Guideline for setting up a Learning Factory

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1 Introduction

This guideline aims to convey how to develop and setting up a Learning Factory. It is based on insights gathered from establishing a transnational Learning Factory EcoDesign within the EcoDesign Circle project (2016 – 2019), which was funded by the EU INTERREG programme for the Baltic Sea Region. The guideline attempts to generalize the approach so that anyone can replicate the process. Section 2 explains the overall process. In section 3 we will go more into detail on how to develop a Learning Factory, deduced from our own approach.

In general, a Learning Factory has the following key characteristic elements (Metternich, 2014)¹:

1. Processes and technologies regarding the topic of the respective Learning Factory are based on real industrial sites
2. Covers at least one node in the value chain
3. Has a changeable environment, is modular and not necessarily geographically anchored (e.g. virtual)
4. Is used for teaching and training
5. Theoretical knowledge can be tested practically
6. Uses a problem-based learning approach and requires interactive involvement of the participants (experimentation)
7. Can enable onsite and remote learning
8. Fosters the exchange between different disciplines and supports formal and informal learning

Note that a “product” can also be a service and the “factory” can also be virtual. Depending on the scope, the target audience and the available equipment, a Learning Factory can have several forms.

Some examples for Learning Factories are as follows:

- The Bernard M. Gordon Learning Factory is a hands-on facility for engineering students to use in conjunction with capstone design and other courses, as well as research projects and student organizations. (USA, Penn State College of Engineering, Bernard M. Gordon Learning Factory (http://www.lf.psu.edu/))
- In the Learning Factory for Energy Productivity, a cooperation of McKinsey and the University of Darmstadt, Germany, croduction managers can learn how to save energy by using innovative energy management methods and new Industry 4.0 technologies (McKinsey Lernfabrik für Energieproduktivität (https://energiefernabrik.mckinsey.de/))
- In cooperation with the Technische Universität Berlin, the Fraunhofer IPK and Bayer Pharma AG, the International Transfer Center for Logistics (ITCL) GmbH has developed a learning factory for the process and pharmaceutical industry. The goal of this learning factory is the sustainable implementation of operational excellence by enhancing the qualification of employees. The focus of the training measures is the interactive teaching of

lean management skills through observation, theory and application in the learning factory. (ITCL Learning Factory (http://itcl-berlin.de/en/leistungsportfolio/kompetenzmanagement/lernfabrik/))

Specific approach in the Learning Factory EcoDesign

The Learning Factory EcoDesign targets motivated beginners, who would like to learn how to design circular systems. It is a training program for developing innovative circular products and services. During the program one can learn design and life cycle thinking through a creative and hands-on approach. The user-centric ecodesign tools and methods help to minimize the environmental impacts while maximizing the benefits for all stakeholders. The program combines creative design-thinking with life-cycle thinking in order to develop circular systems and business models. The training (goals, content, methods, way of teaching, and process) has been described in detail in the "Workshop Manual".

The Learning Factory Ecodesign fulfills all of the above mentioned characteristics of Metternich, with the exception of No. 1, which is only fulfilled partially.

1. Most parts of the Learning Factory EcoDesign do not take place in an actual industrial site but in a workshop room environment. This was decided deliberately during the course of the project because the training was supposed to be independent from specific equipment in order to be replicable in other locations and by other facilitators. The Learning Factory EcoDesign is a practical workshop which you can run in a regular seminar environment. The “factory” part is a single module which you can omit or adapt to other environments. For the Learning Factory EcoDesign we used the product prototyping environment “Start a Factory” at Fraunhofer IZM to demonstrate the manufacturing process and link design decision to environmental impacts during (re)manufacturing.

2. The Learning Factory addresses the full life-cycle.

3. The Learning Factory consists of different “sprints” and thus can be shortened by skipping sprints, changing the order or changing the timeframe of specific sprints. This approach makes it very flexible.

