Active, Local, Connected: Strategic and Methodological Insights in Three Cases

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The activity of design is rooted in the very first part of the history of the industrial revolution. In the past century, designers invented new products, sometimes introducing substantial social or technical innovation; in other cases, they contributed to improving the aesthetic or technical quality of existing products or materials. Their role has been essential in the definition of an industrial model based on large production volumes for broad markets, but they have also contributed to the maturation of such a model toward sophisticated production platforms and product architectures, which allow industrial production to customize solutions for smaller target groups. Design's contribution has been to help define the social and economic role of industrial production in modern society—to the point that it has sometimes been seen as one of the key factors influencing the identity of the culture and the image of a country.

When industrial production models—and the development model they supported—have been identified as one of the most critical nodes in the question of sustainability, designers have been seen as part of the problem and perceived the urgence to change their perspective, methods, and role. Because of the public perception of design action, which associates design with material and large-scale production, and because of the urgency of the question of sustainability, the choice for designers is either to embrace and cultivate new perspectives for their work or to be marginalized as secondary actors in the development of more sustainable strategies. The former implies that designers reframe their skills and competencies in view of a sustainable perspective. The second case, while not requiring significant changes in the design profession, implies that designers will not be able to seize the opportunities offered by the broad socio-economic change suggested by the question of sustainability.

The debate over sustainability within the discipline of design in the past decades can be framed within two general parameters. The first addresses the question of "what to do." This question refers to the definition of strategies for improving the environmental efficiency of our production and consumption system. The second addresses the question of "how to do it." This question refers to the definition of a methodological approach that supports an effective implementation of sustainable strategies. The present historical

moment, however, makes these two parameters extremely fluid and open. On the one hand, strategic frameworks are continuously reshaped by rapid demographic changes, evolution of technology, social evolution, and economic crisis. On the other hand, methodological frameworks inherited from industrial production have also been reviewed and adapted to new situations, thus generating open and rapidly changing methodological perspectives.

Before turning to some design cases that illustrate the intersection of strategic and methodological frameworks, we identify some relevant issues concerning the two parameters.

Questions of Strategies:
Activating Local and Individual Resources

In the past few decades, the debate on sustainability has explored many directions for improving the environmental health and efficiency of our planet. In the past few years, though, it has become clear that environmental sustainability cannot be achieved without a focus on social and economic sustainability. The most recent economic crisis has further clarified this connection by bringing to light how the failure of large multinational companies has influenced the social and economic traumas. For this reason, any social and economic strategies for future development must be applied in the area where social quality, environmental quality, and appropriate and sustainable forms of economic development converge.

This area defines a complex landscape of solutions that describes different and interwoven paths. To understand this paper, some of these paths need to be better described:

Localization of solutions. Although globalized companies are a reality that economic crises cannot wipe out, the most relevant factors for competitiveness are placed in the local context (Becattini 2004). The need to provide context-specific solutions is forcing companies to develop their global strategies in alliance and cooperation with those in the local contexts in which they operate. Although the environmental, social, and economic sustainability of strategies developed in this context should be evaluated on a case-by-case basis, some essential characteristics of these strategies are intrinsically sustainable. The decentralization of production, indeed, tends to reduce the environmental costs of transport, but in addition (and this is probably more relevant) those strategies tend to activate human, material, and natural resources in the local context. In particular, the activation of local human resources (i.e., through local services, manufacturers, institutions, and users) makes it possible to realize a regenerative process: together with the final outcome of the production process, the activation of such resources also stimulates the regeneration of values, of knowledge, of the institutions, and of the natural environment. When related to a specific context, such as industrial districts, such local co-production processes have proven

to be a source of competitive advantage, both for local contexts and for companies participating in it (Becattini 2004).

Networking resources. In a centralized industrial culture, large companies produce solutions for larger or smaller target groups. This "top-down" structure clearly separates producers from users. Producers are creating value, whereas users (or *consumers*, as defined in this logical framework) are "destroying" such value (Normann and Ramirez 1994; Ramirez 1999). This logical structure dominates the paradigm of traditional industrial production and has been the guiding star for the development of industrial economies. According to this logic, the industrial system progressively *relieves* people from many of the tasks and responsibilities in their daily routines, from washing clothes to organizing parties (Normann 2000). The hidden risk in this idea is that, together with responsibilities and concerns, people are also deprived of their own practical, operative, and even social skills, thus generating a progressive *waste* of human resources (Manzini 2005). However, some signals are emerging that reveal the emergence of opposite trends, from both the production side and the consumption side. The signals from the production side come from companies that are revising their strategies through the direct involvement of users in the production process. Many companies are now considering such strategies to increase the flexibility of the production process and to generate highly personalized solutions, which ultimately push the boundaries of mass customization toward individual solutions (Morelli and Nielsen 2008). The same need for highly personalized and context-related solutions is stimulating individuals, groups, and organizations on the demand side to undertake individual and collective initiatives to solve very specific problems.[1] Once again, the social and environmental quality of these initiatives should be analyzed case by case but their intrinsic characteristics are consistent with the main strategies for sustainability because they create networks among human and material resources in local contexts, thus allowing for *short production chains*. These new signals, both from the production side and from the consumption side, suggest a progressive shift in social and economic systems, from value chains (i.e., top-down production systems that clearly define and separate each value production phase) to a value constellation—a networked production system in which the value is coproduced by different actors, including producers, service providers, local institutions, and individual users.

