

Article

Successful Innovation Transfer through Pre-Standardization: A Case Study

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Abstract: This study presents an approach to structure, analyze and evaluate corporate standardization processes using the example of pre-standardization for the reduction of environmental impacts in product design and development. For this purpose, we give a detailed description of the evolution of the European Standard EN 16524 entitled “Mechanical products—Methodology for reduction of environmental impacts in product design and development”. The standardization strategy behind the evolution of EN 16524 is analyzed using the approach of a Business Model Canvas combined with an evaluation using pre-defined success factors. Moreover, we derive general recommendations for corporate standardization professionals in checklists for each field of the underlying Business Model Canvas. With regard to the case study depicted here, we come to the conclusion that pre-standards are especially suited for innovation transfer in the field of emerging and rapidly evolving scientific and technical results.

Keywords: standardization strategies; pre-standards; success factors; Business Model Canvas; environmental impact

1. Introduction

Technical standards are a tool to ensure equal competitive conditions in international trading and to reduce trade barriers [1–3]. Moreover, technical standards are needed to increase productivity, rentability as well as economic feasibility, to ensure the equivalence of product properties, to specify equal product assessment criteria and to minimize occupational hazards and environmental hazards [4–12].

Irrespective of the company size, engineers are frequently confronted with technical standards. Technical standardization affects all engineering disciplines. In this case study, we analyze the role of pre-standardization in corporate strategies and decision-making processes. In detail, the following key questions (see Figure 1) are addressed: (i) how to ensure the successful marketing of an innovation (e.g., a product, a process, a service); (ii) which standardization strategy to choose; and (iii) which pre-standardization level to choose.

For key question (i), three different approaches are considered, including standardization, patenting and non-disclosure. Answers to key question (ii) can comprise pre-standardization, standardization and intra-company standardization. Finally, answers to key question (iii) differentiate between national, regional and international pre-standardization levels.

The analysis addresses these key questions in a case study on pre-standardization for the reduction of environmental impacts in product design and development. Based on the conclusions, general recommendations for the development of corporate pre-standardization strategies are derived. The case study resorts to a structure depicting the pre-standardization objective, the corresponding success factors for the pre-standardization activity and finally the evaluation of the chosen pre-standardization strategy.



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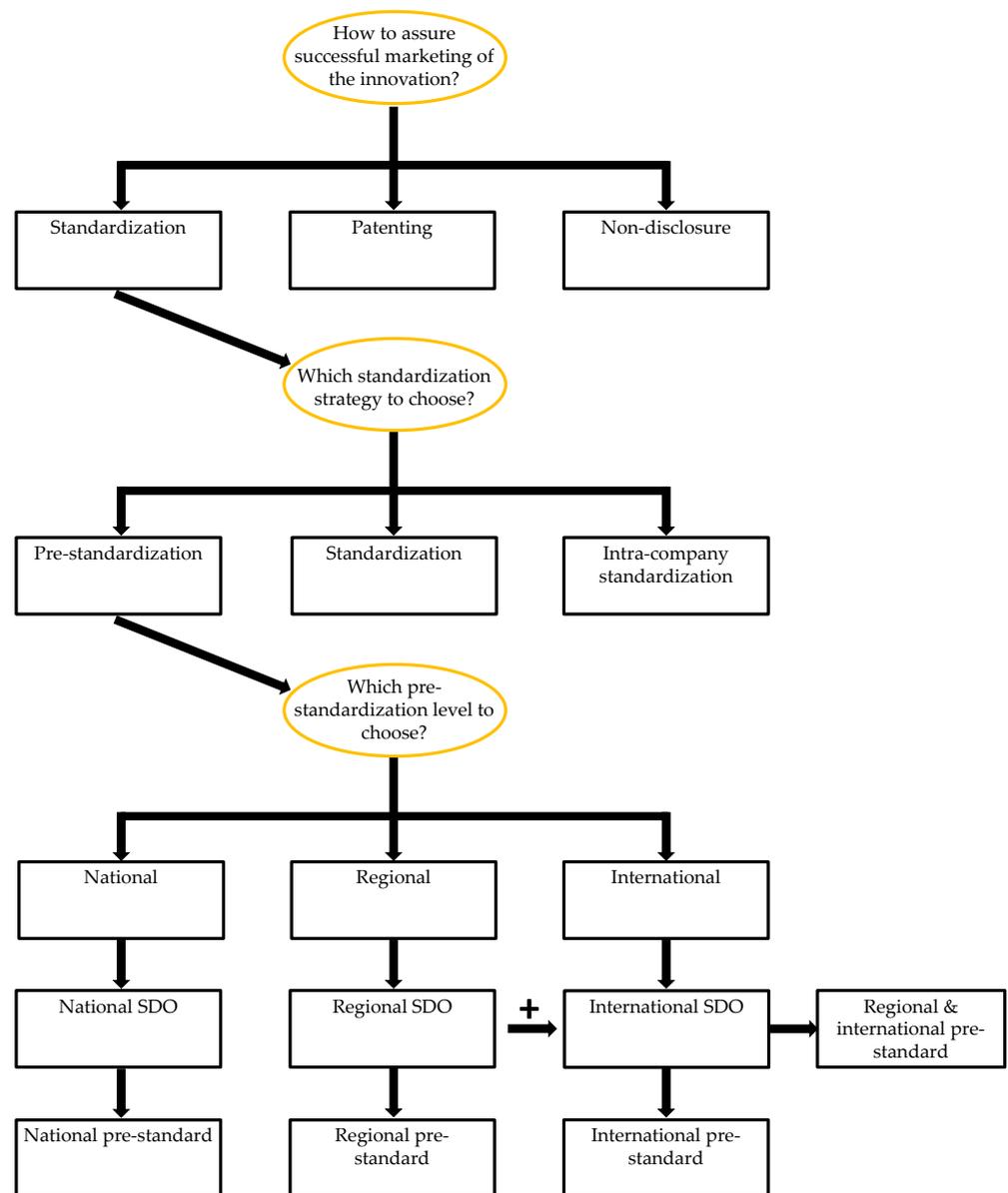