4. The Learning Factory teaches life-cycle-thinking and design-thinking.

5. & 6. During the training teams of participants develop a circular system in order to solve a design challenge using the methods and tools developed for the Learning Factory by applying theoretical knowledge gained during the training.

6. Information, tools, and materials are available on the web-platform Sustainability Guide.

7. The training supports formal learning through the introduction of theories and methods, but also informal learning such as interdisciplinary teamwork and creative thinking through the “do-it-yourself” approach. Working in teams also supports that participants learn from their team mates.

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1 A working session for a specific task limited in time.
Figure 1: The electronic hardware prototyping lab “Start-a-Factory” [Source: Fraunhofer IZM]
The “Lean Startup Approach” (Ries, 2011) was followed in developing the Learning Factory EcoDesign, and it is recommendable for developing learning factories in general. A core component of the methodology is the **build-measure-learn** feedback loop. The first step is to figure out the customers’ needs and problems from the customer perspective. After understanding the problems, you can develop ideas and concepts for your learning factory. Eventually, you can test your concept with your “customers”, measure their satisfaction, learn through testing and refine the concept. This process is shown in Figure 2.

![Figure 2: The build-measure-learn feedback loop, adapted from (Ries 2011).](image)

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3 The process in detail

Figure 3 shows the development process of a Learning Factory in detail. The diamonds symbolize diverging phases (first half) and converging phases (second half): In each of the diamonds you will first explore and then summarize. In a way, each “diamond” represents one Ries’ feedback loop.

- **First diamond:** Identify stakeholders and explore their needs; condense everything into a rough concept
- **Second diamond:** Test concept against requirements from potential participants through surveys and further specify concept
- **Third Diamond:** Test and refine concept through piloting; end with a business plan

Figure 3: The development process
3.1 Develop a rough concept and a project plan

In the first step, develop a rough concept for how and what you would like to teach, which learning environment you would like to use, what your goals and target audience are. During this step also plan your project, i.e. time and resources needed to build your Learning Factory.

Specific approach in the Learning Factory EcoDesign

The Learning Factory EcoDesign was developed by Fraunhofer IZM as subcontractor of the German Environment Agency (Umweltbundesamt) within the EcoDesign Circle Project funded by the European INTERREG Fond for the Baltic Sea Region. A project proposal was written for the German Environment Agency including the project plan. The cooperation with the Ecodesign Circle Consortium opened up opportunities and synergies, such as the common development of the online platform Sustainability Guide. Furthermore, feedback and exchange from project partners helped to develop a concept which is replicable. The cooperation also made it possible to run the training in the partner countries and learn more about nation-specific issues in the field of ecodesign and organising and running such a training.

See ANNEX I for an example of the working plan according to the project proposal.

3.2 Forming a network and analysis of current situation

During the second step you should identify the main stakeholders and knowledge carriers in your environment, for example:

- Science and academia, which are able to develop content or know-how on educational topics
- (Industry) Associations relevant to your target audience, that can provide input and can help you to spread information later on
- Existing networks in your field
- Benchmark other learning factories and educational & training programs

From a long list of stakeholders identify the most important ones. It is easier to interview stakeholders you already know personally or you can get introduced to. Try to get in contact with them and ask for an interview. Summarize your basic concept in two pages (who are you, what is your goal, what is your basic concept) beforehand so that they have a rough understanding of the project. Think of interview questions you would like to ask about their current activities, importance of the topic, challenges and drivers in your field of interest, identification of target audience, needs of the target audience, training methods, relevant information for content and methods, and their ability and willingness to support the project [see example in ANNEX II]. Collect information sources on teaching methods and content (projects, reports, websites, other learning factories) in one document. Also summarize the interviews in order to refine the concept based on the collected insights.
Simultaneously, start to look at the facility/factory environment which you would like to use. Talk to the people in charge of the facility. Identify the resources and machines available there and identify what is still needed.

