

# New design competences for localized production systems: a case study in Denmark

## ABSTRACT:

This paper discusses the current development in production culture, based on local production networks. The role of the designer is put in perspective and outlined through a research project, Den Grønne Møbel (DGM), where different design areas were coordinated in a business concept and an organization involving different stakeholders. For several years now, DGM has been producing furniture from local materials, hereby aiming to create a new culture for well designed and environmentally sound furniture with a 'story'.

Although not totally new, this organizational model is particularly innovative in fully industrialized countries such as Denmark and represents an interesting alternative to globalized industrial production. Furthermore this case is an interesting opportunity to re-discuss the role and competences of designers in such new models.

Tools and methods of the design profession are especially valuable in such holistic concepts, but also further tools and methods should be developed to support such initiatives.

## **Kaare Eriksen**

School of Architecture and Design, Aalborg University, Aalborg, Denmark.  
eriksen@aod.aau.dk

## **Nicola Morelli**

School of Architecture and Design, Aalborg University, Aalborg, Denmark.  
nmor@aod.aau.dk

*Today [...] it would be interesting to reevaluate handicraft and its original product culture as a critical dimension, related to memory, especially in the light of the existing social need for a review of the energy cycle, use of resource and social integration through work. This doesn't mean that we should turn back to handicraft based production, which would be impossible and not desirable, but it rather means that we can introduce a parallel track in production on social plan and in specific companies working between high technology and craftwork. (Thau 1990), translated by the authors)*

## INTRODUCTION

In the most recent years, new industrial models are emerging, that are supporting innovative economic activities, by exploring the advantages and opportunities of local and social networks. Such models are aimed at producing solutions to specific and sometimes individual problems on a local basis.

So far, the proposition of such models has been very effective in developing countries: *micro-loans* systems, for instance have supported and encouraged the development of local network of craft workers, who have been able to take advantage from small economy of scale the network made possible. The same model, however, has been considered in developing countries to generate highly individualized solutions that respond to the enormous differentiation of needs and lifestyles in modern society. (Manzini 2004)

The new economic activities are often originated and inspired by local conditions, in which local opportunities and needs emerge. Even at this level, however, the solution required may prove to reach a level of complexity that cannot be addressed by a single company, but should rather involve a network of actors cooperating in a *Solution Oriented Partnership* (SOP) (Jegou, Manzini and Meroni 2004). Furthermore, those partnership may include heterogeneous actors such as global and local companies, designers, manufacturers, service providers, users, who may be involved as *co-producers* of the final result as in IKEA (Ramirez 1999), and sometimes competitors in the same production sector. The links between the actors in those partnerships are temporary and only based in the common interest in producing the desired solution. However such partnership should be considered as a *solution oriented production systems* and organized accordingly.

As many other production systems this kind of system needs to be accurately structured according to logics that are similar to the traditional industrial logic: in other words, the solutions coming out from this system must be reproducible, should possibly generate some form of economy of scale and be based on a structured development process.

This logic represents the new stage of the development of local and customized services, from a *craftsmen* phase, in which

unique services were addressing individual needs, to a phase of *industrialization of services* in which a *service platform* is generated, in order to adapt the same service concept to different local contexts. The creation of such a platform is particularly relevant, because it encourages large companies and service providers, to participate to local networks, as the economy of scale would be the result of the development of service concept that can be used in different local contexts.

Notwithstanding some similarities, this new definition of production system implies different relationships between the actors involved in the system:

- While in the traditional view of the production system the material component of the product is dominant, in the new perspective material (products) and immaterial components (services) are equally balanced, therefore we can define the output of the production process as a *Product-Service System* (PSS)
- In the old model, the final product was mediating between producers and users. In the new PSS, instead the relationship between producers and customers becomes wider, the mediator being no longer a product, but an event extended in time and space.
- Unlike the traditional production systems, in which the process of value creation stops with products' sale, to be replaced by a process of value consumption (the user *consumes* the value created in the production chain), in the new production system the creation of value is extended to the use phase and actively involve users (Normann 1994; Ramirez 1999; Normann 2000).

