

A Product Innovation Toolkit for Green Business in South East Asia

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Abstract

Most of the available Sustainable Product Innovation (SPI) approaches and tools have been developed in Western Europe, based upon European experiences. However, in South-East Asian economies like Vietnam, Cambodia and Laos, needs are different and more immediate. Also the characteristics of the local companies and product innovation approaches differ because of specific local social, economic and industrial development aspects. Based upon the experiences of Delft University of Technology with Design for Sustainability within companies in, among others, East Africa, Central America, India and South-East Asia, an adapted approach and set of tools has been developed which fits better into the context of small and medium sized enterprises in SE Asian economies.

This toolkit development is part of the activities in the EU SWITCH-ASIA project SPIN-VCL: Sustainable Product Innovation in Vietnam, Cambodia and Laos. VNCPC and AIT-VN have jointly set up the regional coordination office (“Green Office”) for the project in Hanoi. In the project 500 companies, mainly SMEs, participate to improve their products over the whole life cycle of the product and make them more sustainable, thus contributing to the objective of ‘Green Business’.

The toolkit is organized according to the step-by-step approach that has been developed for SPIN implementation at the companies. This approach consists of four phases: Kick-off, product planning, product development and implementation.

Other than most existing SPI approaches, the SPIN toolkit includes integrated approaches along the full line of possible company needs, ranging from benchmarking or redesign of existing products to development of fully new products and services, as well as strategic development approaches for branding and marketing of greener products. This extension is based on the explicit needs of SE Asian companies encountered in earlier projects. These approaches are all adapted to local circumstances and different circumstances such as micro-enterprises, SMEs, craft villages or larger companies.

A needs assessment was performed to find out the requirements of the companies as well as the prospective experts to be trained in the approach, feeding into the theoretical and methodological development of the toolkit. Co-design sessions were organized with local experts to further fine-tune the toolkit. The preliminary results of company projects in which the toolkit is used show encouraging results, and further improvements are proposed for the next version of the toolkit.

Keywords: Sustainable product innovation, green business, methodological approaches, SMEs, toolkit

Introduction

Sustainable Product Innovation (SPI) is an important focus for green Business. Companies are improving the efficiency of current production and the design of new products and services. These profit-driven strategies go by many names, such as Ecodesign, sustainable product design and more recently, Design for Sustainability (D4S).

In the 1990s, concepts such as Ecodesign and green product design were introduced as strategies companies could employ to reduce the environmental impacts associated with their production processes (Brezet and van Hemel 1997). To keep pace with the rapidly changing industrial setting, many environmental movements have expanded their scope to include social and economic concerns. These environmental, social, and economic priorities are the three pillars to ‘sustainability.’ Sustainability can be defined as

“the possibility that humans and other life will flourish on the Earth forever” (Ehrenfeld 2008).

Ecodesign has evolved to include both the social and profit elements of production and is now referred to as sustainable product design or ‘Design for Sustainability’ (D4S). D4S goes beyond how to make a ‘green’ product and embraces how to meet consumer needs in a more sustainable way. Companies incorporating D4S in their long-term product innovation strategies strive to alleviate the negative environmental, social, and economic impacts in the product’s supply chain and throughout its life-cycle. The D4S concept now embraces both incremental (redesign) and radical (new products, product-service systems) product innovation to achieve the necessary sustainability gains. D4S essentially integrates these approaches and aims to drastically improve the efficiency and social qualities of production processes by developing new products, services, and systems

alongside on-going continuous improvement of products (Crul and Diehl 2006, Crul et al. 2009).

