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Designing a product service system in a social framework – methodological and ethical considerations

Abstract

Macroscopic social and economic changes in the last few years are forcing business companies and public institutions to redefine their approach to social intervention, focusing on local and highly individualised solutions. This change is also calling for a new design approach. The challenge for designers is not only to be able to provide local and highly individualised solutions, but also to propose strategies to transfer and reproduce the solutions, or part of them, into different local contexts, thus creating economy of scope. This would be possible by using forms of *codification* and modularisation of the most relevant components in local solutions.

The code refers to the organisational knowledge included in local components and the way each component interacts with the others. Like software systems, local product-service systems can be built upon a *source code*. This paper will illustrate how this process was developed in a concrete case. Through this case the authors analyse the possibility to build something similar to a source code for initiatives based on social interaction and investigate the process of construction of such a code Furthermore, the author discuss differences and analogies between design intervention in a social context and in the normal business context.

The question of codification suggests a methodological approach for supporting *transferability* both in the problem space (dealing with complexity) and in the solution space (dealing with contingency). The analysis of differences and similarities between business- and socially-oriented processes suggests a new role for designers and new opportunities for innovation.

Keywords: Product Service Systems, methodology, ethics, codification, transferability

Introduction

General overview

The project reported here is part of a strategy to link teaching activities to applications in the real world and to design research. The actors are:

- **The students of the 8th semester Industrial Design at the School of Architecture and Design** in a Danish University: the project was the theme for a 3 weeks workshop on concept development.
- ***Focus Folkeoplysning***, (FF) a Danish organization that provides vocational education.
- **The authors of this paper**, who, in the last few years, have been working in different institutions, on themes related to system design and service design.

The opportunity came from a loose cooperation between FF and the University aiming at a new service to employ people with low employment opportunities. FF had developed the concept of the service (a meal delivery system for people working in the city centre) to the first embryonic stage and is now planning to develop the project to a running phase in a few months. The idea of the cooperation between the organisation and the university came from the discussion about designers' role in planning and developing innovative services, which is an ongoing discussion not only in Denmark.[1]

This theme is close to the more general question of relocating the role of designers beyond the traditional link with material products. This theme has been the main research focus for the authors (Jonas, 1994, 1996, 1997; Morelli, 2002, 2003b, 2006a, 2006b, 2006d).

The project is also consistent with the authors' research on applications of design methodological approaches to innovation in social systems, outside the traditional market-oriented context for the design discipline (Morelli, 2003a, 2006c)

The project

Active labour 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 labelled as *active welfare* (Møller, 2002; Sabel & Zeitlin, 2003; Vandenbroucke, 2003)or *open welfare* (Cottam & Leadbeater, 2004) makes it possible to decrease the level of people dependence from the welfare system, thus encouraging the re-integration into the labour market. FF´s initiative in this area consisted in a program to employ people with different social and behavioural problems in a café, which is in most aspects similar to any other café. Here unemployed people have a regular working routine and a continuous social contact with clients.-This is an opportunity to learn new skills for a good reintegration in the labour market.

The new service proposed as a theme of a workshop with design students is a meal delivery system for people working-in the central areas of a city. Businesses in those 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 small cafés and restaurants offering good quality food, to satisfy their needs and optimise the time for their lunch break. The service should 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 with low employment capabilities in five main functions: logistic, payment, IT, delivery, marketing and bike repairing (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 provider, in turn, will contribute to the service with a small amount of money per 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.

The research question

The project's approach to social innovation is based on the direct participation of local actors in the development of innovation. The project is supposed to generate a broad structure in which FF will organise

[1] Several design education institutions in Denmark are focusing on service design. Service design is now a consolidated subject in design education in several Scandinavian countries and in UK. Recently service design has also been the theme for exhibitions and conferences promoted at the Danish Design Centre. System Design at the School of Art and Design at Kassel University, Germany, one of the partners in this project, is developing solutions for people; in this approach the distinction of products, services, infrastructures is a secondary one.

the practical and operative aspects of the service. The assumption is that local actors (providers, 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 (they know implicitly *what* the system is supposed to do) and system developers know the technology (they know *how* the system can do it).

By transferring the responsibility to develop the system directly to users it is possible to capture essential knowledge that would be critical for the development of highly contextualised solutions. This condition however, would also reduce the possibility that those initiatives be reproduced in different local contexts.

This means that many of such initiatives remain isolated cases and little space is left for their broader diffusion, notwithstanding their high potential to offer concrete solutions to present crises of welfare systems. An important research question arising from this context is therefore whether those initiatives can be totally or partly transferable[2].

The reproducibility / transferability of those initiatives would be possible by using forms of *codification* of the knowledge needed for their planning and/or development. Codification implies the modularisation of the most relevant components included in a project (related to knowledge and processes) and a certain level of standardisation of such modules. In this sense codification implies a reduction of the reach and qualitative complex characteristics of local solutions into a simpler, but nevertheless more reproducible solution that could generate economy of scale or scope. [3]

The code to develop in this case includes all the organisational 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. Like software systems, local product-service systems can be built upon a *source code.* This contiguity, however, should suggest a set of relevant research questions:

- Is it possible to generate anything similar to a source code for initiatives based on social interaction and innovation? What can the source code for open welfare look like? Which are the aspects of codification that contribute to the reproducibility / transferability of this kind of design interventions?

- A further question concerns the capability for designers to contribute to generating such a source code, that means to design and represent the processes involved in initiatives of social innovation, as well as they are able to design and represent the outcome of industrial processes. Can the services in this context be compared with services developed in a normal business context? Do designers need any particular knowledge to operate in the context of social services? Are the criteria to evaluate efficiency of those services the same as those used to evaluate the efficiency of market-related services? Are there special methodological requirements for the social approach as compared to the business approach?

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[2] The debate regarding the question of transferability in design research is just beginning, see for example Chow(Chow, 2006).

[3] It is clear that the challenge in this project is highly complex, because the knowledge to be codified does not concern a product, or a process of transformation of material parts, but it rather relates to social structures and contexts, organisational and cultural components, which are by nature harder to be trapped in a code.

The hypothesis is that codification is possible on the problem side (dealing with the complexity of the situation to be improved) as well as on the solution side (dealing with the contingency of the form of the new situation):

- On the problem side we provide a *methodological concept*, which enables designers to systematically understand and represent highly contextualized situations and to specify processes in order to transfer these situations into preferred ones.

