

Eco-Management and Audit Scheme (EMAS) at German Higher Education Institutions

Armin Ibitz*

Abstract

A total of 26 German universities have so far introduced the European Union's Eco-Management and Audit Scheme (EMAS) but more are to follow. The purpose of this study is to identify the major drivers for universities to implement the voluntary EMAS and to reveal a pattern of EMAS certification among German Higher Education Institutions in order to develop a framework to ease the employment of EMAS at other universities.

The paper examines environmental statements and reports of universities implementing the auditing scheme with the aim to determine the rationale behind the implementation. Content analysis techniques are applied to highlight common features but also specific characteristics. However, to be able to put the developments into a broader context the study also includes secondary resources, mainly from articles in international journals. Finally, for gaining a better understanding of the issue from a legal perspective, legal sources were also included. Scholarly attention to the emerging deployment of EMAS at tertiary education institutions in Germany has been limited. An up-to-date overview of EMAS deployment at German universities is provided and barriers to implementation highlighted.

The study reveals that so far mostly state-owned universities have opted for EMAS, and most of them are of small size and have previous environmental expertise and experience. Private universities have not tapped the potential of EMAS. The high concentration of EMAS certified higher education institutions in the state of Baden-Württemberg suggests that the state government's efforts to support the implementation of EMAS bear fruits. The study provides policy recommendations on how to increase incentives for achieving EMAS certification among tertiary education institutions.

Keywords: Eco-Management and Audit Scheme; EMAS; Higher education; Germany; Sustainable Development

* Assistant Professor, Department of German, Wenzao Ursuline University of Languages

1. Introduction

Since the 1990s environmental management systems have been implemented across many industry sectors, mainly in a response to tightening environmental legislation, rising competition but also to growing environmental awareness among consumers and other stakeholders. Since the adoption of internationally recognized and standardized schemes is encouraged by many governments and public authorities to enable domestic entities to withstand global competition, a growing number of enterprises have introduced voluntary environmental management systems to minimize their environmental impacts, ensure legal compliance, satisfy customer requirements, improve risk management, enhance their overall efficiency, and cut costs, while simultaneously reinforcing their green image (Khanna, 2001; Melnyk et al., 2003; Steger, 2000).

Recently, academic institutions have also shown increased interest in implementing voluntary environmental management systems. Several German higher education institutions have introduced the European Union Eco-Management and Audit Scheme (EMAS). The increased interest of higher education institutions in EMAS not only confirms the ongoing transformation process of the higher education sector but also reflects a global trend of greening the universities which could eventually lead to a more sustainable society (Shriberg, 2002). Universities take a crucial role as a multiplier of ideas and concepts since they educate future political, economic and societal leaders (Leal, 2011; Stoltenberg, 2009). As of now, Germany has 399 universities, colleges and polytechnics, where some 2.2 million students are educated and over 570,000 staff are employed (Hochschulrektorenkonferenz, 2011). Doubtless, the time spent at universities leaves a strong imprint on future entrepreneurs, government workers, politicians, and scientists. Only with a strong environmental commitment of the higher education sector Sustainable Development is achievable. Moreover, the role of higher education institutions is changing dramatically, and pressure on the higher education sector from various external stakeholders (government authorities, industry actors, environmental groups, customers) is mounting. Universities not only have to serve the society with research, teaching and general services, but they are also demanded to take on social and environmental responsibilities (von Richter, et al., 2000). While academic institutions face even tougher budgetary restraints and requests to implement entrepreneurial management practices, they are operating in an increasingly dense network of domestic and international environmental regulations. Although direct environmental impact from the tertiary sector is low, the higher education sector contributes decisively to the exploration and

understanding of global environmental challenges and thus the issue provides a worthwhile area of research.

Aim of the Study

The present study has three major purposes: First, it attempts to reveal the rationale behind the implementation of voluntary EMAS adoption by assessing major drivers. Second, it seeks to draw a general certification pattern for EMAS among German academic institutions. Finally, the work aims to provide rudimentary policy recommendations on how to increase incentives for EMAS certification. Therefore the paper examines the environmental statements and reports from academic institutions implementing the auditing scheme with the aim to determine the rationale behind implementation. Content analysis techniques are applied to highlight common features but also specific characteristics. Regularly published environmental statements provide a solid source of data since these environmental reports need to be validated by an external accredited verifier. Furthermore, they contain detailed information about the current environmental performance, the status of the environmental management system, environmental targets, implemented environmental policies and measures as well as achieved environmental improvements. However, to be able to put the developments into a broader context the study also includes secondary resources, mainly from articles in international journals. Finally, for gaining a better understanding of the issue from a legal perspective, legal sources were also included. The observed results provide the foundation for an in-depth discussion that aims to formulate rudimentary policy recommendations for easing the application of EMAS at other institutions.

The study is structured as follows. Section two will provide the theoretical framework for exploring socio-economic motives of universities to voluntarily implement costly and complex formal environmental certification schemes. Section three links the German higher education sector with EMAS by providing an up-to-date picture of the situation of EMAS among German universities. Finally, the work draws conclusions from the case of Germany, which embodies the largest sample of universities registered with EMAS in the entire EU.