Central to SPI is the notion of eco-efficiency: Global environmental pressures are directly related to the size of the population which helps define consumption levels, and the materials and energy required to produce each 'unit' of consumption. The assumption is that environmental pressures should be reduced by about half. Taking into account the current growth rate of developing economies, the efficiency of products and processes needs to be improved by a factor of 4. Future generations could be living in a world with a population of 9 or 10 billion, and much higher consumption levels, which would require materials and energy improvements by a factor of 10 to 20. This type of 'factor thinking' or 'factor X thinking' (von Weizsäcker et al., 1997; Factor 10 Club, 1997; NIDO/KSI, 2003) shows the magnitude of the task at hand, and the critical need to improve production processes, products, and systems.

More recently, this notion of decoupling economic growth and use of resources by factor efficiency improvements has been fundamentally criticized as being unrealistic. Jackson (2009) gives the example that with sustained economic growth, carbon intensity in 2050 should be a factor 130 lower than today, a truly daunting factor of improvement to be achieved. The need for a radical change of society towards sustainability, challenging the necessity of economic growth as the basis for prosperity, is expressed in several influential publications (Ehrenfeld 2008, Jackson 2009). A new kind of prosperity is proposed, based on human flourishing in far less materialistic ways. As John Ehrenfeld (2008) notes in *Sustainability by Design*, we still have the opportunity to change our unsustainable habits, but we can no longer afford to take our current consumption patterns for granted. A consumer demanding cleanly-produced products might feel good about his or her lifestyle choice, but it will take more than just consuming such products to initiate a change – it will require a decrease in consumption as well in order to realize any gains.

Short-term incremental redesign of existing products, also called 'inside-the-box' innovation, can typically lead to improvements up to a factor 5. To achieve long-term factors of 10, 20 or higher, or changes towards radical shifts in the whole of society, radical product innovation, or outside-the-box innovation, is necessary. This includes developing completely new products, improving products as well as the services connected to them, and developing entirely new functional systems of products and services.

Vietnam is one of the important economies in South-East Asia, for that reason it is central in the

product innovation research described in this paper. Since 1986, Vietnamese economy has been developing averagely 7% annually. This turned Vietnam from one of the poorest nations into a low-middle income country nowadays. However, the economic prosperity has been achieved with serious trade-offs for society and the environment.

Today this traditional pattern of development is reaching the limits of the carrying capacity of ecosystems and the depletion of natural non-renewable resources. At the same time, the economic growth, which relies on expansion of investment and labor, and on the over-exploitation of natural resources, is leveling off. It is high time for Vietnam to evolve to a more advanced and balanced pattern of development, based on its intellectual capacities. Among many ways, Sustainable Product Innovation is expected to be a promising approach toward a society based on sustainable production and consumption.

SPI was first and successfully introduced in Vietnam in the CP4BP - Cleaner Production for Better Products project (Crul and Nguyen, 2010). It now continues to be applied in the EU SWITCH-Asia SPIN (Sustainable Product Innovation) project, which aims at SPI implementing in the period 2010-2013 in at least 340 Vietnamese companies and delivering at least 700 redesign or new sustainable products. Further project activities of SPIN take place in Cambodia and Laos, where another 160 companies will be involved in the project with 300 more products.

Methods

A company that wants to innovate its products or services needs to know what to do and how to do it. A basic systematic approach for this has been developed by Roozenburg and Eekels (1995) and consists of four basic steps (see figure 1): Formulating goals and defining strategies for product development based on market perceptions; generating and selecting ideas for the new or improved product; developing these ideas into the blueprint of the new product; and transforming the plans into reality including production, distribution, sales, use and end-of-life of the product. Of course an actual product innovation process will often be more chaotic, iterative and less linear than described here, nevertheless the fundamental steps can usually be recognised and are necessary for successful innovation.

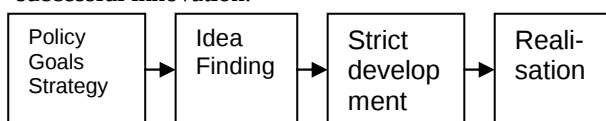


Figure 1: Basic steps for Product Innovation (Roozenburg and Eekels 1995)

This approach is elaborated in the existing SPI approaches (Crul et al, 2009) and also forms the basis for the Sustainable Product Innovation Toolkit for SE Asia. However, in South-East Asian economies like Vietnam, Cambodia and Laos, needs are different and more immediate. Also the characteristics of the local companies and product innovation approaches differ because of specific local social, economic and industrial development aspects.