The shift proposed by the new model tends to stress the relevance of the immaterial components of the new solutions (such as the service components), with respect to material components related to industrial products. This shift is therefore challenging a more traditional design view, which associate designers with material products, and proposing instead a new scenario in which the role of design needs to be reconsidered. It is therefore legitimate to question:

- Are designers still relevant in this scenario?
- Where should designers be located?
- Are there cases and examples of a different role of designers in generating local or highly customized solutions?
- What methodological tools do designers need if they have to claim their role in that scenario?

This paper aims at addressing those questions by discussing a specific case study, the project *Det grønne møbel* (DGM), developed in Denmark. The evolution of industrial production described in this section represents an interesting framework in which this case study, which was developed in the 90's, can still offer interesting insights and a good example on how designers can play an important role in the new scenario.

### RE-ORIENTING DESIGN COMPETENCES

The networks created through SOPs are obviously reliant on a solid social cohesion or on strong economical motivations for the actors involved. Therefore the development of such partnerships seems to be a job for managers or, at least for people with a background in social studies and social work. Designers may however play a critical role in such initiative.

The traditional view of designers as *people-that-create-things* often overshadows the important role designers have in bridging organizational culture, technical knowledge and socio-cultural patterns. Each outcome of a design process is the

synthesis of those three main domains. This consideration is important to revise some clichés about designers' competences and roles.

It is a common view, for instance, that industrial designers only deal with products, while the new initiatives are often based on immaterial elements, such as values, social cohesion and service components.

In fact the design discipline has often debated the involvement and the competence of designers in the definition of such components. Several contributions, for instance have focused on the role of designers in the design of systems of products and services (often defined as *product-service systems* or PSS) (Manzini 1993; Manzini 1993); (Pacenti 1998; Morelli 2002; Morelli 2003). While other authors have called for a wider perspective for the design discipline<sup>1</sup>. Although those contributions strongly recommend the definition of a design culture related to those themes, no specific professional profile for designers has been defined for this area.

While several other disciplines (such as marketing, management, social science) have offered interesting insights for the development of the new perspective, the design discipline has a unique potential to contribute to the definition of a specific design area for the design of new solutions. The case study illustrated in this paper is an example of how design can trigger innovation by shaping an innovative PSS, while, at the same time being the catalyst for the generation of a solution oriented partnership among several heterogeneous partners.

### CASE STUDY: THE STORY OF DET GRØNNE MØBELS PROJECT

The Det Grønne Møbel "the green furniture project" (or DGM) is a practical experiment, done as action research on systems design related to furniture production in the above mentioned production context. The project was defined by a set of objectives (the 11 statements) defining the term "green furniture" in relation to user values, environmental, social and cultural values as well as business values and design quality in general. (table 1)

<p>The definition of "green furniture" according to "Det Grønne Møbel":</p> <ol style="list-style-type: none"> <li>1. – Made from at least 80% local resources (in weight or volume)</li> <li>2. – Processed in an environmentally sound manner, close to its place of use</li> <li>3. –Bio-degradable without causing environmental problems</li> <li>4.- A celebration of quality and good craftsmanship craftsmanship</li> <li>5. – A celebration of the user and life</li> <li>6. –A celebration of history, the place, the present and the future (story telling)</li> <li>7. - Good business for the manufacturer and for society.</li> <li>8. - Easy to maintain and aging with beauty</li> <li>9. - Functional with excellent aesthetic qualities</li> <li>10. – Suited for becoming a future antique or heirloom</li> <li>11. - Suitable for being a valuable part of the circumstances that surround the furniture throughout its lifespan</li> </ol> <p>(Eriksen 1998)</p>
---

**Table 1** The eleven statements defining the "green furniture" in the DGM project



### Design and story telling

The basic idea for setting up the DGM-association was based on environmental concerns, but the means for such an effort was primarily based on the integration of several specific design related aspects to show, that design qualities like good craftsmanship, aesthetics, storytelling and a holistic approach was needed to create meaningful concepts, that would be accepted by all stakeholders.