2. The Conceptual Framework

The implementation of voluntary environmental management schemes in economic enterprises has drawn the attention of researchers across the globe, and the epistemological community has closely observed developments and certification processes throughout various economic sectors (Halkos & Evangelinos, 2002; Harter & Homison, 1999; Henriques & Sadorsky, 1996; King & Lenox, 2000; Nakamura et al., 2001; Ruiz-Tagle, 2006; Videras & Alberini, 2000; Welch et al., 2002). The present work can thus draw from a rich and comprehensive academic literature scrutinizing the determinants of the adoption of environmental management systems in economic enterprises (Arora & Cason, 1995; Bansal & Hunter, 2003; Darnall, 2003). While ISO has drawn most scholarly attention, the literature on EMAS is limited, partly due to EMAS' previous regional restriction to the EU and partly due to its initial limitation to the manufacturing industry. While scientific literature about formal environmental management systems in private enterprises is multifaceted, much less is known about higher education institutions and the implementation of EMAS (Delakowitz & Hoffmann, 2000; Ferreira et al., 2006). Thus, this study sets out to fill this gap and contribute to the ongoing academic discussion by providing new perspectives on the issue (Adomßent et al., 2008; Krizek et al., 2012).

2.1 International Efforts on Greening Education and Promoting Sustainability

The relationship between education and environmental issues was first internationally discussed at the *Stockholm Conference (UN Conference on Human Environment)* in 1972. In 1977, the *Intergovernmental Conference on Environmental Education* in Tiflis (1977) resulted in the formulation of the first international declaration on environmental education, mainly focusing on promoting environmental teaching, research, and training. However, it was the *Brundtland Report* (1987) that drew large public attention by introducing the term *Sustainable Development*. International joint efforts were initiated and the first declarations signed in an effort to implement green ideas within the higher education sector, for instance, the *Talloires Declaration* (1990). By providing a comprehensive framework for the establishment of an international network of colleges and universities to promote Sustainable Development, it served as a first official statement by universities to commit to environmental sustainability in higher education (Wright, 2004). While the *Declaration* provides a good platform to show commitment to Sustainable Development, it not only fails to include a solid environmental report mechanism but also lacks a binding target system. The *Declaration* also provides no

concrete measures or mechanisms to improve environmental performance on the campus. As of February 2017, 502 universities and colleges from over 50 countries have signed the *Talloires Declaration*. Interestingly, Taiwan shows 47 universities as signatories, while there is only one from Germany, namely the University of Augsburg (*Talloires Declaration*, 2017).

In 1992, the *Rio Earth Summit* provided international environment-related topics with a new impetus and eventually enabled the concept of Sustainable Development to enter the academic institutional sphere. And the implementation of the UN action plan *Agenda 21* contributed to raising the general level of environmental consciousness within the global higher education sector, through a series of environment-related conferences (such as *Conferences for Higher Education for Sustainable Development*). Research focus on Sustainable Development was broadened and first attempts to implement green processes at universities were launched (Wright, 2002).

In 1993, the *Kyoto Declaration on Sustainable Development* urged universities to seek, establish and disseminate a clearer understanding of Sustainable Development by setting out concrete action plans and the request to come up with measurable pragmatic activities. A year later, the *Association of European Universities (CRE)* introduced the *Cooperation Programme in Europe for Research on Nature and Industry (Copernicus Charta)*, which calls on universities and other academic institutions to act as leaders in creating sustainable societies. It stresses the necessity for a strong commitment on the part of European universities to Sustainable Development by mobilizing existing resources at higher education institutions. As universities have expertise in various fields of research, they are crucial players and should take over major responsibilities by implementing ten principles of action focusing on key areas such as public outreach, environmental literacy and encouraging partnerships. Furthermore, the Charta stresses participation from all individuals at universities (students, faculty, staff, employees, researchers). As of 2017, the Copernicus Charta lists 238 signatory universities across Europe, 46 of which are from Germany (COPERNICUS, 2017). Although the list of signatories has steadily grown longer, progress is hard to assess since there exists no reporting mechanism that allows further information retrieval about environmental progress.

While the emergence of an increasing number of declarations and international agreements suggests a growing commitment among academic institutions to deal with ecological challenges, the effectiveness of such efforts is questionable since the implementation of measures is decided by the individual institution. While international

declarations merely represent a non-binding framework that lack mechanisms of reporting implemented projects and achievements, EMAS provides a meaningful instrument for organizations to introduce a clear and binding target system, where achievements and progress can be measured quantitatively.

2.2 The European Union's Eco-Management and Audit Scheme

In 1993, the European Union developed the Eco-Management and Audit Scheme (EMAS) as a management tool for evaluating, reporting and enhancing the environmental performance of manufacturing enterprises and organizations within the EU. Designed as a voluntary instrument, EMAS aims to call on the environmental responsibilities of enterprises and organizations to commit themselves to the conservation of natural resources and the protection of the environment. Registration with EMAS requires the introduction of a well-defined environmental management system after a previous comprehensive environmental review of relevant internal processes. Apart from full compliance with environmental legislation, participants commit themselves to continuous environmental improvements by regularly tightening their environmental performance targets. EMAS requires the publication of independently validated environmental statements every three years in order to inform the public about the environmental performance of the organization. Therefore, all implemented environmental measures have to be evaluated and verified by an external and independent auditor who guarantees the credibility of implemented measures as well as disclosure of sensitive information. Environmental performance is measured quantitatively and participants can expect benefits from improved resource and energy efficiency. However, EMAS is not only concerned with direct environmental impacts and pollution in the ordinary sense but also includes indirect aspects such as transportation, employees' health and safety, ethical issues, as well as environmental transparency. EMAS calls for an open dialogue with external stakeholders as well as the integration of the employees in the greening process. All in all, compared with ISO, the EMAS scheme is more comprehensive and more rigid. After successful registration, the organization is eligible to carry the EMAS symbol for marketing purposes and all EMAS registered organizations are enlisted in a European wide and publicly accessible register (The European Commission, 2013). All in all, EMAS provides a meaningful tool to re-evaluate own strengths and weaknesses and concentrate human and financial resources on selected areas in order to enhance visibility, public recognition but also overall efficiency. EMAS increases not only the information flow

