

Design as a problem and design as a solution for sustainability

Nicola Morelli, School of Architecture and Design, Aalborg University

Nmor@aod.aau.dk

Abstract

The role of industrial design has been essential in the definition of an industrial model based on large production volumes for broad markets, but industrial designers also contributed to the maturation of such a model towards sophisticated production platforms and product architectures, which allowed industrial production to customise solutions for smaller target groups.

The growing attention to the question of sustainability, together with economic and social factors related to globalisation and to the more recent economic crisis, is making more and more evident that this model is intrinsically unsustainable and problematic. Because of its tight link with this model, industrial design was considered a critical part of the problem.

This made the design discipline particularly sensitive to the question of sustainability. In this context the need for a decisive change of perspective for designers is certainly a necessity, but can also be an opportunity to propose a new approach that can generate opportunities for sustainable innovation and development, especially at the local level.

The new approach is based on a genetic change in the role of industrial companies and designers, which challenges the public perception of design action. However, the deep roots of the design discipline in the culture of industrial production and the analogies between this historical moment and the beginning of the industrial revolution may provide interesting insights on how designers, companies and institutions can seize the opportunities coming from such a large and rapid change.

Are designers part of the problem?

A non-designer observer of the activity and the role of design in the last century would not hesitate placing design as a complementary activity in the evolution of the paradigm of industrial production. The activity of design is rooted into the very first part of industrial revolution, although it became more and more evident with the maturation of industrial production, when the division of roles and competences supported a clearer definition of the activity of designers. In the past century designers invented new products, sometimes introducing substantial social or technical innovation, or, in other cases, they contributed to improving the aesthetical 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 towards sophisticated production platforms and product architectures, which allowed industrial production to customise solutions for smaller target groups.

Design has contributed to define the social and economic role of industrial production in modern society, to the point that it has been sometimes seen as one of the key factors for the identity of a country, as it happened in Italy, UK or in Denmark.

Finally designers have been able to link engineering thinking, mainly focused on production aspects, to humanistic thinking, which put users and their needs at the centre of innovation activities. An optimistic statement would go as far as to say that design has been essential to bend the hard core of industrial production towards the well being and comfort of society. In this view designers have played a critical role in the solution of social, cultural and economic problems related to the development of industrialised countries.

The emergence of concerns about environmental sustainability, and, in the last few years, the increasing –and long overdue– political attention towards more sustainable production and consumption models are calling for a radical redefinition of the main parameters of social and economic development, including industrial production and the way it organises, serves and supports consumption patterns and lifestyles.

The evident phenomena related to climate change have made it clear that the way industrial economies have addressed the question of economic development and individual well being is unsustainable, the limits of the environmental capability to support this model of development are being forced. The environmental consequences of such situation are clear to everyone; besides those phenomena, the social and political turmoil of the last decade can also be interpreted as another serious consequence of the failure of such model to provide a balanced development of humanity on this planet.

One of the starting points for a substantial revision of the framework in which designers are working has been the debate about a study of sustainability promoted by the Dutch government (Weterings 1992) which suggested that a 90% reduction of the global ecological impact (factor 10) be needed, by 2040, to preserve a significant amount of resources for the next generation. Beside the question on how to work towards such reduction, the factor 10 debate also issued a strong warning against expanding the western development model to developing countries.

Besides offering an uninteresting scenario of a global society flattened production and consumption culture of western countries', the expansion of the western development model would have catastrophic environmental consequences in the medium and long term, because of its high resource intensity.

A new dimension to this question has been added by the rise of a few sleeping economic giants, such as China, which focused the debate about globalisation onto more tangible questions, including the relocation of work activities and the emergence of evident social inequalities.

Anti-globalisation movements have emphasised the social inequalities caused by the relocation of work and exploitation of labour force (Klein 1999). However such inequalities are not solely related to different geographical areas of the world; even within western countries the high level of unemployment caused by this phenomenon is causing the gulf between social classes, while, at the same time immigration flows and the ageing of population are eroding the basis of the welfare system, thus requiring a new framework for the definition of social quality.