Distributing solution potential. The shift from centralized models to networked ones also implies a shift from a model in which the power to generate solutions is concentrated in few places and social roles, to a model in which a relevant part of this power is distributed to local communities and individuals. The new model tends to increase the problem-solving capabilities of local communities. Such problem solving power is not an alternative to the traditional industrial production models, but rather is comple-

1 The EU-funded EMUDE project collected many cases of such individual and collective initiatives in a blog: www.sustainable-everyday.org. The initiatives cover a wide range of local and personal initiatives, including initiatives to reduce traffic congestion, to take care of local green areas and cultivate local vegetables, and to increase social interaction in a local area between elderly people and children.

mentary to them. Industrial production's strategies are based on top-down provision of clearly defined solutions (business and governments provide products and services to citizens), whereas the horizontal networks allow for an exchange of *sticky* resources—resources such as tacit knowledge, mutual understanding, and solidarity, which cannot be codified, institutionalized, or prescribed. The activation of such resources often discloses a landscape of new opportunities.

Questions of Method: Applying Industrial Design Strategies to New Problems

During the past century, industrial design has generated its own operative paradigms (i.e., a toolbox of methods and tools to approach design cases)[2] to support industrial production. Both industrial companies and designers had to take into account some general criteria concerning the need to generate economies of scale the codification, communication, and transmission of knowledge across different phases, actors, and places in the production process and a clearly defined subdivision of labor.

Industrial design also has contributed to the most recent evolution from mass production to mass customization. Its contribution was key in supporting more modular product structures and product platforms, by which industrial production has achieved a level of flexibility that comes closer to the flexibility of craftsmanship in the pre-industrial age.

A deep or thorough revision of designers' roles should not ignore the heritage coming from its collaboration with industrial production. Several criteria that have been guiding designers in this context still make sense in the new context:

Reproducibility. The outcome of industrial activities must be reproducible. A century ago, Henry Ford reshaped industrial production toward a model that would dominate for several decades—a model based on large scales of production. More recently, industrial developments have reduced the scale of production to individual types of products. In this context, the concept of reproducibility has been transposed from the whole product to its component parts or its production processes. This transformation is producing a shift from economies of scale—focused on the supply side and working on increasing the scale of production of a single product for the largest possible target group—to economies of scope—focusing on the demand side and offering different types of products or services to smaller target groups. This shift is also moving the idea of flexibility from material products to solutions. Products were reproduced through the multiplication of material production; flexibility in production was challenged by the capability of the production system to incorporate as much knowledge as possible about individual needs. Co-produced solutions, meanwhile, are based on individual and context-specific knowledge, and the

2 The term operative paradigm has been introduced by Arbnor and Bjerke. An operative paradigm includes methods and tools borrowed by different disciplinary areas and appropriately adapted to deal with a specific study area.

challenge is to organize this knowledge to make them reproducible on a larger scale.

Subdivision of labor. The shift from craftsmanship to industrial production was based on a logical disassembling of a craftsperson's knowledge and functions into modules, which could be individually treated in different phases of the industrial production process. This principle led to the modularization of industrial products, and such modularization, later on, supported mass customization. Each module could be treated by different people and required different technical knowledge.

When modularization is applied to solutions instead of products, tacit knowledge and hidden capabilities might be involved, which would generate a high degree of customization (Morelli and Nielsen 2010). This knowledge is "sticky," meaning that its links to the contexts make it hard for producers and designers to acquire it in a codified form; thus, integrating it into the traditional production process is impossible (von Hippel 1994). For this reason, the inherited practice of designers to disassemble complex functional systems into modular architectures must be re-adapted for solution architectures; these adaptations delegate knowledge modules and distribute decision and action power among a heterogeneous workforce, which might include actors (i.e., final users, users' organizations, and local institutions) that previously were external to the traditional production process.

Codification of solutions. The process of disassembling the craftsperson's knowledge in modular production systems has been possible through a sort of reverse engineering of material products and the re-composition of them on the basis of clearly codified instructions. The process of codification has been essential for the reproducibility of some knowledge, previously embedded in a craftsperson's brain, so that it could be handled by new people (technicians or low-skilled workers employed in production plants). The shift from products to solutions and the inclusion in such solutions of a new and often unskilled people suggest two possible strategies for circulating knowledge:

- A new effort of codification (from technical knowledge embedded in industrial processes to common users), and
- An effort to support the exchange, without codification, of implicit and tacit knowledge among users.

The two strategies are complementary: the first supports *vertical* communication from companies (and institutions) to customers (or citizens), whereas the second creates the conditions for horizontal networks of cooperation between people.

Focus on users and on the demand side. The previous criteria derive from the intersection of industrial production logic and the design profession; this one, meanwhile, derives from the specificity of the design profession and can prove useful for the

redefinition of an operative paradigm. Being often placed in the area of interaction between industrial production and final users, designers have developed skills and capabilities to interpret users' cultures, needs, and behaviors and translate them into industrial offering (Verganti 2003). Such capability, recently improved with the support of ethnographic methods and sociological considerations, is crucial when focusing on the nodal point of defining new production and consumption models, proposing new scenarios and lifestyles, and supporting horizontal networks of collaboration between individuals at the local level.

Activating, Localizing, and Connecting By Design: Three Cases

Many cases of sustainable social innovation are emerging that have generated localized, individualized, and networked solutions. Such cases often derive from spontaneous initiatives of citizens or groups of individuals, or from specific local conditions. This pattern raises some questions about the possibility of generating social innovation in the framework outlined above, as a result of design activities; assuming that such innovation is possible, what kind of operative paradigm is needed to support design action in these cases? In the following sections, three projects are proposed that, in different ways, address these questions. All the cases are part of the teaching and research activities undertaken at the School of Architecture and Design (A&D) at Aalborg University and are based on a direct involvement of some of the actors (i.e., companies, service providers, users) that will be running or using the service. We describe each of these projects to explain the framework in which the project has been developed, the characteristics and structure of the service, and the methodological considerations resulting from the project.

