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CHEMICAL LEASING: ETHICAL

APPROACH IN THE MANAGEMENT OF CHEMICAL SUBSTANCES?

The paper at hand responds to the recognized need to reduce the risks connected to the production and use of chemical substances and suggests that any measures that reduce such risks can be considered as strategy to mainstream ethical approaches in chemistry if their underlying objective is to avoid harm to human health and the environment.

The chemical substances of concern for this paper are those chemicals that small and medium-sized enterprises (SMEs) frequently use in their production processes. Since the application of chemicals often is not part of the SME's core competency, it was argued that many SMEs in the productive sector often do not have sufficient information on characteristics and properties of the chemicals they apply. Furthermore, it was argued that the lack of information increases the likelihood of an inefficient application of the chemicals by the SME, which, in turn, will increase the overall risks emanating from the use of chemicals.

Following this argumentation, the paper at hand has sought to identify solutions that facilitate the increase of information on chemicals at the side of the SME with the aim to reduce the risks of applying chemical substances.

While the producer of chemicals have been identified to be a viable source of information on the characteristics and properties of chemical sub-

stances, it was demonstrated that the current sales concept does not provide incentives to transfer such knowledge from the producer to the SME. Based on this finding, it was shown that a possible strategy to overcome this shortcoming is the introduction of service-oriented so-called chemical leasing business models. Based on the findings of pilot studies on the introduction of these innovative business models at the global scale the paper concluded that Chemical Leasing can be considered as an effective means to mainstream ethical approaches in the management of chemical substances.

Chemicals contribute to a large extent to economic growth and social welfare of modern societies. With a trade surplus in chemicals of € 35.4 billion in 2007*, the chemical industry is one the largest industries in Europe, selling its products to end users, such as SMEs. Particularly for SMEs, the use and consumption of chemicals in production processes often play an important role and thus are vital for their economic success. At the same time, many chemicals pose serious threats to human

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health and the environment. In the past decades, industry, governments and regional entities have responded to these threats by calling for business approaches and legislative frameworks that minimize the risks that chemicals pose to human health and the environment.

The public sector has responded to this by incorporating approaches, such as the precautionary or cradle-to-cradle principle, at the very core of national and regional legislation or international legally binding instruments, such as the Stockholm, Rotterdam or Basel Conventions or voluntary frameworks, such as the Strategic Approach to International Chemicals Management (SAICM).

Private sector approaches to minimize the risks of chemicals include the development and implementation of strategies, such as Corporate Social Responsibility (CSR) and the Responsible Care initiatives in production processes and supply chain management.

While multinational private sector companies have the financial means to implement such risk reduction strategies, this may not be the case for SMEs.

The objective of this paper is to analyze why SMEs often lack capacity to implement such risk management strategies. Following the analysis, the paper will provide a solution to overcome these shortcomings by introducing the Chemical Leasing business model.

Ethics in chemistry

The paper at hand responds to the need recognized by the private and public sectors to identify and foster business approaches and regulatory frameworks that are capable to reduce the risks connected to the production and use of chemical substances.

In the context of this paper, any change of process or behavior that leads to the minimization of negative effects of chemicals shall be considered as ethical approach if the following two conditions are met. First, the underlying objective of the measures undertaken shall be to avoid harm to human health and the environment [1] and, secondly, the approach should confirm to the basic rules of society embodied in law and in general ethical customs [2].

Several risk reduction strategies for chemicals management have been identified, which allegedly have a vast potential to facilitate the mainstreaming of ethical approaches in chemistry. These strategies include the reduction of consumption of chemicals; the optimization of processes, in which chemicals are produced or applied; and the implementation of general safety measures throughout the life cycle of chemicals.

For the following discussion, the paper will evaluate the potential of identified solutions to facilitate the implementation of the above-mentioned risk reduction strategies and, as reasoned above, the mainstreaming of ethical approaches in chemistry.

The application of chemicals in SMEs

For the following analysis, the paper focuses on those SMEs in the productive sector that apply chemicals in their production processes. A key assumption of the subsequent discussion is that for this type of SME, the application of chemicals plays only a minor role in the over-

all production process and, therefore, is not a part of the core competency of the firm.

As a consequence, many SMEs often do not have sufficient information on the characteristics and environmental impact of chemicals substances they apply.

The paper at hand argues that the lack of information on the properties and characteristics of chemicals applied by SMEs results in their inefficient application. A likely consequence of such inefficient application, for example, can be the overconsumption of the chemical or spillages and accidents.

Following this argumentation, the overall risk of negative effects to human health and the environment in this context should be significantly increased.

As the lack of information of the SME on characteristics and properties of its chemical substances is a crucial factor for negative effects on human health and the environment, any approach that increases the information at the side of the SME should be capable to reduce the overall risk of applying chemicals.

According to the above definition, such approaches can be considered as ethical approaches, if they have a potential to reduce the consumption of chemicals; to optimize processes, in which chemicals are produced or applied; or to implement general safety measures throughout the life cycle of chemicals.