**Specific approach in the Learning Factory EcoDesign**

As we were part of the “EcoDesign Circle” project and planned a replicable approach in other countries, we interviewed the project partners first. Apart from the consortium, we identified other stakeholders and knowledge carriers in the field of ecodesign in the Baltic Sea region. We created a “long list” of about 100 potential stakeholders from universities, design centres and networks, and industrial associations. In the end, 18 people were selected to be interviewed from following backgrounds:

- Six universities (mostly design and technical universities)
- Five design centres (project partners)
- Two industry associations
- One consulting company
- One already established network (with expertise on biomimicry)

Having a wide range of different backgrounds was important for us, since it increased the knowledge input. We summarized the insights and deduced the target group of the Learning Factory, the way of teaching, and the content, and potential support we could get from the interviewees. One important outcome was that the overall concept of the Learning Factory EcoDesign should be applicable to any sector and product category and should not be dependent on specific equipment in order to be replicable. This slightly changed our direction of thought as the production environment we had foreseen is very specific for electronics manufacturing. In the end we decided to develop a workshop-based approach which is independent from any industrial site and the approach and insights can be applied to any industry. As a separate “module” we added a tour through our facilities to explain environmental impacts associated with manufacturing. This module can be omitted or replaced by a tour through any other production or recycling facility. For the workshop in Sweden we arranged a tour through “Urban Deli”. “Urban Deli” is a combination of restaurant, café, supermarket and hotel with a sustainable approach. In Poland we visited the furniture/hardwoods manufacturer “TAMO”. They produce locally, try to avoid glues and other chemicals for the most part and also partly use reject wood as a resource, representing another good example of a sustainable company.

Implementing a production environment into the concept represents a unique approach that you may have to adjust to your specific situation. In our case the “equipment” of the “factory” is not the core learning object but the way of thinking and the approach how you solve problems. Therefore, one could argue whether the Learning Factory EcoDesign is a “real” Learning Factory. When developing your own Learning Factory, you have to check which environment you can provide and how you would implement it in a useful way. One insight from our project is that safety and technical requirements as well as running operations limit the interaction of participants with the machinery. In other words, in case machines are used daily for manufacturing, they are usually not available for training purposes and machines usually require technical and safety training. On the other hand, procuring machines
“just” for a Learning Factory is too costly. Therefore, **multiple use** of equipment make sense, e.g. the use machinery of a demonstration environment, a technical centre or Maker Space for the Learning Factory.

See ANNEX II for an example of a questionnaire for your stakeholders.

3.3 Understand the needs of the target audience

After you have developed a rough idea regarding the way of teaching and the teaching content from your status quo analysis, check whether your **current assumptions and concept** fits the **needs, expectations and wishes** of the target audience. The simplest way is to develop an **online survey** [see example in ANNEX III]. Use your network to spread the invitation to participate via the survey. Write a short invitation letter for the target audience to participate [see example in ANNEX IV]. Let the participants rate the importance of different topics and get feedback on the preferred way of teaching. Make sure that you also ask for background information so that you can differentiate between different user groups you would like to address.

**Specific approach in the Learning Factory EcoDesign**

For the Learning Factory EcoDesign it was important to make sure that we had a solid information baseline on how the potential target audience thinks and what their needs are. Another important aspect was to check their country of origin and professional background, to find out about regions / fields of professions with greater need of education on the topic of ecodesign. You will find a good overview of specific questions in ANNEX III. From both the interviews with stakeholders and the survey with potentials “users” we understood that a mix of teaching **theoretical concepts**, presentation of **methods and tools** as well as **practical, creative and problem based learning** (learning-by-doing) would be an effective approach.

See ANNEX III for an example of a survey and ANNEX IV for an example of an invitation letter.