The combination of those factors and, more recently the current economic crisis and the renewed political interest for a sustainable development are now reviving the early warnings, pushing more and more business and institutional actors to review their future development agenda.

Sustainability and changes in the designers' perspective

The debate about sustainability in the design discipline has a its root back in Buckminster Fuller projects and in the almost contemporary contributions of Victor Papanek (Papanek 1973; Papanek 1985), almost thirty-five years ago. Papanek pointed out the designers' responsibilities with respect to major social and environmental needs. Fuller's and Papanek's contributions were perhaps the earliest alarm bell ringing for a change in the design profession, although this call did not cause a large impact in the mainstream industrial production, consumer culture and on development policies. Papanek, proposed a polarisation, between industrial production in developed countries and local production in developing countries which reflected a general view of design as associated with the mainstream industrial production. Although this was not Papanek's intention, such a polarisation kept designers (with few exceptions) distant from any possible participation in innovation initiatives and developing policies.

For several years the majority of designers interpreted their social role as complementary to business strategies. This approach was very critical towards any design initiative that was not based on the traditional market-driven approach. It is true that a small group of designers was proposing interesting albeit isolated design contributions for the solution of social or environmental problems¹, but the logic of economic rationalism seemed unbreakable, and it did not contribute to any exploration

¹ An overview of such contributions is proposed by Margolin (Margolin 2002) Another relevant contribution in this sense came from Ezio Manzini ((Manzini 1990; Manzini 1995) Who considered environmental problems as a question concerning the ecology of the artificial world. With this proposal Manzini was in fact overcoming Papanek's approach, by proposing an approach that instead of contrasting industrial production was proposing a change of its intrinsic logic.

of the middle ground between pure market-based industrial logic and socially responsible design.

The most recent developments, from the recent financial crisis to the new politics of the US government, are now suggesting a different scenario, in which industrial production's objective is compatible and complementary to sustainable development. In this scenario scientists and technologists are asked for a new effort to improve the physical aspects of social metabolisms whereas other actors, including designers, are urged to work on the major social, cultural, political and economical implications of the new scenarios.

This paper will explore such new perspectives, looking at some relevant implications and opportunities for industrial companies and modern economies.

Global production and local solutions

The economic crisis did not change the orientation of the mainstream industrial production towards globalisation. However more and more complex patterns in local markets are suggesting that competitive strategies should aim at generating context based innovation and highly individualised solutions. In general terms this implies shorter production chains or (as discussed in the next section) a different form of value creation, based on local "horizontal" networks of value creation and knowledge exchange. Although the social, economic and environmental sustainability of those strategies should be evaluated case by case, such strategies are in general terms aligned with the principle of social sustainability (because they focus on social interaction in local contexts) and environmental sustainability, because they tend to reduce the physical distance between production and consumption.

The challenge implied in such strategies is intuitively related to the need for business companies to compensate for the lower capability to realise economy of scale. Therefore such strategies need new alliances, in order to re-distribute production processes between global companies and local actors, including local authorities, service providers and even final customers. New *solution platforms* are needed, that mobilise local resources and context related, uncodified and tacit knowledge. Such platforms will most probably open the way to new solutions that are strongly linked to local contexts and are almost tailor-made on the needs of individual users.

Solution platforms would organise local and individual resources in *modular architectures*, in which each module clearly defines a set of competences or skills. This form of modularity makes such solutions replicable in different local contexts. The organisation of such modules is a design activity that stirs up memories of the first industrial revolution: at that time, tacit knowledge from craftsmen was *de-composed* and reorganised in modular industrial components; an analogous operation at present

time would make it possible to capture and de-compose tacit and un-codified knowledge embedded in local contexts and recompose it in *scripts*, sequences of events, organisational structures that make local and personalised solutions more concrete, reproducible and easy to communicate.

The characteristics of the knowledge included in such solutions, however, represent the challenge of this new industrial revolution. The actors involved in those solutions have different cultures, language and knowledge. The new platforms put together global companies, local service providers and individuals, engineers and high specialised personnel, together with elderly people or other people who are not supposed, nor can be required to pass through a complex learning process. New languages and approaches are needed, to make sure that such heterogeneous mix of actors can work together on a common platform.