To find out the requirements to build a toolkit that takes these characteristics and needs into account, the following research methods were used in the preparation phase.

- *Existing manuals review* in which the differences of the existing D4S/SPI manuals and their pitfalls and shortcomings were analysed.
 - *Evaluation of the process, tool use and approaches* during the earlier CP4BP company projects (in 2008 – 2009) in Vietnam. A knowledge transfer analytical framework (Diehl 2010) was used for this evaluation, which included in-depth interviews with the project stakeholders and analysis of project documents and evaluations.
 - *Macro needs Assessment* of sectors in Vietnam, based on desk study of macro-economical data, a benchmark study of Vietnam, Cambodia and Laos against China, and questionnaire-based interviews with 6 large sector organization experts in Vietnam
 - *Micro Needs assessment* of 10 selected SMEs that were going to participate, using checklist-based interview techniques, performed by the VNCPC staff of SPIN project office.
 - *Trainees Need Assessment* of the 40 selected trainees and experts from Cambodia, Laos and Vietnam involved in the project was performed by AIT staff of the SPIN project office.
 - *Co-creation workshops* with experts and future users of the toolkit. 3 co-creation workshops, facilitated by TU Delft staff, were performed with trainees and SPIN staff on particular aspects of the approach outlined the toolkit, to get direct feedback and improvement options.
 - *Feedback sessions and questionnaires* during consultants trainings in the North and the South of Vietnam where the toolkit was used
 - *Analysis of the preliminary results with the use of the toolkit* in the first batch of companies implementing SPI in the project in 2011. This analysis is currently performed by interviews with involved project staff, analysis of company reporting and interviews with the international experts involved in the projects.
- This extensive mix of different methods has facilitated an iterative improvement approach for the toolkit, as described below.

Results and Discussion

Toolkit summary

The toolkit emerging from this research was fully focused on a consultant/advisor supported approach for the company, and was structured around the four key steps for the product innovation approach (Roozenburg and Eekels 1995) as described above: *Phase 1: Kick-off* – During the kick-off meeting with the company, the consultant introduces himself and the SPIN project, and collects some basic information about the company. Also, the relevant SPIN activities will be chosen on basis of the company's wishes and insights gained by the consultant.

Phase 2: Product planning – The product planning phase contains all steps that are necessary to develop a good project brief for further product development in Phase 3. Amongst these steps are the execution of a SWOT-analysis, and the development of a brand promise and market strategy for the company. These strategic elements were primarily derived from the excellent work on brand driven innovation as developed by Roscam Abbing (2010). Depending on the selected SPIN activities (see below), there will be an environmental and social assessment of the product that is to be improved or the generation of a design strategy for the development of a new product. The result of these activities will be summarized in the project brief, which also describes the concrete plans for the following phases.

Phase 3: Product development – Within the product development phase one can distinguish two main steps: concept development and realization. On basis of the project brief, concepts will be developed through an iterative process of idea generation and evaluation. Once a concept has been developed that meets the criteria defined in the previous phase, a production and marketing plan are developed to respectively produce and market the product. The most important result of this phase is a prototype, which will be used for product assessment and demonstration of the first company project results.

Phase 4: Implementation – In order to demonstrate the environmental and social improvements as well as the strategic improvements, a product assessment is undertaken. In order to achieve successful and sustaining implementation of the results of the former phases, an implementation is written. This implementation plan will guide the company through the process of successful production and marketing of the product once the company project is finished.

This whole process is illustrated in figure 2.