- On the solution side we provide a *platform concept* that supports highly specialized and complex Product Service Systems in a certain field of application by using basic solution elements.

The authors suggest that, when appropriately designed, the intervention in this area may generate good opportunities for innovation. In fact the project proposes a perspective shift in the way of doing business in this area, which raise the level of social intervention to the status of a normal business.

Designing for social purposes

A framework of designing for social purposes

Since its first contributions (Papanek, 1973) (*Ahmedabad Declaration*, 1979)[4] the debate about a social role for designers has pointed out the need for a new approach of design to social and environmental issues, challenging the dominant logic of economic rationalism that is orienting mainstream design activities. The most recent emergence of macroscopic phenomena, such as globalisation, massive migration, population ageing and new cultural patterns are increasing the demand for new solutions to improve social quality.

The traditional approach to social intervention is based on a *relieving logic* (Manzini, 2005) that replaced products and services informally offered by families, neighbours, social networks (*informal economy*) with a set of product or services offered by a *provider* to a *consumer*, on the basis of an economic exchange. In this sense the logic of public intervention on social problems did not differ from a market driven logic. However this logic is probably very expensive in the long term, because the separation between a *server* (the institution or the private company) and *served* subjects (the citizens) considers the latter as passive receiver, thus reducing their capability to solve their own problems in the future. Furthermore this logic undermines the social cohesion that an informal economy inevitably creates.

The problem of social quality, in other words, requires a revision of the traditional logic and possibly the definition of a new approach to social action.

Design and social quality

The capability to work on local contexts emerges as a spin-off of the same phenomenon of globalisation: new technologies make it possible to reduce market segments to extreme customisation. Furthermore global

[4] These are the two milestones of this debate. Papanek view was opposing market driven logics to socially oriented design, thus considering the two logics as antithetic and incompatible. The Ahmedabad declarations proposed a different view of design as *a powerful force for the improvement of the quality of life in the developing world*; thus proposing a view in which local and traditional cultures could be supported, without ignoring *the power that science and technology can make available* to them. A critical comparison of the two approaches has been proposed by Margolin (Margolin, 2006)

companies are recognising the local capability of generating context-related solutions as a critical competitive factor (Becattini, 2004). Global companies are challenged to become an active part in local networks including institutions, companies, and customers. This is changing the conception of the social role of business organizations:

- Rather than providing products, those organisation are now supporting local networks of stakeholders, and
- Rather than providing ultimate *relieving* solutions, they are providing semi-finished *platforms*, including products and services, that will *enable* people to create value according to their individual needs

This contextual condition would redirect the design agenda: Rather than finished material products, designers will be required to produce scenarios, platforms and operative strategies that enable small companies, local institutions, cooperative groups, association and individuals to produce their own solutions.

The long tradition of cooperation between design and industries generated an *operative paradigm*[5] (based on reproducibility of knowledge, division of labour, optimisation of resources), that can be useful to support designers working in the new context. A relevant design problem, in this context is to *industrialise* local and highly individualised solutions, that means making them *transferable* to different contexts, in order to satisfy similar patterns of needs.

Design and morality – a kind of qualification

The new perspective outlined above, together with the challenge for designers to redefine their role and activities, raise the question whether there should be a special moral code for design. Should design be a critical discipline? Jonas (2006) argues that design (as a discipline) is *uncritical*, because it has to be. Since we are confined to the observation of observations (2nd order cybernetics), it becomes delicate to evaluate the representations of reality by comparing them with reality itself. Pure criticism, whatever that might be, is not really useful in the process; the pivotal point is missing. Critical theory, the favourite toy for some intellectuals, is broken. It is impossible to embrace the entire world with its apparent calamities and – at the same time – to keep its perplexing complexity at arm´s length by "criticising" it. Criticism will be replaced by performance and appropriate methodology and the focus on the communicative process. Social systems (Luhmann, 1984) are systems of communications (groups, teams, neighbourhoods, companies, social movements). System and service design is aiming at intervention strategies regarding desired outcomes. But design itself cannot define these purposes. Design can be "critical" only in the sense that it provides and illustrates different choices and puts them to discussion among the stakeholders. It has no criteria that enable decisions as to morally "good" or "bad" solutions.

We should think of replacing normativity (criticism) by "teleology" (purpose orientation) and effectiveness. Rosenblueth et al. (Rosenblueth, Wiener, & Bigelow, 1943) re-introduced the concept of teleology into science. The critical attitude should better be transformed into an ironical attitude (Rorty, 1989). Imagination, provocation, intervention, etc. are essential elements of design´s role in increasing the variety of choices for people.

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[5] Arbnor and Bjerke (Arbnor & Bjerke, 1997) introduce the term *operative paradigm* to indicate a toolbox of *methodical procedures* and *methodics* that can be used to apply a methodological approach to a specific study area.

Design (as a discipline) is *amoral*. The claim for ethics as a major criterion in design seems to be a symptom of immaturity. We need a moral disarmament of design in order to become acceptable to other disciplines. Ethics should be kept implicit in the process. (Margolin, 1998) criticizes Simon´s (Simon, 1969, 3rd ed. 1996) definition of design as "transforming existing situations into preferred ones" as "deceptively catholic". But can there be a more challenging and responsible task than this? "Humanistic" attitudes are not really useful in a time where the "human measure" is an increasingly inappropriate criterion. Only by dropping rigorous concepts of humanism will we be able to work for real people in their individuality. It makes no sense at all to work for "mankind" or for "the environment". This attitude ignores complexity.

Design teams, companies and individuals are definitely *responsible* for what they are doing. Responsibility is only possible if we do *not* retreat to moral positions. There was the time when designers thought they would transfer real problems into real solutions. Today we know that these are just denotations indicating the starting point and the endpoint of a project. It is more appropriate to talk about transferring system state 1 into system state 2, always having in mind the **complexity** of state 1 (perspectivity of defining / designing the "problems") and the **contingency** of state 2 (there are many possible "solutions"). Contingency is inherent in the process. Responsibility is required to deal with this perspectivity in a democratic manner, to support, for example, error-friendliness of solutions or innovations.

Designers who act as moral guards will ring hollow, because this is not their domain of expertise; they just colonize the field in an inadequate manner. They should rather conceive themselves as scouts, sometimes as jesters (since the creation of alternatives is their area of expertise), hopefully as respected partners in a network of disciplines and stakeholders. Appropriate methodology, especially regarding communication, is essential.