The element of storytelling is highly ranked in the DGM-koncept. This aspect is supported by the relation between the customer and the local workshop, but also in cases where DGM has planned public events in situations, where for example trees of historic value in public spaces had to be felled due to dutch elm disease. In such cases DGM has planned and managed spectacular events (The Elmedag was repeated in Copenhagen in 1997) with local spectators to observe the process of turning old city trees into usable planks for furniture, that could afterwards be purchased in local workshops. (Figure 2)



**Figure 2** Storytelling in praxis: the old trees being felled and sliced into planks for furniture production at the Elmedag event in Aarhus, Denmark, 1994. Photo: Det Grønne Møbel

### The DGM standards and products

DGM defines the standards for production on the associated workshops, including the design finish and the environmental requirements. The association is for example heading for implementing a principle of only using planks dried in open air without using the conventional and oil consuming process of oven-drying timber.

The furniture collection, that was originally launched, consisted of 10 models ranging from tables and chairs (upholstered with seaweed) to a swing sofa, a cupboard, a shelf and even a coffin for cremation.



**Figure 3** Product from the DGM-collection: swing sofa. Designed by Smedegaard & Weis. Photo: Det Grønne Møbel

These pieces of furniture were all of high standard concerning delicate craftsmanship and aesthetic value. Much like the furniture you would find in any shop selling high end Scandinavian designed products. The collection has recently been trimmed to consist of only a simple dining table and a set of childrens stools, but more products are expected to be launched later.

### A system to survive

The organisation is an almost totally web based initiative with no showroom of its own. This has made it possible for DGM to survive even in periods, where sales were low. In the starting phase, the initiative was supported by the Danish ministry of environment and the the Danish ministry of culture, but for more than 5 years the organisation has received no economic support of any kind.

DGM can be seen as an example on how to adapt the holistic and aesthetic attitude and focus of the design profession into a concept based on a unique partnership between the different stakeholders a value chain. The concept was developed as a design project itself, and professional designers of different kind has strongly been involved in defining the identity and business principles, and they have contributed to the development of products, that carry the message of the DGM-initiative.

The methods used in the process therefore consisted of a mixture of traditional designers skills related to product development, but also new skills for communicating (events/the web) were needed. Much of this work was done as a teamwork including designers, end-users and craftsmen, that all agreed on the goal of setting up local production systems based on good design. Therefore a simple means/end principle was used more or less systematically, and even story boards and cartoon-like communication tools were used to describe scenarios and organisational structures.

Shortly after presenting the newly developed furniture collection at Århus City Hall, DGM was invited to set up a similar project in Copenhagen using the same tools and models to establish a local network with different stakeholders. This task proved to be very difficult due to different factors like too vague definition of responsibilities, different expectations, the furniture collection not being fully developed for easy manufacturing, lack of economic resources etc. After just a few years the Copenhagen initiative was closed.

### DISCUSSION: WHAT DO WE LEARN FROM THIS CASE STUDY?

The case study provides some answers to the questions listed in the first part of this paper, but, on the other hand, it suggests new questions.

When considering the DGM project, one may argue that this was a good management case study, rather than a design case. Indeed this case is an example of innovation management that the design discipline would possibly consider: it concerns the development of a new activity on the basis of a business idea.

Some considerations, in fact, would frame this case in relatively new territories of exploration in management initiatives. In particular the participation of different companies and actors in a networked initiative represents a typical business case considered in organisational studies focusing on inter-organisational relations and networked organisations. Several contributions are already available in this area, which

focus on different aspects, such as resource optimisation, social and power structure within networks, cost efficiency and innovative outcomes (Oliver 1998; Grandori 1999). Other studies focus on networks as an emerging socio-economic phenomenon which combines business strategies and social cohesion (Castells 2000)

This case study provides a new perspective to the debate about the potential of local networks, by emphasising the relevance of the final design solution for the definition of the whole networked organisation. All the actors involved in the project work around a shared idea of a design solution. On the basis of this solution the mutual relationships between all the actors are defined, in order to reach a relatively flexible kind of formalisation of the relationship between the actors and therefore more clarity and trust within the system.