3.4 Develop the training concept and plan the pilot

After the **survey** and the **interviews**, you should have a good overview of what you should teach and how. Now it is the time to go into the **detailed planning** of the overall training concept. This includes:

- Define final **scope, target audience and goals** of the training
- Select and prepare the **training content** in an appealing manner for your target audience
- Select the **training method(s)** (workshop, seminar, online tutorials, videos, games, quiz, hands-on exercises with equipment, …) - Hint: we advise to use interactive and practical methods
- Discuss with “operational” staff how you can use the **equipment**, how they can contribute by showing and explaining relevant topics
• Plan how to use the equipment in your facility
• Identify which **auxiliaries and resources** you need
• Plan the sequence and timing of the training steps

**Plan the concept** together with your team members, ask for feedback and iterate until you are satisfied. The challenging part is to screen a wide range of possible concepts and methods and decide for the best fitting ones. ANNEX V shows a typical approach for such a process. After you developed the concept you can plan the first execution – **the pilot**. Decide which facilitators/trainers you need. Decide on the date, reserve and **procure the resources** and means you need. Write an invitation letter including scope, target audience, goals and benefits of participation and prepare an (online) **application form** [ANNEX IV, ANNEX VI]. **Invite potential participants** via your network, mailing lists and social media channels. From the applicants, select the persons which fit your target audience best and invite them officially to the training (required information: date, time, place, scope, required material to bring). Prepare a **feedback form** for participants to assess the way of teaching and the teaching content after the training.

![Image: The Circular System Canvas of the Learning Factory Ecodesign](image)

**Figure 4:** The Circular System Canvas of the Learning Factory Ecodesign [Source: Fraunhofer IZM]
Specific approach in the Learning Factory EcoDesign

We developed the training concept mostly based on the insights gathered via the questionnaires. The majority of the potential users wished for a participative workshop in addition to information for self-study. Therefore we divided the teaching approach of the Learning Factory EcoDesign into two parts – a participative workshop and online materials (tools & extra information). This material was uploaded to the “Sustainability Guide”, an online platform which was developed by the Swedish Industrial Design Foundation in cooperation with Fraunhofer IZM.

The goal of the workshop is to learn how to design a circular system around a product considering all important aspects that come with it (e.g. business models). There are numerous ways to carry out a workshop. We surveyed several approaches that might fit the workshop goal best. In the end we chose a concept based on the Design Sprint Method developed by Google Ventures. It was the perfect fit, since we were able to tackle different design phases in short sprints. We adapted this Design Sprint methodology and integrated ecodesign practices.

The visit of the prototyping environment “Start a Factory” was in general regarded as very interesting and enriching. However, a direct transfer of the insights to the “design challenges” worked on during the workshop was only partially possible, as “Start-a-Factory” focuses solely on electronic manufacturing equipment. Therefore it is very important to specifically address environmental issues during the tour and to discuss insights afterwards.

See ANNEX IV for an example of an invitation letter and ANNEX VI for an example of an application form. In ANNEX V you will find an example of a process for finding the best tools and methods.

3.5 Execute and test the concept

After you developed the concept you can execute and test it in order to learn and improve it. This should still be part of the development phase and also be communicated as such.

1. Prepare the training in detail:
   - Exact timing
   - Briefing of facilitators
   - Preparation of workshop rooms and facilities (Learning Factory)
   - Organization of catering/food/drinks
   - Provision of required material and auxiliaries

2. Execute the training:
   - Welcome the participants
   - Introduction to concept, content and timing
   - Execution of the training
   - Inquire written or oral feedback about timing, content, facilitation, methods and learning effect
3. **Review and adapt**
   - Take some time to analyse the feedback of the participants
   - Have an internal meeting with the facilitators to discuss insights
   - Adapt your training based on the feedback

4. **Iterate – Refine the concept**
   - Do another training to adapt your concept, i.e. follow the three steps above
   - Try out different timings and sequences of steps – you can also try out shorter or longer versions (add, delete or replace steps)
   - Choose a different target audience
   - You will always learn

Figure 5: The pilot workshop [Source: Fraunhofer IZM]
Specific approach in the Learning Factory EcoDesign

In order to test the training we initially planned two workshops: one “test” with students and one “pilot” with professionals. Furthermore, we held three full–scale workshops in the countries of our project partners. They organized the venue and invited the participants, whereas we facilitated the Learning Factory. In those locations we had to “substitute” the factory module situated at Fraunhofer IZM in Berlin with another option. We decided to do field tours to manufacturing facilities of companies instead.