Methodology

The need for accelerated and systematic innovation suggests to adopt *design as the generic process model of innovation***.** Since innovation is knowledge intensive, attempts at operationalization have to integrate the scientific and the designerly process. Furthermore a successful approach has to reflect the involvement of the designer / researcher in the process.

The emerging paradigm of "research THROUGH design" (Jonas, 2007) provides a methodological and epistemological concept for the relation of "problems" and "solutions". Problem definition (dealing with complexity on the problem side), project formation (dealing with the process), and solution generation (dealing with contingency on the solution side) have been integrated into a consistent process model. The challenge consists in its efficient operationalization.

General overview

System design, which is a major field of study at Kassel University, is using an instrument for systematic problem solving and innovation which is being developed for designers and design researchers and their

collaborators (Hugentobler et al, 2004, Münch, 2005)[j] . It helps to reduce complexity and uncertainty during problem solving and research while increasing efficiency and effectiveness when collaborating with partners and clients. Moreover, the instrument provides a terminology which improves the transferability of design processes (and possibly solution elements) to new / similar / comparable situations. The instrument operates from a design research perspective and is based on the assumption that this perspective encompasses social innovation processes as well as technological and market oriented R & D and innovation.

The approach distinguishes and addresses situation, process, methods and tools, (Fig. 1), and thus exceeds existing models (MEPSS 2005, IDEO, n.d.). It assists design researchers and their collaborators and clients to

1. Specify / categorize (problem) *situations,*
2. Match *process* patterns to the specified situation and define the *role* of design researchers in the process, and
3. Select *methods / tools* related to the process.

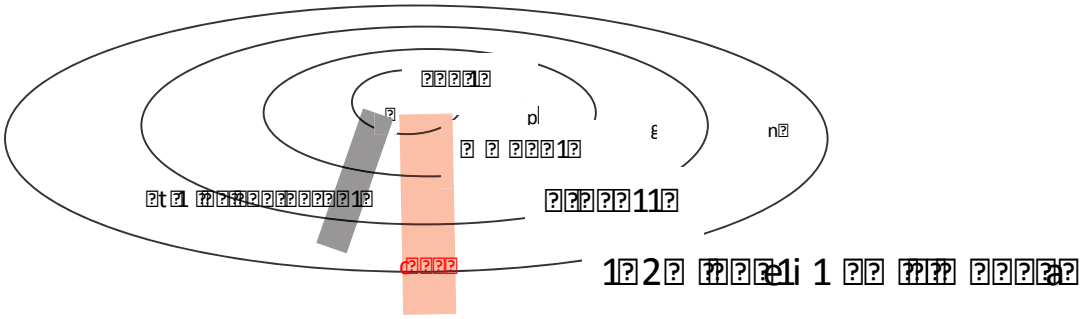

Fig. 1: t.bag addresses "situation" that other approaches leave unattended. Systemic models of the situation contribute to the transferability of solutions.

Theoretical background

The instrument is underpinned by a generic process model, which consists of a hypercyclic combination of the *macro-cycle (domains of knowing): ANALYSIS – PROJECTION - SYNTHESIS* (Nelson, 2003) and the *micro-cycle (learning steps): research – analysis – synthesis – realization* (Kolb, 1984), linearized into a "toolbox" (fig. 2) .

	research	analysis	synthesis	realization
ANALYSIS				

[j] [illegible]

PROJECTION				
SYNTHESIS				
COMMUNICATION				

Fig. 2: Hypercyclic model of a generic design process, linearized into a "toolbox" (Hugentobler, Jonas & Rahe, 2004), (Münch, 2005).

T.bag starts with the problem specification and a systemic model of the problem situation. From that a preliminary proposal for a specific process is derived, based upon the generic process model and using methods and tools from the toolbox (this is pre-rationalization). The proposed process can be modified according to new and changing insights and requirements any time, so that t.bag has the function of a communicative / reflective tool during the process. The final process can be documented and stored in a project archive for further evaluation and use (this is post-rationalization). The growing archive will feed the toolbox and generates new knowledge regarding the appropriate use of methods for the configuration of processes. Prototypical processes for certain situations may emerge, so that transferability of processes will be a longer-term effect of the use of t.bag (Chow & Jonas, 2007).

The approach is made operable by applying a number of descriptive concepts: project dimensions, project domains, project constraints and process types, which are used for stepwise specification of a situation, which needs to be improved, i.e. for the definition of a problem-solving or innovation project.

- **Project dimensions** comprise:
  - *System:* scope of contextual factors to be considered: market, society, environment, etc. (degree of complexity),
  - *Research:* scientific standard to be considered (degree of scientific knowledge input),
  - *Future:* projective time space to be considered (degree of uncertainty), and
  - *Implementation:* executive opportunities (degree of realisation).
- **Project domains** describe the project focus and comprise:
  - *Technology,*
  - *Business / market,*
  - *Human values.*
- **Project constraints** specify further conditions and comprise:
  - *Schedule,*
  - *Budget,*
  - *Human resources, etc.*
- **Process types** are derived from the hypercyclic model / toolbox (fig. 2):

ANALYSIS				PROJECTION				SYNTHESIS				
												1 a "complete" design (research) process
												2 a futures studies process (without synthesis)
												3 a "normal" design process (without proper projection)
												4 a "risky" design process (not properly grounded in what IS)
												5 an analytic process (inquiry into "the true")
												6 a projective process (inquiry into "the ideal")

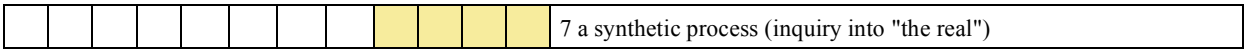

Fig. 3: Rough categorization of innovation-, design and design research processes.

Operationalization

The following describes the operational steps in more detail. They can be considered as a conversation between stakeholders, which tries to clarify the situation in order to design an appropriate initial process plan.

(1) Specify problem situation

- Identify the overall process by determining the values of the **project dimensions**
    - **System** dimension: high in this project, because of the specific complexity of the client´s system (employees, social aspects, market situation) and the uncertain contextual conditions.
    - **Research** dimension**:** low in this project, just existing knowledge.
    - **Future** dimension: short to medium terms (2-5 years).
    - **Implementation** dimension: low to medium, a concept / feasibility study, serving as a pool of ideas for the working prototype.
- Decide on the **project domain**

In this project: User values with a side glance at future business opportunities. Users are the end-users as well as the client´s employees.

