As the head of social sustainability noted:

Well I think...what we did particularly well is the engagement of the senior leadership team. I mean this topic is extremely high on the agenda of our CEO and the COO and our head of development, so this has been done very effectively. Otherwise they hadn’t committed the resources for a long term strategic project like that. So involvement of senior management I think worked very well.

Second, there were strong efforts of sustainability operations to involve different departments with their prior experiences in the field of sustainability. In 2013, there were people in many functional areas (e.g., global purchasing or global facility management) dedicated to the topic. The following statement was made by the head of social sustainability:

And I think what also worked very well is the inclusion of the topic across many, many different lines of businesses. So regardless whether this is development or marketing or sales or...internal operations, in all the different board areas, in all the different functional areas, there are people dedicated to that topic and that helps. Growing the overall message and the overall strategy together, so this is not an isolated topic that is happening somewhere alone, this is really something that touches the whole organization, at least all functional areas of the organization. I think that’s also something that worked pretty well.

Third, SAP made sure to foster significant bottom support and engage employees across the organization. Due to the emotional and personal connection many employees felt for the topic as responsible citizens, SAP was able to feed off the substantial interest and engagement even before the sustainability strategy was launched, which made it relatively easy to find motivated employees to staff the project. The sustainability champions network played a crucial role in connecting the headquarters with the subsidiaries worldwide. Since then, the network has helped to spread the word and encourage behavioral change. Employee engagement has become particularly important with respect to the relatively high autonomy of the subsidiaries. Daniel Schmid said the following:



There are a lot of grass root activities and there had already been a lot of activities in the past before we considered to underpin our long term commitment to sustainability, and it would be stupid not to use that. You know, there's a lot of energy, there's a lot of expectation, there are a lot of positive activities...

Within sustainability operations, there was an early understanding that individuals would play a tremendously important role in the transformation, and, because the organizational adoption of the sustainability transformation was triggered through sustainability operations, of the company took several measures to convince and motivate employees across the organization. Specifically, the company addressed sustainability as an emotional issue targeted at reaching the hearts and minds of the employees and making them proud of belonging to a sustainable organization. Daniel Schmid said the following: "With sustainability we really had the opportunity...to connect that to the heart of our employees as well to doing something good—not only good for customers or clients, but...good for society, for our planet".

Sustainability operations aimed to foster intrinsic motivation and common awareness as "sustainability-responsible citizens" (Collins, Steg, & Koning, 2007) through various means of communication. Channels that sustainability operations used included phone and conference calls, emails, regular presentations, sparring sessions, internal newsletters, an internal portal, a website, the sustainability report, and so-called focus weeks. Focus weeks included a bundle of diverse activities that focused on a defined topic for each focus week, with the explicit purpose of driving change in the organization. As such, focus weeks combined communication channels from global communications such as TV, news, emails, and local activities, where the sustainability champions network directly engaged with employees in their specific locations. Focus weeks were, for instance, aimed at raising employees' awareness about topics such as paper and energy consumption, social and diversity issues, or employee development and health. The head of economic sustainability said about the role of sustainability operations:

I think what we [sustainability operations] are doing most of the time is...talking to the different departments...and trying to make them think about sustainability. We cannot change the company, but our task is that others change their behavior. So it's really critical to reach those people in their responsive areas, and that they include sustainability in their thinking.

While many efforts aimed to raise employees' intrinsic motivation for the sustainability transformation, the company deemed extrinsic motivational factors to be important also (e.g., sustainability-related efforts that impacted on target agreements and performance measures). The company found that setting appropriate incentive systems that embodied relevant target agreements was relevant for employees to successfully adopt sustainable practices; this included clear accountabilities and responsibilities of the people involved. The head of environmental sustainability, for example, said the following: "The reason why it worked well is because they really felt accountable for that. We used economic incentives ... because then carbon or...electricity consumption...was part of their personal targets, was part of the company targets."

SAP's sustainability-related efforts were generally well-received in the company, particularly by the top management and employees who, from the very beginning, had been showing strong support. Some topics, however, turned out to be rather problematic, typically where employees felt that something would be taken away from them. The most prominent case was that of company cars: while they were a source of emissions and a main contributor to the company's overall carbon footprint, they were considered to be an essential part of the compensation and reward scheme. Efforts to change the car policy thus met resistance. In response, sustainability operations planned concrete measures in order to limit the negative effects of using company cars. For instance, the company installed eco-training provisions to encourage environmentally friendly driving and car-sharing, and offered training arrangements to employees at no cost.

