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# 01

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## **Development of a Design Management Guide for the Use of Design and Design Management within Corporate R&D and Decision-Making Processes**

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Keywords	↳ SME ↳ decision making ↳ design management ↳ design management guide ↳ design integration ↳ design staircase ↳ design support ↳ innovation
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*In 2005, the Cox-Review [Cox 2005] identified barriers to innovation as well as obstacles to the use of design for Small and Medium-sized Enterprises (SMEs). It proposed design support to help companies use design in order to strengthen their innovation capabilities and competitiveness. Current design support focuses on design projects, advice or endorsements. Recent proposals favour a more strategic approach [Boult 2006]. They suggest providing the thinking tools for integrating design into strategic R&D and decision-making processes, which requires framing design at the level of design management.*

*However, research shows that current design support tools and methods are not sufficiently suited for supporting companies to adopt design on a managerial level. Tools and methods are either too general (e. g. SWOT analysis) or limited to a certain phase of an adoption process [e. g. auditing design capability, Design Atlas 2000]; they support rather specific areas and target groups (e. g. entrepreneurs, new product and service development) or are proprietary [e. g. "Matchbox", Design Council and*

*Engine Creative Consultants Ltd. 2006]. Furthermore, they do not connect with specific implicit or explicit concepts of design that guide design decisions. According to the maturity scale model of the Danish Design Centre, these concepts can be mapped onto design maturity scales, ranging from non-design to design as styling, design as process and to design as innovation [Design Staircase® 2001].*

*Design support should help companies adopt design in relation to their actual understanding and practice of design. Therefore it seems reasonable to develop a guide for the integration of design and design management according to maturity levels. The method is to put design-related questions of the participating firms at the beginning of the research process and to help these firms develop individual implementation scenarios that fit their specific situations. These scenarios then contribute to the development of a Design Management guide (DM-guide), using the maturity scale model as a structuring method. The outcome is a visual orientation device. Similar to a map, it offers routes and success factors that enable the adoption of design and design management. Further research should test the DM-guide and refine it. This will be done through "Swiss Design Transfer", a University spin-off and private public partnership.*

## 1. Framing the Context: Innovation System of Central Switzerland

Central Switzerland is home of many SMEs. The project "RISforCCH" [Wolf, Schweikert, Küchler, Stössel 2005], undertaken by Lucerne University of Applied Sciences and Arts – School of Business, identified typical patterns of innovation capability. While the majority of the most innovative SMEs give recognition to aspects of design management in their innovation processes, most of the others do not pay attention to factors relevant to design management, e. g. the early inclusion of all relevant stakeholders in the product development process, and appreciation for creativity and innovation capabilities of all members of the company. Projects such as "RISforCCH" are aimed at increasing the innovativeness of regional SMEs by either intensifying cooperation with the University or with all the relevant actors of the regional innovation system.

A recent research project on design management undertaken by Lucerne University of Applied Sciences and Art – School of Art and Design, revealed the necessity of design support within the regional innovation system [Acklin, Stalder, Wolf 2006].

## 2. Identifying the Gap: Facilitating Design Integration

Insights on current design support modi, trends in design support policies, the limitations of current tools, and further insight that existing tools do not relate to design maturity scales, reveal a gap in tool-innovation. Therefore the envisaged DM-guide should fulfil the objective of supporting SMEs to raise their design maturity level by helping them assess their design capability and recommending specific steps towards realizing the full potential of design integration at their current or next level.

## 3. Research Plan: Goals, Process and Methods

### 3.1 Research Consortium

The research consortium consists of the core research team (a professor, a lecturer, a graphic designer and an assistant from the School of Art and Design) and an extended research team (a professor and a researcher from the School of Business). Six SMEs are participating in the research project. Their profile regarding the use of design can be mapped on a continuum ranging from very little design to an advanced use of design. All research partners are manufacturing companies.

### 3.2 Economic Goals

The economic goal of the research project is to strengthen the innovation capabilities of each participating SME through design management in order to achieve a sustained increase in competitiveness and profitability. The project does not aim to establish a direct cause-impact relationship in monetary terms. However it is argued that measurability can be assumed if the process resulting from the project leads to sustained change at the levels of strategy, brand, culture/identity, product or process.