about the environmental performance of the organization, which otherwise would not be retrievable for outsiders but also the overall transparency within the organization.

While globally, ISO 14001 remains the most recognized environmental management scheme, EMAS has steadily gained importance within the EU. Numbers of EMAS registered bodies in the EU had already reached 3,449 organizations and 10,434 sites in 2014 (European Commission, 2014). Germany tops the list with the most EMAS registered organizations (1,237), followed by Italy (1,056), Spain (1,044), and Austria (272). With 239 verifiers, the country has about double the number of all other EU countries together. While initially EMAS was designed for the manufacturing sector, amendments (EMAS II) extended the range of application to actors from the service sector. Recently, the service sector (including the educational sector) has started to realize the potentials of a formal EMAS certification. In Germany, about 39% of the EMAS registered units are from the manufacturing industry, followed by the service sector (12%). Interestingly, education comes in third place (9%), even before water treatment (6%) (EMAS, 2014). The latest revision (EMAS III), which went into effect in early 2010, extended its application beyond the EU boundaries and opened EMAS to the world.

2.3 EMAS and Higher Education Institutions

From a theoretical perspective, the adoption of a formal environmental management system in economic enterprises is based on cost-benefit calculations made by each specific organization. A profit-oriented company opts for the implementation of a voluntary environmental management system when it expects benefits in return which is fitting with the company's target framework. In their work, Porter & van der Linde (1995) claimed that enterprises located in a context of strict environmental regulation may be directed to a more innovative path by re-evaluating existing principles, structures and processes. However, voluntary approaches may also lead to an improvement in environmental performance and economic efficiency. Cost reduction, efficiency gains or reputation gains may outweigh the costs for implementation, administration, and verification (Vernon et al., 2009). However, since many benefits may only be realized in the mid or long term, voluntary approaches are more attractive to actors with a strategic long-term plan.

Regarding the deployment of voluntary environmental management systems at higher education institutions we can identify several influential factors in the decision making processes, such as the ownership structure, funding sources, size, environmental expertise, legal framework, information access, implementation costs and market

competition (Sharp, 2002).

The ownership structure of the academic institution may influence decision-making processes since it determines the overall mission and long-term goals of the higher education institution. In addition, the ownership issue is closely related to issues of funding. While public academic institutions mainly receive their funds from state authorities, private universities draw large parts of their financial resources from tuition fees and third-party funding. However, although both face tough budget constraints, governmental influence in public universities is assumed to be higher. As of now, Germany's higher education sector is dominated by public universities and includes only about 139 private higher education institutions (Hochschulrektorenkonferenz, 2011).

The size of an organization provides another crucial determinant in the decision for a voluntary environmental management system (Arora & Cason, 1995; Welch et al., 2002). The certification under EMAS generates various costs which need to be covered by the budget of the university, such as fixed costs (validation/verification fees, registration fees, fees for logo integration), internal costs (personnel and technical resources) and external costs (consultancy fees and reporting fees). While for small organizations administrative costs are expectantly lower than for large organizations, implementation costs (verification, certification) are a relatively higher hurdle (Bero et al., 2012; King & Lenox, 2001; Nakamura et al., 2001; Welch et al., 2002). For a large organization the costs of certification are more easily manageable, whereas a small entity may struggle with them (Levy & Marans, 2012). Thus, large universities with abundant financial and human resources can more easily distribute implementation costs. However, the implementation of a university-wide formal environmental management system represents a cross-department issue and requires participation from relevant actors and the existence of strong communication channels. Consequently, an organization of small size benefits from its flexibility in decision-making processes and process coordination, since fewer actors are involved and the hierarchical structure is flat. Moreover, size also translates into visibility, and since the public is increasingly concerned about the environmental performance of large organizations, they face constant scrutiny.

Environmental improvements are often related to innovations and require technological advances and expertise. Technical universities (TU) and Universities of Applied Sciences (FH) thus have an advantage, since they are able to develop technical solutions internally as part of their research work or student projects. Furthermore, universities with a focus on environmental engineering already have their own expertise

and may thus reduce costly external consultants. In general, Universities of Applied Sciences have a closer connection with the industry and they face pressure to develop marketable solutions. Since they are more application oriented they can rely on technical expertise from within. Universities of general sciences on the other hand face higher implementation costs for installing environment-friendly technologies on campus as they would need to invite external companies for consultancy.