- Specify **project constraints.**

This is a students´ project with emphasis on SYNTHESIS, tight timing, no budget.

(2) Match process patterns to specified situation

- Select **process type**

The determination of the project dimensions and project domains helps to select a process type, see fig. 3. This project would correspond to type 1: a "complete design (research) process".

- **Match** process patterns to the specified situation and process type.

Once a situation is specified in terms of dimensions, domains and constraints and the process type is selected, it can be matched to more detailed process patterns. Specific methods and tools to be used can be selected (fig. 4).

timeline	Week 1		Week 2 Week 3
Project phases	**ANALYSIS** mainly existing data	**PROJECTION** future images, contextual uncertainty	**SYNTHESIS** detailed concept of the PSS and exemplary realization of product proposals
Methods used	Sensitivity modelling / analysis	scenario-building ("quattro stagioni"), essential in order to explore uncertain future contexts…	Business concepts Use-cases Prototyping User studies Quick&dirty concepts
Project characteristics	- Design (user values) emphasis - Emphasis on usable concepts - Systemic emphasis, system model necessary as a basis for understanding the system´s dynamics and sensitivity,		

Fig. 4: More detailed process pattern of the project, derived from the situation and the process type.

(3) Select specific methods /tools to be related to the process

Methods and tools are categorized by means of the underlying toolbox structure. In combination with the information available from the considerations above, i.e. the detailed process specification, it is possible to select appropriate methods for an optimal process. This is the link between the four levels of the approach as shown in fig. 1. The result is a preliminary project structure including the methods and tools to be used.

Process

The process consists of the 3 main steps of ANALYSIS, PROJECTION and SYNTHESIS according to the generic model. Analysis and projection have to be packed into 4 days, so that no further field research was possible. Because of the high systemic dimension of the situation it was decided to put the main emphasis on the system analysis and the exploration of uncertain (future) contexts. Both provide a kind of basis and guideline for the more detailed design efforts in the synthesis phase.

Starting point is the well-known interface concept of designing as put forward by (Alexander, 1964) or (Simon, 1969, 3rd ed. 1996): design creates the fit / the interface between the inner system (the artefact) and the outer system (the uncertain context). The inner system is the PSS to be designed, the outer system is the social / market / urban context in which the service has to be viable. This is also comparable to the logic of SWOT analysis: matching the strengths and weaknesses of the system with the opportunities and threats of the environment.

ANALYSIS and PROJECTION

Sensitivity analysis (Vester, 1999) creates a systemic model of the situation by building an effect system out of the relevant factors determining the situation.

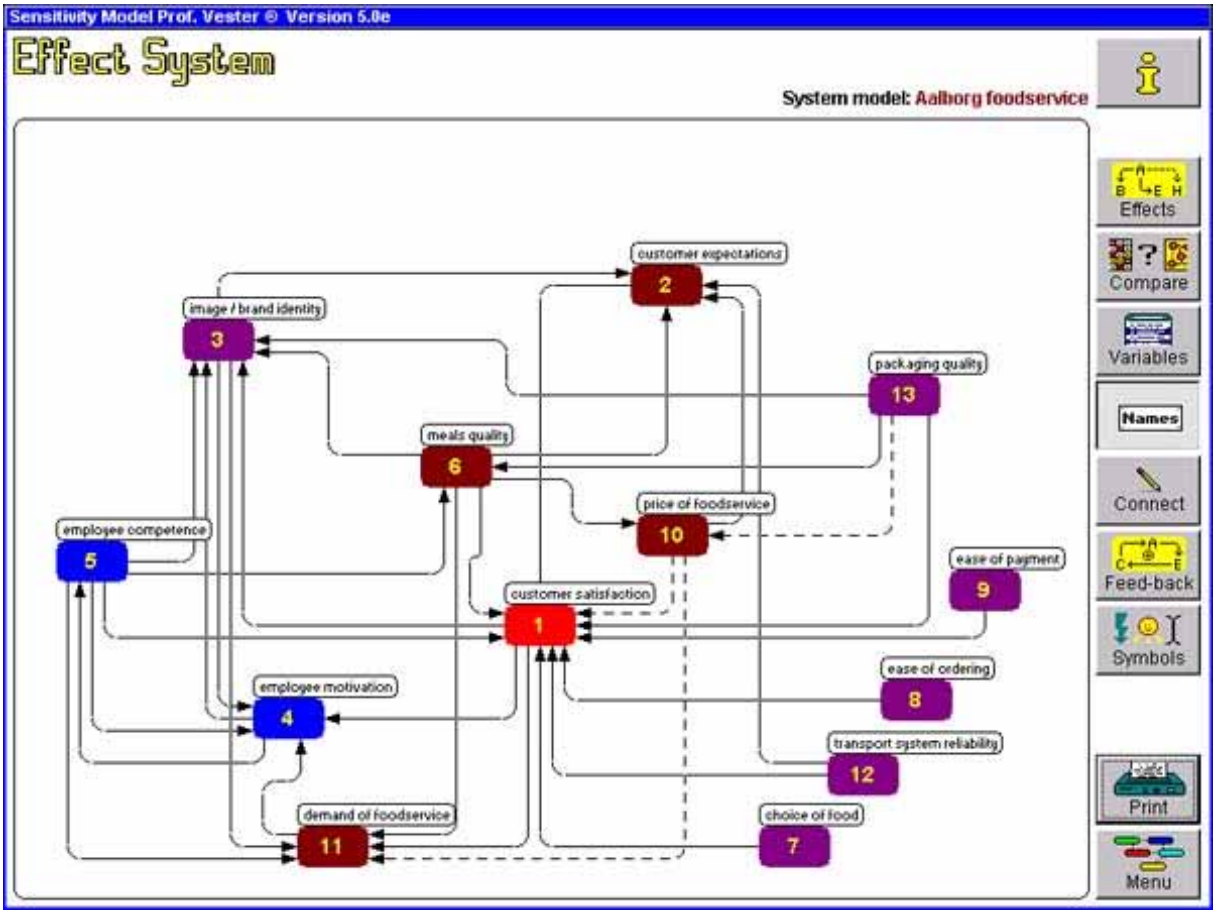

Fig. 5: Effect system of the meal delivery service.

