

The Ties That Bind: Modelling the Components of Contracted Industrial Design Work Collaboration in Finnish Engineering Industry.

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Pro-active design research project (PROOMU) is an ongoing collaborative research project between the University of Art and Design and the University of Helsinki. The research focuses on studying how industrial design enters into the processes of large technological corporations. This paper is based on documentary analyses and ethnographic studies conducted in four Finnish engineering companies also utilising interviews with both external and internal industrial designers and relevant employees at different levels of organisations within the companies involved. The data includes field notes as well as audio and video recordings of planning and working meetings between Industrial Design (ID) consultant and their clients. Companies are global producers of paper making lines, mineral and rock processing equipment, elevators and escalators, steel products and wood processing equipment.

In Finland nearly 85% of all ID work is outsourced. The tendency to outsource continually even more demanding engineering design functions makes it unlikely that companies will bring ID functions in house on a large scale. In this light collaboration between ID consultant and client needs to be examined more closely. The outsourcing process combined with a need to save manufacturing costs and new customer and user centred approach to product development set many challenges to organising ID in the network.

Often ID consultant-client collaboration and its demands are contradictory. Expectations and requirements from ID are extensive but ID work is rarely recognised as requiring systematic procedures. Collaboration is instead typically based on briefings, ad hoc meetings and limited orientation and background knowledge to the client organisation. This model of interaction might work well in simple one-off transactions, however, the ID consultant's involvement is often too casual and late to ensure innovative approaches to product development or contributing to strategic policymaking or front end concept creation. What is needed is the development of interaction in order to utilise ID more effectively. However, developing ID collaboration is very difficult to start as the companies involved may lack the resources to document existing practices or evolve systematic collaboration procedures (Hasu et al 2004).

During the PROOMU research project, I constructed the matrix presented here to summarise my findings, seven key events of interaction in four maturity level, from study of Finnish global engineering companies. The matrix was created to serve as a tool to help analyse and evaluate the process of collaboration by mapping the challenges faced by individual organisations. For managers this approach serves to map various aspects that need to be considered in ID consultant interaction by exposing and promoting the discussion of existing collaboration procedures and their affect on the quality of ID utilisation.

THE TIES THAT BIND: MODELLING THE COMPONENTS OF CONTRACTED INDUSTRIAL DESIGN WORK COLLABORATION IN FINNISH ENGINEERING INDUSTRY

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1. Introduction

Proactive Design Project (PROOMU) is an ongoing collaborative research project between the University of Art and Design and the University of Helsinki. It started in August 2002 and will be ended January 2005. The research focuses on studying how industrial design enters into the processes of large technological corporations. This paper is based on documentary analyses and ethnographic studies conducted in four Finnish engineering companies utilising interviews with both external and internal industrial designers and relevant employees at different levels of organisations within the companies involved. The data includes field notes as well as audio and video recordings of planning and working meetings between ID consultant and their clients. Companies are global producers of paper making lines, mineral and rock processing equipment, elevators and escalators, steel products and wood processing equipment. Industrial design (ID) is seen today as a competitive means in Finnish engineering industry. However, it has been established as part of central business activities only in few companies and, furthermore, the practises and implications of ID vary. The divergences between companies rise from their different backgrounds and characteristics, such as products, personnel and constructed networks. [Hasu & all 2004].

In Finland nearly 85 % of all ID work is outsourced. The tendency to outsource continually even the more demanding engineering design functions makes it unlikely that companies will bring ID functions in house on a larger scale. In this light collaboration between ID consultant and client needs to be examined more closely. The outsourcing progress combined with a new customer and user centred approach to product development set many challenges to organising ID in the network. 1) The products are complex and specialised therefore; the technology and production methods require in-depth analysis and know-how. 2) ID is sometimes difficult to isolate from general product development and often product requirements are specified late in the process therefore; very independent working practises between core developer team and ID consultants dilute ID quality. 3) Engineering industry is rapidly changing from machine manufacturing to the services and solutions. The emerging client and user centered approach to product development

demands that ID consultants have to understand the needs of the new ID customers: end user, caretaker, assembler, purchasing decision maker or designer who use a product as a part of, for example, building design process.