Another critical aspect turned out to be convincing middle management of the need to participate in the transformation. These managers had to handle a huge workload and meet their target agreements, and the company's sustainability transformation added sustainability-related activities to their regular tasks. Thus, the managers often did not see how these activities could help them to meet both their individual and team targets. In order to further convince middle management, the company decided it was necessary to directly talk to and involve them, as Daniel Schmid expressed: "Direct engagement is a very crucial element: just doing it via email or putting it on the portal is not enough; the latter is needed, but it is not enough."

One example of a closer involvement of the middle management was that of "town-hall meetings"—information events on sustainability—held by Peter Graf and Daniel Schmid, where managers agreed to own the meetings, invite the participants, and provide their own platforms for these events.

Measurement: key performance indicators for sustainability

Initially, SAP defined eleven strategic metrics and embedded them at the highest level of key performance indicators (KPI). We can categorize these metrics into areas pertaining to the environmental, social, and economic dimensions of the triple bottom line understanding of sustainability. Environmental goals were related to the company's greenhouse gas emissions, total energy consumption, percentage of renewable energy used, and data center energy consumption. One ambitious environmental goal, reflecting the imperative of climate protection, was the reduction of SAP's greenhouse gas emissions to the level of 2000 by 2020 (about half the 2007 level) (Figure 2 shows the total greenhouse gas emissions between 2000 and 2012).

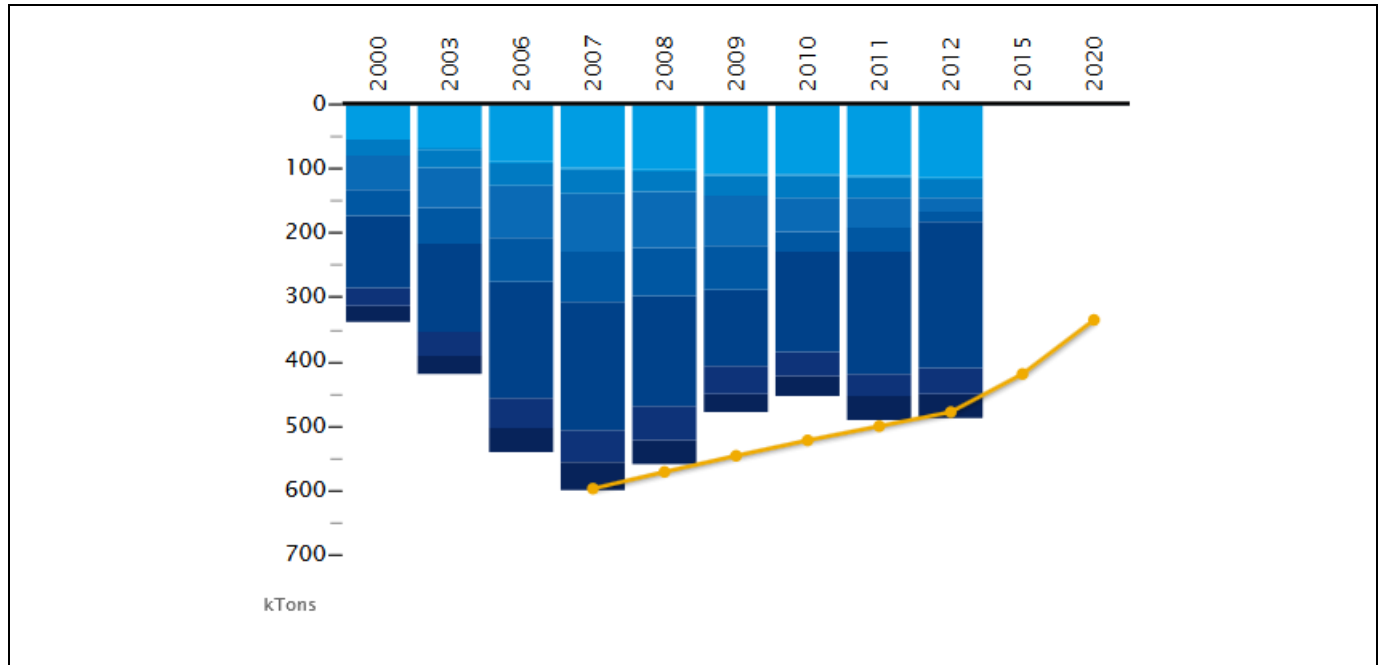


Figure 2. Total Greenhouse Gas Emissions in kTons in from 2000 to 2012 (SAP, 2012)

