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Craft and industry : Investigating the nature and value of collaboration between crafts practitioners and manufacturers within the new product development process.

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Craft and Industry:

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between Crafts Practitioners and Manufacturers
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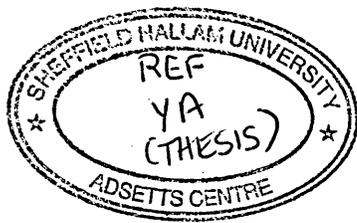
Karen Yair

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Abstract

The thesis investigates the nature and value of crafts knowledges in the context of the new product development (NPD) process. Its aim is to develop an empirically-derived understanding of the potential benefits for both crafts practitioners and manufacturers of collaborative NPD, and of the factors influencing its outcome.

The study adopted a grounded theory methodology, deriving theory from the lived experiences of participants in collaborative projects. Crafts practitioners, crafts-based manufacturers and designers with differing backgrounds and motivations were interviewed in relation to their own perceptions and experiences of the NPD process and its management. From this study, a network of inter-related case studies was developed, enabling comparative evaluation to be undertaken. Data analysis was conducted in relation to an emerging theoretical framework which drew upon an ongoing, critical review of literature relating to theories of design management, cognitive psychology, communication in design, and craft and design epistemologies.

The thesis finds that the manufacturers' NPD activities were facilitated by the involvement of crafts practitioners, which resulted in significant intangible gains in addition to successful product outcomes. Collaboration was discovered in exemplary cases to enhance competitiveness, mobilising latent knowledge-based resources and learning capabilities, whilst initiating developments in organisational culture. For the crafts practitioners interviewed, the industrial environment was discovered to offer new affordances and constraints, which could then become a catalyst to creativity.

In summary, the research:

- identifies the impact of crafts knowledges on the NPD process and its intangible outcomes.
- proposes strategies for the rejuvenation of the crafts-based industries.
- identifies problems inherent in collaboration and factors influencing project outcome.
- proposes implications for practitioners, manufacturers, educators and training providers.
- critiques theoretical advocacy for crafts-industry collaboration.

1. Introduction

1.1. Research Origins

Collaboration between crafts practitioners and manufacturers is widely advocated by theorists, who assert a significant role for crafts knowledges in the development of new products.

Such collaboration, it is claimed, offers manufacturers a wealth of exploitable skills and knowledge, from model making and prototyping capabilities (Woodhuysen 1996, Hughes 1994) to user proximity (Ball and Price 1999, Woodhuysen 1996) and materials understanding (Goodison 1998, Dormer 1995). Together, it is considered that these skills and knowledges can imbue mass- manufactured products with a vitality perceived as lacking in industrial design (Levien 1998, Dormer 1985, Russell 1963 cited in Harrod 99).

In practice, however, the actual incidence of such projects in the UK appears to be small: only one in six British crafts practitioners undertakes any design work or subcontracts any aspect of their product processes (Knott 1994). Moreover, of the limited number of actual cases documented, few have produced mutually satisfactory outcomes, in contrast to those found in Scandinavia, Japan and Italy (see section 3.9). In the UK, manufacturers have complained of practitioners' inability to design in accordance with manufacturing capabilities and market conditions (Reilly 1989), whilst practitioners have been disappointed by the company's failure to adopt their ideas (Cardew 1969) or to produce economically viable versions of their existing products. As ceramicist Alan Caiger-Smith wrote, following his experiences at Honiton Pottery,

'It was no heartbreak when the project came to an end. At last we were able to attend wholeheartedly to our own production and in the long run that was what counted most.'

Caiger-Smith 1995

An initial literature review suggested that these alliances were impeded by the cultural differences existing between the two parties. Crafts practitioners in particular were frustrated by the conservatism and inflexibility encountered working in industry: ceramicist Jacqueline

Poncelet, for example, compared her experiences with UK manufacturers to ‘pushing an elephant’ (cited in Margetts and Harrod 1986).

The available literature relating specifically to crafts – industry collaboration is, however, limited in terms of both breadth and depth, consisting mostly of practitioner accounts (Leach 1940, Pye 1968), journalistic reportage (Benjamin 1986, Margetts and Harrod 1986) and eulogistic commentary (Woodhuysen 1996, Hughes 1994). No empirical research has been conducted in relation to the subject, and no investigation into the problems encountered by both parties has been undertaken.

This paucity of literature presented a compelling imperative for an exploratory, empirical research study, designed to investigate the actual experiences of participants in collaborative projects. By formulating theories from empirical data, it was intended to question existing perceptions of the nature of this type of collaboration, as well as to gain understanding of the discrepancy between theoretical advocacy for crafts – industry collaboration, and the negative experiences of participants in such initiatives. The result – it was hoped – would be a thesis with practical implications for both manufacturers and crafts practitioners engaging in collaborative NPD.

1.2. Research Questions

The research questions concerned the nature and value of craft in an industrial context. How did crafts practitioners act in the NPD scenario? How did manufacturers believe that practitioners' behaviour differed from that of industrial designers? How did both parties describe their experiences of collaboration? What problems were encountered, and how were they resolved?

Two primary objectives emerged through the process of undertaking initial interviews and literature reviews, and guided the next phase of the research. These were:

- to investigate the influence of crafts knowledges on practitioners' approach to design.
- to explore influencing factors on the outcome of such projects.

These objectives were considered particularly significant in the contexts of the continuing decline of the crafts-based industries, the need for sustained growth within the cultural industries, and the threat to crafts education posed by continuing funding restrictions.

1.2.1. Relevance to the Cultural Industries:

Current local and national policy seeks to further the expansion of the cultural industries, providing employment in a sector whose growth is doubling that of the economy as a whole (DCMS cited in Ball and Price 1999). Crafts businesses themselves make a small yet increasingly significant contribution to the sector, providing a steady 5% growth rate per annum (DCMS 2000) which has resulted in a doubling of combined turnover between 1984 and 1994, and a 20% increase in the number of businesses (Knott 1994). Moreover, their significance is considered to transcend their size: crafts businesses supply specialist products and services to the fashion, media and film industries, for example (Conran 1998), whilst attracting inward cultural tourism through their international success (DCMS 2000).

It is acknowledged, however, that the growth of independent crafts businesses often ceases when turnover reaches approximately £20,000 per annum. It has been argued that this is not due to lack of market demand, but to a 'crisis of delegation': practitioners are wary of subcontracting manufacturing or of developing new ranges in collaboration with manufacturers, due to fears of losing control and autonomy (Ball and Price 1999 p.38). It was hoped that, by

investigating the outcomes of actual collaborative projects and the factors influencing their success, the research would indicate strategies capable of overcoming this barrier to growth.

1.2.2. Relevance to the Manufacturing Industries:

Whilst supporting the development of the cultural industries and other growth sectors, it is recognised that vulnerable economic sectors, and the manufacturing industries in particular, need to become more competitive in response to technological change, as well as to evolving patterns of consumption and global trade (DTI 1998 b p.12). In particular, manufacturing companies need to develop new products, markets and customers, adding value to their products through design, quality and service (DTI 1998 b p.9). It would appear that crafts-based manufacturers* are well equipped to respond to these demands, with their inherent customisation capabilities and, the value added by the 'hand made' status of their products, and the potential flexibility resulting from their size and lack of automated production lines. However, despite the lack of relevant literature it was evident at the outset of the research that the majority of crafts-based manufacturers fail to exploit this latent potential, instead continuing to produce existing designs in traditional styles. It was anticipated that, by investigating the collaborative NPD process in detail, it would be possible to identify problems, potential solutions and best practice, with application to similar manufacturers.

1.2.3. Relevance to Crafts Education:

The research objectives also appeared relevant to the debate surrounding the value of crafts education in a technological age, and the transferability of the skills and knowledge developed by it. As Press and Cusworth explain, if crafts education is to survive despite continuing funding restrictions, it must investigate and articulate its nature and value in relation to life after graduation (Press and Cusworth 1998 p.12). It was hoped that the study would contribute to this debate, by providing a detailed analysis of the nature and value of crafts knowledges in an industrial context.

* Crafts-based manufacturers are defined here as companies manufacturing products in glass, ceramic, metal or wood, using crafts skills, often in conjunction with machinery.

1.3 Research Focus

In terms of empirical methodology, the research adopted a grounded theory approach, analysing data gathered from interviews and a small number of case studies. This method was chosen in order to minimise the influence of existing perceptions of crafts knowledges and crafts-industry collaboration upon the research's development. Instead, it was intended to provide an in-depth investigation into the actual dynamics of the relationships concerned and their impact on product outcome, thereby generating theory from the experiences of the individuals concerned.

In terms of units of analysis, the study focused on the hollow-ware industries. This emphasis reflected the emergence of significant research issues in these areas, and the opportunity to develop a network of inter-related case studies, which enabled a comparative analysis to be conducted. It also reflected my personal experience of glass making and ceramics, gained during my undergraduate degree course and personal practice. Initial interviews were consciously sought within the glassware industry, as it was considered that my own tacit knowledge would assist both my interpretation of practitioners' accounts and my understanding of the relevant manufacturing technologies. It was also considered that the low incidence of collaboration in these industries provided an especially strong imperative for research, in comparison to the textiles and furniture industries, where collaboration is more common (Knott 1994). The glassware industry presented a particularly interesting research opportunity: whilst the similarity between industrial and craft manufacturing processes was considered conducive to collaboration (Lundhölft 1996), this was the sector in which the smallest number of British crafts practitioners actually worked (Knott 1994).

The study's theoretical framework developed throughout the research, in response to the empirical data gained from interview and case study analysis. The literature review was initially concerned with writing relating to crafts – industry collaboration, and to general theories of NPD management. As the study progressed, it focused on those issues emerging from empirical analysis: organisational learning, cognitive psychology, communication and epistemologies of craft and design. The development of the theoretical framework was also influenced by my own tacit understanding of crafts practice, which allowed the literature to be interpreted from the perspective of a practitioner as well as a researcher. Personal knowledge made a particular contribution to the section of the literature review concerned with the nature of crafts cognition, facilitating the re-evaluation of crafts cognition in relation to a generic

taxonomy of the human intelligences. Its role was essentially to support and confirm connections made between empirical findings and a previously un-related literary source.

1.4. Thesis Structure

The research developed in an iterative manner, with empirical study and literature review adopting mutually enhancing roles in terms of the thesis' development. The study is organised so that it may be read in a linear sequence. However, its cyclical development is reflected in the structure of the thesis, which presents two distinct bodies of literature, the first as a literature review, and the second as an explanatory tool, located within the case study analyses.

Chapter 2 describes the methodology employed throughout the thesis. It explains the rationale behind the methodological choices made, including the adoption of a qualitative approach, a case study method based on semi-structured interviews, and a grounded theory perspective. It then details the criteria determining choice of data, and the methods employed in its collection and interpretation.

Chapter 3 firstly undertakes a critical review of the literature relating to the nature of craft, as a basis for clarifying the differences between conventional approaches to design for manufacture, and those evident in the empirical data which follows it. It outlines the historical and epistemological contexts underpinning contemporary perceptions of the crafts, together with the influence of crafts theory and discourse. It then investigates the nature of craft as a cognitive process, a form of knowledge, and a creative practice. The chapter then presents literary sources which assist in the analysis of the NPD management issues emerging from the empirical data presented in chapter 4. The intention here is not to present a comprehensive review of literature in the field of design management, communication studies and organisational learning, but to investigate those topics which are directly relevant to data interpretation. Finally, the chapter reviews the limited body of literature relating specifically to collaboration between crafts practitioners and manufacturers.

Chapter 4 contains the study's empirical data. Firstly, it presents four case studies which, between them, present the main themes of the research. Each case is introduced with contextual information, followed by description and an analysis which refers to the literature discussed in chapter 3. The case studies are followed by a summary table, which facilitates comparison between them. Secondly, the chapter presents eleven interview analyses, which offer additional perspectives on the themes emerging from the case studies, whilst offering a point of triangulation. A description of each interview is followed by a comparative analysis.

Chapter 5 draws conclusions from the empirical and literature-based studies. It summarises the potential benefits of collaboration in relation to emerging definitions of crafts knowledge, and the influence upon project outcome of factors relating to the practitioner, the manufacturer and the project management strategy employed. It then suggests policy implications for crafts educators and business support agencies.

The appendices contain a glossary of terms used throughout the thesis, an interview schedule, a cast list of interview and case study participants, a practical demonstration of the data analysis process, and a list of publications arising from the research.

2. Methodology

2.1. Methodological Choices

As chapter 3 explains, no substantial academic research of direct relevance to the field of enquiry was revealed through literature review. The conceptual frameworks underpinning the enquiry could not therefore be derived from existing theory, but had to be generated through the research process itself. This necessitated an open-ended approach, whereby assertions and theories were generated by empirical data, rather than by explicit hypotheses or implicit assumptions.

Further methodological challenges were presented by the nature of the field of enquiry. From the project's outset, it was evident that the research would involve descriptions and analyses of complex, dynamic relationships between individuals and organisations. As deBurca and McLoughlin state (1996 p.2), few methodologies are capable of capturing the richness, complexity and dynamics of such relationships.

These factors necessitated a qualitative approach, focused on developing understanding of 'the complex interrelationships among all that exists' rather than the objective explanation and control characterising quantitative research. As Stake explains, the differences between the two approaches centre on the distinctions between explanation and understanding as the purpose of enquiry, between a personal and an impersonal role for the researcher, between knowledge discovered and knowledge constructed, and between the search for grand theory and the search for understanding through particularisation (Stake 1995 p.37).

Identifying qualitative research strategies consistent with the requirements stated above involved undertaking a brief review of methodological precedent. In the field of enquiry itself, the small amount of existing literature yielded no applicable model. The single study providing relevant data had adopted a quantitative perspective, concerned with establishing the number of crafts practitioners subcontracting aspects of their work (Knott 1994). The remaining literature in the field of enquiry did employ a more qualitative, exploratory approach, but was undertaken from a journalistic (Benjamin 86, Harrod and Margetts 1986) or autobiographical (Leach 1940, Cardew 1969) perspective, or was primarily concerned with conveying the author's opinion

(Dormer 1985, Pye 1968). Such accounts could not be considered as appropriate methodological models, as they appeared to lack the rigour demanded by academic research: any empirical data was presented from a unilateral perspective which substantiated the author's hypothesis, rather than as a basis for generating theory.