Local Meal Service for Elderly People

In the past few decades, the need to reduce welfare costs has inspired policies that promote active and independent lifestyles for elderly people. In Denmark this principle was used also for reorganizing policies for the senior population, based on the goal of keeping people in their own home as long as possible (Platz 1987). This policy implies a certain level of social and physical activity by the elderly people, who are not supposed to be helped in every function of their daily routine, but rather to be supported in their attempt to work autonomously to the satisfaction of their own needs.

Elderly people who have the physical capacity and the willingness to live in their own home are supported with a series of public services, such as meal services, cleaning services, and daily visits from healthcare personnel. They also use common infrastructures, such as activity centers or meeting spaces, to maintain an active lifestyle within their neighborhood. The general approach of local authorities is to be open to any opportunity to improve the level of activity of elderly people because it increases their chances of sustaining an independent life and reduces the costs of public intervention.

The *Delight Assist* project, developed in cooperation between the School of A&D and the central kitchen in Hjørring, is considering this context as the starting point for the redesign of the meal service for elderly people. An analysis of elderly people's (daily, weekly, monthly, and yearly) routine reveals that eating and sometimes meal preparation are perhaps the most recurrent activities in elderly people's individual and social life. Eating not only is about nutrition, but also offers a social opportunity to meet friends and family. In addition, meal preparation is often a sort of "social ritual," as well as an activity in which elderly people can exercise their residual capabilities.

The existing meal service is based primarily on functional criteria, which suggests an efficient but rigid structure for the service. The meal elderly people receive everyday consists of a variety of dishes, but they are ready to eat and must be consumed within a few hours. An alternative that would also reduce isolation for elderly people living in their own home is to have some food that can be made ready for friends or grandchildren coming to visit them.

The analysis of elderly people's daily routine and some ethnographic insights revealed that many people are still fully capable of preparing their own meals and are willing to do so. Others have lost some of their skills, mainly related to fine motor skills (e.g., peeling potatoes or carrots), but they have a passion for food preparation and would be glad to use their residual skills for that; finally, other people are still able to cook but are not strong enough to walk to the supermarket for shopping.

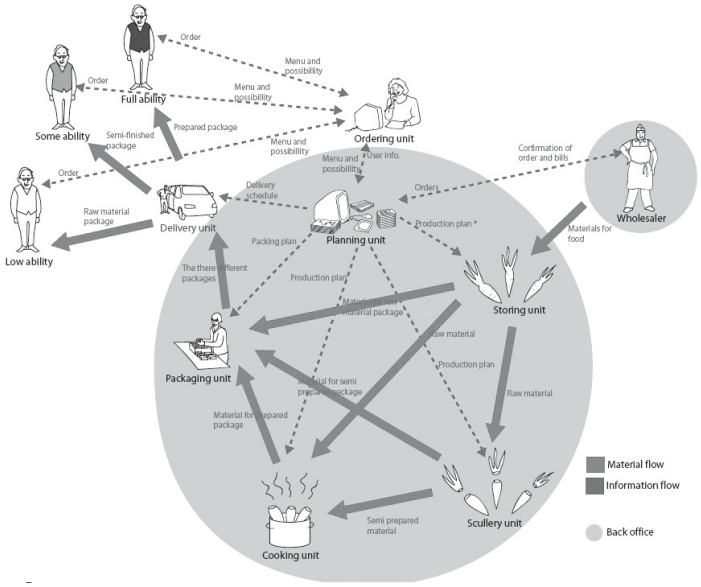
The *Delight Assist* project started from the assumption that the process of meal preparation and consumption can be disassembled into different modules, including shopping/ordering food preparation of the ingredients, cooking, and, of course, meal consumption. Elderly people may decide to retain their independence with respect to some of those modules, but they may want to outsource other functions that exceed their present capabilities.

The new service can provide prepared meals (as in the existing service) or a combination of semi-finished ingredients (e.g., peeled potatoes) or just the raw ingredients. This concept is able to use the residual capabilities of elderly people at different levels, while passing on the other competences to other local actors (a central kitchen or local food providers) (Figure 1).

The Design Challenge

The challenge for designers in this case consisted of *disassembling* the meal production and consumption process and recomposing it in a modular structure; this challenge can be compared with a *reverse engineering* project. The modular structure created with this project also makes it possible to involve local producers (groceries) or new actors (service units to process semi-prepared food), thus

Figure 1
Modularization of the meal service



activating local resources. However, unlike the most common reverse engineering exercises, the starting point is not a complex technological artifact but a part of people's life. For the service to be effective, designers need to consider elderly people as part of the production system, thus including their behavior, daily routine, and capabilities as variables in the production process. For this reason, the service architecture represented in Figure 1 has been disassembled in a series of use cases, in which a detailed description of customers' behavior was linked with a description of the behavior of the whole production system in the back office (Figure 2).

Another problem arising from this case concerns the need for designers to use appropriate communication and representation techniques to include elderly people as co-producers of the system. Unlike products, whose status is perfectly defined before they come in contact with users, services are co-produced by the customers, which means that an appropriate communication channel must be used to address customers' behavior in the co-production of the service outcome. Several kinds of representation techniques are being developed, including graphic representations, clipscapes, and video sketching (Lahlou, Jegou et al.; Morelli and Tollestrup 2007), to increase the level of participation of users in the design process.