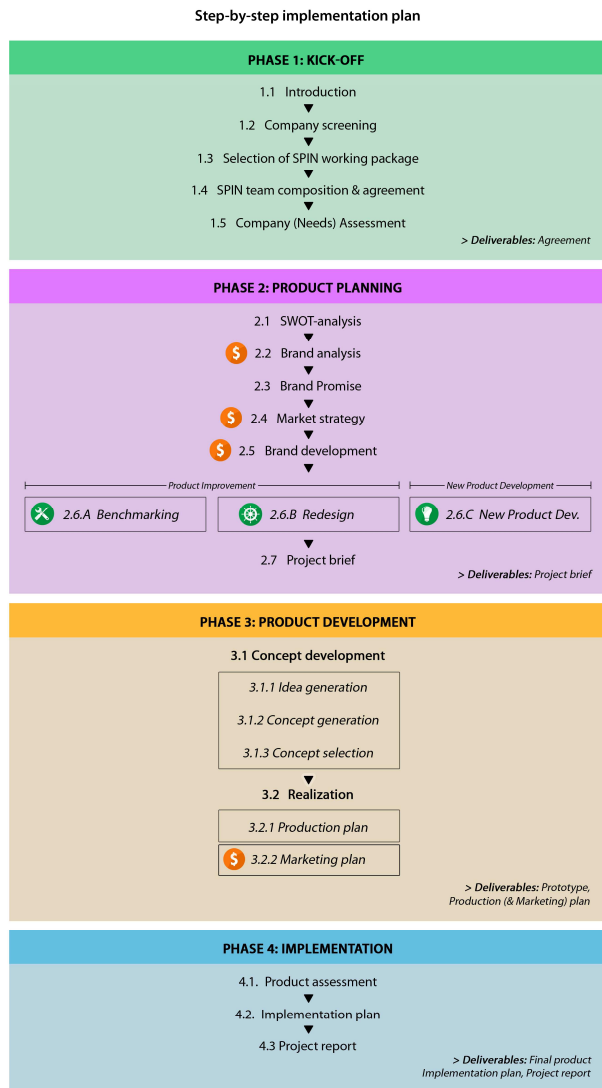


Figure 2: SPIN step-by-step plan (Crul et al 2011)

A key decision for the toolkit design was to present *one* stepwise approach as summarized above, and diversify to a full range of dedicated approaches that most fitted the needs of the individual company *within* that approach. The company is advised by the consultant to select different SPIN activities as described below. These will be collected in a SPIN working package that will be the red thread in the demonstration project. After selecting the SPIN working package, certain steps can be eliminated from the step-by-step Implementation plan, which is described in downscaled plans for the different SPIN working packages.

The five SPIN working packages for the company projects are (see figure 3):

I: Product improvement: the company has a product that they want to improve through better environmental, social, and functional performance. This can be achieved by using either the benchmarking or redesign tool.

II: Product improvement +: the company wants to improve one of their products and market it through the adoption of strategic development activities.

III: New product development: the company wants to develop a new product to expand their product portfolio.

IV: New product development +: the company wants to develop a new product and also market it through the adoption of strategic development activities.

V: Strategic development: the company already has a good product, which does not require improvement at the moment, but the company needs support to build a company brand and/or market the product through strategic development.

If the company selected one of the 'Product Improvement' working packages, they probably already have an idea about which product they would like to improve and how they want to improve it. In this case the company has to select the product and explain their motivation and ideas for improvement.

In case the company selects 'New Product Development', there is less information available at forehand. However, they may already have an idea about what they want the product to look like and to whom they want to sell it. The company is asked to describe the product and potential market.