1.1 Challenges to develop ID collaboration

Often ID consultant – client collaboration and its demands are contradictory. Expectations and requirements from ID are extensive but ID work is rarely recognised as requiring systematic procedures. Collaboration is instead typically based on briefings, ad hoc meetings and limited orientation to the client organisation. This model of collaboration might work well in simple one-off transactions, however, the ID consultant's involvement is often too casual and late to ensure innovative approaches to product development or contributing to strategic policymaking or front end concept creation. What is needed is the development of long-term in-depth relationships in order to utilise ID more effectively [Press & Cooper.2003]. However, developing ID collaboration is very difficult to start as the companies involved may lack the resources to document existing practices or evolve systematic collaboration procedures [Hasu & all 2004].

During the PROOMU research project I unsuccessfully attempted to establish numerous workshops on improving collaboration procedures. The failure was based on a four main factors primary among these was the lack of resources. Secondly, the ID clients assumed that workshop participation was likely to lead to greater staffing commitments than were acceptable. Thirdly, the ID consultants became concerned that participation in the workshops might compromise their existing customer relationships. Finally, the staff responsible for co-ordinating and managing external ID contracts at an operational level felt that the workshops might serve only as a forum for criticising their performance. This last point seemed the most powerful obstacle to this form of collaboration. Under this circumstances I constructed the matrix presented here to summarise my findings from study of four Finnish global engineering companies during the PROOMU research project. I assumed that the matrix format disseminates the findings to managers discreetly but includes sufficient detail to prompt discussions of collaboration procedures and their affect on the ID utilisation.

2. The ID Contract Work Collaboration Model

The contract work collaboration model presented here provides an outline description of the situation in four Finnish global engineering companies. Three companies are located between levels 1 and 2 while only one company attained level 3 and level 4 can be seen as a development direction. The model therefore, provides a heuristic tool to study or enlighten the practices of organisational approaches to collaboration between the ID consultants and their clients. The matrix serves as a tool to help analyse and evaluate the process of collaboration by mapping the challenges faced by individual organisations. For managers this approach serves to map various aspects

that need to be considered in ID consultant collaboration by exposing and promoting the discussion of existing collaboration. The matrix can also serve as a research tool to analyse, compare and contrast the ways different organisations approach their complex relationships between client and consultant in ID.

	“no harm, no benefit”	“still missing the final proof..”	“part of the development team”	“works holistic self-leading way”
Components of collaboration	Level 1	Level 2	Level 3	Level 4
Selection	“Telephone catalogue”	“By word of mouth”	Assure capability Structured review	Mutual sustain of capability
Resource and orientation/learning	Incidental trials Limited orientation	Continual change of partners Orientation perform repeatedly	Regular partners	Partners comparable to the internal resources
Contracting	“How much one meter of bar counter will cost?”	Tight offer based contract that pre-determines the budget and schedule	Flexible contracting based on short term plans	Contracting based on long term plans Shared equity?
Communication	“I will send you an e-mail later...”	Through internal co-ordinator	Continual interaction with other product developers	Interaction in all levels of organisation
Product development process	No formal process	Process existing but no guideline for industrial design	Industrial design is part of process and it is used	Constant improvement of process
Leadership and organisational structure	“Who should take care of it?”	Continual change of co-ordinators and thin internal competence of industrial design	Concentrated to the regular actors Sufficient internal resource and competence	Valid balance and task partitioning between internal and external resources
Collaboration evaluation and adjusting	No mutual evaluations Decisions based on intuition	Occasional mutual evaluation of collaboration process causes rarely development actions	Regular mutual evaluation causes now and then development actions	Mutual structured evaluation causes operations of development

Table 1. The Model of ID Contract Work Collaboration in Finnish Engineering Industry

2.1 Key components of collaboration

In 1994, Ring and Van De Ven introduced developmental processes of cooperative interorganizational relationship (IOR). IOR includes strategic alliances, partnerships and various forms of network organisations. Ring and Van de Ven identify the sequence of events and interactions that shape and modify IOR over time, such as negotiations, commitments, executions and assessments. This paper divides these four elements into smaller segments and identifies seven key events and interactions of collaboration framework of ID consultant and their clients. These components are 1) Selection, 2) Resource and learning, 3) Contracting, 4) Communication, 5) Product development process, 6) Evaluation and adjusting and 7) Leadership and organisational structure. Together these components shape and define the circumstances that outline the application of ID in the network. In levels 1 and 2 of the model the practices formed by events and interactions do not support the integration or efficient use of ID entirely. The event combination in level 3 allows an external consultant to act closely with the internal product development team. In level 4, ID consultant is able to work inside a company in a holistic self-leading way. The trust and partnership grows equally when

converging to level 4. Next I explain components more specific with a bit of my research data.