This addresses the first of the questions at the beginning of the paper: the role of designers is crucial in the definition of the whole initiative. The design solution is the discrimination factor between a series of routinary activities (saw mills, furniture production), and at the same time a critical catalyser for a networked initiative that have deep cultural and economic implications.

Beside contributing to the organisational aspects of the initiative, the designer created the red-thread between the various phases of the production of a furniture (the furniture at home refers to the whole story, back to the tree in the backyard). Furthermore it adds aesthetic cultural and sometimes affective value ("I can make a table out of the old elm tree I had in my garden!") to the material evidence of the whole process, the final product.

The designer, in this case, created an open platform, that offers several possibilities for cooperation between the different stakeholders from saw-mills and cabinet makers to tree-owners and furniture designers. In reality different ways of cooperation between the stakeholders (as shown in Figure 1) has emerged as a result of the project. In some cases the tree-owner has ordered the saw-mill to cut her tree into planks for other purposes than furniture production, and in other cases the customer has designed the furniture herself to be produced by a local DGM associated cabinet maker.

Of course the same components of the initiative, from saw mills to cabinet makers' workshops, could have worked together on the basis of other organisational considerations, such as resource sharing, need for more bargaining power, but without all the elements of the design solution, from story telling to final production, the links within the network would be less meaningful

The case study also provides indications on the second critical question proposed above, concerning the location and role of designers in the new industrial context. In this initiative, the designer was actively involved in the planning and managerial phase of the project. The articulation of the initiative around design themes, including craftsmanship, aesthetic quality and story telling, is probably the most evident contribution of the designer at this level. Other motivations contribute to a better definition and qualification of the role of designers, such as the idea of optimisation and reutilisation of natural resources, which is a typical theme for designers that are actively involved in environmental and sustainable activities.

The last two questions proposed at the beginning of this paper do not find a direct answer in the DGM case study: the case study is a good example of design-driven innovation in a systemic case and therefore it could provide indication for the development of further systemic initiatives in this perspective. The DGM project, which anticipates by several years the debate about the extension of the design approach from product

to systemic solutions, focuses on the conditions for a similar case to be proposed, but not on the methodologies designers should use to work in the new domains.

The open questions, to which the DGM project provides partial answers, can be summarised as follow:

- **Can the DGM project be somehow replicated as a concept for further similar initiatives?** i.e. What are the elements (conditions, initiatives, actors and criteria) that are specific to the DGM project and what are instead those elements that can be replicated in another project?
- **How can this happen?** I.e. is a project like this replicable by means of a clear methodological approach or is it just the result of the experience and/or the lucky intuition of a designer and a group of actors?
- **What methodology can be used to generate a similar System?** i.e., whether there are or not methodological indications directly derived by the DGM project, what methodological problems should be addressed in developing systemic design projects such as the DGM?

Initiatives like the DGM project cannot be replicated without considering the social, economic and cultural context the project refers to. There are however elements that could be considered in different projects, even in developing countries, where local networks are already existing on the basis of social cohesion and low capability to import raw material from other regions. The promoter of the initiative, however proposes a platform of basic elements deriving from such a concept (Eriksen 2003):118):

- A clear definition of the value mission,
- A 'green' perspective
- A clear output for the project
- A network of partners participating in the organisation
- A business driver
- The support of media and communication
- The involvement of designers.

The possibility to replicate the project also depends on the definition of methodological frames for designers to operate in systemic contexts similar to the DGM project. While the success of this project may be the result of favourable conditions, managerial intuition and design sensitivity, it is difficult to think of re-proposing project based on such a complicate systemic solution without a solid methodological frame. Such a frame should integrate skills and competences that belong to the tradition of product design, to new competences that allow designers to understand how social and cultural aspects shape the system, to articulate logical and time-related sequences for the development of systemic solutions and to communicate the solution effectively.

The design team obviously used methods to map the actors and investigate different solutions, the definition of a methodology for designers, though was not the primary focus of this project and therefore the project does not explicitly offer rich methodological insights.