The main challenge however, is in the substantial change of perspective required by this approach. A sort of *genetic mutation* is needed, which is based on a radically new way of looking at some fundamentals of the present industrial model. The following sections will illustrate some critical characteristics of this mutation.

Enabling, instead of relieving

The new framework illustrated in the previous section implies new forms of interaction between global and local actors, and between producers and consumers. Norman and Ramirez; compare the existing business approach, based on linear processes of value creation (value chains) with an emerging model in which value creation is based on horizontal networks including final customers (Value constellation)(Normann and Ramirez 1994) The new form of value creation implies new roles for business companies, which are no longer *producers*, but rather *organisers of value creation*, and for customers, which are no longer *receivers* of companies' offerings, but rather active *value co-producers*(Ramirez 1999). This perspective shift has very critical implications, because it implies some fundamental logical changes in the traditional market-driven approach.

This approach was based on the idea that business companies' role was to *relieve* their customers/users of the many tasks of everyday life. According to this approach business companies have progressively extended their offering, to include tasks that were previously performed by individuals or by their social networks (family, friends): given a problem (washing clothes or organising a party), a solution was offered for a price, thus relieving individuals and their social network of the effort and responsibility to perform that task. In economic term this approach brought typical activities of our informal economy into the market place, thus making them an instance of the formal economy.(Normann 2000). In the market logic this implied broader business opportunities, however this logic does not consider the negative effects of a progressive

passivisation of users, deriving by their increasing lower involvement in the definition of a solution. Users, who no longer need to use their own technical, practical or social skills, will progressively lose their capabilities to solve their own problems or even to define them. This logic, which is the fundament of the idea of *comfort* in the existing market-driven approach, is in fact disabling people (Manzini 2005) because it deprives them of the capability to solve problems in the future. What customers now save in physical effort or time will be paid in the future in terms of lost knowledge and skills. People will need more and more services and products to find solutions they could easily find by themselves. Such a progressive deprivation of capability has been indicated by A. Sen as a critical cause of social disadvantage. Although Sen's consideration referred to developing countries, his idea of active human beings, as opposed to passive receivers of products or services, provides an interesting point of view for revising the approach to social and environmental problems also within the most industrialised countries, because it reverses the present trend to move individual and personal activities from the private area to the marketplace. Needless to mention that this logic is sometimes undermining social relationships as it replaces personal links and social networks with technological products or services.

Of course this paper is not implying that a logic based on value co-production is intrinsically more sustainable. The economic and environmental conditions generated by the new approach should of course be evaluated case by case. However one of the more interesting aspects of this new logic is the discovery and activation of hidden or sleeping resources: skills, competences and capabilities, which, once activated, can open new scenarios. Those resources may prove very valuable when addressing problems, such as the reform of welfare system or the definition of sustainable strategies for industrial systems, because the present forms of organisation of those systems are socially, economically and sometimes environmentally unsustainable.

Environmental quality and social quality

The landscape outlined so far reveals that one of the main directions indicated in the debate on sustainability, the question of localisation and shortening of the production chain, is in fact a territory in which environmental issues become entwined with the theme of social quality. A perspective shift in this territory may provide a significant contribution to the question of sustainability.

At the local level the idea of social quality has been widely revised in the light of a progressive shrinking of public intervention in the public sector (De Leonardis 1998). The public initiative has gradually been replaced by market-driven initiatives, which have introduced market logics, often driven by the above mentioned relieving approach. The question of social quality however, needs to be revised in a renewed perspective, that looks beyond the traditional market-driven approach.

A new definition of social quality should be based on (De Leonardis 1998; Morelli 2007):

- Enabling individuals to define their own needs and actively participate to the definition of their own solutions
- Increasing social participation, intended as active involvement in the improvement of the conditions of the local community

Those conditions refer to a need to *activate* citizens. In the traditional market-driven approach individuals were considered as *consumers*, i.e. *destroyers* of the economic value manufacturers generated and embedded in products (Ramirez 1999) They were considered as a problem, rather than a resource. In the new logic, instead individuals are requested to participate to the production process. The activation of individuals in the value creation process is particularly relevant for parts of the society (elderly people, jobless or people outside the mainstream consumption system, in developed countries) that are otherwise excluded by social life, and those communities (mainly in developing countries) whose consistency is undermined by poor socioeconomic conditions, which limit the individual's range of possible actions to a mere fight for subsistence.