Management research, and design management in particular, proved a richer source of appropriate precedent. Researchers in the field of 'research into design' (Frayling 1993) have faced similar research situations (ie the development of new products by interdisciplinary teams displaying cultural differences), and a similar need to formulate theory from empirical evidence.

Research in this field is dominated by the case study method, which functions both as a means of formulating hypotheses to be tested through quantitative methods (Bruce 1993 p.355), and as a research tool in its own right (Langrish 1993 p.360). The method is valued by design theorists because of its capacity to challenge existing paradigms, even those which are held implicitly, by highlighting the exemplar as well as the typical case (Langrish 1993 p.358). It is also perceived as consistent with the diversity of design practice, encouraging the development of taxonomies rather than underlying principles (Langrish 1993 p.358). Furthermore, it is valued for its capacity to explore a situation through detailed analysis, without recourse to the deductive reasoning which would contradict the non-linear, teleological nature of the design process (Langrish 1993 p.358). As Bruce states (1993 p.355),

"The case study approach is rooted in an inductive tradition whereby insights and explanations are derived from observation. This is diametrically opposed to a positivist approach that is concerned with prediction, with measurement and with the testing out of hypotheses."

Langrish's suggestion that the case study's role in articulating phenomena which are only implicitly understood (Langrish 1993 p.360) may be considered especially pertinent in investigating an activity acknowledged as resistant to verbalisation (see chapter 3). In this instance, its appropriateness is confirmed by Yin (Yin 1994 p.1), who states that,

'In general, case studies are the preferred strategy when 'how' or 'why' questions are being asked, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real life context.'

It is clear that the case study method is flexible, accommodating a range of approaches and techniques appropriate to a diverse range of subjects and objectives (Bruce 1993 p.355). Researchers may use interviews, observation and documentary research to investigate the unit of analysis (Bruce 1993 p.355), and choose between sequential analysis and a grounded theory approach (deBurca and McLoughlin 1996 p.7).

Literature relating to the applications for grounded theory in management research suggested a high degree of appropriateness to the challenges presented by the research subject. Essentially, grounded theory (Glaser and Strauss 1967) is a means of developing theory from systematically gathered and analysed empirical data (deBurca and McLoughlin 1996 p.7). It is distinguished from other qualitative methods in that data collection and analysis proceed simultaneously, rather than in a linear, segmented sequence (deBurca and McLoughlin 1996 p.10). This means that it is particularly useful in situations where research is not guided by existing theory.

Further advocacy for the use of grounded theory in management research is made on the basis of its multilateral, process-centred perspective, and of its social psychological orientation. These factors, it is asserted, result in a high degree of appropriateness for investigating the networks of relationships between people and organisations (deBurca and McLoughlin 1996 p.7).

2.2. Identifying Units of Analysis

The primary criterion for identifying units of analysis was that the individuals or companies involved should be working in ceramic, glass or metal holloware. This strategy reflected my own experiential understanding of these media, which it was considered would benefit my understanding of the case. A lack of current collaborations necessitated a retrospective approach, whereby processes are analysed through the participants' reconstruction of events, rather than a progressive one, based on observational analysis (see Sonnenwald 1996). A time limit of two years since project completion was imposed, however, in order to optimise access to project participants. No other criteria were imposed, as the number of potential interviewees was already limited.

Recently completed collaborative projects tend not to be documented, but reported by word of mouth within the crafts and manufacturing communities. The process of identifying cases therefore involved pursuing contacts made through colleagues, friends and exhibitors at trade fairs. Such personal recommendations proved valuable, both in facilitating access and in ensuring the relevance of potential interviewees. This reflects recognition of the value of prior contacts in fieldwork (Hermes 1995), as a means of establishing the rapport which encourages interviewee participation (Stake 1995 p.4).

It was decided to precede case study analysis with a series of one-off interviews, intended to identify potential cases whilst beginning the process of identifying key issues for investigation. Following Stake (1995 p.6) and Jevnaker (1997), a variety of interviewees were sought, including crafts practitioners with a variety of approaches and objectives for their relationships with manufacturers, and representatives of manufacturers who had worked with crafts practitioners and those who had not. In order to gain a broader perspective, owners of manufacturers which had evolved from craft production were also interviewed, as well as educators and an historian.

Interviews revealing collaborative projects with the potential for case study analysis were followed by further interviews with other project participants. In four instances, these evolved into case studies. Langrish's taxonomy of selection methods suggests that the first and second of these cases may be considered examples of the atypical: unusual examples capable of challenging conventional thinking (Langrish 1993 p.362). This is substantiated by Stake, who

suggests that the capacity for case studies to investigate the atypical counters criticism of their resistance to generalisation (Stake 1995 p.4). The second two case studies, according to the same taxonomy, may be considered comparative.

Case study one presented an exemplar of crafts – industry collaboration, an atypical example which clearly demonstrated one means of optimising the potential of the crafts in an industrial context. Although the analysis enabled factors influencing this success to be proposed, these required triangulation. The search for further case studies therefore sought to fulfil this need, as well as to identify further beneficial outcomes of collaboration.

A network of further case studies was therefore developed, featuring two crafts practitioners / designers and three manufacturing companies. Both practitioners were researched working in two different manufacturing environments, one of which – PMC - was common to both. This enabled comparative analysis to be undertaken, and assertions regarding the influencing factors on their relative success to be formulated.

Interviews continued independently of the case studies, in order to assist the process of identifying further cases, and to provide additional perspectives on the issues emerging from the case study data.

2.3. Data Collection

It is recognised that both interviews and case study analyses can encompass a range of techniques and strategies, from which the researcher should identify those most consistent with their objectives and the nature of the research question and case subject (Burton 1996 p.63).

In determining an interview strategy, the degree of involvement desired by both parties had to be taken into consideration: as Gummesson argues, in management research (including, by inference, design management), the role of the researcher may be interchangeable with that of the consultant (Gummesson 1991). In this instance, the cases' retrospective nature precluded action research, with its aim of facilitating change (Curle cited in Svengren 1993 p.445).

The degree of control to be imposed by the researcher also influences interview strategy: it is recognised that interviews may be unstructured, semi-structured, or questionnaire-based (Bruce 1993 p.355), and that this choice will impact significantly on the data obtained. It was decided to undertake an in-depth, semi-structured approach, consistent with the need to challenge existing paradigms and to generate theory from empirical data: as Stake explains, over-preparation and inflexibility on the part of the researcher can prevent the emergence of unexpected yet relevant issues (Stake 1995 p.257).

It is acknowledged that, whilst subjectivity is an inherent characteristic of qualitative research, rigour is required in order to avoid the imposition of a prescriptive agenda onto the interview situation (Stake 1995 p.65). In addition, the rapport required for a free exchange of information to take place (Stroh 1996 p.65) needs to be balanced with a certain detachment, in order to maintain relative neutrality: as Bruce and Docherty state (1993 p.403),

'Rapport between clients, designers and the researchers is needed and this takes time and effort to build..... The researcher has to establish a balance between getting close to the participants and yet remaining detached to ensure that validity is safeguarded.'

These concerns are addressed by grounded theorists by posing general questions, intended to elicit the interviewee's narrative with only minimal framing by the researcher (deBurca and McLoughlin 1996 p.7). Charmaz (1990 p.1167) suggests that the grounded theorist adopts a five-stage approach to interviews, beginning with neutral, factual questions, followed by

informational questions intended to establish chronology, occurrences and the interviewee's awareness. She suggests a progression to reflective and 'feeling' questions, designed to elicit data relating to self and taking the form of 'how' type questions, before the interview is ended with ending questions intended to close on a positive note. A similar strategy is advocated by Stake, who suggests a combination of topic (information seeking) and issue questions, posed in an open-ended manner in order to encourage description and explanation (Stake 1995 p.65).

These issues influenced the interview structure adopted in this instance, with interviews typically progressing from discussion of shared experiences and acquaintances to factual information relating to the project and the individual or company, before an exploration of the issues raised. They also resulted in a longitudinal approach: following Bruce and Docherty's example, many of the companies and individuals studied in depth were visited on several, separate occasions (Bruce and Docherty 1993 p.403).

Other techniques were employed with the aim of maintaining rigour during the interview process. For example, lists of questions were used to guide the interview in accordance with the overall research question, without excluding the unexpected (Stake 1995 p.257). Questions arising from discussion were noted and referred back to at an appropriate lapse in the conversation, in order to prevent interruption to the interviewee's narrative (Stake 1995 p.66). Audio recording was undertaken, enabling the discussion itself to take precedence over note-taking (Stake 1995 p.65). Overall, the role of researcher as listener was adopted, prompting the interviewee to articulate their world view through probing questions (Stake 1995 p.65).

2.4. Interpretation

Qualitative research values subjectivity, whilst striving to maintain rigour in analysis through triangulation techniques, and through an acknowledgement of the researcher's personal perspective and its impact on interpretation (Stake 1995 p.134).

Triangulation aims not to confirm the researcher's initial assertions, but to develop alternative analyses as a means of challenging them or of understanding the situation's richness (Stake 1995 p.134). As Flick states (1992 p.175 – 198),

'The protocols of triangulation have come to be the search for additional representations more than the confirmation of a single meaning.'

Introducing triangulation to interpretation involved applying a series of verification techniques, detailed by Stake (1995 p.134), which encouraged the scrutinisation of empirical data from different perspectives. Firstly, a relativist (or multi-dimensional) approach was adopted, with as many of each case's key players as possible being interviewed. The importance of this technique in similar research in the field of design management has been emphasised by Jevnaker (1997), who states that,

'...there is more than one perspective on industrial design, even within the same firm... Such a description (multi-dimensional) will give a more valid picture of what goes on and is experienced in practice, rather than the more idealised pictures of product development.'

Secondly, contextual understanding of each project was also constructed, through research undertaken into personal and company histories, and the way in which design has traditionally been undertaken in the industries concerned.

Thirdly, single sources of data were not relied upon as empirical evidence. Instead, a form of methodological triangulation was applied, using contextual information and observation of working practices, drawings and prototypes as well as comparisons between the two interview analyses. 'Investigator triangulation' (Stake 1995 p.114), or the seeking of alternative interpretations from colleagues, was also employed in order to generate, challenge and refine

assertions. This is considered particularly important in researching designer (or craft practitioner) – client relationships, due to their reliance on non-verbal communication. As Bruce and Docherty state, in-depth interviews should be combined with observation and documentary evidence of the design process (Bruce and Docherty 1993 p.403), in order to cross-check and to question further the primary source material (Bruce 1993 p.355).

Finally, the technique known as ‘member checking’ (Stake 1995 p.114) was used in order to minimise misunderstanding of interview transcripts: this involved seeking feedback on draft reports from interviewees, without promising any amendment.

Triangulation elicits multiple perspectives, which may differ or even conflict. In the research’s early stages, these multiple perspectives appeared confusing and threatening, challenging existing assertions and suggesting the need to establish a single, ‘correct’ perspective. However, contextual and methodological triangulation also provide insight into the individual priorities, expectations, motivations and other influencing factors on each interviewee’s perception of the situation. This led to the realisation that each case consists of a set of individual perceptions and experiences, and that inconsistency between participants’ accounts is often illuminating in itself: as Stake states (Stake 1995 p.134), any attempt to resolve contradictory accounts actually obscures the ‘reality’ of the situation.

During the course of the research, it was found that understanding of the interviewee’s personal perspective on the case could be furthered through observation of the interview situation itself. Visiting the interviewee at their work location provided insight into their professional image and working style, as well as, in some cases, the dynamic between work and home life. For example, an informal, extended interview often paralleled working practices based on strong inter-personal relationships. Interviewees were sometimes able to offer explanation of their colleagues’ interview style: in one case, a guarded approach by one interviewee was explained by another as evidence of his insecurity as a newcomer to the business.

It is accepted that understanding the case requires acknowledgement not only of the interviewee’s personal perspective, but also that of the researcher: it is necessary to recognise the impact of personal knowledge and experience on interpretation of a given situation (Stake 1995 p.134). This is because of the impossibility of absolute neutrality: whether explicit or implicit, the researcher’s world view influences interpretation, particularly in evaluating the

significance of emerging conceptual categories (deBurca and McLoughlin 1996 p.2). As Stake states (Stake 1995 p.134),

'Case study is subjective, relying heavily on our previous experience and our sense of the worth of things..... We seek an accurate but limited understanding..... Researchers are encouraged to include their own personal perspectives in the interpretation.'

The recommendation that both quotes and transcript extracts should be provided, in order to increase the transparency of this influence for the reader (Stake 1995 p.134), has been accommodated (see Appendix 4). It is also suggested that the researcher explains their personal perspective and its impact on interpretation (deBurca and McLoughlin 1996 p.2, Stake 1995 p.134). In this instance, for example, my experience of glass and ceramic making meant that I had to be wary of empathising with the practitioner involved in collaboration rather than the manufacturer, and of limiting my conceptual understanding of crafts knowledge, practice and cognition to my own experience.

2.5. Analysis

Qualitative analysis is founded on methods of direct interpretation and categorical aggregation, used either independently or in combination (Stake 1995 p.78). A combinative approach was considered appropriate in this case, with direct interpretation enabling probing response questions to be formulated during the interviews themselves, and subsequent aggregation eliciting other, less obvious, issues.

Grounded theorists undertake aggregation through a process of coding and categorisation, which enables data collection and analysis to proceed simultaneously. The first stage of this process involves transcribing the interview in full, in order to provide a record of exact words and emphases, together with interruptions and other contextual factors. The resulting transcripts allow data to be repeatedly re-evaluated in relation to evolving theoretical frameworks and new information. Individual sentences can also be re-examined for clues to meaning evident in phrasing and expression: as Stroh indicates, direct transcripts provide the researcher with a useful language analysis tool (Stroh 1996 p.53).