Other projects and academic studies have been developed in the last few years, that explicitly focused on those aspects and can therefore cast a new light on the DGM project and suggest new interpretations and new methodological insights.<sup>3</sup>

The methodological aspects emerging from such projects can be divided in 3 main categories

1. **Analytical aspects:** Definition of tools and methods to map the actors involved in the system, thus providing a picture of the social and cultural landscape in which the system will be proposed. Such tools include actors profiling, maps of social networks (Morelli 2002; Morelli 2004), situated action analysis (Gaver 1999; Sangiorgi 2004), cultural probes (Gaver 1999)
2. **Design aspects:** Definition of tools and methods to design the system, including managerial and systemic tools to control the various phases of the system, such as IDEF0 (IDEFO 1993) tools to elicit the detailed requirements for the system, such as use cases, scenarios and systemic maps (Morelli 2002)
3. **Representation aspects:** Definition of tools and methods to represent the system, both to technical experts that will be involved in some phases and to common users of the system, who should be carefully explained how the system works. Tools and methods in this case, should include blueprinting tools (Shostack 1982; Morelli 2002; Sangiorgi 2004) and design Plans (Jegou et al. 2004)

The development of such methodologies represents a relevant effort to systematize the experience deriving from the DGM project, together with other insights coming from other projects aimed at defining new Product Service Systems (PSS). The development of this disciplinary area is expected to give the designer a better capability to cooperate with companies and experts from different disciplinary areas to the design of highly personalized solutions.

## CONCLUSION

The case study reported in this paper introduces and explains how new models of production introduce a parallel track to traditional industrial production models or even alternative solutions to the standardized and globalized solutions proposed by modern industrial production. The relevance of this case study for the design discipline is in its capability to emphasize the critical role design can play in the development of similar initiatives. Design is a catalyzer of the DGM project, because it added new values and meanings to an initiative that would otherwise be only based on economic relationships.

This paper is therefore proposing an extension of the activities of designers to new domains. This will possibly require the reorganization of design education and the whole design discipline. New questions can be opened, concerning the profile of the designer in a systemic perspective. Should this systemic perspective be considered as part of the traditional design education? Or should it be part of a new disciplinary area focused on strategic (social, organizational, cultural) aspects of design activities?

This paper does not provide any answer to those questions; however, by analyzing the DGM project, with its potential and limits, it emphasizes some relevant aspects related to the extension of the design domain.

A first aspect concerns the nature of the design activity. The designer, in this project, did not work on single products, but rather on an open platform for a set of different design solutions. Each individual solution was the result of the cooperation between the actors involved in the system. Such cooperation, in some cases, did not necessarily include the contribution of the designer (clients could directly work with the cabinet maker to design their own furniture).

A second aspect concerns role and limits of designers' activities in multidisciplinary teams: because of the complexity of the relationships within the network, the designer cannot work without cooperating with other experts, namely lawyers,

organization experts, public relation experts, experts in management, marketing and financial matters and even other product designers. The cooperation between the actors has to be built upon a clear understanding of the design concept. This is only possible if the designer is able to develop a solid platform (i.e. a network with solid motivation between the actors).

The third aspect concerns designers' capabilities to communicate the systemic solutions they propose: designers must learn to use new tools to represent the design concept in a way that can be easily understood by all the actors and can be used by the other experts, to set up the legal, organizational and financial aspects of the project. In the DGM case the communication among the actors was based on a loose representation of the system (through dialogue between the designer and the other experts). A more formal representation, e.g. a clear *design plan*, would have possibly facilitated cooperation and coordination between the actors.

The new research directions that can derive from the DGM project can be based on an analysis and a development of professional and methodological implications of such aspects.