Based on this general goal, the SMEs each work towards their own individual goals, which emanate from specific questions related to five areas as provided by the Design Atlas audit tool that are to be improved by means of design and design management.

### 3.3 Scientific Goals

The project aims at developing a guide that can be used by SMEs regardless of economic sector and size. The research consortium will collaboratively work out individual design integration scenarios based on individual situations and questions of the participating SMEs. It will also analyze individual corporate contexts in order to find patterns, leading to a generalization of design integration scenarios to be used for the formulation of the DM-guide.

### 3.4 Process

The development of the DM-guide follows a 3-step process that employs a variety of formats and methods. [Fig. 1 ↪ 34]

### 3.5 Methods

In phases 1 and 2 of the research process, methods widely adopted within consulting settings were used, such as audits, interviews, workshops and observations. Three tools were selected on the basis of being helpful to frame a design-related context and to stimulate interaction between the research team and the companies' senior management teams:

- The Design Staircase® from the Danish Design Centre  
[Design Staircase 2001]
- The Design Atlas from the British Design Council  
[Design Atlas 2000]
- The Design Management Framework (DM-Framework) from the Design Management International program at Lucerne University of Applied Sciences and Arts – School of Art and Design  
[Acklin 2007]

#### 3.5.1 Design Staircase

“In 2001, the Danish Design Centre developed the Design Staircase® to measure the companies' use of design. The basic notion of the Design Staircase® is that companies may work with design on several

levels or steps, depending on circumstances. Higher positions on the Design Staircase® are correlated with positive effects on gross result growth as well as distinct positive effects on export ratios” [Design Staircase 2001].

#### 3.5.2 Design Atlas

The Design Atlas of the British Design Council is a tool for auditing design capability within an organization. It consists of a set of questions revolving around the following areas: planning for design, processes for design, resources for design, people for design and culture for design. [Fig. 2 ↪ 34]

#### 3.5.3 DM-Framework

The DM-Framework was developed as an organizing agenda for the Bachelor course Design Management, International at Lucerne University of Applied Sciences and Arts – School of Art and Design. It has been used during research phases 1 and 2 and as a means to map the scenarios of design integration. The framework outlines three major areas of design impact or three major ways of implementing design and design management in a company.

## 4. Research Partners: Portraits and Questions

In order to illustrate the processes and results of research phases 1 and 2, two of the six companies are portrayed, and their questions regarding an improved use of design are outlined. Of these two companies, company A is the most design-driven and company B is the least design-oriented company of the participating SMEs.

Company A:

Company A is a leading producer of stoves, chimney stoves, electric mock fires, garden fireplaces, etc. Two partners founded it 25 years ago as an importing firm. Today company A owns production facilities in Scandinavia with an overall staff of 150 employees. Its main markets are Switzerland, Denmark, Norway, the Netherlands and France, followed by Belgium, Austria and the US. Company A has been successful so far due to highly innovative products combined with a consistent marketing and sales strategy. Design makes use of

a distinctive design language and has always been part of the firm's business strategy and a means to differentiate itself from its competitors. The company's fireplaces have earned design awards in Germany and in the USA.

Company B:

Company B is a leading manufacturer of measuring devices for compression, temperature and power. It employs roughly 200 people. The firm is a subsidiary of a German manufacturing group, but due to its history and its size it operates, to a large part, independently. Its clients are in the chemical, machinery, aviation and medicine industries all over the world. Most of the company's products are for OEM markets, although it is also developing its own product ranges. The company has implemented a Kaizen process (continuous improvement process). Currently it is undertaking a cultural change from an engineering-driven manufacturing focus towards increasing customer orientation. Due to its OEM focus, the design of its products is engineering driven and standardized. Only recently the firm, in its quest to develop new non-OEM product ranges, identified design as a source of value creation, and currently is sourcing external design competency. [Fig. 3 ↪ 34]

## 5. Results Phase 1: Current use of Design

In phase 1 the current use of design of each company has been analyzed. This resulted in a design integration profile for each company based on the Design Atlas framework, and in a design maturity level based on the Design Staircase®.