2.2 Selection

Product development strategy (or ID strategy) of a company is key importance when searching for a design consultancy. The motive and objective to collaborate ID should be in line with the strategy. In lower levels of the collaboration model identifying and evaluating ID consultants seems to be quite random. Often companies learn about ID consultancies by word of mouth. After preliminary contact the collaboration and contract is set. The selection is more often based on intuition than on structured evaluation methods; good "reputation", personal characteristic, cost and scheduling seem to be central decision-making motives. And yet, the important aspect is to assure that the consultancy has the technical capability required by the company's R&D strategy and that the consultancy is a good social and cultural fit with the organisation.

2.3 Resource and Orientation

For FOREST, a company that manufactures paper making lines orientation was a key element in selecting partners together with the technical, cultural and social capabilities demanded by the product development strategy. The senior ID manager employed assistants from design consultancies or recently graduated young designers. In all cases the consultants worked as temporary employees during an internal "rooming-in" period as the company's senior ID manager calls the practise. Some of the assistants later founded their own firms and became regular partners.

The idea behind this practise was one of FOREST's strategic focuses - improving profitability. This strategic principle also forms the cornerstone of industrial design at FOREST. ID concentrates on easing production and is so intended to lead to significant cost-savings and justifying the presence of ID in the paper plant industry. To be able to reach these objectives the ID consultants are expected to know the production methods well. As the senior design manager explains:

" To be able to know how to pass through the tunnel of production you have to know the tube. No mobile phone designer is able to understand the methods of heavy industry." (Interview 21102003)

This kind of intense orientation requires vast internal resources and ID competence, although later it reduces the time required to co-ordinate external work.

Resource, orientation and learning are firmly tied together for the simple reason that, according to my data, all regular and significant ID partner relationships have developed through 1) a long and solid working relationship and/or 2) the consultants were contracted as internal designers for a fixed period. It was clear that consultants working on specific one-off projects were not orientated as well as the ones in the above scenarios and that effect to their performance.

2.4 Contracting

FOREST has solved the challenge of contracting by developing a so-called yearly contract. This means that FOREST buys 40 % of all the annual working hours of the partner design consultancy at an agreed price. The work is not based on offers for separate projects. Below are comments made by the design manager of FOREST and an external ID consultant on this way of contracting.

"We do not ask for offers for different projects so our design work is not based on the offers, but we have a yearly contract where we agree that we buy 3500 hours give or take 10 % of design work from that consultancy for the price of x. After that we start working and invoicing work and somewhere towards the end of the year we start to check if the hours are filled..." (Interview 11102002)

"With the yearly agreement we are able to work in peace and are treated well. We can be sure that we get everything done." (Interview 12112002)

The advantages of the yearly contract are obvious. 1) The contract is flexible. 2) It eases both purchasing and performing the design work. 3) The committed share of workload is also a way of managing risks for both parties. The approach guarantees to FOREST that the consultancy has other clients as well and through those new know-how is transmitted to FOREST. To the consultancy the 40 % commitment to FOREST ensures independence outside this arrangement and avoiding a risk of putting all their eggs in one basket.

The contracts that define the responsibilities and performance of the parties are tools for controlling collaboration. In addition, the wider contract framework that defines for instance confidentiality requirements, companies often use also contracts that are tied to certain projects. These project-based *one-off agreements* can sometimes turn out to be obstacles for operative actions. For example, if the consultants have to make an offer to be employed for a project, it means that they have to plan and schedule the whole project to be able to define the final costs on the basis of the client's initial idea of a new product. The budget and schedule included in the contract pre-determine the course of the project and also the contribution of ID. At worst, design consultants are not able to react flexibly to changes that most product development projects unavoidably carry. A tight contract may not be applicable in a complex product development environment.

2.5 Communication

In the case of ECON (leading producer of elevators and escalators) product development is decentralised in several different countries. Its Italian product development unit created a successful new product in collaboration with a local ID consultancy located across the street. The same consultancy was contracted for a new project, but at this time the primary development was made in Finland and the core team was different. Here, communication was based on few meetings, e-mails and telephone calls through an internal co-ordinator or project manager. During the former collaboration project the ID consultancy had not only influenced the visual appearance of the product, but

also the manufacturing, technical applications and customer/user needs analysis. In the latter, the utilisation of ID was solely focussed on the visual design such as colours and materials, because the collaboration practises did not consider the effects of the changes in geographical locations and interpersonal relationships.