Figure 1. Key questions for corporate standardization strategies depicted in a decision tree. It assists in identifying the recognized standard-developing organization (SDO) for the elaboration of the final normative document. Regional SDOs and international SDOs can either be involved subsequently or simultaneously to yield a regional and international normative document.

2. Assessing Corporate Standardization Strategies Using Key Success Factors

The definition of key success factors is necessary for an organization or project to achieve its mission. A key success factor is an activity required for ensuring the success of a company or an organization. Key success factors should not be confused with success criteria. The latter are outcomes of a project or achievements of an organization necessary to consider the project a success or the organization successful. Success criteria are defined with the objectives and may be quantified by key performance indicators [13–15].

In the following case study, key success factors for corporate standardization strategies are compiled in nine clusters (see Table 1). Each cluster contains questions that will provide assistance for the definition of key success factors for corporate standardization strategies. This approach, termed the Business Model Canvas, is typically used to implement key success factors and serves here to understand how standardization goals can be achieved [16–18].

Table 1. Thematic clusters and corresponding questions used for the identification of key success factors for corporate standardization strategies.

| Cluster | Question(s) |
|------------------------|--|
| Key partner | Who are the relevant stakeholders in the standardization activity? |
| Key activity | What key activities do the value propositions require? What key activities do the distribution channels require? What key activities do the customer relationships require? What key activities do the revenue streams require? |
| Key resources | What key resources do the value propositions require? What key resources do the distribution channels require? What key resources do the customer relationships require? What key resources do the revenue streams require? |
| Value proposition | What value is delivered to the customer? Which customer problem is solved? What bundles of products and services are offered to each customer segment? Which customer needs are satisfied? |
| Customer relationships | What type of relationship does each customer segment require? Which relationships are established? How are the relationships integrated? How costly are the relationships? |
| Customer segments | For whom is value creation existing? Who are the most important customers? |
| Channels | Through which channels do customer segments want to be reached? How are the customer segments reached currently? How are channels integrated? Which channel works best? Which channels are most cost-efficient? How are channels integrated with customer routines? |
| Cost structure | What are the most important costs? Which key resources are most expensive? Which key activities are most expensive? |
| Revenue streams | What are customers willing to pay? For what do customers currently pay? |

In this study, we compiled the most recent information on the evolution of the European Standard EN 16524 entitled “Mechanical products—Methodology for reduction of environmental impacts in product design and development” in the nine thematic clusters of a Business Model Canvas under consideration of various stakeholder perspectives [19]. These stakeholder perspectives include producers [20], science [21], associations [22] and recognized standard-developing organizations (SDOs) [23]. The strategy behind the evolution of EN 16524 was finally analyzed using the approach of a Business Model Canvas combined with an evaluation using pre-defined success factors.