The legal framework provided by the government represents another factor to consider, and legal compliance is a concern for both enterprises as well as universities. In general, the academic sector shows lower levels of environmental pollution than the manufacturing sector and is thus less troubled to achieve legal compliance. Nevertheless, universities do not operate in a legal vacuum and legislative pressure to improve the environmental performance of the higher education sector is rising. However, as the economic sector illustrates, EMAS certification frequency varies among the sectors. Companies located in a thoroughly regulated and monitored segment are more likely to introduce environmental management systems since they are already confronted with strict regulations urging them to respond accordingly. For actors located in a relatively unregulated sector, the introduction of EMAS is less imperative (Porter & van der Linde, 1995).

Universities are not stand-alone organizations as they fulfill essential socio-economic functions (Leal, 2011). In an increasingly competitive global higher education sector, close cooperation with local, regional and global actors has become a major requirement. Due to governmental pressure, universities seek to intensify cooperation with the industry in order to compensate for financial support from the state. Strengthening the cooperation with the industry represents a cornerstone of the higher education reform in Germany, and universities are increasingly sensitive to stakeholder pressures. However, facing notorious budget cuts, cost-management has become a major task for universities, and pressure to enhance efficiency in administration and operation, teaching and research is mounting. Certification with EMAS - which finds strong recognition among actors in the private sector - signals its readiness to deal with contemporary challenges, such as the environment. Since the government is also putting pressure on universities to ensure that they commit to the promotion of sustainability on campus as well as beyond, EMAS certification serves two purposes at the same time (von Richter et al., 2000).

The global academic world has seen a tremendous rise in competition among academic institutions over the last decades and universities not only compete in drawing

funds from the private sector but also in terms of prestige, research, and recruiting students. The existence of a solid brand and a clear and recognizable profile enables universities to withstand difficulties in attracting potential students and investors. An internationally recognized certification mark, such as EMAS, increases trust from customers and stakeholders. Particularly for actors located in a highly competitive market, EMAS may provide an extra benefit, setting the organization apart from its competitors. A university may opt for EMAS to gain benefits as a first-mover and to differentiate itself from others (Porter & van der Linde, 1995).

Through the introduction of market-oriented management practices, public image and reputation have gained importance at higher education institutions. With the rise of environmental awareness, also academic institutions are measured by their environmental performances and their contribution to promoting sustainability. Apparently, in a growing market of environmentally informed stakeholders, an eco-friendly image and the deployment of an internationally recognized environmental management systems are supportive for universities. While universities are facing increasingly eco-sensitive stakeholders (students, industry, environmental groups, government authorities, etc.), higher education institutions find themselves in a process of learning how to respond to mounting environmental demands. While EMAS serves as an instrument to improve public image, perception, and visibility, certification represents a rather complex administrative issue, particularly when the organizational structure of the introducing body is of large size. Thus, organizations that can draw from earlier experiences in environmental protection measures (such as the implementation of ISO or other environmental management systems) may have an advantage, whereas the learning-by-doing approach may result in a slow, cost-inefficient process with high implementation costs. Consequently, previous expertise in the area of environmental standards, environmental engineering projects or the implementation of other management systems is significant and very likely to reduce the overall transaction and implementation costs (Darnall, 2003; King & Lenox, 2001; Nakamura et al., 2001).

Furthermore, access to environment-related information, databases, and information sharing networks represents a significant determinant in reducing implementation and transaction costs. Signatories of declarations on sustainability and international environmental agreements for the higher education sector have better access to crucial information for reducing implementation costs than outsiders. Conferences and gatherings of members not only provide opportunities for exchange and information sharing but also

provide a platform for networking. The government of Baden-Württemberg, for instance, has implemented a program that brings together various actors with the aim to promote environmental management systems. The program has guided several institutions to successfully install EMAS (Schmidt, 2017).

3. The German Higher Education Sector and EMAS

As of 2017, Germany has 399 higher education institutions (Hochschulkompass, 2017) and a total of 23 universities which carry the EMAS mark (see Table 1). The late 1990s saw a first wave of certification with the Hochschule Zittau/Görlitz as the first European University to register with EMAS in 1999. In 2014, the Hochschule Neubrandenburg (Mecklenburg-Vorpommern) and the Hochschule Weihenstephan-Triesdorf (Bavaria) joined the circle of EMAS certified universities. Also in 2014, with the support of the Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg the Hochschule für Technik Stuttgart along with the Hochschule Biberach und the Hochschule Heilbronn could be registered for EMAS. In 2015, the Catholic University Eichstätt-Ingolstadt has received the first EMAS certification for a Bavarian university. The Catholic University of Eichstätt-Ingolstadt is the first and only non-state university that applied for EMAS certification. The university is supported by the Catholic University of Eichstätt-Ingolstadt Foundation, a foundation established by the bishops of Bavaria. Given that several academic institutions are in the process of preparation for EMAS registration (Pedagogical University Weingarten, Hochschule Trier, and the University of Kassel) interest in EMAS has not diminished over the years.