### 5.1 Design Integration

The current design integration profiles of the two companies are informed by interviews with corporate management, the Design Atlas audit results and subsequent discussions held during the first workshops.

The profiles of companies A and B reflect differences in the use of design, with company A exhibiting the most prominent design use and company B the least out of all six participating companies.

## 5.2 Design Maturity

The current design maturity levels of the two companies are informed by interviews with corporate management, the Design Atlas audit results and subsequent discussions held during the first workshops. Arrows and elaborations indicate the processes of change for companies A and B from their current position towards attaining a higher position by means of individual design integration scenarios.

[Fig. 4 ↪ 35]

Design is already an integral part of the company's corporate culture, new product development, strategic planning, etc. However, the company sees a number of improvements in how its core values, design philosophy and the most basic elements of its product language could be better communicated to its staff. The Idea discovery and generation phase of the design process is another subject that could be better communicated internally in order to make staff better understand where and how ideas and product concepts emerge.

[Fig. 5 ↪ 35]

Design is not yet an integral part of the company's mindset. However, the company is interested in the potential of design as a product differentiator and is engaged in explorative studies. It sees that a product language (level 2) needs to be developed and coordinated. It also understands that in order to do so beyond a pilot project, a design process (level 3) needs to be implemented alongside the engineering process.

## 6. Results Phase 2: Design Integration Scenarios

In phase 2 scenarios for design integration for all companies have been developed. This resulted in a plan for the implementation of improved ways of using design. [Fig. 6 ↪ 35]

### 6.1 Design Integration Scenario for Company A

Process:

At the beginning of the process, the team from company A worked on making its current design philosophy, which is expressed in all its

products, spaces and communication, explicit by means of verbal statements. It engaged in making the principles of product design visually explicit by means of structured “mood boards” that link sources of inspiration (taken from architecture, art and product design) to current product lines. It also engaged in translating its current ISO-based development process model into a process diagram that additionally displays relevant stakeholders and aims at making the process more transparent. The research team supplied both mood boards structure and process diagram.

This work proved to be a valuable process for the team from company A. By consciously going to the roots of the firm and its design philosophy the team became aware of what implicitly drives all designed expressions from the company. However, mood board structure and process diagram provoked discussions about their overall usefulness. Time beyond the research project's timeframe will have to show whether communicating the company's design philosophy and new product development process can strengthen corporate culture and staff's identification with it. [Fig. 7 ↪ 35]

## 6.2 Design Integration Scenario for Company B

Process:

At the beginning of the process, the research team worked with the management team on a future state regarding product design and its integration with engineering and marketing. The management team engaged in transferring aspects of their corporate vision into drafts for a design philosophy and a design strategy. The company also showed product design explorations that allowed the research team to get a glimpse of a current project. The research team helped in formulating a rough design briefing aimed at channelling product design studies.

Collaboration provoked major discussions throughout the process. They touched issues such as an aspiration for more explicit product design, scepticism about its overall need and usefulness, and bottom-up, uncoordinated action demonstrated with older products and upcoming packaging design concepts.

The overall process turned out to actually be very, if not too demanding and challenging on several levels. The research team identified limitations in using plain language to advance the idea of how management and design could be successfully linked, despite the use of case studies that showed the relationships between design philosophy, strategy and product language. Another challenge emerged with regard to team dynamics and the risk of abandoning the project.

At the end of the project, the company presented a new product to be launched in fall 2008, for which the company for the first time had sourced design skills from a design studio (product language) and from an advertising agency (packaging). The company plans to strategically use unique selling propositions based on engineering and design in order to beat a specific competitor.

### 6.3 Comparison and Discussion

Comparing profiles and scenarios of design integration from company A and company B aims at clarifying success factors for the successful use of design. Regarding maturity levels on the Design Staircase® model, company A has been positioned on level 3, company B on level 1(2). Regarding the current use of design, significant differences between the two firms exist as becomes clear by comparing their profiles in the spider diagram below. [Fig. 8 ↪ 36]

The comparison makes evident that company A makes use of a number of critical success factors, which company B does not. Each of these success factors has a specific potential to leverage design capability, and by doing so to transform the business and maybe the future of a company.