A Meal Delivery Service for Workers in the City Centers[3]

Active labor market policies in Denmark and Scandinavia are based on an approach aimed at enhancing unemployed people's residual capabilities (Esping-Andersen 2002). This approach, often labeled *active welfare* (Møller 2002; Sabel and Zeitlin 2003; Vandenbroucke 2003) or *open welfare* (Cottam and Leadbeater 2004), makes it possible to decrease peoples' level of dependence on the welfare system, thus encouraging their re-integration into the labor market.

3 This project was developed with the cooperation of Prof. Wolfgang Jonas, University of Kassel. A more detailed explanation of this project has been provided in Morelli, N., W. Jonas, et al. (2008). *Product Service Systems and Non-Market Oriented Approach—Methodological and Ethical Considerations from a Design Perspective*. Changing the Change, Design, Visions, Proposals, and Tools, Torino, Italy. and Jonas, W., N. Morelli, et al. (2008). Designing a product service system in a social framework—methodological and ethical considerations. *UNDISCIPLINED! Rigour in emerging design disciplines and professions*, The 2008 DRS Conference. Sheffield, UK.

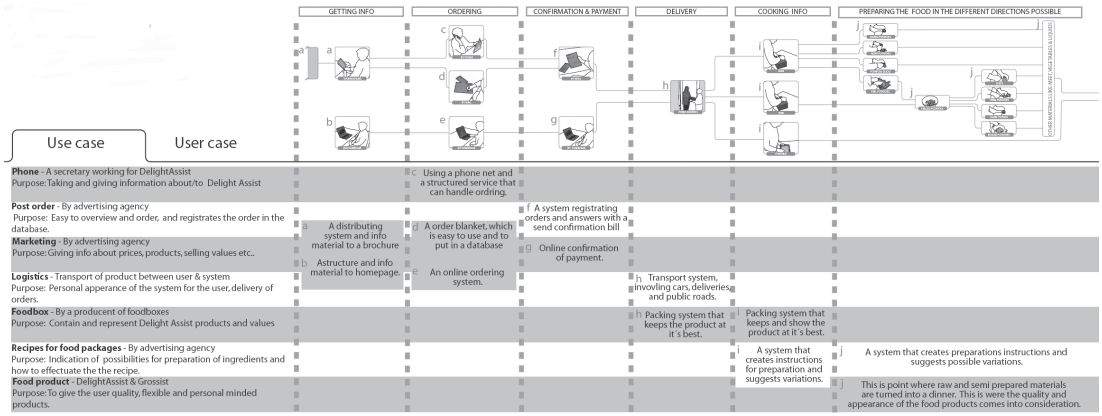


Figure 2

Use case: the front office is represented as a scenario, whereas the back office of describes the behavior of components in the back-office for each phase of this scenario.

Some of the initiatives of Fokus Folkeoplysning (FF) can be framed in this context. FF is a Danish organization that provides vocational education programs. FF´s initiative in this area consisted of a program to employ people with different social and behavioral problems in business activities to give them an opportunity for learning new skills that can help them become integrated into the labor market. Furthermore, FF's goal is to aim for higher levels of occupation and employment for unemployed people (whereas government activation schemes focus on occupations that require very low-level skills). In the past, the organization created a café, which was in most aspects similar to any other café. Here, however, unemployed people have a regular working routine and a continuous social contact with clients.

The new service proposed in collaboration with A&D and the University of Kassel is a meal delivery system for people working in the central areas of a city. The project has been named *Frokost kurerer* (The Lunch Couriers). Businesses in these areas can rarely afford a canteen for their employees. Their employees must buy their own lunch and often have very limited choices, influenced by reduced time and dietary factors. The new service is meant to connect them with meal providers—small cafés and restaurants offering good quality food—to satisfy their needs and optimize the time for their lunch break. The service will serve a limited area of the city and use bicycles as the only means of transportation. As in the café, the service will employ people who have low employment capabilities to serve in five main functions: logistics, payments, IT, delivery, marketing/PR, and bike repair (in total about 15 people). The cost of the service is meant to be very low ("as much as sending a postcard"), compared to the normal cost of the lunch, decided by the meal provider. The meal providers, in turn, will contribute to the service with a small fee for each meal. The local government is paying the salary (the normal unemployment benefit, plus a small activation contribution), plus a small amount of money per employee to support the service.

Table 1

	Scenario 1 Frokost kureren	Scenario 2 Couré	Scenario 3 Bike the lunch	Scenario 4 Kolibri
Logistics				
Delivery				
Payment				
Marketing/PR				
Bike maintenance				

The Design Process

The design process consisted of three main steps, analysis, projection, and synthesis, according to the generic model suggested by Jonas (Jonas 2007; Jonas, Morelli et al. 2008).

In the **analysis** phase**,** sensitivity analysis (Vester 1999) was used to create a systemic model of the situation by building an effect system out of the situation's relevant factors. The analysis identified active, reactive, critical, and neutral variables involved in the project, and then, on this basis, the **projection** phase used some of the critical variables to generate a map of extreme contextual states, or scenarios (Figure 3).

In the **synthesis** phase, four scenarios ("4 stagioni" method) were developed (Figure 4). Each scenario defines a business concept on the basis of the most critical factors (logistics, delivery, payment, marketing/PR and bike maintenance) identified in the sensitivity analysis.

Each concept, identified with a name, defines a platform of actors, interaction, information flows, and business flows that needs to be defined in detail. The requirements are therefore organized on the basis of the five activity fields described in Table 1.