3.1 The Legal Context

For universities, legal compliance is an important issue, particularly since the network of environmental regulations is becoming increasingly tense. In Germany, environmental protection received constitutional status with its integration in the basic law in the form of a state objective in 1994. According to Article 20a “[...], the state shall protect the natural foundations of life and animals by legislation and, in accordance with law and justice, by executive and judicial action, all within the framework of the constitutional order.” (Bundesministerium der Justiz, 2012). Thus, all state organs are legally bound to take into account the environmental impacts of their actions in order to protect future generations. Besides these general provisions embodied in the constitution,

Germany possesses a rigid framework of environmental regulations and has enacted a series of environmental legislation aimed at protecting natural resources. However, regarding the promotion of sustainable campuses, the influence of the federal government is limited since legislative power for educational and environmental matters is handed over to the sixteen states by Articles 20 I and 79 III of the Basic Law. From a legal perspective, the central government is merely responsible for laying out the general education policy framework, while according to Article 75 of the Basic Law specific laws and regulations are drafted by each state. Consequently, every state has its specific legislation regarding environmental protection and promotion of Sustainable Development. Interestingly, only four states (Baden-Württemberg, Hamburg, Rheinland-Pfalz, and Schleswig-Holstein) refer to the term of Sustainable Development in their Higher Education Laws. While legal pressure to promote Sustainable Development in the higher education sector seems to play a minor role, government initiatives to reduce transaction and implementation cost for EMAS seem to trigger fruitful responses. EMAS certified academic institutions can be found in eleven out of the sixteen German states. From a geographical perspective, there is a clear geographical concentration in the state of Baden-Württemberg (BW), which stands out with seven EMAS certified higher education institutions (one more in progress). Moreover, all academic institutions of this state were registering within the last six years. Since 2000 the government of Baden-Württemberg supports groups of organizations that consider implementing EMAS with professional expertise and financial incentives (Förderdatenbank, 2014). Since the establishment of the program, over 70 convoys of organizations were taken successfully to the EMAS certification this way (The University of Hohenheim and Hochschule Nürtingen-Geislingen are in the same convoy, as well as Universities of Applied Sciences of Biberach, Heilbronn, and Stuttgart).

The majority of EMAS registered academic institutions are considered small or medium size. Since initial efforts for EMAS often originate from a small but highly-motivated group of individuals, small universities appear to more easily overcome existing organizational hurdles. Due to budgetary limits, small universities tend to avoid high consulting costs from external consulting companies by launching small-scale projects where internal expertise (staff and students) is mobilized. Although there is a bias towards small and medium-sized universities registering with EMAS, certification is also achievable for large higher education institutions as the cases of Dresden, Berlin and Tübingen show. Large universities have larger potentials for saving and they can distribute the implementation costs over many areas.

Table 1
EMAS certified Higher Education Institutions in Germany.

Year of 1st EMAS Certification	Name of University	Federal State	Students	Annual Third-party Budget funding			ISO-14000 certified	Copernicus Charta
				Staff	(in €m)	(in €m)		
(in progress)	Pedagogical University Weingarten	BW	3,300	241	n.a.	n.a.		
(in progress)	Hochschule Trier - Environment Campus Birkenfeld*	RP	15,260	n.a.	102	n.a.		
2015	Catholic University of Eichstätt-Ingolstadt	BAY	5,400	805	n.a.	6.4		
2014	Hochschule für Technik Stuttgart	BW	3,800	110	n.a.	n.a.		
2014	Hochschule Biberach	BW	2,400	70	n.a.	n.a.		
2014	Hochschule Neubrandenburg	MV	2,000	290	n.a.	n.a.		
2014	Hochschule Weihenstephan-Triesdorf	BY	5,600	200	n.a.	n.a.		
2013	Nürtingen-Geislingen Univ. Of Business and Environment	BW	4,800	200	n.a.	n.a.		
2013	Hochschule Heilbronn	BW	8,000	340	n.a.	n.a.		
2012	University of Kiel	SH	24,189	3,328	228.6	90	✓	
2012	Hochschule Esslingen-University of Applied Sciences	BW	6,079	1,000	30	n.a.		
2011	University of Hohenheim*	BW	8,458	2,048	122	27.8		
2011	University of Tübingen	BW	27,132	10,000	395	94		
2011	Hochschule Harz-University of Applied Sciences	ST	3,300	n.a.	n.a.	2.5		
2010	Brandenburg University of Technology Cottbus	BB	6,752	199	51.8	34		✓
2010	Eberswalde University for Sustainable Development	BB	1,800	44	7.9	4		✓
2009	Hochschule Osnabrück - University of Applied Sciences	NI	11,000	744	105.0	n.a.		
2008	Cologne University of Applied Sciences*	NRW	21,000	1,000	130	12		
2004	Freie Universität Berlin	BE	28,500	4,000	274	106	✓	✓
2004	University of Bremen	HB	19,524	3,359	278.6	86		✓
2004	Lübeck University of Applied Sciences	SH	4,143	320	17.8	5		✓
2003	Bremen University of Applied Sciences	HB	8,273	n.a.	n.a.	n.a.		
2003	University of Technology Dresden	SN	35,336	4,400	500	204		
2002	University of Applied Sciences Landshut	BY	4,313	100	n.a.	1		
2000	Leuphana University Lüneburg	NI	6,982	930	79.1	1.3		✓
2000	University of Paderborn	NRW	18,500	2,210	165	11.1		
2000	Bielefeld University	NRW	18,546	1,262	220	53.5	✓	✓
1999	Hochschule Zittau/Görlitz - University of Applied Sciences	SN	3,750	490	n.a.	n.a.		✓