3. Case Study: Assessing the Strategy of Pre-Standardization for the Reduction of Environmental Impacts in Product Design and Development

The majority of all value chains are based on a linear economic model. Planned obsolescence is the generic term for the corporate strategies as well as methods of manufacturers and retailers, which lead to a shortening of the product lifetime expected by the consumer in order to accelerate the new purchase [24]. In this context, obsolescence is the loss of ability of an item to perform satisfactorily due to changes in performance requirements [25]. Obsolescence is inevitable and cannot be avoided, but foresight and careful planning can minimize its impact and costs. From the customer’s perspective, purchasing products in this context is equivalent to buying the usage rights for a certain period in the future. From the manufacturer’s perspective, planned obsolescence leads to cost savings through

cheaper materials, which immediately increases profits, and it leads to an increase in sales because the shorter product lifetime comes into play after a few years and profits rise again and the market share grows. There are several promotive factors for product obsolescence: saturated markets or overcapacity make obsolescence necessary to maintain the demand; confusing or non-transparent markets complicate customer churn; finally, the strong profit orientation of the manufacturer drives product obsolescence.

Obsolescence presents itself in several ways: (i) technological progress makes an old product obsolete because the new product is better (technical or functional obsolescence); (ii) artificial, planned shortening of the lifetime by the manufacturer with the purpose of forcing the customer to buy replacements (qualitative obsolescence); (iii) fully functional items are replaced by new ones (psychological obsolescence); (iv) the item is no longer available from the original manufacturer (economic constraints) [26].

This case study addresses preliminary standardization for the reduction of environmental impacts in product design and development. The assessment of environmental impacts is strongly related to production processes and issues of raw material and energy supply, as well as waste management. However, in recent years, a paradigm shift led to the situation in which the product itself and its environmental impact became a topic of public interest. This trend is reflected by a growing number of product labels (e.g., Nordic Swan, Japanese Eco-Mark, Canadian Environmental, Blauer Engel). Moreover, this change can be seen, for example, in policy strategies such as the eco-design directive within the framework of the integrated product policy of the European Union. Information on the properties of a product has a positive effect on the position of a company in the market (as information for consumers and investors, in communication with trading companies, for marketing and sales purposes, as criteria for public procurement, for granting legal certainty). The analysis of ecological parameters also contributes to the reduction of the environmental impacts of products and manufacturing processes, to an increase in material and energy efficiency, to the avoidance of hazardous substances and materials and to extended product lifetimes [27].

3.1. Description of the Pre-Standardization Pathway

Currently, rising societal concerns about environmental issues result in regulatory pressure on companies in many industrial sectors. Therefore, eco-design represents a corporate strategy for many companies to assume their role in improving their environmental performance. However, the European state-of-the-art in eco-design is still an emerging topic. In particular, small and medium-sized enterprises (SMEs) are facing severe problems in this context, with special regard to comparably low production volumes as well as changing legal requirements. Therefore, SMEs have to implement eco-design aspects into their corporate strategies. Problems related to the implementation of eco-design aspects originate from (i) a lack of awareness and (ii) a lack of involvement of industrial stakeholders in the development of eco-design tools.

To overcome this dilemma, the Centre Technique des Industries Mécaniques (CETIM) and the Arts et Métiers ParisTech (formerly known as École Nationale Supérieure d'Arts et Métiers, ENSAM) funded a research project for the development of an eco-design integration method based on an organizational learning process and an organizational change management. The novelty of this approach is that it acquires the minimal basis of environmental knowledge during the analysis phase of the eco-design process. Thereby, it constitutes a low barrier for companies to start with the improvement of their environmental performance [21].