Social metrics were the company's employee turnover, the percentage of women in top management, employee health, and employee engagement. SAP's economic sustainability was measured based on metrics related to revenue, operating margin, and customer satisfaction. In terms of sustainability, the clear definition of targets was a remarkable advancement because it considerably stretched the set of corporate strategic measures, which formerly had focused on economic metrics. Thus, introducing measures for environmental and social issues, particularly during a time of economic crisis, required and showcased substantial top management support. Table 1 overviews selected key metrics taken from the 2012 Integrated Report structured along the three dimensions of sustainability.

Table 1. Important Metrics (a Complete Overview of Key Indicators can be Retrieved at sapintegratedreport.com)

Dimension	Metric	Measure	Description
Environmental	Greenhouse gas emissions	kTons CO ₂ e	Sum of all greenhouse gas emissions measured, including emissions from business flights, corporate cars, building electricity, employee commuting, etc.
	Total energy consumption	GWh	Sum of all energy consumed through SAP's operations.
	Data center energy	kWh/full-time equivalent	Measuring and managing the energy use of the data center on a per employee basis.
Social	Employee retention	%	Measures voluntary attrition, that is, the number of people that voluntarily leave the company. The company now uses "employee retention" as opposed to "employee turnover", as they did in earlier versions of the sustainability report.
	Female managers	%	Measures the number of women in management positions. SAP strives to achieve diversity throughout the organization.
	Employee engagement	%	Measured by a survey instrument (includes items that, for instance, measure whether employees are proud to work with SAP, trust with leadership, and how employees view sustainability and its importance for SAP).
Economic	Software and software-related service revenue	€ millions	Represents fees earned from the sale or license of software to customers.
	Operating margin	%	Ratio of operating profit to total revenue expressed as a percentage.
	Net promoter score	Numerical value that ignores passives on a scale from 0-10	Willingness of SAP's customers to recommend or promote the company to others; measured through the customer survey; introduced in 2012.

The accomplishment of many sustainability goals was assessed—at the minimum—on a yearly basis and made publicly available. The primary metrics were based on several underlying sub-metrics and corresponding goals. For example, the greenhouse gas emissions included, inter alia, the number of business flights (reduction of 5 percent targeted in 2009) or paper consumption for printing (reduction of 20 percent targeted in 2009).

The overall responsibility for SAP's sustainability performance was with sustainability operations. Still, sustainability operations did not bear responsibility for each metric. The head of the global diversity office, for instance, was responsible for the metric "number of women in management" and was in the reporting line of human resources. Yet, in order to meet the target, she received support from sustainability operations; in many cases, reaching sustainability targets thus became a joint effort across functional borders.

It is noteworthy that the accomplishment of sustainability goals did not affect the majority of employees in terms of individual targets. Targeting and controlling the goal achievement with regard to carbon emissions at the individual level would, for example, require a much more precise measurement system.

The measurement of goal accomplishment proved to be a complex task that included both the measurement of baseline levels and of the ongoing development. The organization was challenged to identify intelligent ways to analyze and interpret the data. In some cases, it turned out to be difficult to extract the relevant data. In the next section, we describe the role that information systems played in enabling the measurement of sustainability targets as well as other aspects of the sustainability transformation.

The role of information systems—SAP runs SAP

From the start of its transformation, SAP sought to use information systems and related IT capabilities to support the change. Specifically, it identified information systems as being a great enabler for designing and implementing more sustainable business processes, for providing opportunities to create transparency about the sustainability

transformation, and for allowing for an open and inclusive dialog. One important principle had been "SAP runs SAP"; that is, in using sustainability software, SAP acted as their own customer and co-innovation partner. Sustainability operations were, for example, among the first customers who used new environmental SAP software and provided feedback to the developers on a regular base.

The company tried to develop information systems that enabled it to monitor, analyze, and present environmental data. With such capabilities, employees at all levels became empowered to re-assess their own work practices in the light of new, sustainability-oriented action goals that were derived from the above introduced key performance metrics. Figure 3 provides a screenshot from the company's website (the 2012 integrated report) that shows how greenhouse gas emissions in the Americas were distributed across different emission drivers in 2012.