By means of cross-impact analysis it is possible to gain valuable insight regarding the systemic roles of the variables:

- **active** factors (e.g. 5 employee competence, 13 packaging quality, etc.) have a strong impact on the rest of the system and may be used as levers for intervention,

- **reactive** factors (e.g. 1 customer satisfaction, 3 image / brand identity, etc.) serve as indicators showing the state of the system, they are normally not useful for direct interventions,

- **critical** factors (e.g. 4 employee motivation, 1 customer satisfaction, etc.) have high influence on the rest of the system and are – at the same time – influenced by the system, they have to be handled with much care,

- **neutral** (e.g. 10 price of foodservice) and **buffering** (e.g. 13 packaging quality) factors contribute to the self-regulation and stabilization of the system.

Sensitivity modelling is not a solution machine but serves as a communication platform structuring the debate among stakeholders and contributing to a common understanding of the situation and its dynamics. And, of course, this contributes to structure and purpose-ortientation of the further process: **Motivation of the employees**, **customer satisfaction** and **reliability** of the service turn out to be essential for the system.

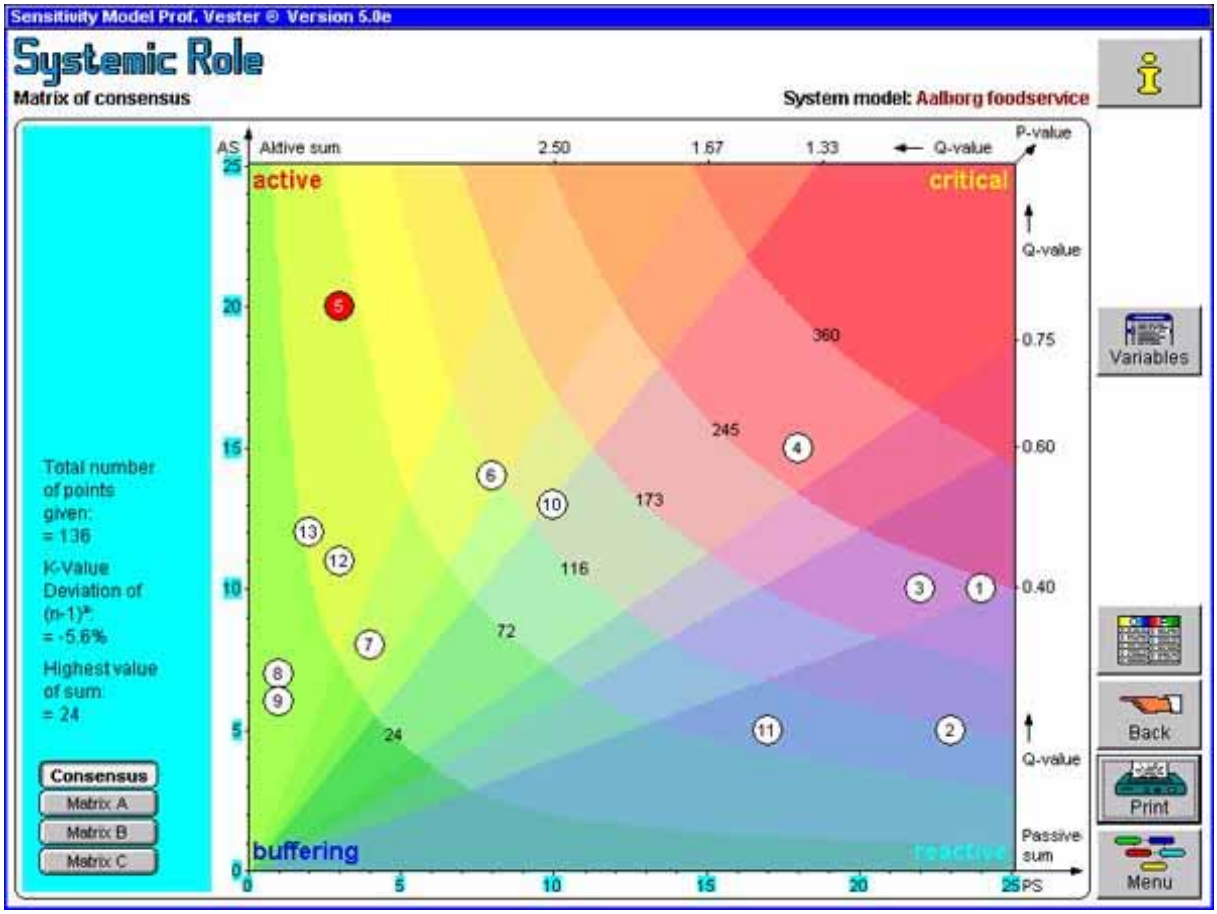

Fig. 6: Systemic roles of factors of the meal delivery system.

Another essential outcome of ANALYSIS is the definition of activity / solution modules for the foodservice: **logistics, delivery, payment, marketing / PR, and bike maintenance**.

PROJECTION

Projection normally deals with possible future states of the system´s environment and the viability of solutions with respect to these conditions. Here it is not so much the future state but the present situation of customers´ demands in the local context that is unclear. So we have to ask: what are the external uncertainties that influence success or failure of the service?

We use the scenario approach "quattro stagioni" (Schwartz 1991) to describe 4 extreme contextual states. The main purpose of this step is to make possible future contexts explicit. Increased awareness of future uncertainty contributes to the transferability of solutions into new contexts. With reference to the debates in the ANALYSIS phase we decide to use the dimensions:

- time flexibility of customers (fast food – slow food)

- food preference of customers (simple food – complex food)