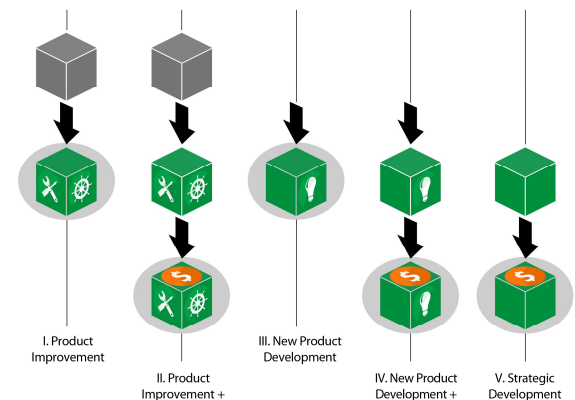


Figure 3: SPIN working packages (Crul et al, 2011)

In the toolkit, each of the steps in all phases is enriched with instructions for the consultant, tips for the joint company meetings, and of course background, description, examples and worksheets for each of the tools and activities. Throughout, the signs for the SPIN activities (figure 4) are included.



Figure 4: Key SPIN activities (Crul et al. 2011)

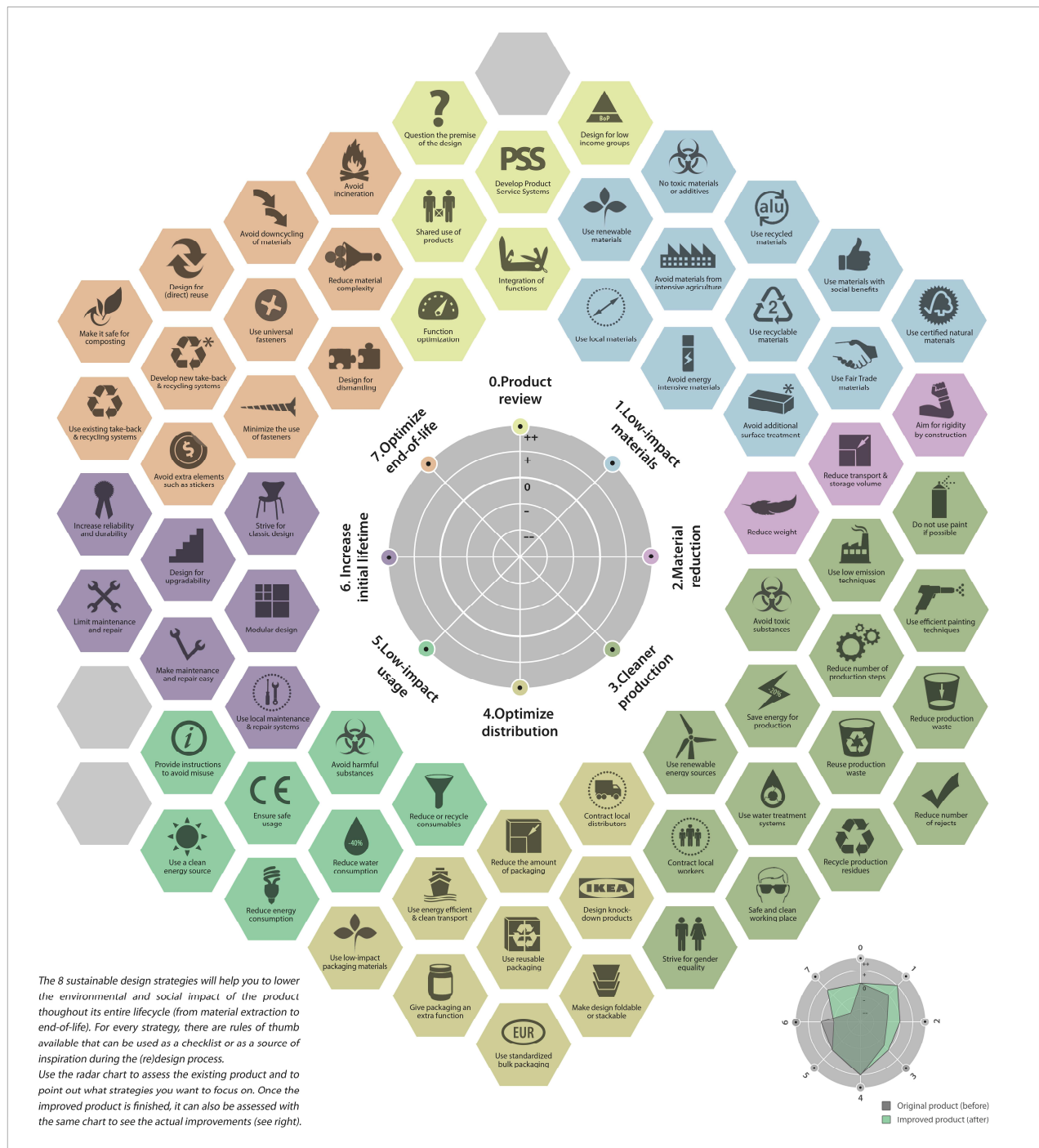


Figure 5: Summary of the redesign approach with overview of design strategies (Crul et al, 2011)

It is not the purpose of this paper to detail all the SPIN activities that are possible, hence as an example on the previous page one of the key activities is summarized: redesign of products as part of the product improvement approach. The approach consists of several steps (lower part of figure 5). Definition of the sustainable redesign strategies as one of the key tools for redesign is elaborated into detailed rules of thumb (upper part of figure 5). Finally, the assessment of the project is done with a double radar chart (middle of figure 5). This summary is available for in-company use as a poster that can be a constant reminder of the project work onsite.

Continuous improvement of the toolkit

As described in the methodology section, several avenues were taken to find the necessary improvement directions for the toolkit for use in the SE Asian circumstances. From the existing manuals review and CP4BP process evaluation, it was decided to include the strategic methodologies and approaches, exclude needs assessment as a stand-alone tool, and develop the toolkit as one single platform with one central approach.