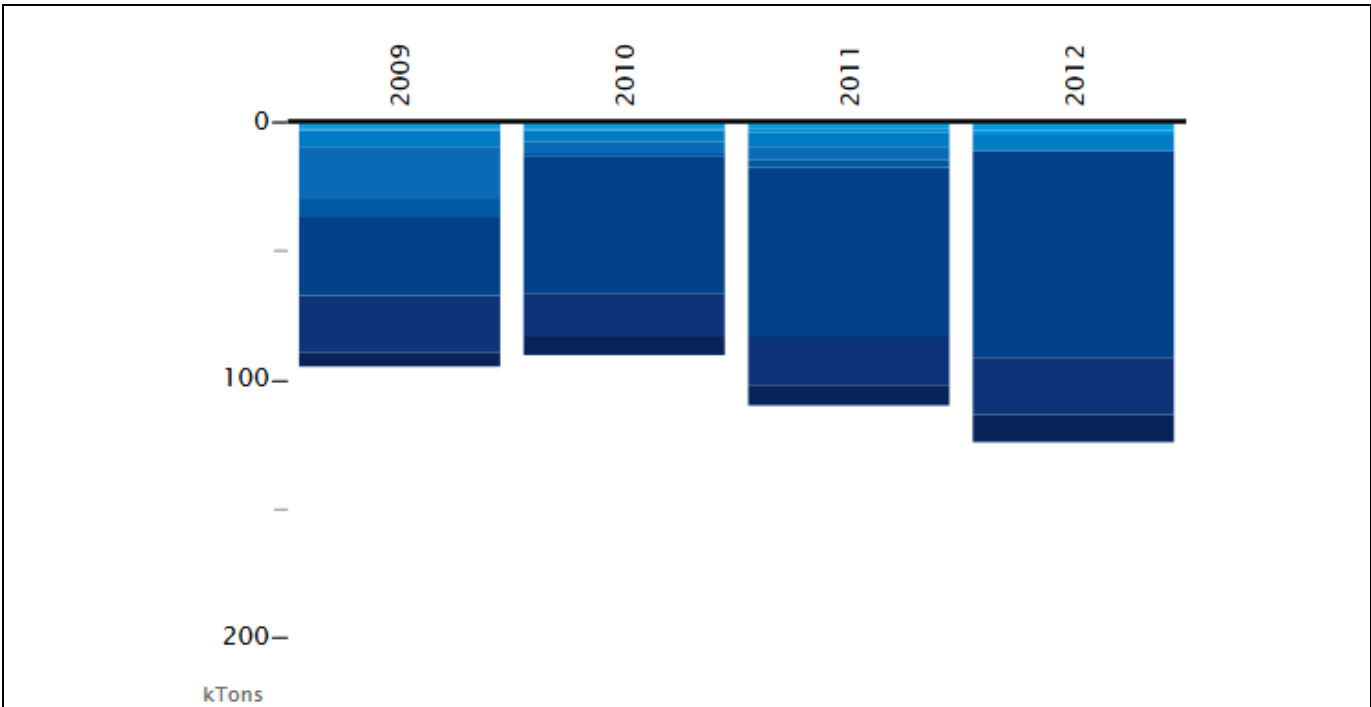


Figure 3 a. Creating Transparency Through IT: Greenhouse Gas Emissions in kTons in the Americas

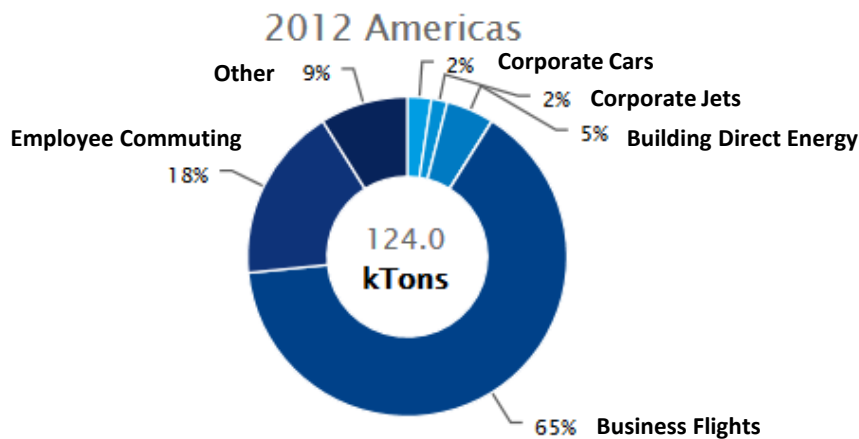


Figure 3 b. Creating Transparency Through IT: Greenhouse Gas Emissions in kTons in the Americas from 2009 to 2012 (SAP, 2012)

The head of economic sustainability made the following statement. She noted the importance of using information systems to create transparency through the availability of environmental data for the sustainability transformation: “I think that transparency is one of the most important things when it comes to sustainability. Because without that you cannot see where you’re good, where you’re bad, where you can set targets, how you have improved. There is this saying: you can only manage what you measure.”.