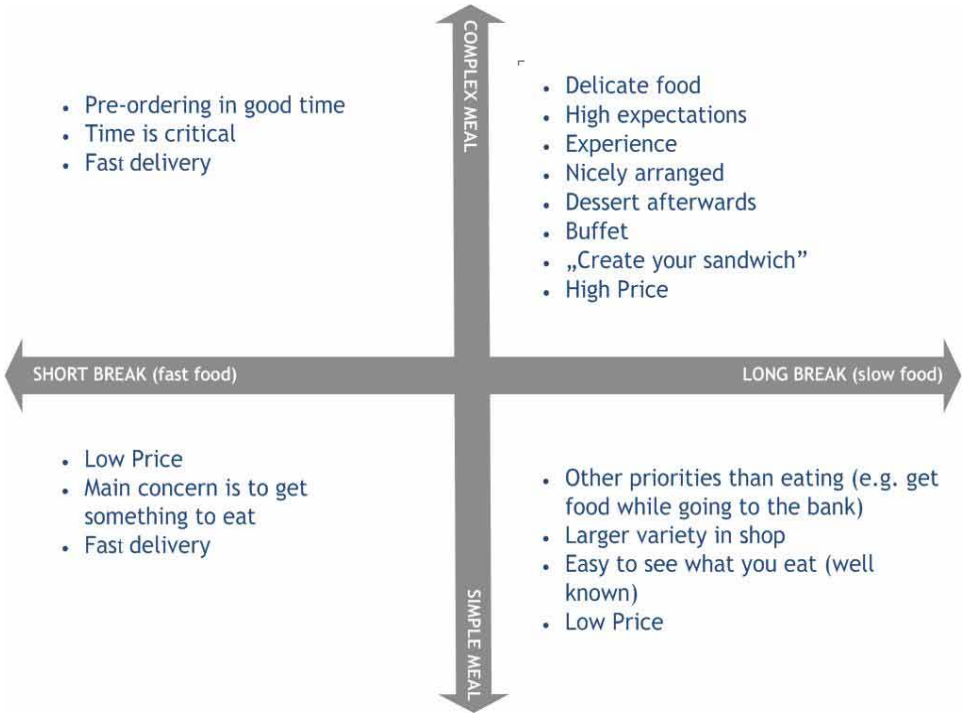

Fig. 7: "Quattro stagioni", 4 different scenarios for the service.

In a final step we try to match the activity / solution modules to the scenarios:

- If we are uncertain about the future context, then we should aim at a robust strategy, which is usable in different contexts (a horizontal row, explorative scenario approach).

- If we are certain about the future context, or if we are determined to be successful in the chosen scenario by all means, then we should aim at specific / taylored strategies aiming at the desired state (a vertical column, normative scenario approach).

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Logistics				
Delivery				
Payment				
Marketing / PR				
Bike maintenance				
...				

Fig. 8: Strategy development for the activity fields related to the scenarios (Jonas, 2000, 2003, 2005).

SYNTHESIS

The synthesis consists in the development of the four scenarios outlined above into details.

Each scenario defines a business concept on the basis of the most critical factors identified in the "4 stagioni" method and in the sensitivity analysis (Fig. 9).

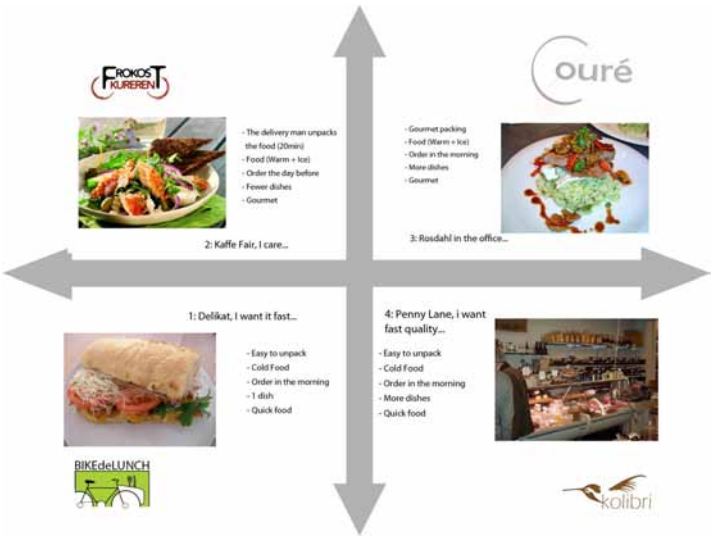

Fig. 9: Overview of the four concepts deriving from the 4 stagioni method.

Requirements

Each concept, identified with a name, defines a platform of actors, interaction, information and business flows that needs to be defined in details. The requirements are therefore organised on the basis of the 5 activities fields described in Fig. 8:

Logistic aspects depend on bicycle transportation and customers' expectation about delivery time. Those aspects concern the identification of a *served* area, a number of food providers that can be associated to each concept, number and efficiency of the couriers (the project does not assume the courier to be in perfect shape every day)

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: delivering people should not have the responsibility to collect the payment, this has several implications on the organisation of the payment system.

Marketing/PR: delivering people are not specialised in this service, and in some case they have problems in their social relation with other people. This requires more attention on strategies to address customers' expectations and on the interaction between customers and delivery people.

Bike Maintenance: The service has its own bike repair workshop, that should also 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 "4 stagioni" method, is organised in order to address different design aspects:

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

A modular architecture

Being based on bicycle transportation, the service must cover a limited area of the city centre and use only local resources (food providers, restaurants). The methodological approach used for the organisation of local activities and the exploitation of local potential is based on a modular architecture, in which each module refers to an autonomous actor. Each actor holds the knowledge needed for providing a part of the service. The main organisational task is to generate a *solution platform* that allows multiple solutions, by specifying sequence of events, interaction among modules, physical and financial flows (Fig. 10).

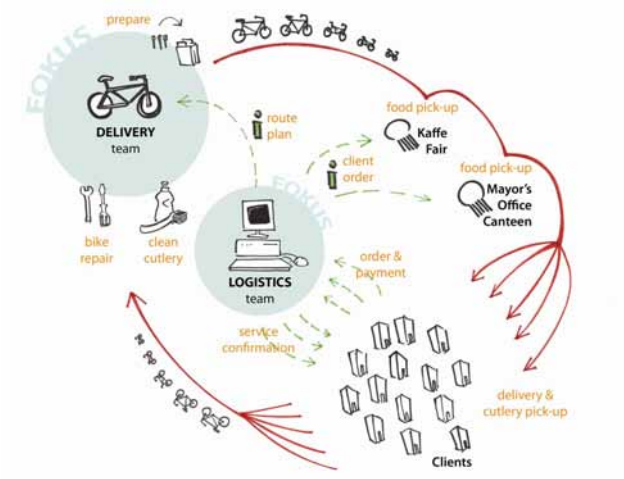

Fig. 10: Specification of quality and sequence of interaction among the actors in the "Frokost Kureren" concept.

Those platforms allow for a distribution of *engineering power* among the modules of the platform. Each module will be appropriately designed and organised at the local level (e.g. each food provider will autonomously decide upon its offering), while the system organiser will negotiate the connection of those modules through an appropriate modelling activity that simulates the behaviour of the system in time and space. The system organiser should also propose elements essential elements for the coordination of the activities , such as time planners, bicycle transportation, a web page for ordering and daily menus.