These transcripts provide a basis for coding and categorisation. Initially, this process was undertaken by formulating lists of emic issues emerging from the data, substantiated with relevant quotations and illustrations, and investigated in relation to other sources in a written report. As research progressed and my knowledge of grounded theory improved, however, a more formal method was applied, based on deBurca and McLoughlin's study of a grounded theory approach to business network research.

Following deBurca and McLoughlin (1996 p.7), initial coding was undertaken by examining the transcripts with the aim of identifying underlying processes: each transcript was printed and physically cut up into individual sentences, which could then be grouped into recurring issues. The resulting observations were then summarised, synthesised and sorted, with care being taken to ensure that codes were developed to fit the data, rather than the data being forced to fit emerging codes. The scraps of paper bearing individual sentences were regrouped many times during this process, which involved the use of spider diagrams and flow charts in identifying causal relationships, and ultimately resulted in a list of codes. Focused coding then ensued, with categories of coded data being formulated and clarified by re-examining the entire data set in relation to the limited number of codes developed during the initial phase. The original

transcript was scrutinised again, and marked with symbols and coloured lines to denote the existence of data relevant to the categories. This was not a process of summarising the data, but of verifying the conceptual framework emerging from it, with individual pieces of data being used to challenge the emerging categories through continual comparison. This process is illustrated in Appendix 4, which contains photocopies of original documents produced during the data analysis stage.

Developing categories in this way facilitated the process of progressive focusing (Parlett and Hamilton 76 p.148), enabling the field of enquiry to be gradually narrowed, to focus on issues emerging from the research. In this way, an emphasis developed on practitioners undertaking design and subcontracting roles, and on the glass and pewterware industries.

2.6. Theoretical coding

Theoretical coding is the process which enables coded categories to be developed into hypotheses and theories. Continuing to follow deBurca and McLoughlin's method, the categories emerging from the data were gradually woven together into a conceptual framework which sought to preserve the complexity found in the units of analysis. Firstly, connections between categories were sought, with the aim of establishing any interdependency which enabled them to be collapsed into more general categories. As De Burca and McLoughlin explain, these compounded categories represent the 'building blocks' from which theoretical frameworks can be developed (De Burca and McLoughlin 1996 p.14). Adopting this approach, as interviewing progressed, so the emerging data was grouped in constantly evolving categories and sub-categories, allowing assertions to be formulated, then questioned and substantiated through cross-referencing. Lists, spider diagrams and flow charts were used to order these categories, and to make connections between them.

Next, key variables were sought by considering the significance of the category and its impact on other categories. This was undertaken through reference to new empirical data ('theoretical sampling') and literature sources ('selective sampling of the literature'), capable of challenging, confirming or expanding on the emerging categories.

Theoretical sampling may involve comparing different people's accounts of similar situations, comparing data from the same people at different times, or comparing properties found in the data with other properties (Charmaz 1990). In this instance, it was attained by comparing different craft practitioners' accounts of working with the same manufacturer, and different manufacturers' accounts of working with the same practitioner. Selective sampling of the literature also proved an illuminating means of developing theory, with the emerging data categories being used to identify literature sources which were then scrutinised for relevance. For example, the theories of crafts knowledge as a pluralistic intelligence and as a catalyst for organisational communication and learning, were not evident at the project's outset, but were revealed through categorisation and sampling. The project's literature review may therefore be considered fully integrated with, and reflective of, the issues raised through empirical research, as the breadth of reading involved could not have been envisaged at the project's outset.

This approach parallels Bonoma's process model for case research, also adopted by Bruce and Docherty in investigating client – designer relationships (Bruce and Docherty 1993). According to this model, the researcher is first immersed in the field of enquiry by a literature search and interviews, before progressing to a design phase, where the key issues and research questions are established through a dialogue between conceptualisation and empirical data. This is followed by a prediction phase, in which the focus of enquiry is defined, and finally a disconfirmation by extremes, where tentative generalisations are teased out. Like deBurca and McLoughlin, Bruce and Docherty describe a process which is iterative rather than linear, with constant interchange occurring between the phases.

3. Literature Review

3.1. Introduction:

The aim of this chapter is to critically review the two bodies of literature relevant to the empirical analysis which follows. Its role in the research process, as explained in chapter 2, was not to formulate hypotheses prior to conducting empirical studies, but to develop and test assertions emerging from the data. For this reason, it cannot be considered comprehensive, but rather reflective of the processes involved in data collection, analysis and interpretation.

The first section of the literature review investigates theoretical studies relating to the nature of craft, as a basis for clarifying the differences between conventional approaches to design for manufacture, and those evident in the following case study analyses. This section firstly outlines the historical context for the undervaluing of craft in contemporary society, and the impact of recent research upon perceptions of crafts practice. It then establishes a literary context, describing the reasons for the recent expansion of crafts discourse and its impact upon the theoretical frameworks underpinning it. It suggests that the shift from the search for universal definitions of 'craft' to an acknowledgement of the practice as inherently pluralistic has enabled diversity to be acknowledged and encouraged, whilst creating a space for the identification of common characteristics.

Next, the section investigates the nature of craft as:

- a cognitive process, proposing a common cognitive foundation in the notion of a dialogue between sensory perception and conceptual thinking.
- a form of knowledge, proposing its tacit, implicit and context-specific nature, and the resulting resistance to verbalisation, rationalisation and generalisation as distinguishing characteristics.
- a creative practice, proposing as common characteristics an interdependency of self-identity and creative practice, a view of collaboration with others as integral to creative practice, and the need to engage with materials, processes, forms and their related associations or traditions.

The second section of the literature review investigates aspects of the broad literatures relating to competitiveness, new product development, communication studies and organisational learning. It is not the intention to present a comprehensive survey of these literatures, but to focus on those sources which assist in the interpretation of the empirical data presented in chapter 4.

The section firstly locates itself within the context of NPD management theory, explaining the importance of this field of study, and indicating its breadth and complexity. It then comments on the particular relevance of the discipline to crafts-based manufacturing, in reference to the factors impeding its recovery from decline, and to both the quantifiable and the intangible benefits to be gained from NPD within the sector. The section then proceeds to investigate particular issues within the NPD management literature, which the empirical evidence presented in chapter 4 suggests are particularly pertinent to the crafts-based industries.

The chapter concludes with a review of the limited literature relating specifically to collaboration between crafts practitioners and UK manufacturers. This section draws upon original documents and contemporary reports of collaborative projects, contextualised in relation to theories of the relationship between craft and industry.

3.2. Craft in Context

3.2.1. Historical Perspective:

'The craft world is a modern response to the unbalanced nature of the Western intellectual tradition. Unluckily, the value of working with one's hands remains an esoteric wisdom in this world, evident only to initiates. Outside the craft world it seems incomprehensible, and thus worthless.'

Metcalf in Dormer 1997, p 69

The undervaluing of the crafts has been widely attributed to discrepancies existing between the types of knowledge and cognitive processes valued in modern Western society, and those characterising crafts practice.

These characteristics are described and referenced in full in sections 3.5 – 3.6 of this chapter. To summarise, however, crafts cognition and the knowledge it produces utilise the bodily intelligences, resist verbal articulation, and are specific to the context in which they are used. The objects that they produce, meanwhile, demand to be touched and used, as well as observed. They are therefore undervalued in a society which elevates linguistic intelligence and verbal articulation, and which values logic over intuition, universal knowledge over local knowledge, objectivity over subjectivity, images over objects and sight over touch (see sections 3.5 – 3.6).

Crafts theorists have traced the development of this emphasis on logical, verbal and explicable knowledge from the work of the Greek philosophers, through to twentieth century Modernism.

Cooley (in Thackara 1988) identifies the origins of the Western hierarchy of intelligences in Plato's concern with differentiating knowledge from opinion, and his subsequent assertion that true knowledge is distinguished by its capacity to be explained, using universally applicable definitions. This epistemology is considered to have initiated the elevation of intellectual work, thereby reinforcing existing societal divisions by reducing practical work to manual skill (Cooley, Coleman 1988 p.11, Metcalf 1993 p.46). As Cooley explains,

'what cannot be stated explicitly in precise instructions – all areas of human thought that require skill, intuition or sense of tradition – are relegated to some kind of arbitrary fumbling.....'

Greek philosophy has also been identified as the origin for the hierarchy of the senses which privileges sight over touch. As Mitchell explains, Aristotle considered sight to be superior precisely because of the immateriality involved in processing visual information, which he believed linked it more closely to intellect than touch (in Harrod 1997 p.326).

During the Renaissance era, a revival of interest in these classical ideas led to attempts to rationalise practical, tacit knowledge and encode it in universally applicable theories. As Cooley explains, this revolutionised fine art, the applied arts and architecture. Whereas buildings, for example, had previously been developed in situ, by reconciling an overall plan with context-specific knowledge gained through the building process, now they were predetermined in reference to theoretical principles (Cooley in Thackara 1988). This new emphasis on written knowledge and conceptual – rather than practical - thinking introduced a hierarchy of labour within the arts and building trades, as design and fine art became perceived as intellectual, creative activities, and craft as menial skill (Cooley in Thackara 1988). Despite resistance from the masonic guilds (Cooley in Thackara 1988), this hierarchy was formalised by the newly established academic institutions (Coleman 1988 p.12), which demonstrated their dismissal of practical knowledge by revoking the title 'magister' from skilled practitioners (Cooley in Thackara 1988). It also reinforced the separation of theoretical and practical knowledge, and the elevation of both the objective above the subjective (Cooley in Thackara 1988). Similarly, art objects were accorded greater value than craft objects, with artists producing rare and marginal art works, whilst artisans became seen as skilled manual workers without intellectual or creative input. (McCullough 1996 p.12)

Schön explains that, as the scientific world-view represented by this belief in rationality gradually gained prominence, the belief in science as a catalyst for human progress also became established. By the Enlightenment era of the 18th century this had become a major philosophical theme, with reason being upheld as a means of achieving a moral and egalitarian society, and of escaping the 'primitive' beliefs which, it was considered, had previously impeded humanity's progress (Schön 1983 p.31). This emphasis on reason reinforced both the undervaluing of practical knowledge (Alfoldy in Harrod 1997 p.333), and the hierarchy of intelligences that ranked language over sight, and sight above touch. In a culture that strove for

lucidity and 'universal' truth, the artefact was considered a poor means of conveying the meaning intended by its creator (Shreeve in Johnson 1998 p.41, Metcalf in Dormer 1997, p.69). The senses, meanwhile, were perceived as 'tyrannical': intellectual freedom could, it was believed, only be attained through the contemplation of the aesthetic (Tucker in Harrod 1997 p.333).

During the Industrial era, new commercial applications for scientific knowledge reinforced the value of explicable, rational knowledge. The early 19th century Positivist movement consolidated the concept of scientific knowledge as the only true knowledge, and sought to eradicate mysticism, superstition, and other forms of 'lesser' knowledge, whilst ensuring that the politics and morals underpinning contemporary society were formulated according to rational principles (Schön 1983 p.31).

Perceptions of skill and its social significance were also inverted at this time, as machinery became capable of emulating the precision only previously attained by highly skilled craftspeople (Evans in Johnson 1998). The design and making of everyday objects were separated, and again design activity was accorded higher status (McCullough 1996 p.12). Craft objects also lost their status as art: as Coleman explains,

'Skill ceased to carry its previous social significance and began to lose its central place in everyday life, while work became burdensome toil. Art on the other hand became the property of the rich.'

(Coleman, cited by Evans in Johnson 1998 p.13)

By the late 19th century, the Positivist philosophy's supremacy had been institutionalised in the new universities and professional schools (Schön 1983 p.31). Its principles continued to be debated into the early 20th century, resulting in a definition of knowledge which required propositions to be testable either analytically or empirically. Moreover, empirical data was to be formulated in hypotheses, derived from existing theory and tested by experiment (Schön 1983 p.31). Professional knowledge, meanwhile was required to be standardised, specialised, and scientific (Schön 1983 p.23), whilst professional activity became seen as a process of instrumental problem solving, conducted in reference to scientific theory and technique (Schön 1983 p.21)

In this context, practical knowledge was considered unrigorous and hence worthless, neither rationalisable nor truly descriptive of the world (Schön 1983 p.31). Skill, meanwhile, was seen as a means of applying knowledge rather than of generating it (Schön 1983 p.27).

It is not surprising that, as industrialisation constituted both a cause and an effect of Positivism (Schön 1983 p.27), its growth served to reinforce rationalism. As industrial organisations grew, managing them in a reliable and predictable manner required symbolic thinking: procedure became more important than observation, reflection and action (McCullough 1996 p.254). The resulting efficiency-oriented industrial culture was reinforced by the introduction of productivity-related pay systems, which rewarded output over quality and devalued individual judgement and practical knowledge (McCullough 1996 p.71). As Dormer explains, personal knowledge could not be valued in a culture where technology - and the explicit knowledge underpinning it - were perceived as necessary in order to minimise risk, and where procedural knowledge was necessary in order to disseminate information effectively (Dormer 1997 p.141).

Modernism, having links with the Enlightenment philosophers through the writings of Clement Greenberg, is considered to have reinforced the undervaluing of the crafts still further (Alfoldy in Harrod 1997). In fine art, the object's sensory dimension became perceived as superficial and unimportant, in relation to the concepts it embodied (Johnson in Harrod 1997 p.94). In design, meanwhile, there developed an on-going preoccupation with the notions of universality (Metcalf 1993, Alfoldy 1992), and the 'autonomous object', defined by its own existence rather than its context. The Modernist influence also instilled in designers a definition of 'function' based on performance-related and technological attributes, to the neglect of the sensory dimensions and personal significance (Black and McDermott 1997).

3.2.2. contemporary context

It is considered that the undervaluing of crafts knowledge and cognition is reinforced by certain aspects of contemporary society.

Firstly, commodity culture has resulted in the processes involved in the making of craft objects being undervalued in relation to the products themselves: as Lippard explains, whilst many traditional cultures emphasise process over production, Western capitalism emphasises the commodity produced (Lippard cited in Evans in Johnson 1998 p37).

