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Design-Driven Innovation Process Model

by Claudia Acklin

According to the Cox Review (2005), various internal and external factors both advance and hinder the innovation capabilities of small and medium-sized

enterprises (SMEs). Regarding the use of creative talent and innovation capabilities, the report mentions the following obstacles: lack of awareness and experience; lack of belief in the value of, or confidence in, the outcome; not knowing where to turn for specialized help; limited ambition or appetite for risk; and too many other pressures on the business. Regarding the use of design, the report mentions the following obstacles: cost, lack of in-house design or creative skills,

lack of customer demand, manufacturing or development issues, lack of access to external designers or creative skills, regulatory issues/government bureaucracy, and design not being considered as important.

On the other hand, an earlier study (Bougrain and Haudeville, 2002) comes to the conclusion that the presence of in-house design teams enables companies to absorb know-how from industrial networks of the regional innovation systems more quickly. So there is a correla-

tion between design and the innovation capabilities of a firm.

Two applied research projects in Central Switzerland aimed at introducing design and design management to 11 SMEs with little or no design experience. After assessing current use of design in each of the SMEs and introducing them to design's potential benefits, researchers worked with the companies' project teams to develop specific design strategies and innovation projects. These ranged from

improving customer experiences through optimizing Web sites and other touchpoints to developing design guidelines for the product language of such items as pressure and temperature measurement devices or for the corporate identity of a business-to-business (B2B) company entering the business-to-consumer (B2C) market.

During theory building within these two projects, we explored the contribution of design research, design leadership, and design management to a generic innovation management model. In a second step, we developed a design-driven innovation process model featuring six phases: impulse, research, development, strategy, implementation, and evolution. Our model is integrative, multidisciplinary, and permeable in order to meet the needs of SMEs for easy implementation and cost and risk reduction.

Past and current projects in Central Switzerland

Central Switzerland is home to many SMEs that face all of the above-mentioned obstacles. A project undertaken by the Lucerne School of Business Administration (Wolf, Schweikert, Küchler, and Stössel, 2005) 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 other SMEs overlook factors relevant to design management, for example, the early inclusion of all relevant stakeholders in the product development process.

Two projects (Acklin and Hugentobler, 2008; one ongoing) undertaken by the Lucerne School of Art and Design investigated the state of design integration in 11 SMEs in Central Switzerland. These projects were aimed at increasing the innovativeness of regional SMEs by intensifying cooperation either with the university or with other relevant actors in the regional innovation system. Of special interest to the researcher were companies with little or no know-how in applying design and design management to their research and development (R&D) activities and their innovation planning. Within those SMEs the potential of using design as an aid to improve the so-called bottom line is especially high.

The main findings from these two applied research projects referring to the integration of design and design management and to their innovation capabilities are:

- *Design integration.* All the companies did have a basic understanding of design as a means to improve the functionality and ergonomics of products beyond making them look more beautiful. However, few companies considered design as a strategic

resource to improve company positioning or the relationship with the customer. Designers were rarely involved in the product development processes; they were used on an ad hoc basis, mostly for the development of corporate communication materials. Furthermore, the culture of companies with little or no design know-how—for example, technology-led SMEs—tended to be goal oriented and favored a decision-making attitude with a strong focus on effectiveness and efficiency. In these companies, design appeared to be a “nice-to-have” rather than a “must-have” factor in the development process.

- *Innovation.* Most of these companies lacked adequate resources (space, time, people, money) for innovation. In some of these firms, innovation processes did not exist, mainly because they were in the original equipment manufacturing business and had not been exposed to the consumer market. However, some of them had considered entering the B2C market to become more independent from their B2B customers. In some cases designers were part of the staff, but the companies were lacking the preconditions for more radical innovation because the boundaries of new product development and innovation

A basic understanding and acceptance of design and design management need to be established in a company (sensitization); second, design methods need to be introduced and practiced within a specific problem area or pilot project (application); and third, design management has to be implemented in a sustainable way into the processes of the company (implementation).

processes were blurred together, causing incremental improvements of products to be mistaken for (game-changing) innovation. This was not helped by the fact that a clear innovation strategy was often missing.