According to this methodological approach the first stage of the project consists on the identification of the actors (food providers, service providers and customers) (Fig. 11) on the basis of their geographical location.

a b

Fig. 11: Geographical identification and location of the suppliers, service providers (a) and customers (b) for one of the "Colibri" concept.

Addressing time-related instances

Likewise architectural design, the concept development process can start from larger scales (platforms) and, in a second phase, be articulated into details (products and interactions)

Unlike architectural design, though, the definition of 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 logistic and delivery. The whole system should be organised around a very short “time window” for delivery: lunchtime.

An event based method, such as use cases, can effectively address time-related instances of the service. Use cases are used in service design to specify the sequence of events in a service (Morelli, 2002). Each use case represents a simple instance of the service and focuses on a specific actor (the courier, the customer, the IT unit). The time sequence specifies each phase of the service, elicits requirements concerning the actor’s experience (front office) and the system behaviour (back office) (Fig. 12), finally, use cases facilitate the coordination between individual time plans (Fig. 13)

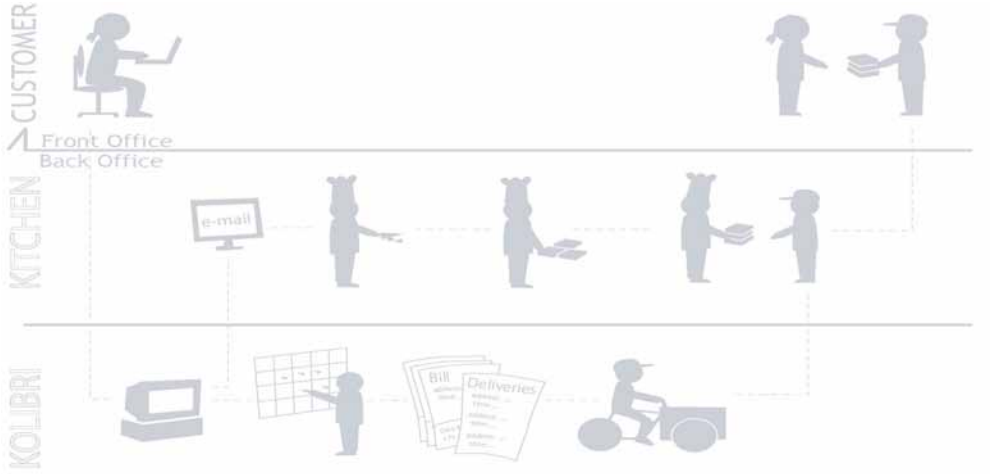

Fig. 12: Use case specifying front and back office for the "Kolibri" concept.

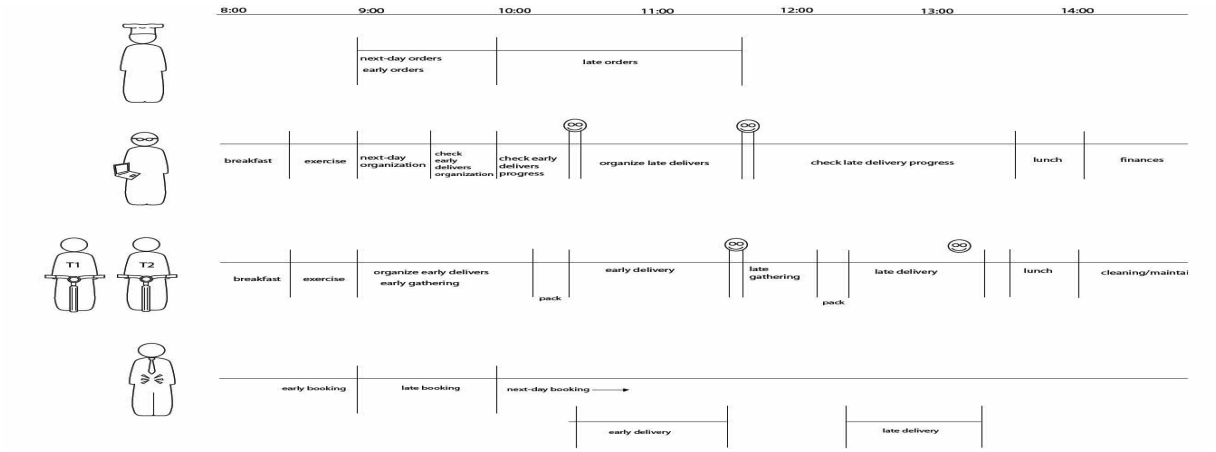

Fig. 13: Time plan comparison in the "bike the lunch" concept.

Planning variation of individual choices

The focus on highly individualised solutions requires that different scenarios be defined, that address individual choices. The scenarios consider different actors' behaviour, different organisational instances and emphasise their implications on the system.

Scenarios are particularly relevant in the organisation 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) and with organisational instances (e.g. the availability of meals or food providers that satisfy that choice). By grouping those instances, different ordering scenarios can be adequately addressed, that improve the efficiency of the service (Fig 14).