These success factors can be summed up as follows:

- Include a design champion on the level of top management and create a design management function that has direct access to the decision-making processes of top management.
- Formulate a design philosophy as part of the mission or vision of the company, which then informs a design strategy and a consistent design language for all products and services.
- Implement processes for design such as the coordination of all

internal stakeholders who make design contributions to strategy/brand, culture/identity, and product/service.

- Alter the “typical” process of improving products towards an innovation process that is complemented by a design-based innovation process.
- Allocate budgets, time and people to projects and establish adequate measurement tools. Start with pilot projects prior to company-wide implementation.
- Include design competency into all design-relevant business activities either through internal designers or through cooperation with an external design service provider.
- Create and foster a climate of innovation and creativity within the company and use every opportunity to communicate the strength of design as a strategic resource.

## 7. Conceptualizing the DM-Guide: From Concept to Beta-Prototype

### 7.1 Objectives

As stated above, the DM-guide should support SMEs to raise their design maturity level by helping them assess their design maturity and by finding specific ways towards realizing their full potential at their current or next higher level. Based on these objectives the research team decided that the underlying concept of the DM-guide should be based on the Design Staircase®.

### 7.2 Conceptual Model

The conceptual model of the DM-guide relates the four basic perspectives to each other. Levels and goals are related to the current situation and goal setting on a horizontal axis (assessing design maturity: current and future). On a vertical level, triggers are related to success factors representing an operational relationship (finding ways to improve design integration). The conceptual model uses the four perspectives as its basic building blocks and entry points in order to understand the guide and to be able to use it in the intended way. [Fig. 9 ↪ 36]

### 1. Levels

Levels correspond to the design maturity levels of the Design Staircase®:

- Companies that do not use design
- Companies that use design for style or appearance
- Companies that integrate design into the development process
- Companies that consider design as a key strategic element

### 2. Triggers

Triggers are factors arising from environmental spheres and stakeholders. Depending on a company's sector or main focus they may push SMEs to make greater and more effective use of design. The following triggers cover a broad enough field for the purpose of the DM-guide:

- Triggers from the economic sphere: new economic goals set; new companies or business units founded
- Triggers from the technology sphere: new materials invented; new technologies developed
- Triggers from the society sphere: new values of customers; new competitors and markets
- Triggers from the state as stakeholder: new laws implemented; new industrial norms set

### 3. Goals

Goals are business objectives that respond to challenges and triggers. They are desirable future states. For the purpose of the DM-guide they are framed in terms of design categories such as products, services, corporate design, marketing communication, brand management, and in terms of using design categories towards increased visibility, greater strategic orientation, better integration, increased differentiation, improved new product planning and innovativeness.

### 4. Success factors

Success factors are internal levers with the potential to trigger the dynamics of change inside a company. The list of success factors follows the categories of the Design Atlas, but however with some modifications:

- Design Planning: design leadership in support of corporate decision-making
- Design Philosophy: design philosophy, design strategy and design language
- Design Resources: budgets, time, manpower and controlling tools
- Design Coordination: management and coordination of all internal stakeholders
- Design Process: design-based research and innovation processes
- Design Competency: skills and knowledge for design-relevant business activities
- Design Culture: climate of innovation and creativity for the whole organization

### 7.3 Concept Development, Visualization and Prototyping

Based on the conceptual model, the research team engaged in a five-step process that led to a beta-prototype.

#### Step 1:

In the initial phase, three different visual metaphors (suitable for both intended users, i. e. senior management of SMEs, and intended use, i. e. a pragmatic way to approach design-related questions) were presented to and discussed with four company teams: the Matrix; the Map; and the Staircase.