The global sustainability transformation and change manager also pointed out the importance of information systems with respect to transparency: “So no transparency without IT and no transparency without resilient data.”.

Similarly, Daniel Schmid stressed the meaning of information systems:

The role of the information technology is that it helps you in a standardized way, in a process-oriented way, to have the holistic view but as well the deep dive opportunity. Without IT I would say we would struggle with hundreds of parameters with differences from global perspectives and the different countries. So I think without systems support, IT support, it would be a big, big challenge to manage sustainability.

Sustainability operations used information systems to not only pull together and centralize information, but also communicate and disseminate this information across the entire organization. Information about the sustainability initiative, the past, current, and future efforts, and their impacts on the transformation objectives were made accessible to employees in the organization via an online portal solution (SAP portal). This solution provided access to online analytical processing features that allowed people to interactively explore practice performance data in light of environmental indicators. This accessibility of data and the increased levels of transparency enabled locally driven, bottom-up efforts and community building in particular. To facilitate and connect the local work of the sustainability champions, for instance, the company implemented an enterprise social software portal. As a sustainability champion explained, the tool worked well in encouraging a constructive feedback culture, in connecting and identifying individual experts, and in facilitating the community-building process:

It’s kind of like Facebook, but you’re allowed to put topics on there and share documents and it’s really pulled our group of champions together, because when we discuss a topic, everybody kind of jumps in and gives their opinion. And if somebody gives an opinion without really referencing where they got the information then...somebody will call them on it and say “hey, where’s your references?”

Through these technologies, SAP enabled employees to engage in an organization-wide exchange about ideas about the sustainability transformation. This fostered community-building and awareness about the new, emergent sustainability topic.

Information systems also allowed for the implementation of more sustainable work practices and thus enabled people to change work habits and develop new eco-friendly routines. For instance, the company provided video conferencing tools that employees increasingly used in order to reduce physical travel and movement of resources. A consultant said:

Another example is physical travel. We have dedicated media rooms. In my daily work I'm using ... phoning and conferencing and...[technology name]; so this collaboration tools allow to talk to people and, by switching on just the camera, the room is more like a kind of physical...meeting than just having a normal phone. So I do not need to fly over to the US just to do meetings. So when you need physical meetings, you will not get rid of them..., but you can dramatically reduce the amount of meetings needed.

Table 2 overviews the above described and other important systems that were used as part of the sustainability initiative.

Table 2: Tools used as part of the sustainability initiative			
Tool	Purpose	Description	User group
SAP Business Warehouse	Data presentation and analysis	Used to track and communicate sustainability performance, to define goals and objectives, and for external reporting	Restricted user group (sustainability operations)
Business Objects Explorer	Environmental data presentation and analysis	Multi-dimensional data analysis	Restricted user group (sustainability operations, other sustainability teams, sustainability champions)
Dashboard	Data presentation	Creating internal transparency with regard to paper consumption, energy consumption, commuting (carbon emissions). Accessed by employees via the Portal Solution	Used throughout SAP
SAP sustainability report; replaced by SAP integrated report in 2012	Website	Information about the initiative, metrics, outcome assessment, commenting, micro blogging	Available both internally and externally
SAP Portal	Intranet	Access to different applications	Used throughout SAP
SAP Communities	Community platform	Online discussions	Used throughout SAP
SAP Connect	Integrated functionality for phone conferencing, document sharing, and application sharing	Often used for online presentations	Used throughout SAP
Telepresence	Video conferencing	Highly professional videoconferencing tool, with communication rooms with same layout and appearance in different locations	Used throughout SAP
MS Communicator	Chatting	Synchronous and asynchronous communication	Used throughout SAP

Providing sustainability solutions

Because SAP followed a dual strategy, the internal transformation provided the basis for the company to also provide sustainability solutions and services to their customers. Daniel Schmid explained the relationship between the internal sustainability transformation and providing sustainability solutions as follows (Seidel, 2013, p. 329):

Only if sustainability is really anchored in your core business and if you become a role model as a company, you will make a difference, and only then it is more than a silo approach. Sustainability needs to be embedded in your portfolio so you can help other companies transform, become more efficient, and become more sustainable.