Secondly, some theorists argue that the need for craft objects is negated by the development of new technologies, capable of replicating the craft object's uniqueness and aesthetic attributes: as Dormer explains (Dormer 1997 p.145),

'If you cannot tell whether a piece of machined textile is hand-done or machined, then either the much-vaunted poetry of the handcraft aesthetic is a myth, or the same poetic aesthetic claimed for handcraft is also achievable through technology, and consequently what technology distributes is not only knowledge but also 'poetry'.

This argument is, however, countered by Johnson, who believes that the sensuousness of the crafts has particular resonance in an increasingly virtual world (Johnson in Harrod 1997 p.94),

Finally, the craft object's domestic – and hence feminine – associations, together with the tacit nature of the knowledge which created it and the kinaesthetic language involved in describing it, are considered to have caused its undervaluing in a patriarchal society: as Shreeve argues,

'...the nature of tacit knowledge, such as intuition, hunches, know-how is ascribed to the feminine and given lower value, or even discarded as a legitimate way of knowing'.

(Shreeve in Johnson 1998 p 47).

In this culture, crafts practice, is often condemned as 'mindless making' (Johnson 1998 p.13), with its practitioners' inarticulacy being misinterpreted as a lack of intelligence rather than as intelligence expressing itself in a non-verbal form (Mitchell in Harrod 1998 p.329).

Experiential, practical knowledge, meanwhile, is denigrated as intuition or manual skill (Dormer 1988 p.15). As Dormer explains, the legacy of the Industrial Revolution's division of labour remains in the perception that ideas are formulated by designers, and implemented by craftspeople (Dormer 1988 p.91): skill itself is seen as a constraint upon creativity, rather than a stimulus (Metcalf 1993 p.46).

Contemporary culture therefore continues to fetishise the craft object (Jackson in Johnson 1998 p.94), neglecting to value its contextual meaning (Metcalf 1993) or the processes involved in its making. As Fisher and Gibbon observe, the word 'craft' has become used primarily as a noun

rather than a verb, describing a ‘highly circumscribed and institutionalised set of elite cultural practices’ rather than an activity or process (Fisher and Gibbon 1999 p.286).

Crafts practitioners, meanwhile, have been subjected to a range of negative stereotypes. They are often perceived as amateurs: as Johnson explains (1995), craft is the only cultural practice whose professional and amateur spheres are so closely related, and in which the professional is subsumed under the amateur. Greenhalgh suggests that crafts practitioners have also been widely portrayed as ‘cultural Luddites... stubborn reactionaries’ who thrive on a nostalgia relating to a pre-industrial era (in Dormer 1997 p.104), or reject industrial and capitalist notions of progress (Hobbis in Harrod 1997, Fry 1995 p.208). As Pye explains (1968 p.4),

‘There are people who say they would like to see the last of craftsmanship because, as they conceive of it, it is essentially backward-looking and opposed to the new technology which the world must now depend on. For these people craftsmanship is at best an affair of hobbies in garden sheds; just as for them art is an affair of things in galleries.’

When crafts knowledge itself has been valued, it has rarely been for those inarticulate and intangible aspects which are now considered central by crafts theorists (see sections 3.5 – 3.6), but rather for those tangible aspects which are visible in the object itself. This limited appreciation of crafts knowledge is evident in the fine arts, where the crafts have been valued solely as an antidote to the dematerialisation of conceptual art, an art form whose accessibility through familiar form countered the excesses of ‘rampant tutti-frutti postmodernism’ (Dormer in Thackara 1988): as Stair explains, the craft object was consciously de-contextualised and admired for its material qualities alone (Stair in Harrod 1997 p.161). However, as section 3.8 will demonstrate, it also exerted a considerable influence on attitudes towards the role of craft in design for industry.

3.3. Craft Reconsidered

The above summary suggests that the crafts have traditionally been valued primarily for their tangible outcomes and the explicit skills developed through their practice, rather than as a form of cognition and tacit knowledge.

However, the past decade has seen this trend reversed, as theorists have investigated the meaning and relevance of the crafts in relation to critical frameworks drawn from more established areas of the social sciences (Johnson 1998 p.15). This activity has challenged many of the values previously disadvantaging the crafts, assisting the discipline in establishing its own identity, separate and distinct from both art and design.

Firstly, theorists have drawn on the notion of cultural relativism, which refutes the notion of universal absolutes, accepting that nothing is meaningful without consideration of its context (Alfoldy in Harrod 1997 p.334). This means that craft objects may be valued in relation to their associated or implied uses, rather than simply against aesthetic criteria: as Jackson argues (in Harrod 1997 p.286),

'Objects need to be read as a crystallisation of the ideology from which they spring; as a way of asking fundamental questions about culture' rather than as 'disembodied works of genius'

By abandoning the search for universal truth, cultural relativism challenges the hierarchies which set art above craft: if we accept that meaning is subject to interpretation, then the supposedly greater lucidity of information gained visually is irrelevant to the value it is accorded (Alfoldy in Harrod 1997 p.334). Moreover, it ends the search for definitions of craft, and of hierarchies both within it and between it and other cultural practices, by legitimising the plurality and diversity which, as explained above, now characterise crafts discourse.

Secondly, theorists have drawn on the work of social scientists who have challenged the notion of logic and rationality as the supreme forms of human intelligence. This re-evaluation has resulted partly from research undertaken in the neuro-biological sciences, which suggests that the devaluing of bodily-kinaesthetic intelligence is a social construct rather than a biological fact (see Gardner 1993 pp.206 - 237). As Metcalf explains, the cognitive style developed by the

individual reflects specific environmental conditions and is value-neutral (Metcalf 1993). This new paradigm is also partially attributable to an emerging awareness of the limitations of rationality, which Schön traces from the early 1960s (Schön 1983 p.38). Schön explains that, in many respects, the professionals who draw on rational knowledge have failed both in attaining their own standards and in helping society to achieve its objectives. This has led to a questioning of the knowledge and thinking processes underpinning their practice, and to the assertion that rationality emphasises problem-solving rather than problem-setting (Schön 1983 p.40). According to Schön, rational knowledge alone is inadequate in dealing with the complexity, instability, uniqueness and conflict characteristic of modern life. He proposes that society begins to value and develop 'reflection-in-action', a way of thinking which is grounded in engagement with the situation rather than in reference to principles, calculations and procedures. He argues that professionals need to develop their capacity to understand the nature of the unique problem, accepting its uncertainties and contradictions, rather than attempting to label and resolve the problem according to precedent (Schön 1983 p.40). The process of defining the problem should, he believes, become a means of both clarifying the desired result, and identifying the means of achieving it (Schön 1983 p.41).

The theory of 'reflection-in-action' assists in legitimising crafts cognition, by suggesting that human development could be furthered by valuing practical and intuitive thinking. Similarly, Polanyi's theory of 'tacit knowledge' or 'personal knowledge' explicates the value of the intangible knowledge that it produces (Polanyi 1958). Polanyi challenges the entire concept of rational, impersonal knowledge, arguing that because the practical application of theoretical knowledge is inevitably influenced by the individual's unique experiential knowledge, knowledge is more accurately perceived as a 'fusion of the personal and the objective' (Polanyi 1958 p.viii) than as an understanding of rational procedures. By challenging the view of science as dispassionate, impersonal and universal, Polanyi validates implicit, tacit knowledge and explicates its contribution to all human knowledge. As crafts theorists have noted (Shreeve in Johnson 1998 p.42), such implicit knowledge assumes particular importance in crafts cognition because of craft's basis in the physical act of making, rather than in language (Dormer in Thackara 1988).

Thirdly, crafts theorists have benefited from the nascence of their field at a time when technological developments are causing a re-evaluation of the ways in which humans think and work. This has led theorists to investigate the correlation between the cognitive processes involved in manipulating physical and virtual environments, and hence the crafts practitioner's

role in the digital age (McCullough 1996, Fry 1995, Thomas-Mitchell 1993, Jones in Thackara 1988). It has been proposed that computer systems and programmes offer particular combinations of affordances and constraints in a similar way to physical materials and processes. Because of the crafts practitioner's expertise in working within these parameters whilst stretching their potential, theorists consider crafts knowledge and cognition to be easily transferable to the digital domain: as Jones explains (in Thackara 1988), software in particular requires a design process which emphasises incremental development through testing.

This argument is reinforced by the evolution of tactile interfaces, which also benefit from the crafts practitioner's manual dexterity and bodily-kinaesthetic intelligence. As Thomas-Mitchell argues, in this case crafts cognition, with its emphasis on dialogue with the object, is more appropriate than design cognition, with its emphasis on dialogue with a representation of the object (Thomas-Mitchell 1993 p.131).

The outcome of the explosion of research interest in the crafts over the past decade, combined with the application of new theoretical frameworks, is that the discipline is no longer valued merely for the objects it produces. As the above definitions suggest, it is beginning to be also appreciated for the knowledge and cognitive processes it develops (Fry 1995 p.203).

3.4. Crafts Discourse

Crafts discourse has been subjected to a number of criticisms. Until recently, it is considered to have prioritised expressive work, preventing the development of alternative languages appropriate to other forms of practice including the domestic and the utilitarian. It is criticised for its adoption of language and concern with issues only appropriate for the small percentage of practitioners making 'fine art' work. It is considered to have been preoccupied with a search for 'monolithic theories' and universal definitions of crafts practice which deny its essential diversity. In addition, it is considered to have been primarily concerned with supporting and protecting practice, rather than criticising or challenging it (Johnson 1995).

The restricted view of the crafts evident in these criticisms is symptomatic of research activity which was, until recently, funded predominantly by The Crafts Council. Harrod's account of the organisation's history suggests that its limited research resources could never allow it to encompass the full range of crafts practices (Harrod 1999). Meanwhile, The Crafts Council's vulnerability as an institution led to an emphasis on those forms of practice which were perceived as establishing a contemporary relevance for the crafts: as fine art (Harrod 1999 p.86), for example, or as a means of creating jobs and stimulating trade (Harrod 1999 p.412 – 415). In addition to influencing the nature of crafts discourse, this situation has evidently contributed to the paucity of crafts literature bemoaned by Johnson (1995), Evans (in Johnson 1998 p.33) and Press (1998), and consequently to have restricted the development of the 'polyphonic discourse' necessary for mature, critical debate (Johnson 1995).

Recent years have, however, seen a proliferation of research and writing in the UK: indeed, critical discourse has been described as 'the preoccupation of the 1990s' (Johnson 1995). This development is partly attributable to the 1992 accreditation of polytechnics as universities, and the subsequent extension of research funding to the new universities where craft degree courses are undertaken (1992 Education Act). However, it also reflects a crisis in crafts education, as funding restrictions have drawn attention to the discrepancy between the demand for greater efficiency and access, and the resource intensity of the craft disciplines (Press and Cusworth 1998 p.12). Together with the pressures to reduce contact teaching time in favour of distance learning, the emphasis on quantifiable learning outcomes (Shreeve 1997 p.42) and the finding that crafts education rarely functions as a vocational training (Knott 1994, Press and Cusworth

1998), this has created significant impetus for a close examination and articulation of the nature of crafts knowledge, and its broader relevance.

The subsequent expansion of crafts research, together with the new theoretical framework outlined above - has begun to address the criticisms outlined in section 3.3. The acknowledgement of craft as a pluralistic practice is reflected in a pluralistic discourse encompassing a rich diversity of perspectives, methodologies and languages (Johnson 1995). This discourse embraces practice-centred research, empirical research and theoretical research, paralleling the notion of 'research about / for the purposes of / through design' (Archer 1995) with that of 'research about / for the purposes of / through' making.

Even within the single field of 'research about making' in which this research is located, there exists a rich diversity of cultural and theoretical perspectives and forms of expression. This is partly attributable to the lack of an established academic research culture in the crafts, which means that theoretical discourse is largely conducted by specialists in other fields, from cultural theorists (eg Johnson, Harrod) and historians (eg Buckley, Seddon) to cognitive psychologists (eg McCullough) and anthropologists (eg Dissenake). It is also a result of the ambiguous relationship between theory and practice, and between verbal language and the language of the crafted object, which has caused some practitioners to seek alternative means of articulating their work: de Waal, for example, uses a form of poetry (de Waal in Johnson 1998). A resistance to verbalisation and theorisation is considered common amongst crafts practitioners (Butcher 1998 p.57, Johnson 1995), who often claim that their work 'speaks for itself' (eg Hanson at 'Identity' conference, Clegg at 'Jerwood Prize Discussion') and resent the interference of 'wordsmiths' (eg LaTrobe Bateman at 'Craft Futures' conference) *. According to this perspective, verbal discourse diminishes the value of crafts knowledge, imposing verbal language onto objects and processes with a non-verbal dimension and conceptual frameworks appropriated from other disciplines (Metcalf 1993, Johnson 1995). However, other theorists argue that rather than providing a neutral context for interpretation, a 'silent worship' of individual objects and their creators imposes a powerful yet unacknowledged framework, rooted in economics, politics, and the philosophical frameworks discussed in section 3.2 (Meuli in Johnson 1998 p.24). The alternative is a polyphonic debate, where new conceptual frameworks

* 'Identity' was organised by the University of Central England, and held at the Midlands Art Centre, Birmingham on October 20th 1998. 'Craft Futures' was organised by the Victoria and Albert Museum in conjunction with Contemporary Applied Arts, and was held at the V&A on November 28th 1998. The 'Jerwood Prize Discussion' was organised by the Crafts Council, and held at its premises in December 1998.

and forms of expression are developed as appropriate for the different forms of crafts practice (Johnson 1995). This enables practitioners to benefit from analysis, which can bring 'intoxicating' new insights by questioning the meaning of objects from alternative perspectives (Johnson 1998 p.16) or by consolidating the accumulated experience of practice (Butcher in Johnson 1998 p.163). It also enables the crafts to benefit from cross-disciplinary critical theory (Johnson 1998 p.15), and to communicate their meaning and relevance to a wider audience (Meuli in Johnson 1998 p.25, Butcher in Johnson 1998 p.65). As Bristow states (Bristow in Johnson 1998 p.115),

'Theory has not changed my work in any practical sense but it seems to have somehow legitimised what was intuitive; it has provided a way of interrogating these constraints, to see how they have been socially and historically constructed.'