Main insights touched on the issues of hierarchy and usability. It was mentioned that the metaphor should not imply that design maturity levels are a question of hierarchy, but are legitimate states of being. It was also said that the metaphor should not be too abstract, but make a connection with something familiar. Overall the metaphor of the map was clearly favoured by all companies. [Fig. 10 ↪ 37]

#### Step 2:

In the next step the research team designed a travel guide using graphic design, storytelling, game design and further visual differentiation of the initial metaphor to create an archipelago, displaying islands, routes between islands and resources on the islands.

#### Step 3:

Next the research team did both behavioural and appearance prototyping with experts, i. e. representatives from the School of Business. Main insights touched on understanding the rules of the game/guide, identification with one of the four levels/islands, understanding the success factors, appraisal of language, and comprehensibility of some of the visual elements. Feedbacks also included questions of function, structure and properties.

#### Step 4:

In the next step, the research team used a revised version of the prototype and did behavioural and appearance prototyping together with all company teams (1–3 representatives each) in a focus group like format. Prototyping included specific questions on concept and appearance.

This final prototyping session with all company teams produced an overall positive response. All companies understood the metaphor and could find "their island". However, a difference was found with respect to getting started (e. g. the least experienced company in terms of design had more difficulties than the most experienced one). Prototyping also revealed that the guide itself is a good thinking tool, but does not suggest detailed means or tips on how to implement design projects or a design management function.

#### Step 5:

In a final step, the research team did another refinement of appearance and visualization issues based on insights from the final prototyping session. The result led to the design of a beta-prototype.

### 7.4 Beta-Prototype

Through designing and prototyping, the initial conceptual model was translated into an easy to understand, easy to use, visually attractive orientation device, named "Design Management Travel Guide" ("Ihr Design Management Reiseführer"). The result was achieved by using designed means such as visual and narrative metaphors, characters from storytelling and rules from game design. The basic underlying metaphor comes from the field of cartography, displaying a sea

map of a fictitious archipelago of four islands. Each represented a specific degree of design maturity (levels), with routes departing from one island and arriving at the other where one could find and learn more about the resources (success factors) necessary for achieving an improved way of design integration (goals), and with a wind rose representing challenges and winds of change (triggers) for all islands of the archipelago. [Fig. 11 ↪ 37]

A set of rules explains how to use the map: to look for the island, which represents the company's situation best, to identify the triggers that might ask for a different way of design integration, to choose between routes to get to the next island and find the success factors necessary to achieve the company's goals. On each island a typical inhabitant (character) represents a specific form of design integration (or design awareness), welcomes travellers and explains some of the success factors treasured on the island.

## 8. Conclusions

Although the consortium perceived the process of design integration scenario development and the results of the project as successful, the research team made two main observations:

1. The topic of design (and with that the project itself) often was an object at risk due to pressures and challenges from daily business. Three companies engaged in pilot projects for which they sourced design skills in order to create "good practices", in the hope of stating the case of successful design use to a (sceptical) senior management. Time will tell whether the design integration scenarios will actually be implemented and bear fruit in terms of business success and higher design awareness on the level of company decision-making.
2. Most companies expressed the intention to innovate, but they either did not understand what the contribution of design to innovation is, or they lacked some of the fundamental processes, methods and knowledge in order to make it a reality. It was only with one company that the innovation management process was revised and design was included at crucial points of the process.

The DM-guide proved to be easy to use for all companies, whether they performed on levels 1–2 or 3–4; it was able to trigger awareness, discussions and even plans of what should be done next in the company. Interestingly enough, the most design-led company was as much able to draw conclusions from the work with the DM-guide as the least design-led one. It was stated that the implementation of design and design management (and the fostering of innovativeness of a company) is a continuous iterative process of (self-) development. It was also said, that at the moment the guide might not yet speak for itself.

Further tests with companies, for which the subjects of design and design management will be novel, will tell whether the DM-guide needs a supportive and explanatory context such as, for example, workshop formats or media. New research aimed at improving the guide will focus on describing the relationship between design and innovation as well as between design management and innovation management in more detail and on bringing innovation processes and design processes closer together.