*EMAS partly introduced

Source: Author's compilation

Regarding the ownership structure, observations draw a lucid picture: only public organizations have considered EMAS certification. Out of 139 private universities in Germany, only one carries an EMAS certificate (Catholic University of Eichstätt-Ingolstadt). While private universities are primarily smaller institutions with a limited range of offered subjects and receive their budget partly from tuition, state universities can draw on governmental funds and thus have significantly larger financial resources available. However, providing them with responsibilities for their budgets, incentives for cost-cutting and efficiency enhancement measures have surged, and EMAS is now perceived as a tool for controlling cost increases in times of tough budget restraints and rising environmental awareness. In no other country of the EU do so many people (782,000) work for enterprises and organizations that are EMAS registered than in Germany. In the background of a generally high level of public environmental awareness, universities are also expected to take a proactive role in conserving the environment. The public image plays an important role. In 2011, the Environment Campus of Birkenfeld (FH Trier) was ranked first as the most environmentally friendly university in Germany. The second was FH Eberswalde and third came Leuphana University Lüneburg (Utopia, 2011).

As shown in Table 1, 20 out of the 26 EMAS universities are either technical universities or universities of applied sciences. Because the improvement of the environmental performance often aligns with progress in operational efficiencies, breaking down environmental targets in concrete action not only requires expertise in environmental management but also engineering know-how.

3.2 Environmental Expertise

Implementation costs for EMAS are lower for technical universities and universities of applied sciences as they may allocate internal resources to provide technical solutions (e.g. energy saving measures, installation of PV panels, etc.). Furthermore, universities which have laid out rigid environmental policies (e.g., Hochschule Harz) or universities with strong capabilities in environment-related teaching and research (e.g., Leuphana University Lüneburg) can access relevant information more efficiently and could thus lower implementation costs. Since 1991, the Leuphana University Lüneburg has held the UNESCO Chair for “Higher Education for Sustainable Development” (Leuphana, 2013). At the universities of Berlin, Bielefeld, and Kiel the previous ISO14001 certification generated valuable knowledge on the implementation of an environmental management system. Only seven EMAS registered universities (University of Paderborn, FU Berlin,

Universities of Applied Sciences of Heilbronn, Neubrandenburg, Esslingen, Landshut, and Osnabrück) had no environment-related study programs before they certified with EMAS. The study suggests that EMAS is more feasible at universities that can lower implementation costs by drawing from their earlier environmental expertise. Thus, previously installed environment-related research centers, institutes or study programs are supportive of the implementation of EMAS.

3.3 Implemented Measures

EMAS Universities apply a wide range of measures to achieve the aspired improvement of their environmental performance. Areas of involvement include governance and administration, curriculum/study programs, research and innovation, and daily operation. The initial focus is repeatedly laid on measures aimed to enhance the environmental performance of daily operations. Projects with short-term benefits are prioritized over cost-intensive measures with an uncertain return on investment. Major short-term efforts include reducing water, energy and paper usage, reducing waste, drawing electricity from renewable energy distributors, installing a paperless office, and establishing platforms for internal exchange of chemical substances. Green procurement policies extend environmental requests to external suppliers or service enterprises, e.g. copy shops, cleaning companies and restaurants. The Technical University Cottbus and the Leuphana University Lüneburg experienced changes in the menu of the school cafeteria. The long-term measures mainly cover reconsiderations in the energy supplies, the installation of PV panels and large renovation works. While the Leuphana University Lüneburg and the University of Bremen receive their entire electricity needs from renewable energies, the FU Berlin achieved energy savings worth about € 810,000 through a rigid energy saving program in 2004. Regarding the funding of projects, universities draw from various financial sources. In 2005, the TU Cottbus established a fund where all students pay in 1 € annually. The fund is doubled by the university and spent on green projects. Several universities have set out firm targets for environment-related third-party funding in the hope that their environmental expertise, as well as their green image, is strengthened by an increased number of environment-related publications and research projects (e.g., HS Bremen and the HS Zittau/Görlitz set out targets of 30% and 44% respectively).

However, EMAS registered universities not only focus on direct environmental impacts but also take into account indirect environmental impacts. Measures encompass

drafting environmental regulations for new constructions (TU Dresden), promoting public transport (job tickets), organizing public lectures about ecological issues, organizing environmental days for the public, greening the institution's curriculum as well as fostering environment-related research. In general, environment-related research and teaching received an upgrade in EMAS universities, and several universities set out targets of green research projects and publications (e.g., HS Bremen, HS Zittau/Görlitz).

EMAS has not only triggered responses in the administration and research but also the curriculum saw a clear greening process. Particularly, technical universities and universities of applied sciences showed a high willingness to extend their environment-related courses and study programs. While the universities of Tübingen and Bremen are still considering an extension of environmental courses, the University of Applied Sciences of Bremen, Landshut and Zittau/Görlitz have already installed mandatory courses in ecology for all students. In 2012, the Kiel University announced plans to establish a new master program entitled "Sustainability, Society and the Environment", while Esslingen is also considering the introduction of new environment-related studies after its EMAS registration, and the Technical University of Dresden applies environmental impact assessment to scrutinize newly implemented study programs. From a total of 70 study programs, the Hochschule Bremen has seven explicitly environmental studies. Projects with environmental issues constitute about 30% of all projects. However, from a total of about 9,000 study programs in Germany, the fraction of environment-related studies of about 350 is still very small (Hochschulkompass, 2017). Although the merits of the implemented indirect measures are often not directly quantifiable, the higher education sector and the country as a whole benefit in the long term when graduates carry their expertise and experience into various disciplines.