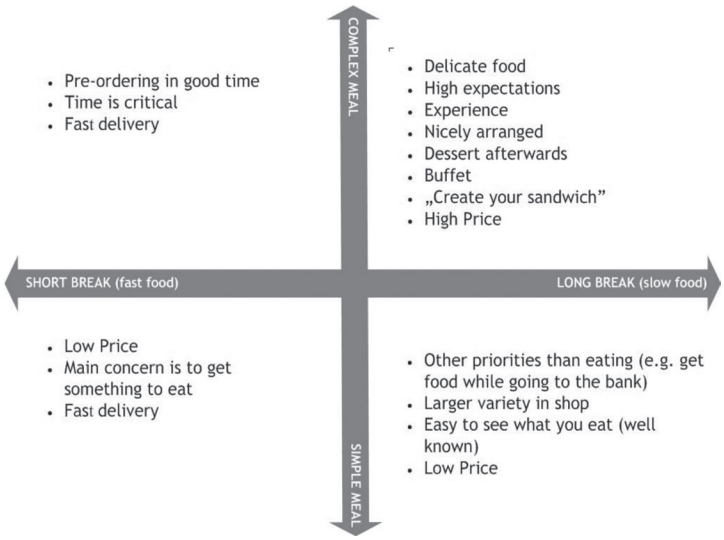
Logistic aspects depend on bicycle transportation and customers' expectations about delivery time. Such aspects include the identification of a *served* area, the number of food providers that can be associated with each of the four concepts, and the number and efficiency of the couriers. (The project does not assume the courier to be in perfect physical shape every day, because the personnel are supposed to be chosen among people with low employment capabilities.)

Delivery aspects include ordering time, food choice (more variety can affect delivering time), and the collection of food from local shops or restaurants.

Payment-related aspects arise because delivery people should not have the responsibility of collecting the payment. This division of responsibility has several implications about how the payment system is organized.

Marketing/PR aspects require different skills than delivery people tend to have. Marketing and PR functions tend to require that more attention be given to strategies that address customers' expectations and to the interaction between customers and delivery people.

Figure 3
Different scenarios for the service



Bike maintenance: The service has its own bike repair workshop that should also be able to provide assistance in case of emergency.

Concept Development Tools

A progressive definition and detailing of the service, starting from the broader frame outlined in the four-scenarios, is organized to address different design aspects:

The development of a modular architecture for the service;
The analysis and design of time-related aspects;
The organization of an efficient system configuration on the basis of a high variation of individual choices; and
The organization and design of infrastructural elements of the system.

A modular architecture. The methodological approach used for the organization of local activities and the exploitation of local potential is based on a modular architecture, in which each module refers to an autonomous actor (e.g., meal providers, individual customers, or groups of customers working in the same office). Each actor holds the knowledge needed for providing a part of the service. The main organizational task is to generate a *solution platform* that allows for multiple solutions by specifying sequence of events, interaction among modules, and physical and financial flows. These solution platforms allow for a distribution of *engineering power* among the modules of the platform. Each module is appropriately designed and organized at the local level (e.g., each food provider autonomously decides its offering), while the system organizer negotiates the connection of the modules through an appropriate modeling activity that simulates the behavior of the system in time

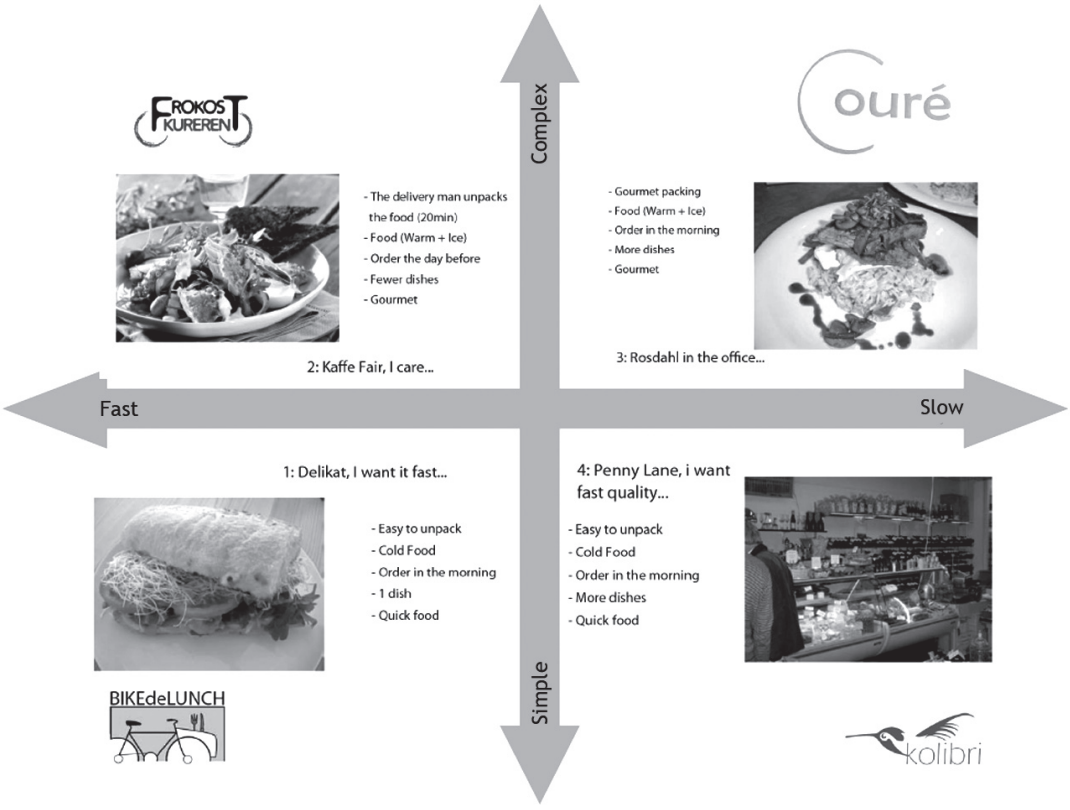


Figure 4
Overview of the four concepts deriving from the 4 stagioni method

and space. The system organizer should also coordinate the essential support activities, such as time plans, bicycle transportation, a website for ordering, and daily menus.