- *Implementation.* Many of the projects undertaken by the 11 companies were postponed or even shelved at some point in the process of collaboration with the researchers. The capability to carry an idea or an innovation project through to completion and to commercialization intending to achieve market success was often missing. Pressure from daily business and, more recently, concerns because of the financial crisis were pushing innovation projects into the background. This was magnified by the lack of a culture that sustained a climate for innovation.

The problem at stake

The challenges for the researchers in the above-mentioned projects

were and still are manifold: First, a basic understanding and acceptance of design and design management need to be established in a company (*sensitization*); second, design methods need to be introduced and practiced within a specific problem area or pilot project (*application*); and third, design management has to be implemented in a sustainable way into the processes of the company (*implementation*).

To overcome these challenges, we are building on the following assumption: If design or design management is not to be perceived by SMEs as something separate and unintelligible done by somebody else, models and tools need to (1) integrate well-known concepts of business sciences and processes that are already (at least partly) implemented in these companies and (2) be easy to use and understandable, for example, through using visualization or storytelling to support their application.

For the early phase of sensitization of SMEs, an easy-to-use, visually attractive orientation

device, the “Design Management Travel Guide,” was developed (see Figure 1).¹ With this guide, SMEs are able to assess their level of design integration and, with the support of a design consultant, come up with a basic design strategy to improve market positioning and customer focus. The guide was developed at the end of the first research project with the intention of validating it in a following project of similar scope. The guide was successfully tested with the next batch of SMEs: They were able to use it and to self-reliantly draw some conclusions about their then-current use of design.

1. The basic underlying metaphor comes from the field of cartography. It displays a sea map of a fictitious archipelago of four islands. Each represents a specific degree of design maturity (cf. the Danish Design Staircase, 2001), with routes departing from one island and arriving at the next, where one can find and learn more about the resources necessary for achieving improved design integration. A “wind rose” represents the challenges and winds of change for all islands of the archipelago. For more information, see Acklin and Hugentobler (2008).

Ihr Design Management Reiseführer

Dieser Reiseführer lädt Sie dazu ein, einen Moment inne zu halten und Neues zu entdecken. Wie wäre es, wenn auch Ihr Unternehmen stärker vom Erfolgsfaktor Design profitieren würde? – Machen Sie sich auf die Reise! Vorab müssen Sie nur zwei Fragen beantworten: Zu welcher Insel gehört Ihr Unternehmen? Von welcher anderen Insel würden Sie sich gerne inspirieren lassen?

So setzen Sie Ihren Reiseführer ein:

1. Auf welcher Insel ist Ihr Unternehmen zuhause?

Lesen Sie die Profile der 4 Inseln durch. Jede entspricht einer typischen Form von Design Nutzung. Auf welcher Insel sehen Sie Ihr Unternehmen? (Sollten Sie Ihr Unternehmen nicht eindeutig verorten können, konsultieren Sie den Entscheidungsbaum in der Legende.)

2. Welchen Winden und Strömungen ist Ihr Unternehmen ausgesetzt?

Schauen Sie sich die Windrose an! Gibt es zurzeit besondere Herausforderungen, denen sich Ihr Unternehmen gegenüber sieht? Könnten Sie von einer andern Insel lernen?

3. Wo möchten Sie gerne hin?

Wählen Sie Ihr Reiseziel! Was hat diese Insel zu bieten, was auf der ihrigen noch nicht vorhanden ist? Welche Erfolgsfaktoren setzt diese Insel ein, um den Herausforderungen zu begegnen?

4. Wählen Sie eine Reiseroute!

Pro Insel stehen zumeist zwei Reiscarrangements zur Verfügung. Wählen Sie die Route auf Grund der vorgeschlagenen Ziele aus. Die Erfolgsfaktoren, die Sie von der Reise mit nach Hause nehmen, können Ihre eigene Insel verändern.

5. Wie verändert sich Ihre Insel?

Stellen Sie sich vor, Sie setzen den Erfolgsfaktor auf Ihrer Insel ein? Was müsste geschehen, damit dies möglich wird? Was würde geschehen, wenn Sie diesen Erfolgsfaktor konsequent nutzen würden?