The results of the above-mentioned research project were published in 2005. After having been implemented by CETIM for several industrial projects, the eco-design integration method was adapted upon feedback from different companies and transposed in a pre-normative document. Around 2007, various companies and institutions joined forces in a French committee named the Association Française de Normalisation (AFNOR) under the direction of the Union de Normalisation de la Mécanique (UNM) to elaborate a

normative document for companies that are already aware of the necessity to integrate environmental aspects into the product design phase. The aim of this committee was to offer a pragmatic eco-design approach particularly suited to SMEs, allowing them to integrate environmental aspects into product development processes and providing a framework for the promotion of this approach. Since the committee consisted of representatives from various sectors (e.g., automotive industry, machinery manufacturers for the paper industry, manufacturers of cold chain and air-conditioning systems, manufacturers of industrial sealings), it was intended to propose a general framework for promoting an intersectoral eco-design approach. The committee had to choose between two types of national normative documents in France: pre-standards (norms expérimentales, XP) and standards (norms françaises, NF). An XP is a “trial” normative document that is subject to a test phase before its content is transferred to an NF. To facilitate the consensus-building process within a very heterogeneous stakeholder constellation, the pre-standardization pathway was chosen. This pathway is a promising strategy for committees characterized by very different requirement profiles. A compromise is normally agreed among different stakeholders when there is a subsequent test phase for the normative document and potential drawbacks can be eliminated.

In 2009, the French pre-standard XP E01-005 entitled “Mechanical products—Eco-design methodology” was published. In order to facilitate the application of XP E01-005 and to collect feedback from practitioners, the pre-standard was subject to a test phase until 2010 [28]. In particular, the test phase was used to gather information on how to specify the form and content of a corporate environmental declaration on eco-design and to enrich the text with examples. Using these new insights from the test phase, the pre-standard was transferred to the French standard NF E01-005, first published in 2010 and revised in 2013 [29,30]. In its 2013 edition, the French standard NF E01-005 entitled “Mechanical products—Methodology of environmental impacts in product design and development” already comprised explicit references to international standards on environmental management, such as ISO 14020, ISO 14021, ISO 14025, ISO 14040 and ISO 14044 [31–35]. It became obvious that the French committee that elaborated NF E01-005 was preparing the next step of implementing the eco-design methodology in a supranational standardization framework. NF E01-005 was submitted as a new work item proposal to the technical committee CEN/TC 406 of the European Committee for standardization. NF E01-005 was published by CEN/TC 406 as CEN/TS 16524 in 2013 [36]. The period of validity of CEN/TS 16524 was initially limited to three years. After two years, the members of CEN were asked to submit their expert opinions, particularly on the question of whether CEN/TS 16524 can be converted into a European standard. In 2020, it was decided by CEN to publish CEN/TS 16524 as European standard EN 16524, with Europe-wide validity [19]. Finally, EN 16524 had to be included into the compendia of the national standards bodies of all CEN member states.

Thus, the project on “Eco-design integration in SMEs”, which originally started as a research project in France, gained pan-European attention and is currently published as European and French standard NF EN 16524 entitled “Mechanical products—Methodology for reduction of environmental impacts in product design and development” [37].

3.2. Success Factors for the Pre-Standardization Pathway

This pre-standardization case study exemplifies how to implement an innovative idea resulting from an applied research project in the pan-European standard framework. In the following, the key success factors for the concept of “growing ideas through pre-standardization” are investigated in the nine thematic clusters (key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure and revenue streams) of the Business Model Canvas (see Figure 2).

| Key success factors | | | | |
|--|---|---|---|--|
| | | Case study: Eco-design | Stakeholder perspective: SME | Anticipated normative document: European |
| Key partners ✓ Academia <u>here:</u> Research project on "Ecodesign integration in SMEs" funded by CETIM and ENSAM) ✓ Inter-trade organization <u>here:</u> CETIM, the technical centre for the mechanical industry in France ✓ SMEs <u>here:</u> Automotive industry, machinery manufacturers, ... ✓ Recognized SDO <u>here:</u> AFNOR | Key activities & resources ✓ Academia <u>here:</u> Promotion of eco-design initiatives within SMEs ✓ Inter-trade organizations <u>here:</u> Supporting the interests of French SMEs ✓ SMEs <u>here:</u> Assuring that the new eco-design methodology is easier to implement than internationally standardized environmental management tools ✓ Recognized SDO <u>here:</u> Defending the national interests on an European level | Value propositions ✓ Creation of awareness for product-related environmental impacts in SMEs ✓ Creation of involvement of industrial stakeholders in the development of eco-design tools ✓ Providing a framework for reporting the environmental performance of a SME | Customer relationships & channels ✓ External view: satisfaction of the customer demand that is more and more characterized by ecological awareness (use of product labels or corporate environmental declarations) ✓ Internal view: streamlining business processes with the overall aim to reduce consumption of raw materials and energy (monitoring and reporting of operational efficiency and reductions of deviations) | Customer segments ✓ Customer segment with awareness for environmental protection, high product quality, human health and wellbeing, and social justice |
| Cost structure ✓ Optimum of environmental costs is attempted ✓ Tradeoff between costs for preventive environmental protection measures and costs for corrective environmental protection measures | | | Revenue streams ✓ Customers are willing to pay for globally accepted labels and corresponding certification costs ✓ Pricing mainly dependent on final product quality (e. g. Best in Class) and on order volume | |