This means that, although resistance to verbalisation persists amongst some practitioners, it is being challenged with the view that theory and practice can be mutually beneficial (Johnson 1998, Meuli in Johnson 1998, and that discourse need not necessarily adopt the language of art criticism (Johnson 1995, Metcalf 1993).

The pluralistic discourse adopted by contemporary crafts theorists addresses both the diachronic (historical) and synchronic (current) significance of processes and objects, and their consumption as well as their production (Press and Cusworth 1998 p. Johnson 1998 p.16), striving to develop forms of language appropriate to the different forms of crafts practice, not only expressive work concerned with embodying meaning (Johnson 1995).

It has also liberated theorists from the search for universal definitions of practice, enabling Harrod to refer to her history of twentieth century crafts as a 'braiding together' of disparate themes (Harrod 1999), and for collections of essays to be published in which diverse themes and writing styles co-exist (Johnson 1998, Harrod 1997). The notion of pluralism may therefore be considered to have cleared a space for future research and analysis: by distinguishing between different forms of crafts practice and precluding the need to generalise across them, it enables both differences and commonalities to be investigated and articulated.

3.5. Crafts Cognition

This section identifies and explores established characteristics of craft as a cognitive process, focusing on incrementalism and on the notion of crafts cognition as a dialogue between sensory perception and conceptual thinking.



3.5.1. Incrementalism

It is acknowledged that crafts practitioners tend not to make a radical departure with each new object or range of objects, but to explore and refine a limited range of forms. Although this 'search for the ideal form' has been described as 'cautious' (Dormer 1997 p.149), it is a tendency which can also appear obsessive, as illustrated by Hans Coper's caricature of himself as a 'demented piano tuner, trying to approximate a phantom pitch' (Victoria and Albert Museum 1969). An alternative perspective is provided by fellow ceramicist Martin Lewis (Lewis 1999), who describes his work as a balance between experimentation and on-going 'fine tuning'.

It has been suggested that this characteristic reflects the amount of time involved in acquiring general crafts knowledge and the expertise necessary to produce a particular form (Dormer 1994). Jones's description of pre-industrial craft as a process of continual development through testing in use and refinement suggests an alternative interpretation, that of a cultural legacy (Jones 1970).

3.5.2. Dialogue

It is apparent that the crafts are characterised by a diversity which transcends cultural boundaries and defies categorisation. However, many forms of crafts practice may be considered to share a common cognitive foundation, in the notion of a dialogue between sensory perception and conceptual thinking: craft is described as the product of a 'direct articulation between hand and mind' (Fry p.210). This perspective is not shared by all practitioners and theorists. The inter-war workshop movement, for example, saw making as an intuitive, meditative activity without conscious or conceptual thought, consistent with the practice of Zen Buddhism (Harrod 1999 p.150). The 1970s studio craft movement, conversely, elevated the conceptual aspect of craft to such an extent that making became a means of embodying ideas rather than formulating them (Harrod 1999 p.190): as ceramicist Glenys Barton commented at the time (cited in Harrod 1999 p.190),

'I don't really think I am a craftsman. Making things bores me. I am more excited by the process of conceiving the idea.'

Nevertheless, the concept of dialogue has persisted throughout the history of crafts discourse, from the Arts and Crafts Movement's definition of craft as a 'complete integration of skills both cerebral and manual' (cited in Edwards 1997 p.48), to Press and Cusworth's definition of 'intelligent making' as an integration of physical and mental skill with tacit and explicable knowledge (1998 p.82).

Analysis of the literature suggests that an interdependency of sensory perception and conceptual thinking in crafts cognition operates on both micro and macro levels.

On the micro level, it is concerned with one particular object and its development, in relation to the practitioner's mental model. Dormer describes this process as an interplay between 'the practitioner, his expertise, and the goal that the practitioner is trying to make or find' (Dormer 1988 p.19). This micro-level dialogue is two-way: as McCullough states (1996 p.1998),

'The attuned craftsman asks, 'What can this medium do?' as much as 'What do I wish to do with this medium?''

Answering these questions, according to McCullough, requires sensory engagement: this type of implicit knowledge can only be gained from evaluating the medium's behaviour as it is subjected to manipulation (McCullough 1996 p.220). In effect, the senses act as both effectors and probes (Johnson 1997, McCullough 1996 p.62), not merely implementing pre-determined mental models, but influencing their development by providing local knowledge, specific to the evolving object.

Shreeve's video-based observational analysis of the weaving processes suggests that this comparative evaluation between existing (general) and new (context-specific) knowledge is largely dependent on the senses, because tacitness and subsequent encoding in physical action (see section 3.6) precludes linguistic evaluation. As she explains (Shreeve in Johnson 1998 p.43),

'The video indicates how much evaluation is taking place by fingers feeling the fabric. A complex judgement occurs, which links the information gained to other experiences and knowledge, in order to evaluate the performance of the fabric in relation to the given design.'

This means that crafts cognition can be considered local, or context-specific: the characteristics of a particular piece of wood or cloth influence both the making process and its outcome (McCullough 1996 p.22), as can other local factors such as the tools being used and the air's temperature and humidity. As Rowley explains (1997 p.6),

'Craftsmanship suggests the customised adaption of skill to circumstance and implies interpretations improvised for the task by an accomplished craftsperson.'

This assertion is illustrated by Shreeve's description of the chain stitching process (in Johnson 1998 p.43):

'Vision is used to assess and evaluate, but the hands contribute to the examination. Finger and thumb apply pressure, stroke backwards and forwards at different speeds on a swatch of fabric: the finger tips are run along a seam to feel the lumps and bumps, a collar is lifted and let fall, hands are run along the surface of an embroidered fabric..... The whole body... acts as a sensitive collector and processor of information.... Without conscious effort, the eyes, hands and feet all respond and adjust minutely to changes in the total production of the piece..... The changes made by a machine in executing embroidery.... can inform the

craftsperson of many aspects of their work. There may be a technical problem, either with the fabric or with the machinery itself, which is indicated by sound and which alerts us to the fact that something is wrong.'

By contributing to a body of experiential knowledge (Shreeve in Johnson 1998 p. 43, Dormer 1988 p.14), the micro-level dialogue informs new mental models, effectively initiating a macro-level dialogue between sensory perception and creativity. As Dormer explains (Dormer 1995 p.20),

'The crafts are partly shaped - and to some extent determined - by the patterns of thinking encoded in processes, tools, and attitudes towards making.'

The accumulated experience of practice becomes a primary creative stimulus, with the insight and knowledge gained through making feeding back into the conceptual process (Butcher in Johnson p.1963) as instrumental and critical skills develop interdependently (McCullough 1996 p.249, Dormer 1988 p.17). As Edwards states (Edwards in Harrod 1997 p.349),

'...memory, experience, judgement, imagination, intuition and research, derived in part from the activities of making, can become part of the cerebral activity of craftspeople.'

McCullough substantiates this argument, suggesting that the idea of constraint as a source of creativity is particularly apt in relation to crafts practice (1996 p.220). This, he states, is partially attributable to the nature of crafts knowledge, as an understanding of the affordances and constraints characterising a particular medium and object (1996 p.220, see section 3.6). It also reflects the implicit nature of crafts knowledge which, he claims, provides a focus without imposing the restrictions characteristic of explicit, rules-based knowledge (McCullough 1996 p.220). As he explains,

'Constraints define formal possibilities and guide creativity into specific channels, much like banks define a river.'

(McCullough 1996 p.220)

This phenomenon is illustrated by practitioners' accounts of their own practice, which describe the crucial role of the making process itself in suggesting imagery (Sekijima, cited in Butcher

1998 p.1963, Binns, cited in Johnson 1998 p.151) and in revealing new applications for materials and processes (Edwards in Harrod 1997 p.350). Ceramicist Martin Lewis defines his work as being ‘about clay and what it can do’, describing an endless fascination with the possibilities revealed by even minute changes to his standard procedures. Basket maker Hisako Sekijima describes the process in detail:

‘When I am making a piece, I see many unexpected things and imageries being unveiled. Instead of changing my original plan, I pursue my intent and set aside ‘the unexpected’ to question their meaning later. I don’t want to miss any subtle moment of revelation, because I know this might be the time I get into a new way of looking at things. I can distil an idea for future baskets from this processing.... This is my way of planning. It is not by drawing nor making a model.’

For many theorists, the notion of dialogue is considered the primary defining characteristic of crafts practice, transcending the myriad of approaches, methodologies, niches and attitudes found in crafts practice. It is considered a primary factor distinguishing craft from fine art (Metcalf in Dormer 1997): as Dormer states (1988, p.14), whereas fine art represents the embodiment of conceptual thinking conducted using language,

‘...the thinking in the crafts of oil painting, pottery, modelling, lace making and so forth resides not in language, but in the physical processes involving the physical handling of the medium.’

This argument is substantiated by Johnson, who suggests that despite an increasing interest in materiality in fine art practice, the sensual dimension is employed for visceral effect, a means of reinforcing ideas rather than formulating them (Johnson 1997 p.1994). This can be attributed to the roots of fine art in philosophy and the Western prioritising of linguistic and intellectual thinking discussed in section 3.1: the art object is essentially an embodiment of conceptual thinking (Danto 1981, Chipp 1968).

To summarise, it appears that crafts cognition is characterised by a dialogue between the conceptual and the physical domains: direct engagement with materials and objects creates local and general knowledge, whilst facilitating access to tacit, experiential knowledge stored in the practitioner’s subconscious. Crafts cognition opposes conventional linear models of planning and implementation, instead following an iterative cycle of action, reflection and

change, in which sensory perception and conceptual thinking are interdependent, and both processes and outcomes are influenced by factors unique to each situation.

3.5.3. Craft as Pluralistic Intelligence

3.5.3.1. bodily-kinaesthetic intelligence:

It is evident that crafts cognition is fundamentally reliant upon sensory perception, as a means of bridging the physical, exterior world with the conceptual, inner world. The senses and the body are used not only to effect solutions, but also to generate and access existing experiential knowledge, and to apply this to the creation and refinement of mental models.

Metcalf proposes that this reliance on sensory perception categorises crafts practice as a form of bodily-kinaesthetic intelligence, as defined by Gardner's theory of multiple intelligences (Gardner 1983). In doing so, he isolates and elevates the manual aspect of crafts practice to a form of intelligence, thereby adding a neurological dimension to his argument for craft to be accorded the status of art.

Although Metcalf's argument has made a significant contribution to the crafts discourse (see above), it has also been criticised for emphasising the physical dimension of crafts practice: Evans (1998) calls for further investigation of his thesis, whilst Johnson (1999) condemns the 'reductive biologism' of a similar argument for merely,

'...inverting the Cartesian mind body split, privileging the body, with bodily sensations remaining separate from, rather than in tension with, cognitive processes.'

Johnson's criticisms are affirmed by a re-appraisal of Gardner's theory, which suggests that physical dexterity is not a remote action, but an inherent aspect of certain forms of cerebral activity. Gardner's definition actually emphasises an interdependency of sensory perception and conceptual thinking: referring to psychological theory, he describes an iterative process, where context-specific knowledge gained through the senses informs the development of mental models, which in turn guide motor movements.

The similarities between this definition and descriptions of crafts cognition are reinforced by further aspects of Gardner's thesis. For example, Gardner's argument that skilled action is not usually mechanical, but guided by continual evaluation conducted during split-second 'points of

repose' (Gardner 1983 p.209) evokes Shreeve's description of the weaving process (see above). His description of bodily memory, meanwhile, corresponds with Johnson's notion of 'imagined touch' (see below), by suggesting that experiential knowledge gained through the senses is stabilised in an internal kinaesthetic language. Gardner considers this facility to be implicit in many human activities: anticipating the weight of an object to be lifted, for example, requires an assessment of the current task in comparison with the individual's bodily memory of similar experiences (Gardner 1993 p.229). It may, however, be considered highly developed amongst crafts practitioners, whose heightened sensory perception creates an unusual range and depth of bodily memory, whilst facilitating evaluation of the current situation.

This re-evaluation of Gardner's definition suggests that whilst crafts cognition does rely on and develop bodily-kinaesthetic intelligence, it uses it in conjunction with other forms of intelligence, rather than in isolation.

This assertion reinforces the arguments of Johnson, McCullough, Shreeve et al for crafts cognition as a dialogue between process and intent. However, it also raises questions regarding the nature of the other forms of cognition involved in crafts practice. As Gardner himself states, human intelligence is inherently pluralistic, and every human activity represents a unique combination of the six forms of intelligence (Gardner 1993 p.144).

This notion of intellectual pluralism provides a framework for the comprehension of particular human activities. By evaluating crafts and design cognition in comparison with Gardner's definitions of the musical, linguistic, spatial and logical-mathematical intelligences, it is possible to propose fundamental differences between them, beyond the crafts practitioner's use of bodily-kinaesthetic intelligence.

3.5.3.2. musical intelligence:

Gardner suggests that the bodily-kinaesthetic and musical intelligences are closely allied, referring to the relationship between music, dance and action, and to the need for physical dexterity in playing a musical instrument (Gardner 1993 p.123). In crafts cognition, it may be asserted that musical intelligence enhances bodily-kinaesthetic intelligence, contributing an auditory dimension to sensory perception, and thereby contributing to context-specific knowledge gained through the haptic-somantic, kinaesthetic and visual senses.

The key characteristic of musical intelligence, defined as the ability to appreciate pitch, rhythm, musical structure and timbre (Gardner 1993 p.123) is, according to empirical analyses of crafts practice, an integral aspect of the making process. Shreeve, for example, describes the embroiderer's use of the machine's pitch to identify faults within the fabric or the machine itself, as well as a form of positive feedback, an indicator that object, maker and idea are 'at one' (see quote above). Similarly, the pitch of the sound made by the potter's wheel indicates its speed, thereby informing the movement of the hands; the timbre of the sound made by greenware as it is being fettled indicates its dryness and therefore its malleability, informing the maker of the degree of pressure required. The emphasis is on sound as part of a multisensory evaluation of the physical world: as Fry (1995) explains in describing the operation of a machine,

'...the color and smell of sparks of a universal grinder in action, its sound, and the felt finish of the ground surface, all deliver information that skill reads and directly translates in machine adjustment.'