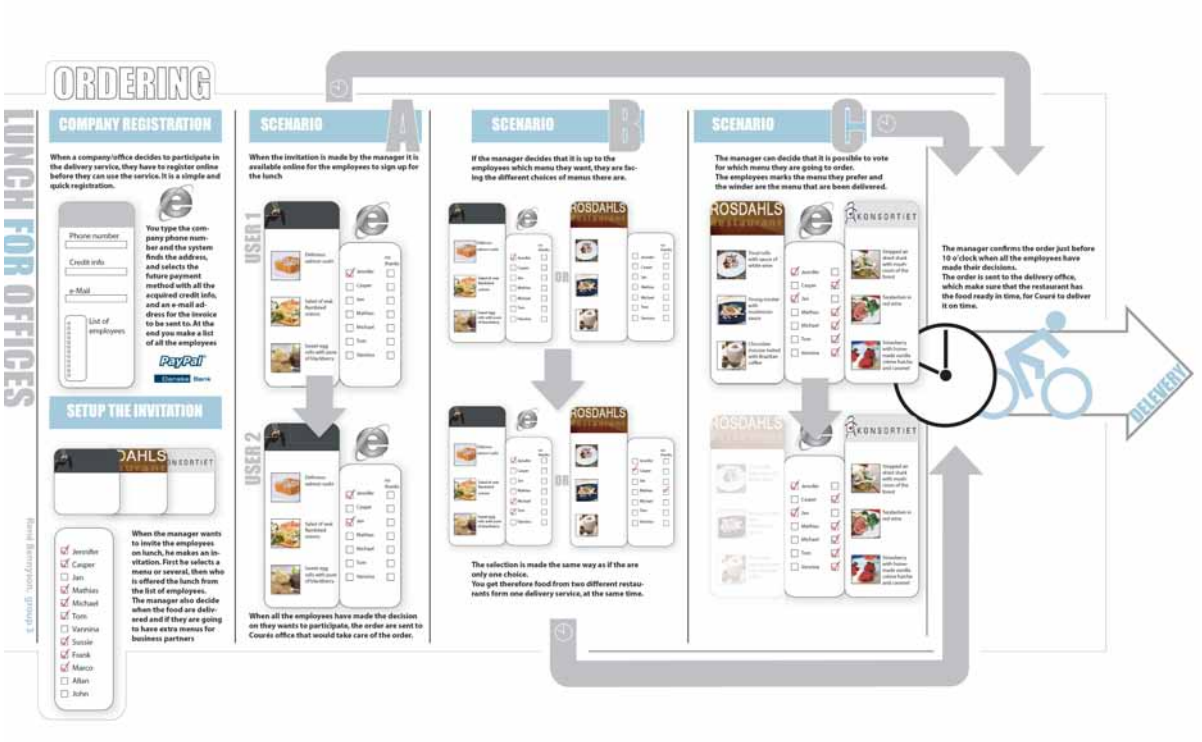

Fig 14: Meal ordering scenarios in the "Couré" concept.

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 will support the service (Fig 15).

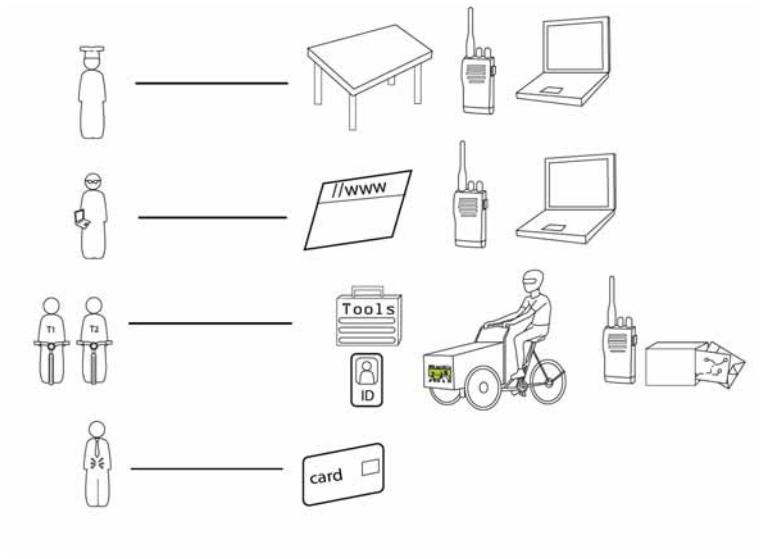

Fig 15: Product and technologies associated to each actor.

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.

Outcomes

The design process brought about four detailed concepts for the "Frokost kureren" service proposed by FF. In fact frequent meeting with FF personnel made it possible for this organisation to be an active part in the development process. Although some of the concepts proposed were not perfectly adequate to this specific initiative the four framework concepts were useful for the company to focus on the problems and develop new solutions.

The focus on the problem side emphasised issues related to

- an adequate time plan to organise the logistic-delivery system, with particular focus on critical phases, in which several functions are overlapping;
- different demand patterns;
- an adequate coordination of the offering from different meal providers
- a marketing and communication strategy consistent with the effective capabilities of FF personnel

By focusing on the solution space FF was able to:

- Identify an approach to coordinate time related instances in the logistic and delivery system (e.g. use cases and scenarios)
- Identify different solution frameworks to address different demand patterns (i.e. different ordering or membership scenarios)
- Identify the elements that would support the interaction between different actors (e.g. booking systems, online menus)
- Define an adequate qualitative level for the service according to the available resources (PR, service identity, interaction between customers and service).

After the workshop the service was started for a test period. FF chose to work on a mixed concept, considering a limited number of meal providers for customers with long break (a scenario similar to the lower right quadrant of the 4 stagioni method). The service is still in the test phase because of the difficulty for the personnel to guarantee an adequate level of service.

Conclusions

The research questions addressed the issues of

codification / transferability: whether is possible to generate anything similar to a source code for this kind of initiatives and what form for the source code; and

differences / similarities of business- and social processes: whether criteria and procedure for designing services in a socially oriented context are different from market oriented services

Transferability of the approach

The relevance of this project in the debate on design research lies not only on the design process for this specific solution, but also in the definition of strategies to "codify" the design process, in order to transfer elements and procedures to further projects in different contexts. This paper proposes the question of

transferability both on the problem space and on the solution space, thus proposing a methodology for handling the problem and an approach to structure the solution:

- The methodology / methods toolbox as described and applied above provides a framework and guideline to deal systematically with highly contextualized design situations. In spite of the situatedness of every new problem t.bag contributes to the collection and refinement of prototypical process patterns.
- The articulation of the solution into an architecture composed by modular elements creates a platform for different combinations that can provide highly individualised PSSs.

Business design processes vs. social design processes

When working on local projects, socially oriented design processes and business processes are both focusing on contextual conditions; in this sense the difference between the two approaches is minimal. In both cases, the processes introduce conditions that are "external" to the design activities, and do not bring about fundamental changes in the design process, although they do imply a different approach. Designers will need to abandon traditional top-down and business centred approaches and increase their sensitivity for social contexts. The design team should individuate a network of local actors that will co-develop the solutions.

Designers, with their methodological approach to innovation and their aesthetic expertise will keep their role as change-agent even in local and highly individualised solutions, but the "symmetry of ignorance" requires a modest attitude for designers, in order to withdraw from the previous control position and become a moderator in the innovation process.

By focusing on mechanisms of activation of local social and business resources, this project points out at the big opportunity for innovation in design activities. Whether coming from business or socially oriented processes, such innovation changes the perceived role of designers in the development process, though it does not change his/her level of responsibility for their action.

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