A new industrial context

When focusing on industrial design, the genetic mutation requested by the question of sustainability touches the nodal point of the link between design and industries. Although business (and institutions) are still thinking of industrial production in terms of material production, some contributions addressing this issue (Manzini 1990; Margolin 2002; Morelli 2007) propose alternative views to the mainstream perspective that refers to design as tightly linked to product manufacturing.

In fact, we cast our sight beyond this link, we could observe a radical shift in the social and economic role of business companies. The technological infrastructure that allows for the relocation and management of manufacturing activities also makes offering from business companies more and more complex.

The fragmentation of the market to micro and sometimes individual target groups requires more attention to the distinctiveness of local and individual conditions. The call for a new, active role of local actors and individuals to the value co-production process is changing the nature of the output of industrial production from material products to solutions with high cultural and experiential value.

The role of business companies is shifting from product manufacturing to the organisation of local networks of actors. Business strategies are increasingly shifting towards an enabling approach and companies are becoming *organisers of value creations*, shifting their role from principal or sole actor in the production system to co-producer of value (Normann and Ramirez 1994).

Design and innovation are no longer placed in a landscape of well defined needs to which producers and designers are providing answers (products). A new landscape is still to be discovered, where new resources, such as tacit knowledge and context-related values, can be activated to generate new solutions. This implies that the locus for design and innovation be moved from the companies' design office towards the final user and specific contexts.

Local solutions and collective intuition

Social innovation is already happening in several local contexts, as a result of spontaneous evolution. Several processes of value co-production start from communities of customers/citizens, who take autonomous or collective initiatives to solve emerging problems or opportunities¹. The collective intuition and initiative may become an important source of innovation. Although the origin of this kind of innovation is in the spontaneous initiative of individuals or groups, companies and institutions may provide a valid support to the most promising of them. If appropriately designed, this support can provide motivations to local actors, organisational and logistic support and communication links. Here below some example of synergy between spontaneous initiatives and designed intervention is provided

Local production of food The awareness of the high impact of food chains on the environment and the uncertainty about the quality of food is encouraging citizens to shorten the food chain, using local providers or producing some food on their own. Local institutions are sometimes supporting this phenomenon by allowing citizens to cultivate small allotments in parks or peripheral areas of the city. This phenomenon has an old tradition in some countries (e.g. the *Kolonihaver* in Denmark) but it is now growing in many big cities ("SEP" 2006).

An interesting example of designed support to this phenomenon is the Urban Farming project. (Tackara 2007). The design support in this case is provided at different levels: at the micro-level the design intervention consists in the organisation of home-based farming allotments of different sizes, from boxes for the balcony to larger containers for the garden. At the macro-level design can provide organisational support for the generation of a marketplace for the locally grown vegetables. The presence of such a market is essential to scale local farming from the individual to the community. The market place consists of *meal assembly centres* i.e. centres where people can exchange their overproduction of vegetables.

Furthermore the kitchen Playground contributes to building motivation and raises the general culture about food and their production/consumption cycles.

Shared transport. Traffic and environmental pollution are convincing many people in big and small cities to revise their attitude towards car usage. Recently this trend has been reinforced by the renewed political interest in sustainable transportation. In the past decade, spontaneous initiatives of car sharing have been growing in all the most industrialised countries. The basic initiative consists in sharing the use of a car within a small group of people. In Denmark, where a very high tax regime is making car ownership much more expensive, a big car hiring company supported organized a car sharing system that could offer a solid logistic, maintenance and booking service.

The support of a large car hiring company consolidated such initiative, by providing support in logistic, maintenance and booking. The company offers the possibility to hire its cars for a short period of time (even just one hour) using an online or phone service. The customers of the service can also park in dedicated parking lots, distributed around the main Danish cities. After booking a car, members can access it by using a magnetic card. According to this structure, the membership in a car sharing system in one of the Danish cities gives access to car sharing systems in other Danish cities, too.