## REFERENCES

- National Institute of Standard and Technology (1993). *Integration Definition for Function Modelling (IDEFO)*.
- Brundtland, G. H. and World Commission on Environment and Development. (1987). *Our common future*. Oxford; New York, Oxford University Press.
- Castells, M. (2000). *The rise of the network society*. Oxford; Malden, MA, Blackwell Publishers.
- Eriksen, K. (1996). *DESILIT-projektet: forskningsrapport*. Arkitektskolen i Århus Aarhus, Denmark
- Eriksen, K. (1998). *Det Grønne Møbel: et domino projekt*, Landsforeningen.
- Eriksen, K. (2003). *Liv eller brand: designeren som udvikler af bæredygtige systemer og produkter*. Aalborg, Institut for Arkitektur & Design, Aalborg Universitet.
- Gaver, B., Dunne, Tony and Pacenti, Elena (1999). "Design: Cultural Probes." *Interaction* 6(1): 21-29.
- Grandori, A., Ed. (1999). *Interfirm networks: organization and industrial competitiveness*. Florence, KY, USA, Routledge.
- Jegou, F., E. Manzini and A. Meroni (2004). *Solution Oriented Partnerships as Models of Network of Advanced Industrialisation to Build Value in Specific Contexts*. SusProNet Conference. Product Service Systems: Practical Value, Brussels, Belgium.
- Manzini, E. (1993). "Il Design dei Servizi. La Progettazione del Prodotto-Servizio." *Design Management*(4): 7-12.
- Manzini, E. (1993). "Lo Scenario del Prodotto-Servizio." *Area*(14): 30-37.
- Manzini, E., Luisa Collina, and Stephen Evans (Ed.) (2004). *Solution Oriented Partnership. How to Design Industrialised Sustainable Solutions*. Cranfield, Cranfield University. European Commission GROWTH Programme.
- Margolin, V. (1995). *The Product Milieu and Social Action. Discovering Design*. R. a. V. M. Buchanan. Chicago, The University of Chicago Press: 121-143.
- Morelli, N. (2002). "Designing product/service systems. A methodological exploration." *Design Issues*: 3-17.
- Morelli, N. (2003). "Product-Service Systems: a Perspective Shift for Designers. A Case Study: the Design of a Telecentre." *Design Studies* 24(1): 73-99.
- Morelli, N. (2004). *The System Around the Product: Methodologies and Experiences Focusing on*

- Material and Immaterial Aspects in Design Solutions*. Futureground. Design Research Society International Conference, Melbourne.
- Morelli, N. (2005). *Design in new industrial contexts: shifting design paradigms and methodologies*. EAD 06. 6th European Academy of Design Conference, Bremen.
- Normann, R. (2000). *Service management: strategy and leadership in service business*. Chichester; New York, Wiley.
- Normann, R., and Ramirez, Rafael (1994). *Designing Interactive Strategy. From Value Chain to Value Constellation*. New York, John Wiley and Sons.
- Oliver, A. a. E., M. (1998). "Networking network studies." *Organization Studies* (19/4): 549-583.
- Pacenti, E. (1998). La progettazione dei servizi tra qualità ambientale e qualità sociale. *Di Tec*. Milano, Politecnico di Milano.
- Ramirez, R. (1999). "Value Co-Production: Intellectual Origins and Implications for Practice and Research." *Strategic Management Journal* **20**: 49-65.
- Sangiorgi, D. (2004). Design dei Servizi come Design dei Sistemi di Attività. *INDACO Dipartimento di*

- Industrial Design delle Arti della Comunicazione e della Moda*. Milano, Politecnico di Milano: 252.
- Shostack, L. G. (1982). "How to Design a Service." *European Journal of Marketing* **16**(1): 49-63.
- Thau, C. (1990). "Omgang med tingene – tingenes tid." *Dansk Kunsthåndværk*(2): 15-18.

---

<sup>1</sup> Margolin (Margolin 1995), for instance proposes to extend the focus of the design activity to the *product milieu*, i.e. the vast array of material and immaterial products that human beings devise and sustain in order to conduct their lives.

<sup>2</sup> This discussion is further described in the evaluation of the DGM initiative in opposition to other 'greening initiatives' in furniture production (Eriksen, 2003)

<sup>3</sup> The main projects the authors refer to are the Telecentra project, funded by the Australian Research Council, aimed at designing office services for nomadic workers (Morelli 2002; Morelli 2003), and the HiCS project, funded by the EU, aimed at designing services for people with reduced accessibility to food. (Manzini 2004) On the basis of those project, further teaching and research activity at Aalborg University is focusing on the design of systemic solutions. Such activity is reported in (Morelli 2004; Morelli 2005).