By 2013, the company provided sustainability-related solutions in two basic forms. First, there were dedicated sustainability solutions in SAP's product portfolio (i.e., energy and resource management, operational risk management, or product and safety stewardship). Second, the company embedded sustainability into its main suite and supply chain solutions—an ongoing process that reflects its role as its own co-innovation partner. Daniel Schmid said with regard to one of their main customers, Danone (Seidel, 2013, p. 329): "Danone, for example, are able to see the carbon footprint of their 35,000 stock units with our solutions on a monthly basis."

At the same time, the internal transformation allowed SAP to offer services well beyond the mere provision of software solutions and act as a consultant for sustainability transformations. As Daniel Schmid explained (Seidel, 2013, p. 329):

Our customers want to exchange experiences with us. They are not only interested in the software solutions, but also in how we drive that transformation. It is absolutely logical for anyone at SAP to use SAP systems—SAP runs SAP. That helps SAP to become very effective and efficient—and that translates into a better footprint.

The close relationship between the external and internal perspective as intended by the dual strategy thus becomes noticeable.

VI. SUCCESS AND EVOLUTION OF THE TRANSFORMATION

In a short time frame, SAP managed to take and anchor a leading role in sustainability. The organization had realized explicit responsibilities and a clear commitment to them. SAP's sustainability efforts received positive feedback from both employees and external stakeholders. The development of the key metrics (Table 3) can be publicly tracked at the websites of SAP's sustainability report through interactive charts (see <http://sapintegratedreport.com>). Note, however, that some achievements may have been influenced by corporate measures (e.g., in response to the economic crisis of 2009).

Table 3: Development of important KPIs (SAP Integrated Report 2012)

Dimension	KPI	2008	2009	2010	2011	2012	Change in %
Environmental	Greenhouse gas emissions	560	480	455	490	485	-13,39
	Total energy consumption	N/A	860	845	860	860	00 (from 2009 to 2012)
	Data center energy	3146	3001	2746	2824	2598	-17,42
Social	Employee retention	92	94	93	93	94	+2,17
	Total female managers	18,1	17,6	17,8	18,7	19,4	+7,18
	Employee engagement	n.a.	69	68	77	79	+ 14,49 (from 2009-2012)
Economic	Software and software-related service revenue (IRFS)	8466	8198	9794	11319	13165	+ 55,5
	Operating margin in %	23	24	21	34	25	+ 8,7

	Net promoter score	-	-	-	-	8,9	N/A
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A main challenge the company is yet to tackle is in keeping up, and reducing, current emission levels even while the economy speeds up out of the financial crisis. For example, in 2011, the company observed an increase of carbon emission levels (compare Figure 3), which was largely due to business expansions: "Due to software revenue increases of 25 percent at constant currencies, the company's worldwide greenhouse gas (GHG) emissions increased eight percent to 490 kilotons in comparison to 455 kilotons, including Sybase, in 2010" (archive.sapsustainabilityreport.com).

VII. CONCLUDING COMMENTS

In this case, we provide a narrative of the transformation process of a global IT solutions provider, SAP. The sustainability transformation SAP embarked on has shown its first results. In 2012, SAP led the Dow Jones Sustainability Index, a key benchmark for the performance of investments in sustainability. SAP also led the software industry in sustainability for the sixth consecutive year. Moreover, the company could be found in a variety of other indexes (e.g., Carbon Disclosure Leadership Index—Top 10, Carbon Performance Leadership Index—Top 10, NASDAQ QMX CRD Global Sustainability 50 Index) and won a number of awards for their sustainability efforts.

From the case, it becomes observable that a variety of factors play a crucial role in transforming the organization toward a more sustainable entity, which range from management decisions to employee engagement and technical issues. Specifically, SAP's sustainability operations used the transformative power of information systems in order to support this transformation. Still, the team is now faced with several important questions in order to continue the transformation and reach the targets that were set for 2020:

- What are the key success factors of the transformation, and how can they be maintained?
- What are the key affordances provided by information systems that supported the transformation and that need to be further developed at the company?
- How can information systems be designed that offer such affordances?