The car sharing service represent a substantial change with respect to the traditional car based mobility, because requires an active participation of customers, who have to accurately plan their trips and car use. However the increasing number of citizens who were happy to organise similar initiatives made business sense for this company. In fact, seen from the company's perspective, the new service does not imply major variations with respect to the traditional car leasing service. The design effort in this case consists of looking for opportunities for a new balance between the active participation required by car sharing systems and the traditional passive involvement of users, typical of other market-driven initiatives. In this case the company is "relieving" local groups of people of some of the responsibilities (maintenance, booking) in a car sharing system, working as a "mediator" among customers, making sure that cars are returned at the right time for the next user, thus using its reputation and services to generate a system of trust.

Creating Trans-local solutions

The new perspective is joining elements of the past in a new combination, indeed it reframes local and highly individualized solutions, typical of the pre-industrial age, within parameters and criteria inherited by the industrial paradigm. Before the industrial revolution local and tailor-made solutions were based on craftsmens' activities. As such, the solutions were not reproducible in any way. In this system the concept of innovation did not make as much sense as the concept of fit. The craftsman was not concerned about producing anything new as much as he was concerned about producing a perfect fit for his customer and for his local context.

In order to create the condition for reproducibility, industrial production had to abandon any ambition to fit the needs of individual customers and, instead, extend their solutions to broader target groups.

The new industrial context generates conditions that can bridge the gap between industrial production and the concept of fit. The condition for this to happen is to shift from economies of scale (offering the same product for the widest possible target group) to economy of scope (using the same knowledge to create different products that can address the demand of different target groups). This is possible by transferring the concept of modularization from products and components to organizational knowledge. The knowledge modules concern elementary components of a service, therefore they refer to activities that can be performed by local actors, thus making "tailor made" solutions possible for individuals and local contexts. The knowledge modules are the bricks of the architecture for local solutions; the mortar is represented by motivations and shared interests.

Trans-local furniture production. The New Zealand-based company Ponoko, for instance, gives customers the possibility to design their own product and have it produced locally. Users are required to post their design to Ponoko, which mobilises a network of producers, located in the customers' area that will deliver the components of the prototype and the final product, ready to be assembled.

Initiatives like this are based on a modular platform that can be partly or integrally reproduced in different contexts, once the needed knowledge modules (local cabinet makers or furniture manufacturers) are identified in the new local context.

The offering can be complemented with communication opportunities that link people from different contexts. Ponoko, for example includes customers' designed products in its web page, thus providing examples for other customers and offering existing customers the opportunity to come into contact with buyers in other parts of the world.

The creation of online communities around those systems generates flows of knowledge between different contexts, which facilitate the trans-local development and evolution of such systems.

Unlike traditional industrial systems, in which the transmission of knowledge is often a threat to the company's capability to keep its competitive advantage, the circulation of knowledge about specific solutions can reinforce the market position of the company that provides the platform for such solutions, in the new system. The technological innovation embedded in the solution is becoming less important than users' capability to find their own solutions. The ability of empowering users in this sense is a critical success factor for companies.

Designers and new clients

This industrial context illustrated in the previous sections would address the design agenda towards a different role for the designer: new *clients* will need designers, such as local networks of small companies, local institutions (banks, libraries, hospitals and local administrations), associations, cooperative groups and individual customers. For those people designers will no longer be asked to produce finite solutions, but rather scenarios, platforms and operative strategies to enable them to co-produce their own solution.

Such a new role for designers will be fully understood and accepted once the public perception of design agency in society is revised: at present, indeed, those actors that are more in need for a design action have very little knowledge about the designers' skills (the usual image of the designer as a creative decorator is the dominant reference), and have rarely considered the possibility that designers may contribute to addressing the new demand. This is particularly true when looking at emerging problems related to social and environmental sustainability. The traditional perception of design agency often excludes designers from the solution of those problems. Furthermore problems related to social and environmental sustainability are often characterised by a sense of urgency and sometimes by a logical location outside the traditional market mechanisms.