6. Machen Sie sich wieder auf die Reise!

Nutzen Sie die Karte in einem Jahr wieder. Würden Sie wieder dieselbe Insel auswählen oder hat sich der Startpunkt für die nächste Reise seither verändert?

Die Insel der integrierten Design Prozesse

Willkommen auf unserer Insel. Design zu nutzen, ist für uns eine Selbstverständlichkeit. Wir haben seit langem einen Industrial Designer angestellt, der für uns arbeitet. Eines unserer Produkte hat sogar einen Design Preis gewonnen, das hat uns stolz gemacht. Wir bemühen uns seit Jahren um einen Markenauftritt, der uns deutlich positioniert und haben eine Internet-Seite aufgebaut, auf der wir neben Information auch interessante Dienstleistungen anbieten. Kundentreue ist uns wichtig! – Seitdem die Firmenleitung verstanden hat, wie allgegenwärtig Design heute im Unternehmen ist und dass Markenwerte und Produktsprache, Firmenphilosophie und Corporate Design aus einem Guss sein müssen, haben wir einen Design Manager angestellt, der in Designfragen versiert ist und all diese Bereiche vernetzt.

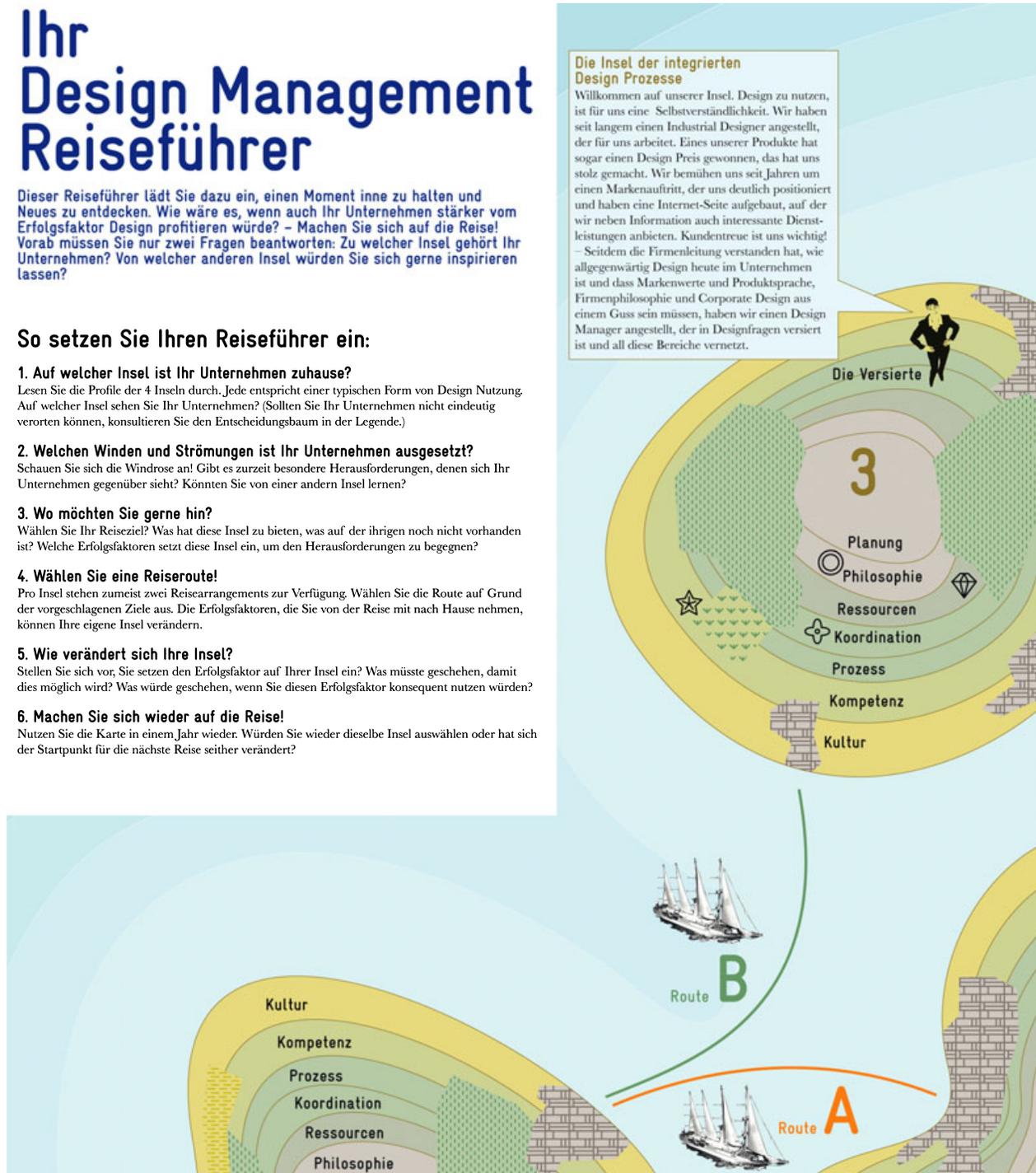


Figure 1. The “Design Management Travel Guide” is meant to help SMEs assess their level of design integration. A design consultant can help them come up with a basic design strategy to help the company with market positioning and customer focus.

To lower company barriers to the integration of design and design management during the *application* of design—for innovation projects, for example, or during implementation of new processes and procedures, classic innovation management models were adapted to include design thinking. (The term *design thinking*, as coined by Boland and Collopy [2004] or Brown [2008] is understood as the introduction of design methodology—for example, the design process—to companies and, in the long term, anchoring design in the company culture.)

In the following, we first discuss the contribution of design research, design management, and design leadership to innovation management. Second, we present a design-driven innovation management model that operates on the above-mentioned requirements of ease in understanding and familiarity with use.

Classic innovation management models