Besides the full programme we executed several workshops lasting one to three hours. The duration of the workshop is adaptable and can vary from one hour to two days. The shorter the workshop, the more sprints have to be skipped. The general workshop structure remains the same. It starts with a theoretical introduction about ecodesign. After that the participative part starts, by forming teams and going through different sprints. In recurring “show and tell” sections, the participants present their current work and receive feedback from the other groups. In between sprints, small coffee breaks and icebreakers are carried out to re-energize / refocus the participants – a workshop over several hours can be exhausting. A very important part is the feedback of the participants in the end. There you gather insights on what to change in upcoming workshops and what to keep as it is. We prepared printed out feedback forms and set up an online feedback survey. In all cases we used the oral feedback from the participants, a feedback form and our own observations to change the order, timing, facilitation and tools to meet the participants’ needs. Remember that developing a Learning Factory is an iterative process and therefore feedback is the most important thing for improving. After a few workshops with different durations, a wide range of people and a lot of feedback, you will feel more secure to facilitate such a workshop and emphasize core concepts.

One important requirement for us was that the Learning Factory EcoDesign should be replicable. Therefore we also developed a "Workshop Manual", targeted at facilitators, which explains the preparation and execution of the training in detail. Besides, we wrote this guideline to assist third parties in developing and establishing Learning Factories for any type of topic.

See the workshop manual for an example of how to execute out Learning Factory EcoDesign.

3.6 Continuation: develop a business plan and marketing strategy

After testing your concept you will probably have developed enough know-how to prepare a business plan for your training. A typical and simple business plan tool you can use is a Business Model Canvas (https://strategyzer.com/canvas/business-model-canvas), which helps you to define, amongst other aspects, your value proposition, your customer segments, your cost structure, and your revenue stream. In addition you can develop a marketing strategy including your marketing goals (e.g. increase number of participants), service description, unique selling proposition, communication plan, distribution channels, price policy etc.

The marketing plan developed for the Learning Factory EcoDesign includes the following:
1. **Service description**: describes the service, the mission, the content, the format, the duration and frequency, the location and the facilitators.

2. **Target Group and Unique Selling Proposition (USP)**: the different target groups to address (age, from which industry, income, occupation, level of experience, level of education, expectations, willingness to pay); the USP describes the strategic competitive advantage your service offers compared to competitors. It should describe the (physical, mental, social, spatial, temporal, monetary, …) benefit of the service for the user. To identify your USP you need to analyse your competitors.

3. **Price Policy**: e.g. different prices for different target groups, discounts, etc. Calculation is based on the time (personnel costs) and resources (materials, auxiliaries, energy, rental fees, …) required for the preparation and execution of the activity. You need to compare this to the willingness to pay of potential customers (market analysis, competitor analysis, market survey).

4. **Communication policy**: includes communication goals, online and offline communication channels and their options (e.g. articles, posts, ads) plus costs.

5. **Distribution policy**: the sales channels and formats; based on the communication policy.

6. **Action points/Marketing plan**: i.e. at which point in time do you execute which task.

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### Specific approach in the Learning Factory EcoDesign

In order to develop our business we cooperated with the PR department at Fraunhofer IZM to write a **marketing plan**. Through our many workshops we were present in the community, so that we were visible and well known, which helped us to market our Learning Factory through people experiencing part of the training. We also developed different **offers** with different **price-tags**, like:

- **Full program** training for individuals
- **Individual workshops** within companies
- **“Train-the-trainer”** seminars for consultants

With the support of an online marketing specialist we developed a **landing page** for the Learning Factory EcoDesign describing the scope of the Learning Factory and our offers with the direct option to **sign up** for the full program or to request an individual offer for an individual workshop. We plan to offer “Train-the-trainer” seminars through third parties which have direct access to the target group or consultants to the target group - in our case for example resource efficiency agencies. In terms of consultants, through taking part in a “train-the-trainer” seminar, the consultants purchase the right to use our approach commercially – limited in time and to a number of companies or participants.