Figure 2. Key success factors for the pre-standardization for the reduction of environmental impacts in product design and development.

3.2.1. Key Partners

The initial step to set up a powerful network of key partners in this pre-standardization case study was to look for existing strategic partnerships. Obviously, CETIM, the technical center for the mechanical industry in France, played a vital role in this regard. CETIM was created upon request from mechanical industry companies in order to provide companies with means and competences to improve their competitiveness, take part in standardization, establish a relationship between scientific research and industry, promote technical progress, provide assistance to improve performance and guarantee quality. Acting as a link between academia and industry, CETIM took the initiative in forming a technical committee for eco-design integration in SMEs at AFNOR, the recognized French SDO.

Finally, the network of key partners consisted of academic representatives, representatives of the inter-trade organization CETIM, various SME representatives and representatives of the recognized French SDO AFNOR. CETIM and SME representatives had a strong interest in establishing a novel normative document closing the gap of missing guidance on eco-design for companies not having the capabilities to perform a full life-cycle assessment that might require extensive human and financial resources. With the eco-design approach for SMEs, an emerging topic was addressed that needed to be developed to coexist with well-established life-cycle assessment methods. At that time, extensive life-cycle assessment approaches for products of globally operating enterprises had already been standardized and the corresponding standards had already reached global acceptance. Therefore, forming a core group of innovation-driven SME representatives and supporters from CETIM was initially chosen to facilitate the (pre-)standardization activity. By doing so, the risk of failure in an initial phase was reduced.

Checklist for key partners and corresponding indicators:

- ✓ The strategic partnership with key partners provides access to the relevant target group (the prospective users of the anticipated (pre-)standard)).
 - The coverage in the relevant industrial sector can be assessed based on the number of companies involved in the standardization activity. Furthermore, the market share of involved companies in the relevant business domain might serve as indicator to assess whether a critical mass for achieving consensus in the (pre-)standardization activity is reached.
- ✓ Besides the sheer number of supporters, it is important to distinguish between conservative partners that tend to represent trusted and established scientific and technical results and innovative partners that tend to represent emerging and rapidly evolving scientific and technical results.
 - The business strategy (vision and mission) of key partners serves as an indicator to characterize partners either as conservative or as innovative.

3.2.2. Key Activities and Resources

The different and potentially conflicting stakeholder interests and objectives determine the key activities that are mandatory to ensure a successful pre-standardization process.

The primary incentive of the research project on “Eco-design integration in SMEs” is to promote eco-design initiatives within SMEs based on the idea of continuous improvement of the environmental performance of a company. Therefore, the outcome of a pre-standardization activity must be suited for SMEs. It is mandatory that the result of the pre-standardization activity constitutes a low barrier for SMEs to ensure that the new eco-design methodology is much easier to implement compared to existing methods in the internationally standardized environmental management framework. This aspect also explains why the pre-standardization level needs to start on a national level in the first place. Here, it was expected that a consensus could be reached more easily than on an European or on an international level, where stakeholder interests are even more heterogeneous. Consequently, gradual dissemination from the national to the European level must be regarded as more promising than rapid dissemination from the national to international level. In this case study, the gradual dissemination followed a threefold approach. Firstly, the results of the research project entitled “Eco-design integration in SMEs” were implemented in several industrial projects. Secondly, feedback from practitioners was collected during the test phase of XP E01-005 with special regard to the form and the content of a corporate environmental declaration on eco-design. Thirdly, the CEN enquiry was used to gather expert opinions for the transposition of CEN/TS 16524 as a European standard. Each of these gradual dissemination steps supported the overall aims to make eco-design for SMEs understandable, to clearly point out the added value of eco-design in SMEs and to clearly distinguish between eco-design for SMEs and conventional life-cycle assessment methods.