The macro and micro-level needs assessment where elaborated into several company scenario's in which the needs for different types of companies, strategies, capacities and markets where combined in a meaningful order to find the detailed needs for companies in this typology (figures 6,7) (G. Jansen, 2010)

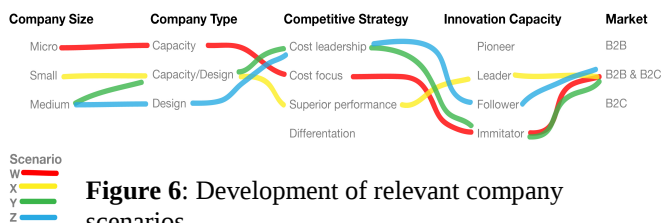


Figure 6: Development of relevant company scenarios.

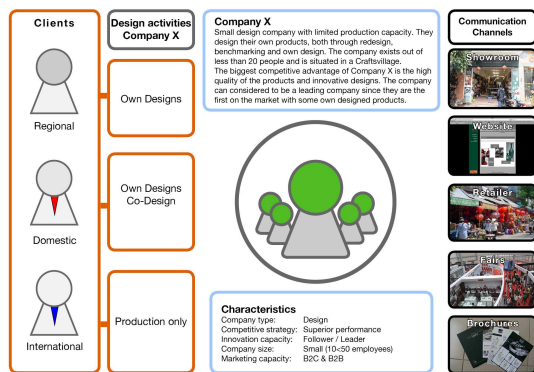


Figure 7: Example of company scenario for a design-oriented company ('x' company in figure 6)

Based on the analysis of the needs, a set of 30 guidelines was formulated for the further development and improvement of the toolkit. These guidelines were translated into detailed adjustments to be made in all chapters, tools and worksheets of the toolkit. Without detailing all guidelines, the following master guidelines were leading in the toolkit design process:

1. *Keep it simple:* product innovation is a complex process, but make clear how to start and take small steps.
2. *Learning by doing:* employ less theory, more exercises.
3. *Quick and small successes:* deliver quick and concrete results in re-design form with mock-ups and prototypes.
4. *Commitment:* connect small successes with the growing commitment of companies to sustainability and SPIN.
5. *Support:* increased support of trainers and companies by SPIN staff and international experts.