3.5.3.3. linguistic intelligence:

Disregarding the highly developed linguistic skills employed by poets and writers, Gardner identifies four ways in which linguistic intelligence is fundamentally important to human society: in explanation, in memorising information, in rhetoric, and in metalinguistic analysis (Gardner 1983 p.78).

Crafts practice draws on linguistic intelligence in terms of memorising and applying technical and procedural knowledge: indeed, it has its own technical language (Dorner 1988 p.17). Practitioners also use verbal language, in order to undertake the organisational, strategic and negotiative aspects of collaborating with others. It may however be asserted that the most profound connection between craft and linguistic intelligence does not concern the role of verbal language in crafts cognition, but crafts practice as a form of explanatory language. This theme will be developed in section 3.7.2.1.

3.5.3.4. spatial intelligence:

In defining spatial intelligence, Gardner again identifies two distinct sub-categories, the concrete and the abstract (Gardner 1993 p.194). It may be asserted that both types contribute to the crafts dialogue, in parallel with bodily-kinaesthetic intelligence.

Concrete spatial intelligence involves the capacity to perceive the visual world with accuracy, and to re-create aspects of visual experience (Gardner 1993 p.173). Gardner states that these capabilities enable the visual artist to transform mental imagery, and to produce graphic representations of spatial information (Gardner 1993 p.176). By implication, they may be considered equally important in forms of crafts practice involving surface decoration or other forms of pictorial representation (in printed textiles or engraved glass, for example). The same capacities allow the individual to visualise problems and solutions (Gardner 1993 p.184), to embody conceptual thinking in mental images (Gardner 1993 p.194) and to produce artefacts displaying a sensitivity to tension, balance and composition (Gardner 1993 p.176). Combined with bodily-kinaesthetic intelligence, this contributes to 'intuitive' problem-solving: as for example, it enables us to evaluate – without reference to measurements or calculations – the soundness of architectural structures (Gardner 1993 p.229), and, by implication, the strength of a handle in relation to a jug.

Abstract spatial intelligence involves the interpretation of visually-received information, as a means of informing strategic thinking (Gardner 1993 p.176). It involves recognising and interpreting visual objects and scenarios (Gardner 1993 p.176), and reformulating mental models in accordance with emerging, context-specific knowledge. Gardner illustrates this concept with the game of chess, in which players' visual interpretation of the pieces enables them to continually reformulate strategies in response to a dynamic situation (Gardner 1993 p.194).

There are clearly strong similarities between Gardner's description of both abstract and concrete spatial cognition, and that characterising the crafts. This indicates that spatial intelligence plays a significant role in crafts cognition. However, the importance to the crafts dialogue of information gained through the tactile, kinaesthetic and auditory senses – as well as through sight – suggests that abstract spatial intelligence is contributory rather than dominant in crafts cognition.

3.5.3.5. logical-mathematical intelligence:

Logical-mathematical intelligence is commonly perceived as abstract (Gardner 1993 p.138), its practitioners specialising in the handling of extended chains of reasoning (Gardner 1993 p.139), guided by explicit problem solving procedures (Gardner 1993 p.144). According to Gardner, however, this Piagetan definition (Piaget 1965, 1969, 1981) is misleading, reflecting a particularly Western perspective.

Gardner accepts Piaget's assertion that the capacity to reason logically is developed through observation and analysis of the physical world, beginning with the child's ordering and evaluation of objects and their response to manipulation (Gardner 1993 p.129). However, he suggests that whereas in Western societies this process is valued as a means of formulating abstract propositions and theories (1993 p.129), in other cultures it is more often applied to meeting actual needs. Gardner illustrates this argument by comparing Western and non-Western methods of estimation, calculation, information classification and time measurement. In each of these activities, non-Western methods derive logic from tacit, experiential knowledge and reference to the physical environment, rather than from calculations derived from algorithms or universal theories (Gardner 1993 p.160).

Conventional Western definitions of logical-mathematical intelligence suggest that its applications in crafts practice are limited, as the partially defined nature of design problems and their abductive nature precludes logical analysis in design thinking (Cross 1995). In crafts practice, where work is as likely to be self-directed (Fisher and Gibbon 1999 p.296) as guided by the semi-objective criteria established by a functional problem or market demand, logical reasoning would appear still less appropriate.

However, Gardner's alternative definition of logical-mathematical intelligence suggests that its contribution to crafts cognition is significant, and merely obscured by the limitations imposed by Western definitions: if logical thinking can be derived from experiential understanding of the physical world rather than abstract formulae, then it can contribute to crafts cognition.

One example relates to the firing temperature of kilns used to fire ceramics and glass. As practitioners develop understanding of how clay and glass react to heat, many choose to ignore the kiln's temperature gauges, relying instead on a visual assessment of pyrometric cones or, in the case of kiln-formed glass or raku-fired ceramics, the objects themselves (see figure 1).



fig.1: pyrometric cones are designed to slump during firing. By observing their movement as the kiln heats, ceramicists and glass makers are able to make the accurate evaluations of the kiln's temperature necessary in order to control firing conditions.

Further examples include the estimation of the quantity of clay required to throw a vessel of a certain diameter, and the evaluation of finished objects in relation to firing conditions, in order to develop understanding of causal relationships. Such methods, which are tacit and derived from experiential knowledge, are perceived by their advocates as more reliable than scientific methods, partly because of their lower susceptibility to technical error: as Gardner remarks, algorithmic calculations are more precise, but are also more likely to fail due to miscalculation or equipment malfunction (1993 p.161). Calculations drawing on sensory evaluation of the situation are also valued for their flexibility, which allows immediate responses to unexpected developments, and because of their capacity to accommodate unique firing conditions resulting from factors such as air quality and density of kiln packing. Gardner's definition of logical-mathematic intelligence suggests that these methods are not illogical, but that logical reasoning is guided by the senses and by tacit, experiential knowledge gained through the senses. This in itself may be considered a more logical choice than reference to objective measurement techniques, when the context for the activity is unpredictable or dynamic, as in crafts practice. As Polanyi states, personal participation does not devalue knowledge, or render it subjective (Polanyi 1958 p.viii):

'Such knowing is indeed objective in the sense of establishing contact with a hidden reality; a contact that is defined as the condition for anticipating an indeterminate range of yet unknown (and perhaps yet inconceivable) true implications.'

This analysis extends the notion of craft as a dialogue between cerebral and physical thinking, by examining the nature of that dialogue. It presents craft as a form of cognition which is not – as commonly portrayed – the antithesis of verbal and logical thinking, but an activity which applies verbal and logical thinking to a dialogue with the physical environment. It suggests that whilst bodily-kinaesthetic intelligence is of fundamental importance to crafts cognition, it is used in partnership with the other intelligences: musical intelligence enhances sensory perception; linguistic intelligence enables the practitioner to communicate through action; spatial intelligence also enhances sensory perception whilst bridging the cerebral and physical domains; logical-mathematical intelligence creates experiential knowledge and enables the practitioner to relate context-specific knowledge to experience.

3.5.4. Cognitive Differences between Craft and Design

The above analysis suggests significant differentiating factors between the cognitive styles underpinning crafts and design practice.

The concept of design as a reflective dialogue, where potential solutions are formulated and refined through continual testing, reflection and change (Cross 1995), is familiar from Schön's theory of reflection-in-action (Schön 1983 p.79):

'The designer... shapes the situation in accordance with his initial appreciation of it, the situation 'talks back', and he responds to the situations' back-talk.... In answer to the situation's back-talk, the designer reflects-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his moves.'

There is, however, a significant point of differentiation between the craft dialogue and the design dialogue, created by the nature of the 'problems' that they address. In the design dialogue, the scale and complexity of these problems – and the inaccessibility of the technologies and materials involved – often prevents direct contact with the product or environment undergoing development (Lawson 1990 p.18). Reflection-in-action then becomes a symbolic process, undertaken in reference to drawings, models and computer-based

simulations rather than the object or environment itself (Jones 1970 p.264, Cross 1990, Lawson 1990 p.170). In crafts cognition, conversely, that dialogue occurs between the conceptual domain and the actual object or product (Pye 1968): as Jones states (1970 p.22),

'The essential difference between the normal method of evolving the shapes of machine-made things, and the earlier method of craft evolution, is that trial-and-error is separated from production by using a scale drawing in place of the product as the medium for experiment and change.'

Because the creation and manipulation of images in real and imagined space depends on spatial intelligence (Gardner 1993 p.176), it may be asserted that spatial intelligence is more important to the design dialogue, than to the crafts dialogue. A comparison between Cross's description of design intelligence as a 'logic of conjecture' * (Cross 1995) and Gardner's definition of spatial intelligence reveals further cognitive roles. Firstly, the need to formulate 'primary generators' for design thinking described by Cross (1995 p.108) requires the problem visualisation capabilities identified as a key characteristic of spatial intelligence (Gardner 1993 p.184). Secondly, developing alternative potential solutions from these objectives (Cross 1995 p.108) requires the ability to generate mental images from conceptual thinking (Gardner 1993 p.1994). A sensitivity to visual tension, balance and composition (Gardner 1993 p.176) is also evidently important in undertaking design activities, although primarily on an implementation rather than a cognitive level.

The high degree of physical dexterity required to produce drawings and models has led theorists to claim a central role for bodily-kinaesthetic intelligence in the design dialogue. However, whilst the importance of these media in design thinking is indisputable, it may be argued that because they merely symbolise reality, their creation, manipulation and evaluation facilitates spatial thought, rather than introducing bodily cognition to it. As Jones states (1970, in Cross p.264),

'...the designer gets no help from the drawing and has to rely, in the main, upon his experience and his imagination and, to a lesser extent, upon the calculation and testing of what are thought to be critical aspects of performance.'

This analysis suggests that spatial intelligence is central to the design dialogue, as a basis for abstract, conceptual cognition, as well as to thinking through drawing and making. Logical reasoning is guided by the creation and manipulation of mental and visual images, whilst bodily-kinaesthetic intelligence is used primarily to create the symbolic representations which facilitate spatial thinking.

It is evident that the craft dialogue and the design dialogue share a common set of core intelligences. However, the above analysis implies that they may be differentiated by the ways in which those intelligences are applied, and in particular, by the primary role played by bodily-kinaesthetic intelligence in crafts cognition and spatial intelligence in design.

* Cross describes the 'logic of conjecture' as a process whereby the designer, in response to the chaotic and poorly defined nature of the design problem, develops and tests a series of conjectured solutions in order to develop understanding of the problem and its potential solutions simultaneously.

3.6. Crafts Knowledge

3.6.1 Definitions

Crafts knowledge – the knowledge resulting from the cognitive activity described in section 3.5 – is commonly described as an understanding or ‘feel’ for materials (Press 1996 p.15, Read 1956, Pye 1968 p.45, McCullough 1996 p.96).



fig.2: carving by David Holgate.

In describing this form of knowledge, many theorists have referred to the notion of 'truth to materials', or the capacity to express the essence of materials through form and surface.* This preoccupation with 'truthfulness' originates, according to Harrod, in the Modernist desire to reform and elevate contemporary life, by controlling the influx of objects into the home through simplicity and austerity: craft makers justified making non-functional objects by claiming that they were 'honest' and unforced (Harrod 1999 p.145). This definition has, however, been

* Harrod describes the importance of this concept, particularly in the inter-war period, and its influence on theory and practice through the writing of contemporary commentators including Ethel Mairet and

criticised for attempting to objectify qualities which are unquestionably subjective and open to individual interpretation (Harrod 1999 p.145): any attempt to express ‘stoniness’ or ‘woodiness’ is merely an attempt to rationalise personal preferences (Pye 1968 p.47). As Pye explains, an object’s resonance may even rely on an inversion of material properties, as in the case of Renaissance figurative sculpture, where the hardness of stone exaggerates the softness of hair, drapery and flesh (Pye 1968 p.47).

Theorists suggest that in reality, the crafts practitioner’s ‘feel for materials’ operates on several levels. It encompasses an appreciation of their objective properties (Pye 1968 p.47): distinguishing structures, affordances and constraints (McCullough 1996 p.96), including factors such as tensile stress, conductivity, elasticity (Pye 1968 p.47), the temper of metal and the grain of wood (McCullough 1996 p.96). However, it also has an implicit dimension: a recognition of the materials’ subjective qualities, such as mass, density, rigidity and warmth, their reaction to particular processes (Pye 1968 p.47), and their impact on a particular object’s weight, composition and balance (Johnson 1999 p.1996). For example, as McCullough explains, working wood requires an understanding of the subtle differences in response between types of wood and individual pieces (McCullough 1996 p.198):

‘Wood can be cut across the grain more readily than along the grain, and it can be cut only so thin and still remain rigid.... Harder woods afford more detailed forming processes, such as carving and sanding. Any wood can be carved more easily than stone. More resilient wood can be worked further than less resilient wood of equal hardness. Of course, no two pieces of one wood are alike.’

This implicit dimension of crafts knowledge is described by Dormer as connoisseurship, or the ability to discriminate between similar but different material qualities, and to recognise their nuances within a framework of values (Dormer 1988 p.23). It requires both technical knowledge and ‘know-how’ (1997 p.140): in order to produce ceramics, for example, technical knowledge such as firing procedures and mould-making techniques must be applied as appropriate to the practitioner’s goals and working environment (Dormer 1997 p.140). McCullough defines the concept more closely, describing how the practitioner reacts to a ‘dense continuum of possibilities’, revealed as the material object is subjected to manipulation (McCullough 1996 p.198). This he considers to be characteristic of crafts materials, whose

Michael Cardew, and through the policies of the Council of Industrial Design, which provided funding for the Crafts Council of Great Britain from 1945 to 1967 (Harrod 1999 p.215).

density and variety enable them to be coaxed from one state to another, and thereby to engage both the senses and the imagination. As he explains (McCullough 1996 p.198),

'Every material has tolerances, within which it is workable and outside of which it breaks down..... An experienced craftsman knows how to choose the right medium and to push it as far as it will go - and no further.'