In case third parties are interested in using material non-commercially, all our material is published under Creative Common Creative Common License “Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)” ([https://creativecommons.org/licenses/by-nc-sa/4.0/](https://creativecommons.org/licenses/by-nc-sa/4.0/)). That means that everyone can use the material non-commercially and adapt the material under the condition that they name the author and publish changes under the same license.

*See ANNEX VII for an example of a marketing plan.*
ANNEX I  Proposal

Figure 6: Schematic representation of the structure and interaction of the work packages (WP) in the Learning Factory EcoDesign project
ANNEX II  First questionnaire for stakeholders

Please complete the following information.

Name:_________________________________________________________________________

Title / Position:__________________________________________________________________________________________

Organization / Institute:__________________________________________________________________________________________

Country:____________________________________________________________________________

E-Mail address:________________________________________________________________________________________________________

Phone number:________________________________________________________________________________________________________

1. Your Activities

1.1 In which sector are your members/partners operating mainly?

1.2 Which activities does your organization have with respect to ecodesign?

1.3 What do you think is a motivation / a driver for ecodesign?

1.4 From your point of view, what are the most common barriers and challenges (economic, technical, know-how etc.) in ecodesign projects?

1.5 How can your organization or your members/partners benefit from the Learning Factory EcoDesign project?

2. Concept of the Learning Factory for EcoDesign

2.1 What do you like about the current draft concept of the Learning Factory EcoDesign?

2.2 What is missing?

3. Information on network members, region/country and experience with ecodesign projects

3.1 Which are the product categories of interest for your members (multiple answers possible):
Furniture
Hardware/Electronic products/IoT/Wearables
Machinery
Fashion
Medical devices
Services
Other:

3.2 Can you provide an indication on how widely ecodesign is known among your members?
- Widely known
- Scarcely known

3.3 Can you evaluate the importance of ecodesign for companies and education (design and engineering) in your region/country?
- Low
- Middle
- High

3.4 Who should use the Learning Factory EcoDesign (multiple answers possible)?
- Ecodesign experts
- Motivated beginner

4. Tools and methods of ecodesign

4.1 Which existing ecodesign methods/tools shall be taught within the Learning Factory EcoDesign (multiple answers possible)? (Where do you see gaps in know-how of the audience/target group in your country/region)
- Environmental impact assessment methods (Life cycle assessment (LCA), Material flow analysis (MFA), Life-cycle costing (LCC))
- Ecodesign principles (Design for: recycling, refurbishment, repair, re-use, dismantleability, longevity, optimized material use, maintenance)
- Simple methods/guidelines how to develop circular economy business models and strategies
- Metrics how to assess the economic impact of ecodesign for business
- Choice of sustainable materials: Design rules and metrics for materials choice
- Information about which technical solutions are sustainable
4.2 Which current design methods shall be taught to professional designers, product developers and teachers within the Learning Factory EcoDesign (multiple answers possible)?

- User-centric design methods for ecodesign (Human centered design, service design, design thinking/strategic design)
- Tools/Methods to unlock creativity
- Life-cycle oriented system design
- Other:

4.3 Which forms of teaching shall be used (multiple answers possible)?

- Online video tutorials
- Classes (lectures and exercises)
- Participative workshops: Learning by doing (e.g. ecodesign sprint)
- Webinars
- Demonstration of ecodesigned products (best cases)
- Showcasing successful business cases
- Co-creation toolkits
- Visualization of material and energy flows in real manufacturing environment
- Other:

5. Participation

5.1 How can you actively contribute to the development of the learning factory? By … Engaging your network (members and partners) How?

Promoting ecodesign to increase the visibility and awareness in your network
How?