The key question that this paper seeks to answer, therefore, is: *are approaches that facilitate the increase of information on chemicals an effective and efficient means to mainstream ethical approaches in chemicals management?*

Information transfer from external sources

SMEs, particularly in times of economic downturn, may spend available financial means rather on the strengthening of core competencies than on the gathering of information on minor important production processes, such as the application of chemicals.

Due to lack of financial means to change this situation, it is likely that the above identified information deficiencies of SMEs on chemicals that they apply will persist [3, 4].

Ohl and Moser (2007 and 2008) have demonstrated that a possible strategy to overcome this shortcoming is the transfer of information from external sources to the user of chemicals, which for this paper is the SME.

It is straightforward to see that producers of chemicals are a valuable external source for information on characteristics of chemical substances, as the production and management of chemicals, including storage and handling, is an integral part of their core competency.

Ohl and Moser furthermore demonstrated that within the current business concept of selling chemical substances, there is no incentive for the producer of chemical substances to transfer its knowledge to the SME, as this would result in increased efficien-

*www.cefic.org/factsandfigures/downloads/Facts_and_Figures_2009_Ch2.pdf

cy and thus reduce overconsumption.

As the SME in this case would need to acquire lesser quantities of the chemical, the producer's sales volume and hence the revenues would directly decrease. The current sales concept of chemical industry, therefore, provides no automatism to transfer such information from the producer to the SME.

The paper at hand therefore suggests that the current sales concept falls short of providing incentives for mainstreaming ethical approaches in chemistry through the introduction of effective and efficient strategies to manage the risks of chemical substances. It hence proposes as a possible solution the introduction of such business models that foster the transfer of information from the producer to the SME.

Ohl and Moser have demonstrated that Chemical Leasing business models are a convincing strategy to achieve this objective.

Chemical Leasing business models

Chemical Leasing is an innovative business model that changes the way in which chemicals are sold.

While in the current sales concept, the producer sells the chemical by transferring the ownership of chemical to the SME, with Chemical Leasing, the producer stays the owner of the chemical.

Since the producer "leases" the chemical to the SME, the basis of the contract between the producer and the SME is not anymore the chemical substance itself, but the service that the chemical provides to the SME. The remuneration shifts from a price per volume or weight in the current sales concept, typically, to a unit price for the provided service. Depending on the conditions of the Chemical Leasing contract, the basis for remuneration can be, for example, the price per treated surface or treated piece.

Since the producer stays the owner of the chemical, the responsibility of the producer to guarantee the environmentally sound management and disposal or recycling of the chemical is expanded over the whole life cycle of the chemical.

Ohl and Moser were able to demonstrate that, given the expanded responsibility, which ideally comprises the recycling of the chemical, the producer has a stake in ensuring that the chemical is applied more efficiently. This is due to the fact that, since the producer stays the owner of the chemical, any overconsumption now directly increases the costs and, therefore, reduces the income of the producer.

By introducing two business models, where the first model is nearest to the current business concept of selling chemicals and the second model differs the most, Ohl and Moser demonstrated that Chemical Leasing business models are capable to transfer knowledge and/or

technologies from the producer of the chemical to the SME.

The likeliness of the business models to transfer knowledge and/or technologies is supported by the fact that the producer and SME, by shifting to Chemical Leasing contract, enter into longer standing business relationships compared to the current sales concept.

Pilot studies

In the past years, several pilot studies have been undertaken to demonstrate the vast potential of Chemical Leasing to generate win-win situations and to improve the overall risk management of chemical substances [5, 6].

In analyzing the pilot studies, it was demonstrated that the introduction of Chemical Leasing delivered the following key outcomes: - Change of management behavior and improvement of internal communication; - Enhancement of the supply chain management of chemicals management; - Improved process efficiency; - Know-how exchange between supplier and users of chemicals (involvement of -technology suppliers); - Capacity building of operation staff; - Positive effects on occupational health and safety of workers by improving workplace conditions.

Besides these favorable outcomes, other positive driver that support the introduction of Chemical Leasing includes the entry into force in 2007 of a new regulatory framework for the Registration, Evaluation and Authorization of Chemicals (Reach) in the European Union.

Reach shifts the responsibility to gather of information on the characteristics of chemicals to producers and users of chemicals. Chemical Leasing with its potential to induce an exchange of information on chemicals between producers and users of chemicals, therefore, supports the implementation of Reach through lowering the costs, particularly for SMEs, to gather information on chemicals applied in production processes.

Conclusions

The outcomes of the pilot studies clearly demonstrate the vast potential of Chemical Leasing business models to reduce the consumption of chemicals; to optimize processes, in which chemicals are produced or applied; and to implement general safety measures throughout the life cycle of chemicals.

The demonstrated knowledge transfer between the producer and the SME and the improvement of the workplace conditions convincingly show that Chemical Leasing business models are capable to reduce negative effects of chemicals to human health and the environment.

The introduction of Chemical Leasing business models thus can be considered as an effective means to mainstream ethical approaches in the management of chemical substances.

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