Many innovation management models—the stage-gate variety, for instance (Cooper, 1996; Cooper and Kleinschmidt, 1990), and the innovation funnel (Benkenstein, 1998)—do not mention the use of design explicitly. Industrial design is considered to be part of the company's R&D, or it is included in the conception phase. So the full potential of design methodology, such as design research methods in the early

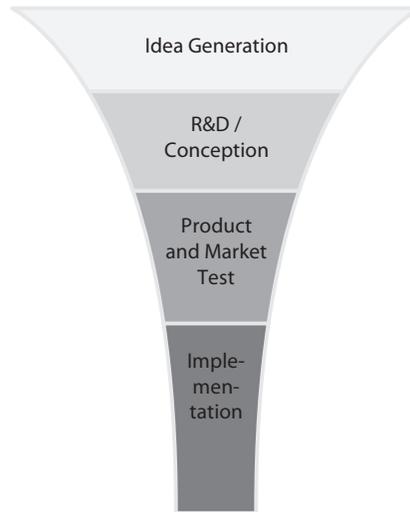


Figure 2. Innovation funnel according to Benkenstein (1998). The bigger the mouth of the funnel, the more ideas will be introduced into the R&D activities of the company.

stages or design management in the later phase of the commercialization of product development, remains untapped. Ulrich and Eppinger (1995) included design in the product development process but did not mention the contribution of design and design management to the so-called fuzzy front end or to the final product launch.

In the model displayed in Figure 2, idea generation is described as a funnel through which many ideas flow into the company. The bigger the mouth of the funnel, the more ideas will be introduced into the R&D activities of the company. During their flow through the funnel, ideas will be constantly tested; some will be discarded, and only a few will turn into full-fledged innovation projects. The resulting products will be

tested before they ever go on the market; their viability on the market will be considered both after conception and before their final implementation.

The funnel model depicts the innovation process like a tunnel with a bottleneck, from which only the strongest projects emerge; only the very beginning of the process is open to the full ecosystem of a company (i.e., its environment, including customers, suppliers, partners, and competitors). This model also leaves open the methods by which the funnel is “filled”; ideas essentially fall out of the sky and find their way into the funnel. It is our understanding that the early phase of innovation management—the fuzzy front end—is crucial to the later direction and result of an innovation project. This phase is also a stage at which the systematic and proactive buildup of customer insights is neglected, and consequently early ideas are often not connected to existing or latent customer needs.