5.2 Do you like to receive more information about the learning factory in the future?

- Yes
- No

6. Further Information
6.1 Please name activities or tools and methods (projects, university courses, teaching content and information related to ecodesign, case studies, best practices) which address ecodesign or could contribute to the learning factory through providing know-how and insights?

<table>
<thead>
<tr>
<th>Name of activity or tools and methods</th>
<th>Name of Organisation / Institute responsible</th>
<th>Web link</th>
<th>Contact details</th>
<th>Comments</th>
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6.2 Please name Institutes, Universities, Organisations etc., which in your opinion may be interested in using the learning factory. Also think of potential users who may still have limited know-how on ecodesign.

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<tr>
<th>Name of Institute, University, Organisation etc.</th>
<th>Contact details</th>
<th>Already involved in ecodesign issues</th>
<th>Might be interested in the Learning Factory for EcoDesign</th>
<th>May contribute to the Learning Factory of EcoDesign</th>
<th>Comments</th>
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6.3 Please mark one of the two pictures below which fits best to the perception of ecodesign in your sectors / industries?
ANNEX III  Survey of potential participants

Have you heard of ecodesign?

☐ Yes
☐ No
☐ I don't know

How high is your interest in learning how to ecodesign products and services?

☐ 1 low
☐ 2
☐ 3
☐ 4 high

How high is your experience in ecodesigning products and services?

Ecodesign is a systematic and comprehensive creative approach to products and services, employing improved product and service-design to minimize their environmental impact across the entire lifecycle.

☐ High, I use this approach in my daily work
☐ Middle, I use the approach occasionally
☐ Some experience
☐ No experience
☐ I don't know

Do you know where to find relevant information about ecodesign tools and methods?

☐ If yes, please specify your sources (website, literature, ...)?
☐ No
☐ Not interested

Do you use any ecodesign tools?

☐ Yes, which one/s? 
☐ No
☐ I don't know

From your point of view, what are the three main goals of ecodesign?

Up to three choices possible

☐ Making products more durable and serviceable
☐ Increasing the use of renewable and recyclable materials
☐ Decreasing the environmental impact of products and services
☐ Establishing recycle and/or take-back programs
☐ Satisfying end-users expectations
☐ Fulfilling environmental legislations and standards
☐ Creating new business areas (new services, new products)
☐ Improving competitiveness
☐ Fostering innovation
☐ Improving the image of brands and companies
☐ Developing more sustainable business models
☐ Greening the economy
What would you say are the three main barriers for businesses to embrace ecodesign?
*Up to three answers possible*
- It may not be financially viable
- The concept is not widely known
- It lacks know-how and experience how to ecodesign in praxis
- The benefit is not clear enough
- The lack of market demand
- The lack of finance
- The lack of public support
- Difficulty to integrate partners along the value chain (e.g. suppliers or recyclers)
- Does not fit to current business model(s)
- Other
- I don't know

What would you like to learn about ecodesign?
*Up to three answers possible*
- Environmental impact assessment methods (e.g. carbon foot printing)
- Circular economy business models methods and guidelines
- Ecodesign principles and strategies
- Key performance indicators to assess the economic impact of ecodesign
- Information about sustainable materials
- Legal/regulatory requirements
- Life-cycle-oriented system design
- Human-centered design methods for ecodesign
- Other
- Nothing - no interest

In which way would you like to learn how to ecodesign products and services?
*Up to 2 choices possible*
- Demonstration of good examples
- Lectures and exercises on ecodesign
- Using ecodesign tools and methods in a participative workshop to work on given generalizable case study
- Using ecodesign tools and methods in a participative workshop to work on your own challenge
- Demonstration of material and energy flows in real manufacturing environment
- I like to teach it myself (websites, video-tutorials, literature, ...)
- Other
- I don't know

Please describe in a few words an ecodesign challenge you like to solve.
In which country are you based?

Are you...