In order to become a part of the solution however, designers need a new methodological approach that addresses the requirements and expectations of the new industrial and social context. The industrial culture has generated an operative paradigm² to operate production and consumption processes within the traditional industrial production paradigm. This culture can provide several interesting insights regarding how to produce solid and sustainable solutions, i.e. solutions that are not only addressing an individual need, but are also empowering individuals and other social actors (service providers, institutions) to generate new social quality.

Two centuries ago the industrialisation process was based on the decomposition of the craftsmans' implicit knowledge in an explicit structure, that could be clearly transmitted across time and space. Industrial manufacturers were therefore able to create an economy of scale, optimisation of resources and a clear subdivision of roles.

A similar process of industrialisation, based on a *decomposition* of knowledge and re-composition in modular structure, could capture and transform part of the tacit knowledge at the local level in order to activate this knowledge in a platform that can support a set of systemic solutions that address individual needs.

Local meal service for elderly people The economic sustainability of healthcare policies is becoming a critical issue several governments are now trying to address by activating citizens, i.e. by providing them with tools to define their own solutions on the basis of a platform of local services. The Delight Assist project, developed at the school of Architecture and Design at Aalborg University, is an example on how this approach can generate an innovative solution for meal services for elderly people who live independently in their own home.

At present the structure of the meal service is quite rigid. Elderly people receive meals everyday. The meal consist of a variety of dishes, but the food they are provided with is ready made and needs to be consumed in few hours. An analysis of elderly people's routine and needs revealed that meals are much more than nutrition, indeed they often represent an opportunity for social interaction, especially for elderly people living in their own home. Having some food ready for friends or grandchildren coming to visit them is a way for elderly people to reduce isolation. Furthermore the meal preparation is sometimes a ritual elderly people miss, with the meal services. Many people would still be able to prepare their own meals; others would like to prepare their meals, but they have partially lost their skills related to fine movements (peeling potatoes or carrots), or simply they cannot walk to the supermarket for shopping.

The Delight Assist project started from the assumption that the process of meal preparation and consumption can be separated in 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 all the services in one solution (that corresponds to the existing service of prepared meals) or a service that provides semi-finished ingredients (such as peeled potatoes) and a service that provides 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)

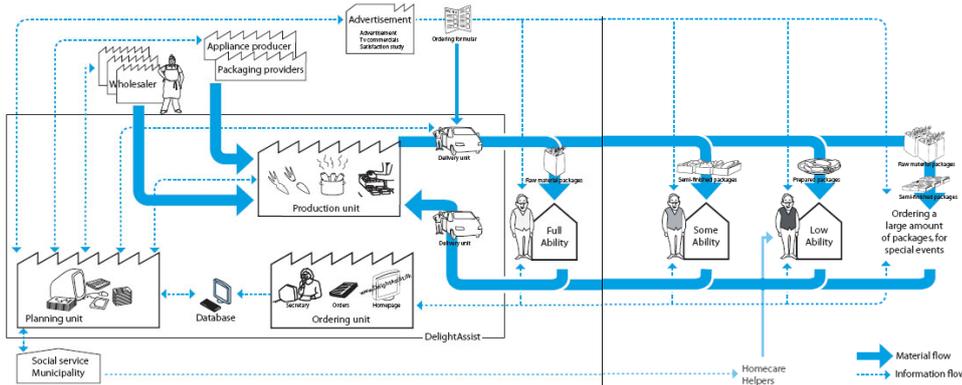


Figure 1 The *Delight Assist* project

The *platforms* that designers should work on support and organise modular structures in which the competences, roles and flows of interaction between different actors are specified. On the basis of such platforms, different combinations (*architectures*) will be possible, which allow each single actor to generate an economy of scope. Designers are in a privileged position to work within this context because of their attitude towards planning interactions (objects, services, or events) and finding a balance between the technologically possible (an *engineering* approach) and the socially desirable (a user-oriented approach).

Conclusions

This paper proposed that the designer be considered as an integral part of the problem of sustainability given the tight link between industrial design and the development of an economic system that is clearly unsustainable. However the designer can also be part of the solution. For this to be possible a new perspective is needed, that casts a light on the ongoing economic and cultural changes, especially at the local level. Such perspective considers that even global companies play their competitive strategies at the local level, involving local actors and paying much more attention to the role customers may have in the process of value production.