Addressing time-related instances. As with architectural design, the concept development process can start from a larger scale (platforms), and, in a second phase, details (e.g., products and interactions) can be articulated. Unlike architectural design, however, the details in service design cannot be based on synchronic representation because of the critical relevance of time sequences and events in phases, such as logistics and delivery. The whole system must be organized around a very short "time window" for delivery: lunchtime. Many critical processes in the services are concentrated in about one hour and must be represented in detailed time sequences. An event-based method, such as use cases, can effectively address time-related instances of the service (Morelli 2002). Each use case represents a simple instance of the service and focuses on a specific actor (e.g., the courier, the customer, the IT unit). The time sequence specifies each phase of the service and elicits requirements concerning the actor's experience (front office) and the system behavior (back office). Finally, use cases facilitate the coordination between individual time plans.

Planning variation of individual choices. The focus on highly individualized solutions requires that different scenarios

be defined that address individual choices. The scenarios consider different actors' behavior and different organizational instances and emphasize their implications on the system. Scenarios are particularly relevant in the organization of meal ordering. Individual preferences could be combined (thus creating cumulative orders from people working in the same building, or people with the same dietary requirements) with organizational instances (e.g., the availability of meals or food providers that satisfy that choice). By grouping these instances, different ordering scenarios can be adequately addressed that improve the efficiency of the service.

Planning the infrastructure. Use cases and scenarios bring the development process to a level of definition that is adequate for the specification of the material tools and the technological elements that support the service. In this case the service is not supposed to introduce any particular innovation at the product level: bicycles, communication tools, and personal equipment are off-the-shelf products; minor adaptations are required (e.g., bicycles, packaging, invoice system) to facilitate delivery logistic and payment-related requirements.

The Challenge

The project's approach to social innovation is based on the direct participation of local actors in the development of innovation processes. The project is supposed to generate a broad structure in which FF organizes the practical and operative aspects of the service. The assumption is that local actors (i.e., providers and customers) have context-specific knowledge for generating local solutions. This kind of knowledge is often hard to transfer to system developers. Rittel (1984) characterized this situation as a *symmetry of ignorance:* knowledge is asymmetric–users are domain experts who understand the practice (i.e., they know implicitly *what* the system is supposed to do), and system developers know the technology (i.e., they know *how* the system can do it).

Transferring the responsibility for developing the system directly to users makes it possible to capture essential knowledge that is critical for the development of highly contextualized solutions. However, this approach also reduces the possibility that these initiatives can be reproduced in different local contexts. Thus, many of the initiatives developed this way remain isolated cases, and little possibility exists for their broader diffusion, notwithstanding their high potential to offer concrete solutions to present crises of welfare systems. Therefore, an important research question arising from this context is whether these initiatives can be totally or partly transferable.[4]

The reproducibility/transferability of these initiatives might be possible using forms of *codification* of the knowledge needed for their planning and development. Codification implies the modular-

4 The debate regarding the question of transferability in design research is just beginning. See for example Chow Chow, R. (2006). Transferability—A Wonder on the Ground of Design Research. *Wonderground, DRS 2006.* Lisbon.

ization of the most relevant components included in a project (related to knowledge and processes) and a certain level of standardization of such modules. In this sense, codification implies a reduction of the qualitatively complex characteristics of local solutions into a simpler but nevertheless more reproducible solution that could generate economies of scale or scope.

The code to develop in this case includes all the organizational knowledge related to the project components, the modules, and the interaction among them. Its reproducibility depends on the capability of local actors to understand and use it to generate their own context-related solution.

Facebook Without Facebook: Redesigning the Core of an Online Community[5]

Until a few decades ago (and in a few cases even now), the social cohesion of local community was based on a *thick layer* of links, based on common interest, trust, shared stories, solidarity, and collaboration. Historically, this network of relationships has been built within specific geographical contexts (e.g., the neighborhood or the small town) or on familial links. The geographically located communities created through these links establish the identity of a place. In fact, such links were not just a cultural characteristic of a community but also a functional and economic factor that supported economic systems. In many cases, such links were strong and reliable enough to become the ground for welfare policies, as happens especially in southern European countries (Esping-Andersen 1996). An economy based on such links has been defined as an *informal economy* because activities in such economic systems often are based on local and informal links between people (Normann 2000). Such systems present little need for a contract, or specific performance indications, and no economic quantification is needed for these informal mechanisms to work efficiently.

Toward the end of the twentieth century, however, the prevalence of progressive market logic and more stringent time arrangements in work patterns, as well as the massive influx of women into the workforce, created a shift from informal arrangements to formal activities, provided by new actors in the marketplace. This shift from an informal economy to a formal pattern of market-based relationships decreased people's reliance on their own social networks and, more generally, on the capability of informal links to provide solutions to everyday problems. The cost for this shift is being paid by some parts of the population, among which are elderly people, who used to have a central role in traditional society but now are at risk of being marginalized as a social problem.