- Employed?
- Self-employed?
- Student?
- Seeking employment?
- Other

Sector/products with which you are mainly dealing professionally

*Up to three answers possible*

- Consumer electronics
- Energy generation
- Foodstuffs
- Furniture
- Houseware
- Media
- Textiles
- Vehicles
- Sports goods
- Domestic appliances
- Machinery
- Construction materials
- Toys
- Other

In which area are you working?

*Selection of up to 2 areas possible*

- Design
- Engineering
- Management
- Academics
- Teaching/Training
- Marketing/Communication
- Art
- Sales/Trade
- Other

Do you have any further comments, recommendations, ideas or expectations? Let us know!
Would you be interested in receiving more information about the project EcoDesign Circle in the future?

Please note that by entering your e-mail address you consent that we collect, store and use your e-mail address in order to inform you about the project. We will not pass your e-mail address to third parties and we will not personalize your entries. You can revoke our right to store and use your e-mail address any time by sending an e-mail to max.marwede@izm.fraunhofer.de.

☐ Yes, please contact me via this e-mail address:
☐ No

End of the survey

Thank you for your participation.
ANNEX IV  Invitation letter

Dear Ladies and Gentlemen,

we would like to invite you cordially to the pilot workshop Learning Factory EcoDesign. The workshop will take place on the XXXX of YYYYY in ZZZZ (starting on DD.MM.YYYY at TT am/pm and ending on DD.MM.YYYY at TT pm).

The Learning Factory EcoDesign targets working product designers and developers, engineers, teachers, design lecturers, start-ups, SMEs, business model developers— in general, actors who are interested in learning how to adopt ecodesign practices and profit from the opportunities arising around the Circular Economy.

What can you expect? During the training, you will go through an Ecodesign Sprint. The Ecodesign Sprint is a process that marries the best of user-centered innovation and design thinking with sustainable design practices. You will learn in an interactive and productive hands-on workshop how to create MHP’s Minimum Harmful Products and Services and drive sustainability led innovation in practice. Teaming up with the other participants of various professional backgrounds, you will analyze user needs, formulate a design challenge, and develop your own ideas for solutions, and prototype a circular system around your product as well as a suitable business model. You will deal with questions like: "What are the users’ needs?", "How can the product be repaired or reused?", “Which services can I offer around my product?”, “What are suitable Circular Economy business models?”, “Which partners do I need to close the loop?” and "How can I minimize the environmental footprint during the life-cycle of my product?” However, goal of the training is not to develop the perfect solution but to understand the design process for circular systems and to get to know the tools you can use in your own business to make a step towards the Circular Economy.

If you are interested in joining, please apply here [LINK]; the number of attendees is limited. By DD.MM.YYYY we will let you know whether you can participate. Your data will be treated as confidential and will not be passed on to third parties.

In case of any questions, feel free to get in contact with ZZZZ, phone number, e-mail address

Best regards

NNNNNNN
ANNEX V  Process of finding the best tools and methods

We collected and screened many ecodesign tools and methods. We clustered them into similar topics and selected methods that fitted best to our workshop concept (practical, learning by doing, design-thinking process). Then we ordered the methods along the design-thinking process (discover, define, develop, deliver) and finalized the workshop flow (see Figure 7).

Find clarity and reduce uncertainty

Figure 7: From chaos to order
ANNEX VI Application form

Personal data

First name: 

Last name: 

E-Mail: 

Organisation: 

Position: 

Gender

☐ Female

☐ Male

☐ X

What is your background (studies, profession)?

Selection of up to 2 areas possible. Please specify if you like.

☐ Design

☐ Engineering

☐ Economics

☐ Natural sciences

☐ Social sciences

☐ Other

Please, briefly explain why you would like to participate.

Your interest, your motivation? Is there a current need for transforming your business to Circular Economy? Is there an Ecodesign Challenge you like to solve?


End of the survey.

Thank you for your participation.
## ANNEX VII  Marketing Plan

Table 1: Marketing plan

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