In theory the network and its economy is usually presented very positively. It is supposed that ideas, knowledge and profits flow between partners easily. However, in reality, well-working network demands complex actions between multiple stakeholders. The generative communication seems to grow between singular actors and these intercommunicate practises are difficult to move from project to another. Risk is that good practises do not establish as organisational procedures but stay at interpersonal level. Design is a social process, and the longer the communication chain is, the more difficult it is to collaborate in product development.

2.6 Product development process

None of the companies in my research do yet have a formal process for industrial design that is linked to the general product development process, such as the stage-gate process model, even if some companies apply similar models to other disciplines. The lack of ID process model creates a situation where the challenges presented to the ID are based entirely on the knowledge of project managers at that stage. With ECON, the managers change for each project, and there is no ID project documentation. As a result, good practises do not develop and knowledge is not transformed.

The industrial design manager of FOREST has substituted the lack of proper ID process by working as a “missionary” - being present when the ID consultants co-operate with a new project team not used to collaborating with ID. The drawback of this practise is the limited resource, in this case the ID manager. Also, having all the central functions controlled by one person is a risk. To lower that risk FOREST has lately appointed another ID manager. Also few new internal designers have been hired for the hands-on design work to relief senior designers to operate at a managerial level.

2.7 Collaboration evaluation and adjusting

When the partnership works well and/or the objectives are reached, the collaboration and working methods are re-evaluated in co-operation. The relationships are either terminated or reorganised. Both partners have learned in the collaboration process and any valuable experiences are used in the development of further collaboration.

There can be several reasons to end the partnership between an organisation and a consultancy; it has either not reached the objectives or it has not progressed well enough. The goals of the partners may have also changed in a way that no longer supports the present relationship. Again, the company’s design strategy may change and the ID partner may no longer be able to implement it. The design consultancy may also prioritise the needs of other

clients or another company may simply offer a more interesting and challenging task environment.

However, it seems that consultants rarely have an opportunity to discuss and solve difficulties of collaboration. FOREST was only one who arranged discussions but for all consultants together. These events were not entirely successful because of the competition between different consultancies and the client-principal relationship. Often the collaborations perish silently even if the partners had obvious reasons to discontinue it.

2.8 Leadership and organisational structure

The companies with an internal structured ID unit seem to be able to utilise externally contracted ID work better than companies with thin ID competence. The existence of active internal unit indicates that collaboration models are mature. In less mature models the external design function is often 1) a low priority or 2) part of other tasks or 3) the staff have not enough ID competence or product development process knowledge. Some companies hire an industrial designer as an expert to co-ordinate ID tasks. It is a big challenge for a single designer inside a company to substitute for the lack of a process especially if the role is mainly auxiliary.

Such a position limits the use of ID in ECON. ECON also employs a few internal industrial designers (employed 2000 and 2002) even though the operative ID work is contracted. The role of the internal ID designers is to aid the project managers. The internal designers do not have solid hands-on experience in product development processes and ID work. Furthermore, their responsibilities have been unclear, as one internal designer explains:

"...in a way my role was very fuzzy, just hang around there, whilst capable internal designers were on board and, in the end, the project manager or myself did not have a very clear understanding what was expected of me." (Interview 10022003).

This kind of situation sets a great challenge for companies to create required development paths for ID specialist being able to be responsible of organising, managing and developing ID activities in network.

3. Conclusion

It appears that most collaborative relationships begin with small, informal, low-risk agreements [Van de Ven, 1976]. Complications typically emerge if collaboration does not develop in a way that balances between client demands and expectations cannot be fulfilled by ID practice. The more demanding the ID requirements, the more a partnership relationship is needed in order to offset internal resources limitations. Realising this tension is crucial to the further development of successful collaboration. The central question in contract work collaboration is therefore, to find the right balance between collaboration practice, client objectives and the roles and responsibilities of the ID resources *within*, *outside* and *between* the organisation and the ID. Vital to this is the availability and competence of the

internal resources of the client organisation to define and develop the appropriate architecture for collaboration procedures.

The systematic development of successful ID collaboration is rare. ID collaboration is expected to develop "naturally" rather than be an explicit target for systematic structuring. This is a risky approach as it leaves the development of the relationship to chance. Future studies might test the utility of the model in assisting organisations to develop and evaluate the progress of their own collaboration development in a consumer business environment.

Acknowledgement

Ultimately, I hope these paper aids the recognition of the significance of relationships between components in ID. All company names are pseudonyms.

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