The Feedback sessions and co-design workshops resulted in priority setting on the content, structure and lay-out of the draft (v1.1) version, resulting in a final first version (v1.2) of the Toolkit to be used in the SPIN company projects.

Currently, the evaluation of the preliminary results of the 100 company projects of the first 2011 cycle in SPIN is ongoing and results informing the future toolkit development are pending.

Examples of company project results

Although reporting is ongoing and many of the first cycle batch of 100 company projects are not yet finalised, a first glimpse of the results can be given.

Ngoc Dong company (Ha Nam province 50km from Hanoi) is using the outer layer of scrap bamboo into a new product, the roof of factory buildings. This is to replace the fibro-cement made from asbestos. The new product creates jobs for weavers, and at the same time saves cost, comparing to the use of fibrocement (see figure 8).

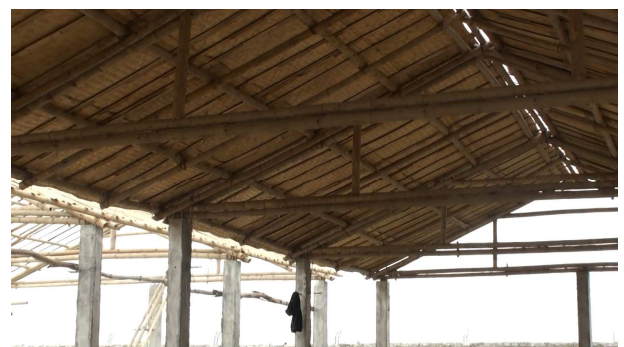


Figure 8: Bamboo scrap roof

Ando company (a ceramics company in Bat Trang craft village) has further developed and improved the design of products based the previous design project CP4BP. The products are 50% thinner and that way reduce 50% of raw materials and energy used for kilning.



Figure 9: New Ando ceramic products

Several lines of *Rattan products* were designed for Phu Vinh craft village. The concept with all these product lines is to use the scrap from rattan and combine with the high manual skills of villagers to have two new product lines of lifestyle products (f.i. in Lamps, see figure 10): rattan lace and rattan leaf. The projects were executed by SPIN and the OneUN Joint Programme on Green Production and Trade. Based on the experiences in this joint programme tools and checklists for SPI dedicated on craft (villages) were added to the SPIN toolkit (Ruebens 2011).



Figure 10: Product of the 'leaf' collection

Conclusion

The systematic four-step approach for product innovation (goals and strategies – idea finding – strict development – realization) was found to be a good basis for the regionally adapted toolkit for Sustainable Product Innovation in South East Asia, as deployed in Vietnam, Laos and Cambodia in the SPIN project. A multi-method preparation process was executed for the development of the toolkit, including reviews and evaluation of existing manuals and projects, macro and micro needs

assessments and co-creation workshops. The toolkit is now advising companies on several possible avenues for SPI, including product improvement, new product development and strategic product development, all with integrated sustainability tools and instruments. The toolkit is dedicated to keep the complex process as simple as possible, and encourage learning by doing. The toolkit focuses on delivering quick and concrete results and establishing commitment of companies for SPI. Thorough analysis of the results and experiences of the first 100 companies working with the toolkit will establish further guidelines for improvement of the toolkit.

Acknowledgements

The development, implementation and improvement of the SPIN Toolkit would not be possible without the help of many. The dedicated young team of SPIN Green Office on Hanoi (with staff from VNCPC and AIT-VN) and the project staff of NCPO in Cambodia and LNCCI in Laos play a crucial role in all of this. Our TU Delft colleagues Gerwin Jansen (project manager for the toolkit development) Shauna Jin and Tim Boudri have dedicated much energy, time and intellect in the development and further improvement of the Guide and connected trainings.

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