3.4 Stakeholder Pressure

The high presence of universities of applied sciences registering with EMAS derives from their market orientation. The majority of EMAS registered higher education institutions are universities of applied sciences, which are more market-driven and focus on close relationships with the industry sector. Consequently, they see a much higher necessity to keep up with the demands of their stakeholders. The German higher education sector is undergoing a substantial reform, and universities are increasingly exposed to global competition. As Germany's higher education policy is heavily borrowing from concepts of economic disciplines, higher education institutions are not only increasingly

demanded to implement entrepreneurial management practices, but also have to bear more self-responsibility for their operations. While universities receive less financial support from the government, they are encouraged to engage in cooperation with the industry sector. As a consequence, universities are not only focusing more on research output but also on the marketability of their research. Third-party funding in Germany has more than doubled since 1998, from €2.5 billion to over €5.3 billion per annum, whereas financial support from states has only increased moderately for the same period of time, from €12.6 billion to €15.5 billion (Der Spiegel, 2012). On average, every professor drew some €153,100 from third-party funds in 2010 (Financial Times Deutschland, 2012). Among the top-15 third-party funded universities of the country (see Table 2) three are EMAS certified - TU Dresden (3rd), FU Berlin (8th), and Bremen University (11th).

Table 2
Top-15 German universities with highest third-party funding.

German Universities with the highest third-party funds		
Third-party funding in 2010 (in 1,000 €)		
	<u>Total</u>	<u>per Professor</u>
1. RWTH Aachen University	234,739	737.0
2. TU München	200,113	583.4
3. TU Dresden	168,788	437.8
4. TU Berlin	145,323	397.1
5. Karlsruher Institute of Technology	137,087	542.9
6. University of Stuttgart	128,850	521.7
7. TU Darmstadt	115,425	427.5
8. Freie Universität Berlin	111,448	257.4
9. University of München	108,067	219.2
10. University of Heidelberg	96,261	349.5
11. University of Bremen	91,494	344.6
12. University of Erlangen-Nürnberg	89,181	240.1
13. Humboldt-University Berlin	89,157	219.9
14. University of Freiburg	86,628	309.4
15. University of Münster	85,166	216.4

Source: Statistisches Bundesamt (2013). *Expenditure on education and culture*. Retrieved from <https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/BildungForschungKultur/BildungKulturfinanzen/Tabellen/ProfessorenEinzelneHochschulen.html>

Certification with a formal and certified environmental management system represents a strong signal to various stakeholders, particularly to the private sector, as environmental management system certifications are widely applied in numerous industry sectors, particularly where suppliers along the entire supply chain are confronted with strict environmental standards. The internationally recognized mark of EMAS is not only put on official documents and letterheads, most of the EMAS universities put the EMAS mark on their main internet portal, where it can be easily spotted, and others make it easily accessible, just one click away from the initial starting page. The study shows that universities already engaged in the field of environment protection and Sustainable Development consider it as an instrument to increase trust confirming their efforts (e.g., HS Zittau/Görlitz, Leuphana University, FH Eberswalde, University of Hohenheim), while general universities in search of increased visibility consider EMAS as a marketing instrument for improving their general visibility (e.g., University of Tübingen, University of Bremen, University of Eichstätt/Ingolstadt).

3.5 EMAS and Profiling

Around the globe, academic institutions are increasingly exposed to competition, and brand recognition has developed into a major challenge for universities. In response to unsatisfying performances of domestic academic institutions in worldwide rankings, the federal and state governments launched the *Excellence Initiative* which aims “to strengthen Germany as a science and research location, improve Germany’s international competitiveness, and make cutting-edge research at German institutions of higher education visible”. Research clusters were formed and after three rounds of the program, competition among academic institutions has intensified as more and more universities have realized the need to enhance their visibility and create their own brand in order to stay competitive. In the category of institutional strategies, the last round of the German *Excellence Initiative* (2012) includes four EMAS registered universities (FU Berlin, University of Bremen, Tübingen and TU Dresden). Furthermore, the Universities of Bielefeld, Bremen, Kiel, Tübingen and TU Dresden could win additional government funding for their outstanding excellence clusters (BMBF, 2013). While the *Times Higher Education World Reputation Ranking 2014* lists six German academic institutions under the Top-100, none of them are EMAS registered (Times Higher Education, 2014). Also in domestic rankings, EMAS registered academic institutions do not take top positions. As the study shows, the environmental management system was introduced at institutions of

lower visibility and lower profile, while top-tier universities with longstanding traditions in research and teaching show less interest in EMAS (CHE Hochschulranking, 2017).