The advent of the second generation of internet applications—in particular social networking applications—is promising to recover part of the social cohesion in the local context that was undermined

5 This project has been developed by a group of students at A&D as a master thesis in Industrial Design. The logical framework for this project is the *life 2.0* research project, which aims at combining new technology and social networking applications to support elderly people as they seek to live an independent life. The author wishes to thank Maria Winther Kristensen and Irune Gonzales, who have enthusiastically and efficiently worked on this project and allowed the author to publish the results.

by the predominant intervention of market forces in our social and economic systems. The new social networking applications are indeed supporting new forms of solidarity, trust, and cultural cohesion, creating new links based on logical and emphatic proximity. Furthermore, these applications increasingly are used in relation to specific local contexts. Facebook and Twitter, for instance, are two of the most typical social networking applications. Although the two applications have been designed to overcome the limitations of local contexts—in fact, they have been created to connect people living in different parts of the world—they are often used to inform friends about local events and to invite them to visit new places. Other applications that are more closely related to geographical contexts (e.g., Google maps) are often used in combination with social networking applications.

The new social patterns are not just a slavish copy of the traditional social patterns that dominated local contexts in past generations; the old mechanisms of trust and social interaction cannot be automatically replaced by these applications. This irreplaceability is particularly apparent when the new IT-based applications for social networking are to be used by people, such as the elderly, who are not familiar with the new applications and are diffident toward technology. Although young people have been exposed to the new applications almost since birth, elderly people often consider computer screens and keyboards to be a barrier to communication. Nevertheless, the social mechanisms that have been almost spontaneously developed using these applications are very close to the mechanisms that supported social cohesion in local contexts in the early days. Furthermore, the activation of these mechanisms in local communities can be used to support elderly people as they seek to maintain an independent life, giving them more links with their neighbors, family members, and friends.

For this reason, A&D and the national association of elderly people in Denmark, Ældresagen, have collaborated to explore the possibility of redesigning such mechanisms. The intent is to reduce their dependence on the technological infrastructures that allow or require their use on the Internet. This redesign exercise again consisted of *reverse engineering*, this time applied to social networking applications.

Social networking applications can be seen as a construction based on overlapping layers: from the physical infrastructure (i.e., computers and every product that gives accessibility to the Internet), to a communication infrastructure (the Internet), to a social layer (including the pattern of social connections among people communicating on the Internet). A reverse engineering process for this phenomenon would start from the third layer, in an attempt to disassemble, isolate, and reproduce the social mechanisms generated in online social networks. The reference to a specific local context would make it easy to recognize and compare the social elements

that a new social network has in common with older, local cultural patterns. This understanding of social mechanisms should allow for a process through which further technological complexity can be added—a process of co-design with elderly people that can make new technologies more accessible and give elderly people a sense of ownership of the new services.

With the expectation that this process could be fruitful, a group of students worked together with some elderly people to propose activities that create social aggregation. The first meetings between the designers and seniors generated a list of activities around which elderly people could build new forms of collaboration, including the following:

- **Giving help –** a local *e-bay* of favors exchange
- **Storytelling –** cooperative writing of local histories
- **Activity calendar –** an open list of upcoming events
- **Buddy system –** expert tutoring for learning or being introduced to new activities
- **Sharing interest –**exchanging information about individual interests
- **Good and bad –** personal evaluation of events, services, products, movies, etc.

Only one of these activities already had a previous arrangement. Storytelling was happening through a spontaneous initiative of a group of people at Ældresagen, who were meeting together periodically to write stories about the past.

After the meeting, the designers started a first simulation of the activities to develop a series of rapid prototypes (i.e. rough working models) of services that could support such activities. Although the rapid prototypes were initially very rough, they have been progressively improved and adjusted. Each prototyping stage provided support to a following stage of prototyping, testing, and co-production.

Local Bulletin Boards

The first stage of prototyping included some examples, such as the short stories of the past written by the group at Ældresagen. To stimulate local interaction among elderly people without forcing them to use unfamiliar technologies, the examples and brief descriptions of the other activities mentioned were posted on a number of bulletin boards placed in two locations: at Ældresagen premises in Aalborg and at an activity center for elderly people in a small town near Aalborg. The experiment aimed at simulating the mechanisms of aggregation and cooperation of people around common interests and collaborative activities.

Each bulletin board had a headline and an explanation of an activity. Some examples were used to stimulate participation. A pile of blank cards was placed close to the bulletin boards to encourage

other seniors to write their own contribution and start a process of collaboration. The participation started very slowly, with no response to the invitation in the first two weeks. However, the participation increased later, as people consistently contributed their own stories, especially in the activity center.

Guided Use Cases

Although the bulletin board is an effective tool to raise awareness of local initiatives, a service for elderly people should be supported by multiple opportunities for interaction and, most important, should define and provide a platform for communication and collaboration.

To define the quality and the details of the interaction between elderly people and the platform, a series of co-design sessions was organized, in which individual senior people were asked to create use cases describing the way they would like to access this service and communicate with other people. The technological possibilities for developing the systems were described on cards, giving participants the opportunity to organize their ideal services on the basis of different forms of interaction. Each card visualised a technological or practical option. The choices included very low-tech communication channels (e.g., postcards, bulletin boards, leaflets), technologies that are already familiar to elderly people (e.g., phones, mobiles, sms), and technologies that are gradually making inroads into the lifestyles of elderly people (from email to social networking applications). A reference to the local context was also specified using maps that allowed people to relate their use cases to their routine and their neighborhood.