3.6.2. Characteristics

Crafts knowledge is widely described as 'tacit' (Press and Cusworth 1998 p.30, Cross 1990, Cooley in Thackara 1988, Dormer 1988 p.14, Shreeve in Johnson 1998 p.42, Jones 1970 p.18, Dumas 1994). This concept derives from Polanyi's notion of tacit knowledge, which draws on theories of psychology, metamathematics and cybernetics (Polanyi 1958). Tacit (or personal) knowledge is seen by Polanyi as a vital component of all human understanding, contributing to objective knowledge even in scientific practice (Polanyi 1958 p.viii). It is considered to be inherently implicit, non-verbal and non-rational (Janik in Goranzon and Josefson 1988 p.54), and to result only from long-term, active participation and sensory engagement with a practical activity (Janik in Goranzon and Josefson 1988 p.49), representing,

'...those aspects of experience which are wholly knowable self-reflectively... but by their very nature are incapable of precise articulation.'

The concept of tacit knowledge provides a useful theoretical framework for crafts discourse, explicating and valuing the 'unseen' dimension of crafts knowledge. Although Polanyi emphasises its influence on all forms of human knowledge (Polanyi 1958 p.viii), Dormer suggests that its contribution to crafts knowledge is particularly significant, due to the activity's sensory dimension (Dormer 1988 p.23):

'I want to claim for practical work a special sense of tacit knowledge, which is that the core of practical craft.... can only be demonstrated, not described.'

This assertion is substantiated by other theorists, who also refer to both crafts knowledge (Jones 1970 p.18, Shreeve in Johnson 1998 p.42, Metcalf 1993p.7, Press 1996 p.15, Dormer 1997 p.14-18) and the objects it produces (Butcher in Johnson 1998 p.66) as resistant to verbalisation. McCullough suggests that as with musical improvisation, skills gained through practice may be

negated by verbal articulation (McCullough 1996 p.225). Shreeve's observational evaluation of the weaving process illustrates this, demonstrating how evaluation of the work in progress takes place at a subconscious level (Shreeve in Johnson 1998 p.43):

'Without conscious effort, the eyes, hands and feet all respond and adjust minutely to changes in the total production of the piece.... At no point has the student needed to speak or articulate exactly what is required; this has been processed at a level below the conscious threshold..... The body responds to the work, but the producer can be oblivious to the nature of that question and that response. This is a tacit process of evaluation, it is not public, it is not transparently obvious, perhaps, to an observer from another discipline, who might be unaware that this evaluation process happens constantly in all manner of craft production.'

Crafts knowledge is also acknowledged as resistant to rationalisation (Dormer 1988 p.14, McCullough 1996 p.1996, Fry 1995 p.209): as McCullough states (1996 p.252),

'[Crafts knowledge] does not become formalized... the understanding is in terms of workability and practices, rather than according to any theoretical constitution. Thus people worked metals for centuries without any notion of lattices and free electrons. Acute knowledge of a medium's structure comes not by theory but through involvement.'

This characteristic is also attributable to the activity's tacit dimension, as verbalisation is recognised as a pre-requisite of deductive analysis (Gardner 1983 pp.73-98). A resistance to rationalisation does not, however, preclude transferability: as Shreeve explains, the making process allows emerging, context-specific knowledge to be compared with - and contribute to - existing, general knowledge. This argument is reinforced by Johnson's notion of 'imagined touch', which suggests that experiences and memories of actual touch sustain and develop the human capacity to imagine physical sensation. As she states (Johnson 1997),

'Through imagined touch we may experience a tactile intimacy with things that are removed from us. This possibility relies on experience, memory and expectation. We need global touch and reach-touch in order to sustain imagined touch.'

Johnson suggests that as experiential knowledge increases, so too does the ability to apply it to situations outside the immediate work context: to predict how an object will respond to manipulation, for example. This phenomenon has been identified in other activities based in

physical action: Gardner (1993 p.229) refers to this 'bodily memory' as the aspect of bodily-kinaesthetic intelligence which enables us to anticipate the weight of an object before lifting it. It may then be asserted that crafts knowledge is not limited to the crafted object: thinking through a dialogue between the mind and the senses creates not only the experiential knowledge valued by design for human experience, but also the means of applying it, beyond the object.

To summarise, the crafts practitioner's 'feel for materials' may be considered an assimilation of explicit and implicit knowledge relating to a medium's affordances and constraints (McCullough 1996 p.96), whose application relies on judgement and contextual awareness (Pye 1968 p.47). It is evident that both the local knowledge produced through the manipulation of a unique material, and the general knowledge accumulated through experience, are unique to the individual practitioner. This suggests that it is more accurate to speak of 'crafts knowledges' than of 'crafts knowledge', a term which, despite its prevalence within the literature of crafts theory, implies a distinct and universal form of knowledge.

Although crafts knowledges are tacit in terms of their resistance to verbalisation and rationalisation, their implicitness, and their uniqueness to the individual and the working environment, they are also transferable to other situations.

3.6.3. Design and Crafts Knowledges:

It has been asserted that the experiential nature of crafts knowledges differentiate them from the industrial designer's understanding of materials, which is primarily concerned with measurable properties such as conductivity, tensile strength and elasticity (Pye 1968 p.45). For many theorists, this point of differentiation between the designer and the crafts practitioner is evident in the objects that they produce, in terms of tactile and aesthetic qualities, and in their relationship to the human body (Paz cited in McCullough 1996, Dormer 1997 p.157): as Johnson explains (Johnson 1997 p.1993),

'[the crafts] are made out of a sense of touch, and invite a tactile response. What is offered is a particular kind of communication for both producer and consumer... What is implied by craft production is an intimacy between producer / object, object' consumer, producer / consumer.'

This argument may be considered to reinforce the arguments for craft to contribute to design, if, as the notion of 'imagined touch' suggests, the crafts practitioner's experiential knowledge of materials may be applied to the objects that they design as well as those that they make.

3.7. Crafts Practice

Having discussed craft as a pluralistic intelligence, capable of producing knowledge on both tacit and explicit levels, here the nature of crafts practice is investigated. The notion of craft as a pluralistic practice is presented, and the creative stimuli, contextual awareness and motivations characteristic of many practitioners introduced.

3.7.1. Craft as Pluralistic Practice

As discussed in section 3.2, the notion of the crafts as a unified practice has been challenged with a perspective which recognises the richness and diversity of an activity encompassing aspects of the fashion and interiors industries, small scale manufacture, architecture, theatre and fine art. As Johnson states (1995),

'There is more than one motivation for making..... The reality is a differentiated practice.'

This new perspective locates crafts practitioners in a 'borderland' between design and the fine and decorative arts (Veiteberg in Johnson 1998 p.74, Harrod 1999), where the porosity of boundaries between disciplines becomes a creative stimulus rather than a source of frustration (Rees in Dormer 1997 p.118). This ambiguity, together with a resistance to definition, have been proposed as the sole factors unifying a multiplicity of practices. This perspective is epitomised by Harrod, whose attempt to define crafts practice in the 1990s identifies its essential 'spirit' as,

'a negation or dissatisfaction with categories and an acceptance – even celebration – of the unfinished, fragmented nature of 20th-century identities.'

It has been suggested that, rather than attempting to establish 'monolithic theories' (Johnson 1995) or hierarchies, theorists focus on 'mapping out the diversity of crafts practice' (Evans in Johnson 1998). Johnson implements this approach, suggesting four 'porous, non-hierarchical categories' * which imply a continuum stretching from the utilitarian to the expressive, along

* the utilitarian, where the primary concern is with function and the secondary with decoration; the decorative, concerned with evoking a sensory response; the expressive, concerned with creating metaphorical, emotional, ideological or narrative meaning; and interface activities, concerned with applying crafts knowledge to collaboration with other professionals (Johnson 1995).

which individual forms of practice may be located (Johnson 1995). Such taxonomies release crafts discourse from the need for assertions to be applicable to all forms of practice, enabling individual forms of practice and the differences and commonalities between them to be investigated. The following description of certain characteristics of crafts practice is not, therefore, an attempt to generalise, but to identify points of differentiation between the work of crafts practitioners and designers.

3.7.2. Creative Stimuli

3.7.2.1. collaboration:

The varied nature of crafts practice is particularly evident in individuals' attitudes towards collaboration: whilst for some practitioners it functions as an essential creative stimulus, for others it is incompatible with an activity which is essentially introspective and isolated (Butcher in Johnson 1998 p.64, Potter 1980 p.78).

This diversity is consistent with the notion of craft as a pluralistic practice, and it may be asserted that the continuum between individual and collaborative forms of creativity equates with that of expressive and utilitarian work. As Jackson states, the pursuit of autonomy characterising 'craft aspiring to fine art' opposes the market-led creativity developed by furniture makers (in Johnson 1998 p.1994). However, it may be argued that crafts cognition has an inherently collaborative dimension: that certain characteristics of crafts knowledges and practice instill a need to work with others which becomes a preference, whilst providing the skills which facilitate it.

As discussed in section 3.5, crafts knowledges have a sensory dimension which render them resistant to verbalization and rationalization (see 3.6). Learning a craft cannot therefore be undertaken solely in reference to written or verbal instruction, but necessitates the imitation of a skilled practitioner (Dormer 1988 p.14 / 47, Dormer 1997 p.148, Press 1996 p.15). Such learning is considered inherently social (McCullough 1996 p.252): an exchange between tutor and student, characterised by observation, action (McCullough 1996 p.252), comparison and reflection (Dormer 1988 p.1948). It is not merely a means of dissemination, but often a dynamic, two-way learning process, where the tutor's own knowledge is reinforced and developed through sharing expertise. As McCullough states (1996 p.249),

'A teacher learns too because showing is more than simply doing. A teacher deepens his or her own knowledge by understanding what a beginner is ready to learn, knowing how rich but difficult a medium the student is ready to take on, and showing how things are done. Teaching consolidates, expands, and provides an outlet.'

Gardner's theory of multiple intelligences suggests that in order to practice a craft, makers develop a certain type of linguistic intelligence, which assists them in working in collaboration with others.

Because of its partial encoding in physical action, crafts knowledges are considered to be most effectively articulated through demonstration (Dormer 1988 p.23) and learned through mimicry (Dormer 1988 p.47): technical manuals can never convey its full complexity or subtlety (Jones 1970 p.20, McCullough 1996 p.249). Jones describes the learning of a craft as a process of generating 'genetic coding', stored in physical actions (Jones 1970 p.20), whilst McCullough describes how demonstration and imitation encourage a visceral form of identification with the process (McCullough 1996 p.249). As he explains (McCullough 1996 p.249),

'Understanding of structure (wood's grain, paper's tooth, metal's temper) is implicit: it is learned through experience. Although this becomes everyday knowledge, it does not become formalised... the understanding is in terms of workability and practices, rather than according to any theoretical constitution. Thus people worked metals for centuries without any notion of lattices and free electrons. Acute knowledge of a medium's structure comes not by theory but through involvement.'

It may be asserted that, in order to share knowledge which defies rationalisation, generalisation and verbal encoding, crafts practitioners develop a hybrid verbal – visual – bodily language which assimilates explanation, drawing and physical action. They share this phenomenon with others employing skilled knowledge, including actors / actresses (Gardner 1993 p.206 / 229), dancers (Gardner 1993 p.223), scientists (Collins cited in Dormer 1988 p.47) and athletes (Mailler cited in Gardner 1993 p.208, Gretzky cited in Gardner 1993 p.223). As Mailler states in reference to boxing,

'There are languages other than words, languages of symbol and languages of nature. There are languages of the body.'

In each case, the basis of the activity in physical action creates a specific language, allowing knowledge which is tacit and experiential to be communicated and stabilised. The impact of this characteristic upon the practitioner's design methodology will be investigated – in relation to the relevant literature – in chapter 4.

There is evidence of the employment of this bodily – verbal – visual language throughout the history of craft: wherever possible, practitioners have learned through imitation. Since the fourteenth century, practitioners have travelled in order to learn new skills through collaboration with others (Press 1996 p.5). This tradition continued through the apprenticeship schemes characteristic of the crafts industries (Harrod 1999 p.226), and into the twentieth century crafts movement. Studio glass pioneers such as Sam Hermann, for example, disseminated the techniques they had discovered through demonstration (Press 1996 p.5), whilst many of their proteges went on to work and study in Scandinavia, developing and broadening their skills through observation and imitation (Harrod 1999 p.402). The studio pottery movement had developed similarly, with Bernard Leach bringing knowledge gained from his ten year stay in Japan to his St Ives workshop - where he trained a number of apprentices (Harrod 1999 p.36) – and to conferences such as the 1952 Conference of Pottery and Textiles held at Dartington Hall (Harrod 1999 p.222). Harrod reveals that, from the 1950s onwards, crafts practitioners have organised workshops, conferences and camps, in order to acquire 'a kind of knowledge which could only be communicated by demonstration' (Harrod 1999 p.226). As well as benefiting their own practice, this has led to a culture of 'learning by doing' which has permeated teaching methods within schools and colleges as well as workshops (Harrod 1999 p.223).

This linguistic element of crafts practice means that for many practitioners, collaboration is integral to practice from their first encounter with a medium. The use of language as within their practice is, for many, reinforced by the culture of collaboration found in crafts workshops, guilds, educational institutions, conferences and camps, which establishes such places as centres for practitioner networks and communities (Harrod 1999 p. 401). As Harrod explains, participants at such conferences and camps enjoyed an atmosphere of 'joyful making' and communal living, sharing meals and entertainment as well as crafts activities (Harrod 1999 p.226). Harrod cites Crafts magazine's review of the 1975 Craftsman Potters' Association Summer Camp, which described its participants as being,

'as happy as sandboys, building wonderful ingenious kilns implemented by outrageous pieces of improvised equipment – vacuum cleaners blowing out – and encouraged by a troop of dogs, children and other potters.'

In addition to its role in teaching and learning, there is an economic imperative for the collaborative nature of much crafts practice: practitioner communities have traditionally benefited from the commercial advantages of larger-scale production and distribution and from their ability to undertake complex projects requiring diverse skills, as well as from their potential to create new knowledge by combining individual expertise (Cooley in Thackara 1988).