During the whole pre-standardization process, the inter-trade organization CETIM basically supported the interests of French SMEs. AFNOR, as a recognized French SDO, took the role of defending the national interests on a European level. While CETIM provided its network of industrial partners and its administrative infrastructure, AFNOR especially provided administrative infrastructure and support for bilateral exchange between national and European committees.

Checklist for key activities and resources and corresponding indicators:

- ✓ Each key partner should provide appropriate resources to achieve the desired outcome of the (pre-)standardization activity in an efficient manner.
 - During the initial phase of the (pre-)standardization activity, each key partner should inform about its key competences and the corresponding cost structure for prospective services. Information on similar reference projects might help to identify the right partner for the right task within the (pre-)standardization activity.
- ✓ It might be helpful to distinguish between various types of key resources.

- The suitability of key resources for the desired outcome of a (pre-)standardization activity might be assessed in the categories of physical, intellectual, human or financial resources.

3.2.3. Value Propositions

The surpluses created by this pre-standardization activity unfold in three areas on different timescales. Eco-design integration in SMEs creates awareness for product-related impacts for the short term and involvement of industrial stakeholders in the development of eco-design tools for the mid-term. The provision of a framework for reporting the environmental performance of SMEs belongs to the sustaining surpluses. This aspect might, for example, be considered in corporate marketing strategies and must therefore be regarded as beneficial for the company and for society as a whole.

Checklist for value propositions and corresponding indicators:

- ✓ The characteristics of the prospective added value of the (pre-)standardization activity need to be clearly depicted.
 - The outcome of a (pre-)standardization activity can be grouped into, e.g., degree of novelty, performance, design, reputation, price, costs, operational risk, accessibility, convenience.
- ✓ It is also highly recommended to link the expected outcome of the (pre-)standardization activity with a return-on-investment consideration.
 - This consideration might take into account, e.g., due dates and payback periods.

3.2.4. Customer Relationships and Channels

The case study at hand represents the pre-standardization of a business process. Generally, process standardization describes the establishment of a set of rules governing how people in an organization are supposed to complete a given task or sequence of tasks to achieve expected results. On the one hand, the pre-standardization for the reduction of environmental impacts in product design and development focuses on the customer demand, which is more and more characterized by ecological awareness. Examples for the demonstration of ecological product design are product labels or corporate environmental declarations reporting the environmental performance of an SME using key performance indicators. On the other hand, the pre-standardization for the reduction of environmental impacts in product design and development helps to streamline intra-corporate processes with respect to operational efficiency and the reduction of deviations. This, in turn, helps to meet customer demands with respect to the environmentally sound production of goods characterized by the reduced consumption of raw materials and energy.

Checklist for channels and corresponding indicators:

- ✓ The success of (pre-)standardization activity is also strongly dependent on how the anticipated customer segments are addressed. This implies that the customer relationship must be defined.
 - The level of customer relationship ranges from the manual allocation of information to automated services and must be adapted to the prospective customer segment.
- ✓ Different channels are associated with different costs that must be accounted for.
 - Cost-effectiveness is an adequate measure for the assessment of different channels.

3.2.5. Customer Segments

SMEs that are planning to integrate eco-design tools and processes follow the societal demand for sustainable development. An increasing number of SMEs focus on the customer segment with awareness for environmental protection, high product quality, human health and well-being and social justice. This customer segment tends to be willing to pay a higher price for environmentally sound products.

Checklist for customer segments and corresponding indicators:

- ✓ Initially, it must be specified for whom the (pre-)standardization activity creates added value.
 - Typically, it is defined whether a normative document is intended for customer segments of the mass market or the niche market.
- ✓ A further characterization of the respective customer segment helps to identify the most important customers.
 - Customer segmentation usually resorts to attributes such as customer expectations, demographic features, the behavioral patterns of customers, preferred markets, features of the customer's personality and the customer's lifestyle.

3.2.6. Cost Structure

Integrating eco-design in SMEs is strongly related to the tradeoff between costs for preventive environmental protection measures and costs for corrective environmental protection measures. As in all business processes, an optimum cost structure is attempted. Here, this optimization task mainly comprises reduced material consumption, reduced energy consumption, avoidance of hazardous materials, reduced waste and reduced emissions into environmental compartments (air, water, soil) and the related operational costs and capital costs.