For SMEs with few financial or human resources, the funnel model poses a few more problems. Very often the ideas are there, coming from R&D, marketing, sales, or senior management. But the company still has to digest a large number of ideas in order to select the most promising for further development, mostly without having the means to do initial market or user research beforehand. Essentially, SMEs tend to be risk averse because they have

few fallback positions, and therefore the early assessment of the ideas with the most market potential is vital to them in order to be able to use their financial resources parsimoniously. Another hurdle is the alignment of company processes needed to launch a new product or service and to follow up on subsequent customer experience issues. The new offering also carries with it questions that must be addressed regarding proper branding and communication strategies.

Contributions of design and design management to innovation management

Design and design management are able to make many contributions to innovation management, from the very beginning through to implementation on the market. In this paper, we have divided these contributions to innovation management into categories of *design*, *design research*, *design management*, and *design leadership*. All of these categories offer various activities, tools, methods, and processes to complement innovation management processes.

For instance, Turner and Topalian (2002) subdivided design management into two dimensions or fields of activity: design management and design leadership. Design management is considered reactive because it mainly manages the resources, time, people, and money necessary for design activities in a company; and design leadership is considered proactive in setting the agenda of an enterprise using design for competitive advantage and envisioning the future. We include a third dimension into our definition of design management: design thinking, which acts as a bridge between the reactive and the proactive notions of design management by establishing a sustainable culture for design in a company (Acklin, 2009).

Figure 3 places the above-mentioned aspects of *design*, *design research*, *design leadership*, and *design management* and its deliverables into a framework that connects them to the phases of a generic innovation management model.

In the early stages of idea generation and selection, the main contributors are *design leadership* and *design research*. Design-driven innovation management and the

alignment of projects to the identity and brand of a company are central tasks of *design leadership*. Design leadership also establishes the necessary structures and processes inside a company through which organizational learning and the observation of emerging market trends form the foundation for a future innovation strategy. A starting point of innovation projects can be the creative reframing of the problem the project sets out to solve; by reframing the problem and formulating a first hypothesis, new approaches and solutions beyond incremental changes become more feasible. The process of idea selection is accelerated as well.

First hypotheses will have to be researched in more depth in a triangulation of market, user, and technological research. *Design research* provides insights into (latent) customer needs through the use of ethnographic research or the research of contexts in which product and services are being used. During concept development, further research phases can deepen the understanding of customer behavior, use of the new product or service through user testing, and so on.