The new alliance at the local level needs to be adequately planned, in order to activate local actors and final users, but also opportunities for generating knowledge that can be reproduced in different local contexts, thus allowing for economy of scope. This process may benefit from an approach borrowed from industrial production, which is very familiar to designers.

Of course an important condition for designers to contribute to those new forms of local and highly individualised innovation is that the role and perception of designers' action be radically revised. The new condition implies a genetic change in the role of industrial system and, consequently a genetic mutation of designers' role and activity. Both companies and designers will no longer be proponents of a set of products and services

to passive users, but rather the facilitators of a system of value co-production. When the result of the designer's work was a product, the efficacy of the solution depended on the product's quality. In the new context, designers should rather work on the customers' (residual or full) capabilities and consider customers as a resource, rather than a problem

In this context, consumers become co-producers and designers will become catalysers in a networked system. In this sense the challenge proposed by Fuller and Papanek many years ago, to invest designers of the responsibility to make more sustainable conditions can be reviewed and finally implemented.

References

- Arbnor Ingeman and Bjørn Bjerke (1997). Methodology for creating business knowledge. Thousand Oaks, Calif. ; London, Sage.
- De Leonardis Ota (1998). In un Diverso Welfare. Sogni e Incubi. Milano, Feltrinelli.
- Klein Naomi (1999). No logo : taking aim at the brand bullies. New York, Picador.
- Manzini Ezio (1990). Artefatti : verso una nuova ecologia dell'ambiente artificiale. Milano, Edizioni DA.
- Manzini Ezio (1995). Prometeus of the Everyday. The Ecology of the Artificial and the Designer's Responsibility. Discovering Design, Exploration in Design Studies. R. Buchanan, and Margolin, Victor Chicago, University of Chicago Press: 219-244.
- Manzini Ezio (2005). "Enabling Solutions for Creative Communities." Designmatters(10): 64-68.
- Margolin Victor (2002). Design for a Sustainable World. The Politics of the Artificial. Essays on Design and Design Studies. V. Margolin. Chicago and London, The University of Chicago Press: 92-105.
- Margolin Victor (2002). The Politics of the Artificial. Essays on Design and Design Studies. Chicago and London, The University of Chicago Press.
- Morelli Nicola (2007). "Social Innovation and New Industrial Contexts: Can Designers "Industrialize" Socially Responsible Solutions?" Design Issues **23**(4): 3-21.
- Normann Richard (2000). Service management : strategy and leadership in service business. Chichester ; New York, Wiley.
- Normann Richard and Rafael Ramirez (1994). Designing Interactive Strategy. From Value Chain to Value Constellation. New York, John Wiley and Sons.
- Papanek Victor (1973). Design for the real world : human ecology and social change. Toronto,.
- Papanek Victor J. (1985). Design for the real world : human ecology and social change. London, Thames and Hudson.
- Ramirez Rafael (1999). "Value Co-Production: Intellectual Origins and Implications for Practice and Research." Strategic Management Journal **20**: 49-65.
- "Sustainable Everyday Project."(2006). Retrieved 01.04, 2008, from <http://www.sustainable-everyday.net/SEPhome/home.html>
- Tackara John (2007). Would it be Great if... London, Dott07.
- Von Hippel Erik (2005). Democratizing Innovation. Cambridge, Massachusetts London, England, The MIT Press
- Weterings R.A.P.M., Opschoor, J.B (1992). 'The Ecocapacity as a Challenge to Technological Development', Advisory Council for Research on Nature and Environment, Rijswijk.

¹ Von Hippel (Von Hippel 2005) provides several examples of such autonomous initiatives, from the modification of existing technological products, including surgery tools, to cooperative initiatives to design of products, such as kite-surfs. Other cases of social innovation based on autonomous and collective initiative have been provided in the EU-funded EMUDE project (<http://www.sustainable-everyday.net>)

² The term *operative paradigm* was introduced by Arbnor and Bjerke (Arbnor and Bjerke 1997). The term is clarified in the next section of this paper.