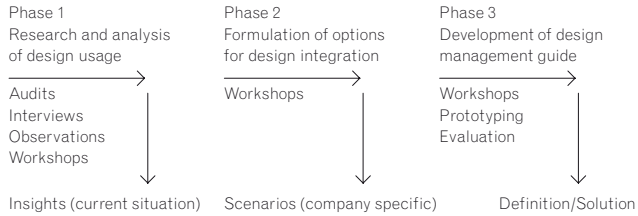


Fig. 1: Research process, main methods and results. I → 22

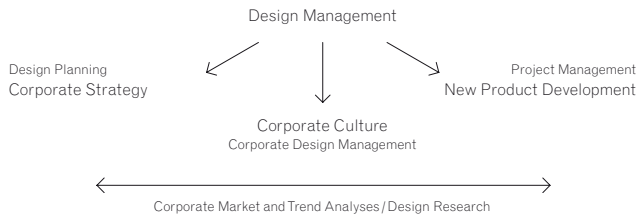


Fig. 2: DM-Framework (Acklin 2007). I → 23

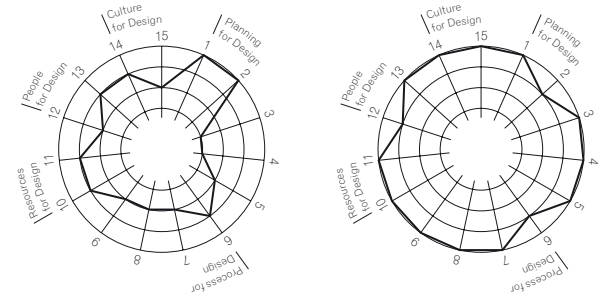


Fig. 3: Company profiles of design integration. (Company A and B) I → 24

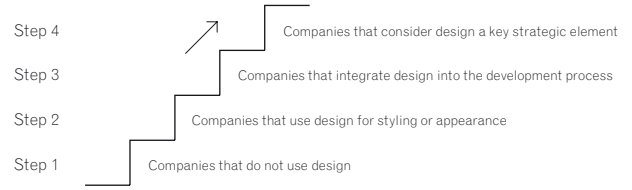


Fig. 4: Design staircase for company A. I → 25

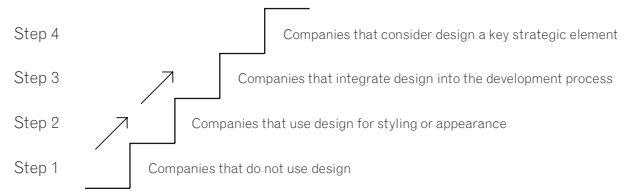


Fig. 5: Design staircase for company B. I → 25

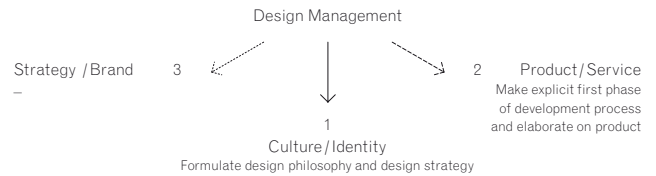


Fig. 6: Design integration scenario for company A. I → 25

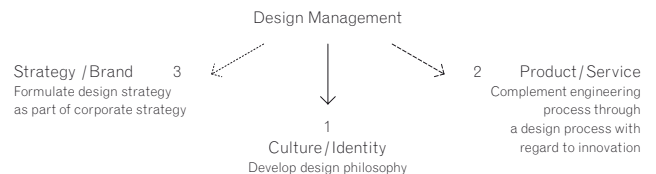
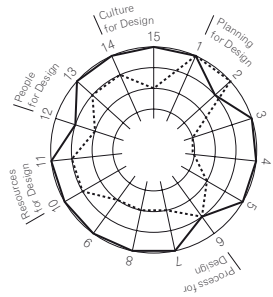


Fig. 7: Design integration scenario for company B. I → 26



- Company A    ···· Company B
- 1 General planning awareness
- 2 General planning communication
- 3 Design planning awareness
- 4 Design planning thinking
- 5 Design planning horizons
- 6 General process awareness
- 7 Design process awareness
- 8 Design process management
- 9 Design process tools
- 10 General resource allocation
- 11 Design resource allocation
- 12 Design skills
- 13 Design organisation
- 14 Design commitment
- 15 Design attitudes