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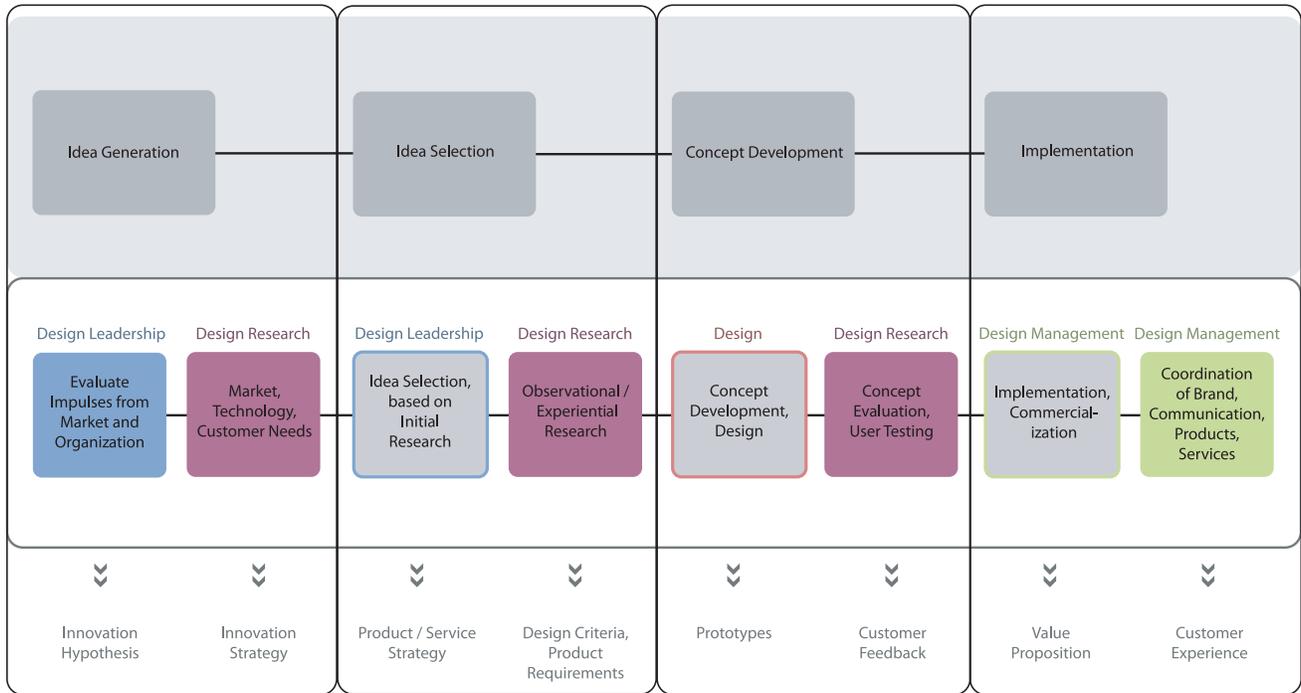


Figure 3. Contributions of design and design management to innovation management and its deliverables.

Finally, design management is an activity that is helpful for the implementation of innovation projects inside the company as well as connecting management functions and processes and connecting philosophy with strategy and delivery. Design management will also, by operating as a coordinator, design a coherent customer experience for the new product or service at all customer touchpoints.

Design-driven innovation management model

For SMEs with processes that are often flat and sometimes less standardized compared to structures

and processes of large organizations, we propose to intertwine strategy building, innovation management, and design management into a process that includes the six stages defined in our design-driven innovation management model (see Figure 4): impulse, research, development, strategy, implementation, and evolution. These stages do not necessarily need to be executed in a linear succession but can be carried out concurrently.²

The more or less formal starting point of the process is the impulse stage; it comprises a mix of

market observation and analysis and an assessment of what the company has learned so far. This stage aims to describe what kind of market and customer trends have been emerging and to formulate a first hypothesis. In the research phase, appropriate methods are applied to understand the question in more depth: these can include ethnographic, trend, and experiential research, but also technological and market studies. The development stage should be informed by criteria deduced from the analysis of the research material.

In this model, the strategy phase follows the impulse, research, and development stages and is not