3.6 International Agreements

In 1993, the European University Association realized the critical role of universities in advancing the *Agenda 21*, and thus launched the *Copernicus Campus* and the *CRE Copernicus Charta*. The fact that out of the 21 signatory universities of the Copernicus Charta, only two are from Germany and only one of them has introduced EMAS (Leuphana University Lüneburg) undermines the assumed large role environmental agreements have on the implementation of EMAS in the higher education sector.¹ A total of 34 German universities have signed the *Magna Charta of European Universities*, in which participatory universities commit themselves to an ongoing process of informing, educating and mobilizing their employees, students and all the relevant parts of society concerning the consequences of ecological degradation.² However, among the mainly large and prestigious signatory universities only three (the Universities of Bremen, Paderborn and Tübingen) are EMAS registered. Thus, being a signatory of an agreement on environmental protection does not necessarily trigger the implementation of a voluntary environmental management system. This may be due to the lack of green commitment as well as missing reporting and monitoring mechanisms in the agreements. Thus, signing international agreements aimed at the promotion of Sustainable Development alone does not guarantee concrete environmental action from universities.

4. Conclusion

Environmental assessment strategies are on the rise in the German higher education sector. Consistent with the global trend of greening campuses, developments in Germany suggest that Sustainable Development becomes increasingly relevant for higher education institutions. Acknowledging their vital role in conserving nature, a rising number of universities have shown their willingness to promote the idea of a sustainable campus and reduce direct and indirect environmental impacts by implanting the formal environmental management system EMAS. As of now, 26 higher education institutions have registered with EMAS in Germany. While the first wave of certification in the early years of the new

¹ Copernicus Alliance, <https://www.copernicus-alliance.org> (accessed 2 November 2017).

² The Magna Charta Universitatum, <http://www.magna-charta.org> (accessed 2 November 2017).

Millennium could be linked to the pressure that was placed on academic institutions to sharpen their own brands, a recent increase of EMAS registration among academic institutions can be explained by reaping potential financial benefits and increased governmental incentives. As the study shows, EMAS universities have strictly applied cost-benefit calculations for decision making and budget constraints further push universities to search for efficiency gains and cut operational costs. The study finds little evidence that implemented environmental programs and measures from universities go beyond the scope of those from the industry sector. All examined universities initially engaged in short-term cost reduction measures, such as reducing water usage, solid waste stream or improving heating efficiency. However, universities did not have to invest over-proportionally to achieve improvement in environmental performance as well as cost reduction since the implemented environmental measures could be amortized in a relatively short time.

While strong impetus derives from the expectation of financial benefits, legal pressure seems to play a minor role in the implementation of EMAS. Nonetheless, EMAS ensures legal compliance and sends a positive signal to the industry. This is increasingly important as the government pressures universities to intensify cooperation with industry. Accordingly, all of the EMAS registered universities show strong capabilities in drawing third-party funding through their vibrant cooperation network with the private sector. Since the EMAS mark is associated with a high level of environmental performance, the reputation of EMAS registered organization is improved and the mark is placed for marketing purposes by every EMAS university. In combination with the regular communication of environmental progress internally and externally, recognition among students, investors and other stakeholders is strengthened.

However, EMAS implementation also faces major barriers, such as high administrative and implementation costs and a lack of financial incentives. While in absolute terms, larger universities have bigger saving potentials than smaller ones, administrative and transaction costs increase with size. German universities show a very fragmented organizational structure where cooperation and communication are limited. From a historical account, traditional universities are not designed to cooperate on such complex cross-departmental issues. Thus, administrative costs vary greatly across universities. Since the implementation of an environmental management system takes years to complete, universities must be equipped with tools that encourage long-term planning. The study shows that universities with existing environmental expertise and

know-how are more likely to opt for the implementation of EMAS. Environmental expertise and easy access to environment-related information through environmental research centers facilitate registration with EMAS by lowering transaction costs. Particularly, technical universities and universities of applied sciences take advantageous positions when it comes to mobilizing internal expertise for finding environmental solutions and improving process efficiencies. Furthermore, the initial drive for EMAS often comes from an individual person or a small group of individuals with a strong commitment to bringing the issue to the highest decision-making levels. However, the final decision depends heavily on the green commitment of the top management of the university. And as there is no formal network for information sharing, benefits from EMAS are often not recognized by decision makers. Information sharing about the benefits of EMAS is very limited and there are often difficulties to calculate the specific benefits from EMAS in monetary terms. In general, individual institutions act fairly independently on the issue, and efforts of greening remain project-based, mainly driven by highly motivated individuals.

Furthermore, a systematic linkage of efforts between the administration and operational management with research and teaching is often missing. Reforms of the operational management outpace the progress of greening the curriculum and research. As a consequence, EMAS universities are much faster in greening their daily operations and administrative processes than in adapting their educational beliefs and curricula.

While several institutions could already accumulate experience with EMAS, there is a clear lack of information sharing and networking among peers at the national level. The successful case of Baden-Württemberg shows the important role of the state government in facilitating EMAS registration by providing know-how and expertise, encouraging networking, and providing financial incentives. In contrast to the implementation costs, the benefits are often difficult to assess in monetary terms and this is particularly true for measures aimed at indirect environmental impacts. While authorities provide prefabricated programs and modules of environmental management systems, universities hesitate due to uncertainties in calculating the specific benefits from EMAS. The establishment of an information sharing platform about potential benefits from EMAS could not only provide best practice measures and networking opportunities but also include technical and administrative support for realizing concrete direct and indirect environmental measures. Since the implementation of EMAS can only succeed with a solid green commitment at the top decision-making levels at the university, efforts to raise public environmental

consciousness have to be intensified. Knowledge of how to achieve potential managerial, environmental and financial improvements needs to be expanded. The case of Baden-Württemberg may provide a model for others to simplify the deployment of EMAS.

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