ACKNOWLEDGMENTS

This teaching case is based on the experiences and research findings from our multi-year case study and theoretical analysis of the IT-enabled sustainability transformation at SAP. The findings from this study can be found in Seidel, Recker, and vom Brocke (2013). The empirical data for the study was collected between 2009 and 2011. For this teaching case, we further collected data from the SAP 2012 integrated report and from an interview with Daniel Schmid held in 2013. We note that, since publishing our case study and the writing of this teaching case, the SAP organization has further evolved. The current situation at SAP may thus look different to the one presented in this report. We would like to thank Stephanie Raabe and Daniel Schmid from SAP for organizing data access and being highly supportive throughout the study. We are thankful for the Associate Editor whose editorial review improved this teaching case substantially.

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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APPENDIX A: RESEARCH METHOD

This teaching case draws on our case research that examines the actual developments at SAP, involving causal conditions, challenges, and enablers of SAP's transformation towards a sustainable organization. The empirical and theoretical analysis of this case is described in Seidel et al. (2013).

We examined the case and collected data during 2009-2011. We used three methods of data collection. First, relevant documents were analyzed, including SAP's sustainability report condensing targets, progress, and challenges of the project. Second, members of the organization's sustainability operations team responded to a questionnaire that addressed general aspects related to the organization's internal sustainability transformation. Third, the same partners as well as additional interviewees (sustainability champions, transformation managers, developers, consultants and sales agents) participated in semi-structured interviews. A total of 21 interviews with a length between 30 and 90 minutes each were conducted, with an average of about 55 minutes. The following themes governed our data collection:

- (1) Sustainability: What is it, why is it important, how can it be measured, and what are important impact factors?
- (2) IT: what is "green IT", where is the value, what is the demand, and what is the supply?

- (3) Organizational transformation: What is the company's overall business transformation approach? What are enablers and barriers? What is the transformative role of IT in this context?
- (4) Processes: what are “green processes,” what is the role of IT in green processes, how can green processes create value?

We further consulted data published in SAP's 2012 integrated report and analyzed an additional interview conducted with Daniel Schmid, Head of Sustainability Operations, in 2013 (Seidel, 2013) in order to update the case description.

APPENDIX B: GLOSSARY OF KEY TERMS

Glossary of Key Terms	
Term	Definition
Affordance	Affordances are action possibilities provided by information technology to a group of users (Markus & Silver, 2008).
Green IS	Green IS concerns the design and implementation of sustainable business processes using the transformative power of information systems (Watson et al., 2010).
Green IT	Green IT concerns the reduction of negative effects caused throughout the lifecycle of information technologies, including their production, use, and disposal (Watson, Boudreau, Chen, & Huber, 2008).
Information system	Information systems are conceived as “formal, sociotechnical, organizational systems designed to collect, process, store, and distribute information” (Piccoli, 2012, p. 28). IT is thus the technical part of an IS, including software solutions.
Sustainability	Sustainability relates to “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987), and concerns the delivery of economic, social, and environmental benefits simultaneously with classical organizational performance (Elkington, 1998).
Sustainability Council	Sustainability-related efforts at SAP were originally governed by a Sustainability Council where Executive Board members cooperated with representatives from across SAP operations. The council guided the overall efforts, decided on projects, and approved budget allocations. Today, the Sustainability Council is no longer in place, and there are direct reporting lines from the Chief Sustainability Officer to the Co-CEOs and other steering committees (e.g., for integrated reporting) staffed with senior executives.
Sustainability Champion	Sustainability Champions have the role of multipliers and front runners that communicate and facilitate the implementation of the sustainability strategy. Sustainability champions receive special training and support. Sustainability Champions dedicate 10% of their working time to sustainability-related issues.
Sustainability Operations	Sustainability Operations is structured in accordance to the three dimensions of the triple bottom line (Norman & MacDonald, 2004), namely the environmental, social, and economic dimensions. Each dimension is headed by a manager. In addition to these dimensions, the fourth pillar of Sustainability Operations is change management, acknowledging and addressing the profound transformation the company had to undergo in order to reach their sustainability targets.

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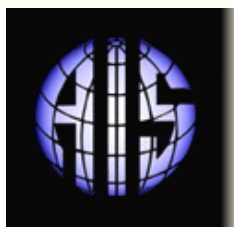
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