2. An early contribution to the model building phase was made by Norbert Welte.

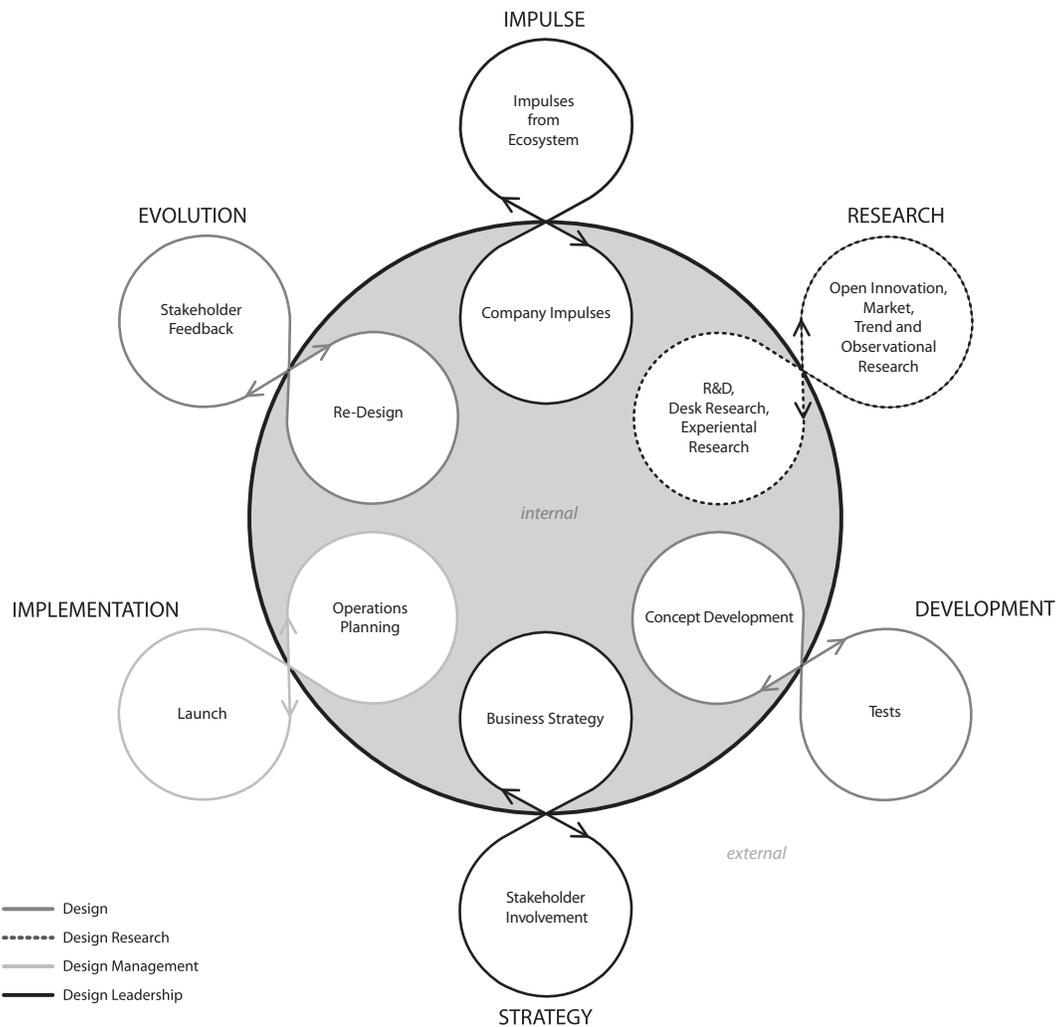


Figure 4. A design-driven innovation management model. The stages do not necessarily need to be executed in a linear succession but can be carried out concurrently.

the starting point. The logic behind it is that it puts the new offerings themselves in the forefront, rather than the business analytics. Switching around the sequence of stages allows business strategy development to be enriched by data on trends, customer needs, emerging technological trends, and so on, as well as by the involvement of

suppliers and other stakeholders, which will improve market power.

In the implementation phase, appropriate adjustments of operations and measures for the launch, such as an adapted brand and communication strategy, can be made involving design management as a coordinator and enabler of the overall customer experience connected

to the new offering. The last stage, with a strong emphasis on stakeholder involvement and customer feedback, is the evolution phase, in which the innovative product or service is improved.

Main characteristics of the model

Our design-driven innovation management model has the following

main characteristics: it is *integrative*, *multidisciplinary*, and *permeable*.

Integration

According to “The New St. Gallen Management Model” (Rüegg-Stürm, 2003), in recent years process organization (*Ablauforganisation*) has become more important and has pushed back the organizational structure of the company itself (*Aufbauorganisation*) as an organizing system for companies. In short, the focus has shifted from hierarchy to process, and this has been done for reasons of efficiency. Borja de Mozota (2003) has described a shift in management models from “a hierarchical Taylor model of management to a flat and flexible organizational model, which encourages individual initiative, independence and risk taking” (p. 67). Design and design management can be the advocates of this new management style.

There is also a correlation among strategy, structure, and culture and the way in which they shape processes. Intertwining strategy building, innovation, and design management allows the creation of new and meaningful products, services, and experiences to become the company’s core activity. Innovation becomes the driver, and all processes are designed around the bigger goal of staying on the market. One could even say that the innovation process is actually the iterative process of designing a company to meet customer and market

needs. Fortunately for them, SMEs find it easier to change and adapt processes than do larger companies.