Acting The Interaction

Once defined, the use cases became the basis of a more intense prototyping activity that included the simulation of the interaction by elderly people. This simulation made it possible to improve the co-design process by emphasising new aspects emerging from a "real life" case. To reduce the sense of inadequacy that elderly people can have in front of a computer screen, researchers created a fake screen by placing a paper screen over a real laptop. The tester interacted with this screen using an arrow on a stick in place of the mouse pointer. The researchers then manually changed the screen configuration according to the users' choices. Although slow, this simulation gave the elderly testers a better idea of how the service could work and a stronger sense of ownership over the potential service.

Other simulations focused on the way elderly people contact each other to undertake a certain activity. Here, two people acted out the situation (ringing to each other) and provided feedback on each detail of the interaction that needed to be designed.

Video recording of such simulations can be used for illustrating the prototype to potential users of the service, so that they can figure out a use scenario and be motivated to participate.

	Localizing	Networking	Distributing
Delight Assist	**Reproducibility:** modular system makes it possible to identify providers (groceries/ processer) in the local context	**Subdivision of labor:** elderly people are executing part of the meal production process (and possibly making food for each other) **Codification:** The meal production/ consumption process is divided into modules Special attention on user instructions	**Subdivision of labor:** allowing elderly people to be more active reduces their level of dependence on assistance services. **User focus:** elderly people are supported in their aim to use food as a means of social interaction
Frokost Kureren	**Reproducibility:** Modules (restaurants/shops) can be identified in different local contexts. **Reproducibility:** identification of critical factors for defining design scenarios **Subdivision of labor:** local shops/restaurants organize their menu independently	**Subdivision of labor**: direct orders from local shops/restaurants allow for flexible offering and short production chains. **User focus:** users are given more choices about their lunch.	**Subdivision of labor:** meal production is distributed among local producers **Reproducibility:** once the architecture is defined, new meal providers can be added and the service can be proposed in new contexts.
Facebook Without Facebook	**User focus:** focus on mechanism of social cohesion at the local level **Codification**: *reverse engineering*; comparing Web 2.0 social mechanisms with existing mechanisms of social cohesion	**Codification:** creation of a mechanism to circulate tacit/ latent knowledge, even without codifying it	**Subdivision of labor**: dependency from healthcare system is partially replaced by mutual help and social cohesion

Table 2
The methodological criteria of the three projects are compared with the strategic objectives.

The Design Challenge

Rather than codifying and formalizing implicit and latent knowledge between elderly people, this project tried to recreate the mechanisms that circulate such knowledge and to create a platform that supports such *horizontal* networking. Researchers did so by *reverse engineering* the mechanisms of social interaction happening in Web 2.0 applications. The challenges in this case were in the nature of the process—reverse engineering applies to technologies, whereas Web 2.0 applications consist of a mix of technological and social mechanisms—and in the target population's lack of familiarity with those technologies.

The activity of rapid prototyping was considered to be the most adequate means to address both these challenges. On the one hand, it allowed for a simulation of social mechanisms and the consequent registration of the activity as a design input; on the other hand, it allowed for a progressive introduction of elderly people into technological mechanisms to give them a sense of ownership of the new technology. A plot of participative activities was organized in

which elderly people could find their own motivation to implement a system. The different interaction channels (i.e., bulletin boards, testing, and use cases) were running in parallel and brought about different levels of involvement of people in the project, different reactions and response times, and different approaches to novelty.

Conclusion

The three projects reported in this paper are heterogeneous in their nature, in the detail of their approach, and in their aims:

- The *Delight Assist* project focused on the *engineering* aspects of the system—those aspects that make sure that customers' behavior is addressed and supported by an opportunely organized *back office* system. The aim of the project was to suggest new and more flexible forms of industrial production.
- *Frokost Kureren* focused on the creation of scenarios on the basis of some critical parameters and the organization of different systemic concepts according to those scenarios. The aim of the project was to work on the question of reproducibility of local systems and design scenarios.
- *Facebook Without Facebook* focused on social mechanisms generated by new social networking applications. The aim of the project was to isolate such mechanisms in local contexts and reproduce them beyond the barriers generated by the lack of familiarity with technology.

Meanwhile, all these projects also have some common traits that concern both strategic aims and methodological criteria. All of them address some of the main strategic challenges presented by sustainability: the need to generate local systems, to activate and connect local resources, and to create solutions by distributing decision and production power. Although all the cases have in common a direct or indirect government support, the role of the central government is quite marginal. The organization and management of the initiatives is the responsibility of local actors (Hjørring Central Kitchen, Fokus Folkeoplysning, and Ældresagen). The strategic framework for such an organizational structure is inspired by the principle of subsidiarity, promoted by the European Union (EU 2002), and implemented in welfare strategies in several countries (Vandenbroucke 2003). According to this principle, problems should be resolved by the lowest, smallest, or least centralized competent authority.

In all three projects, a methodological approach has been used that derives from designers' cultural and logical links with industrial production. In Table 2, the methodological criteria of the three projects are compared with the strategic objectives.

The description of the projects and the summary in Table 2 emphasize the extreme complexity of a landscape in which different

strategic aims can be combined with different methodological criteria. These examples demonstrate how the challenge that sustainability poses for designers is still in a very fluid phase—a phase in which neither the strategic frameworks nor the way to address problems and opportunities proposed within those frameworks are perfectly defined. The question of sustainability is still far from proposing consolidated patterns, behaviors, and strategies. Beyond the obvious uncertainty that this situation implies, the fluidity emerging from these cases suggests interesting social innovation opportunities for designers, industrial companies, and institutions.

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