Checklist for the cost structure and corresponding indicators:

- ✓ It must be clearly stated whether the (pre-)standardization effort is cost-driven, value-driven or resorts to a hybrid approach.
 - The cost structure is strongly correlated to the overarching strategy (cost leadership, differentiation strategy or niche strategy).
- ✓ The identification of the relevant costs implied by the prospective normative document must be discussed in a traceable manner. The most expensive key activities and resources required for the (pre-)standardization effort should be identified.
 - Cost structures are typically analyzed with respect to capital investment and operating costs.

3.2.7. Revenue Streams

The costs outlined above need to be complemented with benefits created for the customer. In this regard, the revenue streams can be found in the segment where customers are willing to pay for globally accepted labels and corresponding certification costs. The pricing is mainly dependent on the final product quality (e.g., Best in Class) and on order volume.

Checklist for revenue streams and corresponding indicators:

- ✓ Success can be measured based on the revenue streams.
 - Revenue streams can be grouped into, e.g., sales, user fees, rental fees, licenses, service fees.
- ✓ Revenue streams can be characterized by different pricing models.
 - Pricing models are typically analyzed with respect to fixed prices and dynamic prices.

3.3. Evaluation of the Pre-Standardization Strategy

Since the reduction of environmental impacts in product design and development affects society as a whole and publicly available results must be pursued, patenting and non-disclosure are obviously not options for elaborating a methodology to increase the environmental product performance. For the same reason, intra-company standardization cannot be regarded as a target-oriented approach since intersectoral solutions need to be anticipated. To ensure that the French mechanical industry will implement the eco-

design methodology, the responsible French standardization committee started with a pre-standardization approach to elaborate recommendations that have no strong normative character, such as binding specifications of a standard. Furthermore, these recommendations for increased environmental product performance were addressed on a European pre-standardization level rather than on an international pre-standardization level. The European Union and its environmental policy framework promote pre-standardization activities concerning ecological product design. Globally, the legislative framework in the environmental sector is very diverse and strongly depends on the economic development status of the respective nation. Pre-standardization activities in the environmental sector are therefore aiming at minimum requirements that can be accepted by all stakeholders. Thus, it was decided to derive recommendations for increased environmental product performance in a first approach for the European market with its special legal requirements in the environmental sector.

Alternatively, the standardization activity could have been launched at the ISO level. ISO/TC 207 “Environmental Management” would have been the responsible committee. However, ISO/TC 207 has a strong focus on life-cycle assessment. Performing life-cycle assessment is a more complex approach and not always feasible for SMEs. Therefore, the project was not launched at ISO/TC 207. Gradual dissemination steps were chosen rather than rapid dissemination to increase the acceptance by all relevant stakeholders and to increase market penetration. Conducting the so-called Vienna Agreement to transpose EN 16524 to EN ISO 16524 is still conceivable in the future [38].

4. Conclusions

In this analysis, we depicted that pre-standards are normative documents resulting from a national, regional or international standardization activity hosted by a (recognized) standard-developing organization in a consensus-building process among a limited number of stakeholders. Thus, a pre-standard is exclusively capable to achieve a partial consensus. Furthermore, a pre-standard specifies recommendations and/or possible features for general and/or recurrent activities or the result of these activities (e.g., products, processes and/or services).

We come to the conclusion that especially emerging and rapidly evolving scientific as well as technical results represent the knowledge basis of pre-standards. Thereby, pre-standards represent the state of science and focus on objects of current research. The overarching objective of the elaboration of a pre-standard is to create primarily benefits for a consortium of a limited number of stakeholders, which can subsequently serve society as a whole.

Due to certain reservations about the content or due to differences in the consensus-building process, a pre-standard may not be published as a standard. The application of a pre-standard is also intended to gather the necessary experience, which can then form the basis for the creation of a standard. It is within the responsibility of a (recognized) standard-developing organization to provide a dedicated process for the identification and involvement of all relevant stakeholders within the consensus-building process, as well as a dedicated process for reaching a consensus among all stakeholders. These processes must be clearly documented and communicated by the (recognized) standard-developing organization to the public. Moreover, the processes must ensure the fair, reasonable and non-discriminatory treatment of all stakeholder interests.

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