Multidisciplinarity

To consistently involve members from a variety of management functions—marketing, engineering, sales, communication, design, and so on—in the innovation process has been described as the “sashimi approach” in a reference to design management styles from Japan (cf. Cooper and Press, 1995). Multidisciplinarity is also a central ingredient of design thinking. Stanford’s D-School³ currently builds on a model of collaboration in which the intersection of business, technology, and human factors is explored. Besides the more obvious reasons of capability building and risk control in innovation projects, multidisciplinary teams—and more precisely the early collaboration of engineering and industrial design—function as an accelerator; products are more easily and speedily pushed to the market through combining technological development and human-centered design. An additional side effect of multidisciplinary teams is what Dumas and Mintzberg (1989) called “infusion.” Design methodology is implicitly being included in the above-mentioned stages; it is simply part of the way innovation is

3. For a look at the Stanford model, visit http://stanford.edu/group/dschool/big_picture/design_thinking.html.

done in a company. Integrating design into all activities connected to innovation management allows it to become a part of everybody’s business.

Permeation

Each stage includes a more inner-oriented or outer-oriented activity; this does not mean that an SME should completely dispose of its boundaries and its distinctness from others. To consistently encourage, attract, and include know-how from the ecosystem and from stakeholders into the company calls more for a particular frame of mind than for an organizational principle. For example, the R&D activities of a firm can be combined with methods of open innovation by inviting consumers and lead users to cocreate new offerings. Many (technology-based) SMEs take pride in their innovations—at times so strongly that they exhibit the “not invented here” syndrome. Using frequent feedback loops with customers, suppliers, and other stakeholders throughout the development process means SMEs will have a better shot at reducing the risk of market failure for a new product or service. In a market environment in which sudden shifts make it difficult to plan or even to understand market dynamics, an SME with a more flexible, open, and permeable attitude may find it easier to survive.

Discussion

An integrated model in which strategy building, innovation, and design management become one unified process has advantages. We did not test the model yet; however, some of the first reactions of SME chief executive officers to it were positive. The model made sense to them; the phases of impulse, research, development, strategy, implementation, and evolution were easy to understand and familiar to them and resembled some of the processes of their own companies. The model also implements the prerequisites we formulated early in this paper: adapting frameworks that already existed and visualizing for ease of use.

The disadvantage of this model is that it blurs the boundaries of design and business notions to an extent that the design and design management contributions are no longer recognized as such. (In properly applying design methodology, the devil is in the details.) Thus the model might be misleading to SMEs with little or no design experience because some of the methodology is actually new to them and will have to be practiced many times before it can become part of their company's innovation process and even part of company culture. This also means that designers and design managers need to become permanent staff members of SMEs.

Conclusion

The present formulation of a design-driven innovation process model has been developed particularly for SMEs with little or no design awareness so far. It will have to be validated through further applied research with companies. SMEs have fewer financial resources available than their larger competitors and are less inclined to include design consultants or designers in their activities and innovation processes; thus another challenge for future research will be to address the question of whether more tools and models based on design methodology and design thinking (as well as being inexpensive in their application) can be developed to support SMEs in the integration of design into their company activities and innovation processes. ■

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Author biography

Claudia Acklin studied social pedagogy and journalism and worked for more than 12 years as a journalist. During that period she produced and directed two full-length documentary films. In the past years she has mainly been working in research and the educational field developing new study programs such as the BA in Design Management, International at Lucerne

School of Art and Design in Lucerne/Switzerland. She has been the head of the program ever since its start in 2006. She is also the head of a research group, "Design and Management," and has been doing research in the area of accessibility, design management for SMEs, and design-driven innovation. In 2008, she co-founded the association "Swiss Design Transfer," a regional center for design promotion and support for SMEs. Last year, together with the Commission of Technology and Innovation (a national research body), she held a "Swiss Design Initiative" that invited stakeholders from the design field to discuss the question of whether a national design policy for Switzerland was needed. The result was a first position paper on this issue.