Fig. 8: Comparison of design integration scenarios between company A and company B. I→ 27

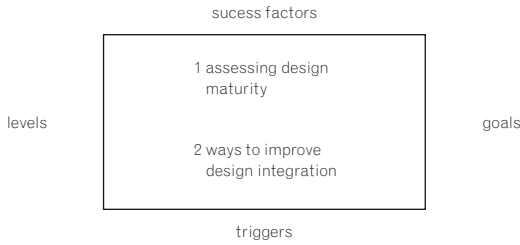


Fig. 9: Conceptual model of the DM-guide. I→ 28

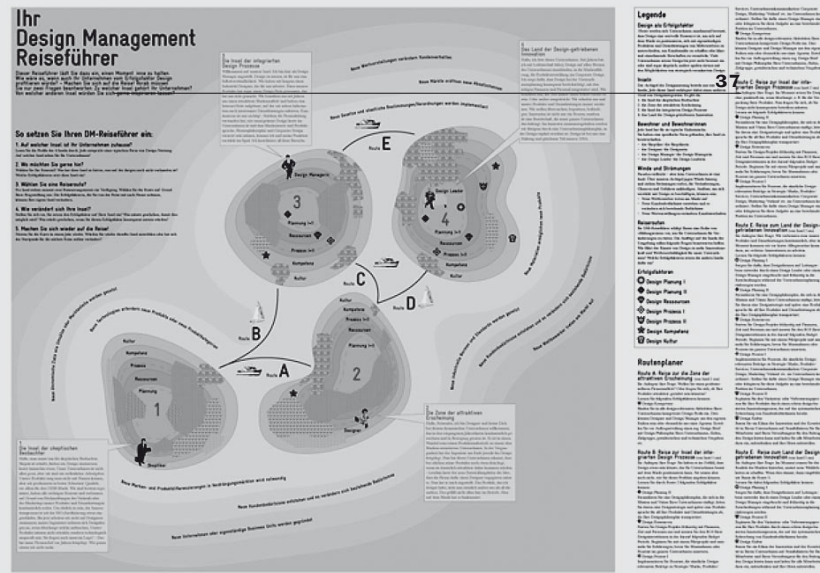
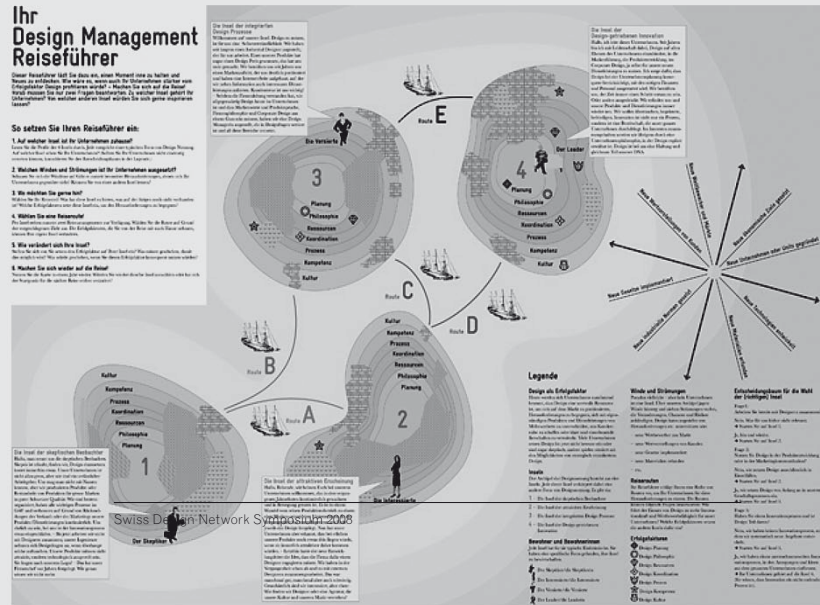


Fig. 10: Concept and visualization. I→ 30    Fig. 11: Beta-prototype. I→ 32



**Note**

This paper is an abridged version of the original project paper.

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