In the studio crafts, collaboration through practitioner communities can also provide the peer criticism which remains an important creative stimulus and support network for practitioners (Ball and Price 1999 p.28). This tradition may be traced to the 1970s, when a lack of discourse inspired makers to undertake critical writing themselves (Harrod 1999 p.1986). Networks and communities can also be responsible for creating and disseminating new technical knowledge (Harrod 1999 p.402), and in inspiring practice. Indeed, the history of the studio glass movement can be traced through the relationships between practitioners. Harvey Littleton, for example, inspired both Erwin Eisch, who became a dominant influence on the studio glass movement in continental Europe (Klein p.268), and Sam Hermann, who – as explained in section 3.5 - inspired the first generation of British glass artists (Harrod 1999 p.328). The 1976 Crafts Advisory Committee conference 'Working With Hot Glass', meanwhile, provided the foundations for the development of an international glassmaking community (Harrod 1999 p.402) which was developed at the 1979 Corning show, with its spirit of 'international co-operation' (Klein and Ward 1992 p.265). Such communities also feature in the development of contemporary metalwork: the 1980 Victoria and Albert Museum conference and exhibition 'Towards a New Iron Age' are considered influential in having assimilated British participants' traditional skills with the new techniques and expressive potential introduced by US delegates. They also stimulated interest in collaboration between iron workers and architects (Harrod 1999 p.403), thereby helping to initiate the trend towards collaboration between practitioners and other professionals on large-scale commissions described by Butcher (in Johnson 1998 p 1963).

In the workshop movement, collaboration through practitioner communities may be considered less concerned than the studio craft movement with critical discourse, being essentially anti-intellectual (Harrod 99 p.1993). Its value was instead primarily ethical, enabling values of

humility and anti-capitalism to be put into practice (Harrod 99 p.393). Communities such as those established in production potteries and at the Craftsman Potters Association Summer Camps were heavily influenced by the 1970s preoccupation with the need for an ‘urbanised, rootless’ society to re-establish a sense of connection (Harrod 1999 p.420).

Collaboration may therefore be considered the most effective means of sharing crafts knowledges, and in establishing practitioner networks and communities based on shared political, ideological or critical frameworks or values. Whether in the workshop tradition or the studio tradition, these communities may be considered to instill a sense of belonging which reinforces the value of a collaborative approach to creative practice. As McCullough states (1996 p.253),

‘Whether around the glassblowers’s oven or over the digital color printer, co-workers take part in a heightened sense of productivity. This sense has a philosophical component: shared avocations, reflecting masters’ admiration for one another’s commitments and achievements.’

The client – practitioner relationship constitutes another cultural factor in the notion of craft as a collaborative activity. It is acknowledged that many practitioners trade on their close relationships with customers, often working to individual requirements (Ball and Price 1999 p.9 / 53): indeed, the Crafts in the 1990s survey found that 75% of furniture makers make to commission (Knott 1994 p.217).

This fact is partly attributable to the roots of crafts practice in ‘service workshops’, providing for the needs of the local community and trading on the goodwill between practitioners and customers (Potter p.1980), or to the need in the contemporary marketplace to secure competitive advantage through uniqueness and service (Jackson in Johnson 1998 p.1994). It may however be argued that the dialogue undertaken with a client is not merely an economic necessity, but can also function as a creative stimulus. The desire to make in response to individual needs and desires is evident across the continuum of crafts practice, including gallery-based work. This assertion is illustrated by furniture-maker Mary Little’s submission for the 1999 Jerwood Prize, for which she adopted a ‘surrogate client’, finding that she was unable to work without the participation of a commissioner. Ceramicist Carol McNicholl describes her own fascination with this relationship (in Harrod 1997, p.379):

'I felt and still feel that making things to exist in an ideal white cube space is nowhere near as interesting as making things for people to live with and use..... The crafts have always seemed to me to be more radical than the fine arts because they are about changing the way that people live.... For me the distinction is that things which are made to live in art galleries only have to sustain the viewer's interest for a few minutes, whereas things made for the domestic context will be seen and used every day and must be sophisticated and complex enough to remain interesting, as well as being simple enough to be a pleasure to use.'

This fascination with the user or client – whether or not they are personally known to the practitioner – extends the notion of craft as a dialogue: the 'internal dynamic' between the practitioner and the outside world extends from materials and processes to the constraints imposed by clients (Dumas 1994). Whether this dialogue constitutes an economic necessity or a creative stimulus, a client's involvement may be considered a form of collaboration. As Dormer states (in Thackara 1988 p.138),

'There are responsibilities to be met and expectations to be fulfilled..... implicit in every craft product is the idea of one human being producing for another, rather than the anonymity which is implicit in mass production.'

These cognitive, economic and social factors may be considered to have established a culture in which, for many makers, collaboration and creativity are inseparable. This is substantiated by two recent major surveys research studies. Press and Cusworth (1998 p.22) found that crafts education furthers teamworking capabilities, whilst Ball and Price (1998 p.10) found that self-employed practitioners tend to expand their businesses organically, through networks formed through informal contacts. The influence of this approach on creativity is identified by Harrod (2000), who suggests that the personal networks established at college are replacing established hierarchies and structures with creative partnerships and alliances.

3.7.2.2. cultural context:

Craft objects contribute to the social, economic and religious life of the community, both influencing and expressing individual and group identity (Metcalf 1993). As such, they tend to become signifiers of cultural capital (Jackson in Harrod 1997), 'accoutrements of cultural practice... almost like a language written into the structure of society' (Bristow in Johnson 1998). They are thereby imbued with cultural significance beyond their aesthetic value,

suggesting associations with a history beyond the object itself which evoke intense responses in their users and audiences (Bristow in Johnson 1998 p.117). As Johnson states (Johnson 1998 p.16),

'The vertical (historical) axes across craft disciplines..... offer sites for a dynamic engagement with many histories. Cloth and clay are a kind of 'connective tissue' across the whole of human experience, past and present.'

This notion of a dialogue between contemporary practice and historical context is evident in the comments of contemporary basket makers interviewed by Butcher. Most of the practitioners, she noted, were influenced by the traditions associated with baskets and basket making techniques: their practice involved a 'reformulation of previous methods of expression, rather than their denial' (Butcher in Johnson 1998 p.64).

Metcalf substantiates this idea, arguing that the meaningful craft object can never be abstract or autonomous, due to the associations evoked for both maker and user by materials and allusions to function (Metcalf 1993). This means that crafts practice cannot be considered separately from contexts and traditions of use, whether this use is domestic, social or ritual (Metcalf 1993, Butcher in Johnson 1998 p.64). Literally, metaphorically or conceptually, practitioners engage with a history of objects and materials, and their roles in people's lives (Johnson 1998 p.67). As Johnson explains (1998 p.67),

'...craft is a point of articulation around a material and its related handmade processes and traditions. By point of articulation I am not so much using the word to mean 'clearly stated', but rather to suggest a 'joining together', a lapping over into other areas.'

3.7.3. Motivations for Making

It has been suggested that 'people who design or make for themselves' have particular motivations for doing so, which distinguish them from professional industrial designers (Margolin in Buchanan and Margolin 1995 p.131). Crafts practitioners invest substantial time and effort in gaining control over a chosen medium (Metcalf in Dormer 1997 p.76) and in developing the capacity to apply this knowledge to professional practice (Ball and Price 1998). The notorious lack of financial reward for this effort (Knott 1994, Potter 1980 p.1980, Ball and Price 1998), together with the above arguments, suggests that motivations for making are

concerned more with personal fulfilment and self-actualisation than with remuneration, status or other conventional measures of success.

This assertion is reinforced by both major surveys of craft graduates conducted in recent years (Ball and Price 99 p.10 / 41, Press and Cusworth 1998), which identify the importance to practitioners of their creative practice in asserting identity and enhancing quality of life, whether it becomes a source of income or a leisure activity. As Press and Cusworth state (1998 p.12),

'Personal development and creative achievement are intertwined and inseparable, and the search for personal meaning and future direction is integral to their practice.'

3.7.3.1. sensory and creative fulfilment:

The 'deep spiritual value' found in crafts practice (Pye 68 p.4) can be partly attributed to the satisfaction to be gained from the making process itself. This satisfaction derives, according to McCullough from the capacity for the direct manipulation of materials and objects to stimulate the senses and focus concentration on a particular task. As McCullough states, the pleasure of handling materials, the concentration required not to ruin the piece, the intricacies of solving a problem, whether technical or conceptual, and the anticipation of a finished product all contribute to the practitioner's sense of satisfaction (McCullough 1996 p.196).

McCullough also describes the calming effect of routine, 'based on soothing motions, habitual expertise, and a sustaining commitment to practice', which has the capacity to engage the practitioner to the point where both real-life concerns and the passing of time appear irrelevant. This state of deep engagement has been compared with Csikszentmihalyi's notion of 'flow' (Fisher and Gibbon 1998), and is considered to fulfil inner needs for relaxation, skill development and self-awareness (McCullough 1996 p.222). For some practitioners it may even be considered inseparable from creativity: Bristow's description of her own making, for example, suggests that routine - and the meditative state that it encourages - is essential in producing work with personal significance (Bristow in Johnson 1998 p.119):

'The continual working of row upon row of stitching and the hand turning of buttonholes is repetitive and often tedious, yet through what becomes a mesmerising personal ritual the work becomes invested with something more than just time. The work is 'soft', quiet,

unassuming, but through the process of quilting, stitching, patching etc, it is imbued with a strength that is belied by its outer appearance.'

It has been suggested that this state of mind is induced by activities which demand a co-ordination of mind and senses. As McCullough states (1996 p.32),

'Reflection finds harmony in the steady flow of hand, eye, tool and material.'

Metcalf suggests that, because the opportunities for such activity are rare in a society where skill and sensory perception have been de-valued (see section 3.2), many individuals experience it for the first time when learning a craft (Metcalf in Dormer 1997 p.76). Drawing on his experience as an educator, Metcalf argues that the potent response of many students to this experience represents an intuitive recognition that the latent bodily intelligences have been awakened. The satisfaction experienced in developing and applying this bodily intelligence to meaningful work often becomes a life-long source of motivation, propelling students through years of training and instilling an unshakeable commitment to their practice (Metcalf 1993).

This view is substantiated by McCullough (1996 p.7), who suggests that the unique, individualistic nature of knowledge characterising activities which integrate mental and physical activity also constitutes a source of motivation: the value attributed by most practitioners to their skill surpasses that of the objects that it produces (McCullough 1996 p.7). Anthropologists suggest that this pleasure in the mastery of materials may be considered an innate human characteristic (McCullough 1996 p.61), perhaps derived from the need to adapt the physical environment in order to meet fundamental needs of food, warmth and shelter.

For some practitioners, the search for sensory fulfilment extends to a need to engage with or transform the physical world (Margolin 1995 in Margolin and Buchanan 1995 p.131), to capture part of it (Halls cited in Dormer 1997 p.150) or to embody and explore aspects of it which are otherwise inaccessible (Holder in Johnson 1998 p.79). Dormer explains this compulsion as a basic human requirement which defies rationalisation (Dormer 1997 p.151). For Johnson however, it reflects our essential nature as sensate beings, which creates a need to transform the physical world and articulate the experience of existing in a material world (Johnson in Harrod 1997). Dormer (1997 p.151) suggests that this need instills in practitioners both a love of the making process, and a passion for the objects produced by it. As he states,

'Objects communicate to some people as powerfully as written texts or musical scores or mathematical equations do for others.....(crafts practice is a way of) gaining the understanding of and possessing the objects of one's desire'.

The decision to practice a craft can reflect the practitioner's search for individual freedom within the confines of society, with making becoming a process of exploring and communicating personal values (Dormer 1995 p.18). It may be motivated by the practitioner's need to reject objects, values and ways of working imposed by others (Dormer 1995 p.18), or as a means of regaining control and self-confidence (Margolin in Buchanan and Margolin 1995 p.131).

In particular, this can reflect a rejection of the creative restrictions imposed by producing objects for the mass market, and of the loss of control involved in making specifications (Jackson in Johnson 1998 p.1993). According to a recent survey, this search for creative autonomy constitutes a major motivation for crafts graduates establishing new businesses (Ball and Price, p 10 / 41). This may be related to a need to express individuality and self-identity (Rees in Dormer 1997 p.117, Ball and Price 1998 p.10 / 41). As Margolin states (in Buchanan and Margolin 1995 p.131), practitioners may be motivated by the desire for,

'self representation, the motivation to see oneself in dress and display, social spaces, decorative arts and other forms.'

3.7.3.2. ideological fulfilment:

The notion of freedom can also have ideological meaning, in terms of liberation from social conventions (Metcalf 1993 p.46) and alien value systems (Margolin in Buchanan and Margolin 1995 p.131). For example, a conscious decision to reassert the value of bodily intelligence through work can signify a challenging of the power structures and hierarchies upheld by a society founded on the supremacy of explicit knowledge and logical reasoning. As Metcalf states (1993 p.46),

'In a sense craft always tries to perform a metaphysical revision: the return of physical labor to equal status with thought.'

As discussed previously, the craft object is never autonomous or neutral, but imbued with meaning through its form, materials, processes and related traditions. This imbues it with the capacity to function as a point of connection with other ideological or ethical perspectives. According to Dormer, craft can have a socialist dimension, evident in the notion of self-actualisation through making, or a conservative ideology, evident in the ethic of self-sufficiency (Dormer 1995 p.18). Dormer's identification of religion as a framework for practice is substantiated by Metcalf's description of the ritual use and meaning of traditional craft objects (Metcalf 1993), whilst that of feminism is reinforced by Shreeve's description of weaving as an expression of untold female histories. Butcher identifies further ideologies common in crafts practice: an anti-authoritarian means of expression, appropriate to cultural or political identity, or to ecological and environmental concerns (in Johnson 1998 p.65). Such concerns may influence the practitioner's approach to work – the materials chosen, the form the work takes and the environments in which it is presented, for example – as well as providing the motivation to work (Butcher in Johnson 1998 p.64).

Whilst recognising that the diversity of crafts practices precludes generalisation, it may be asserted that crafts practice is characterised in many cases by a deeply rooted sense of motivation, a view of collaboration as integral to practice, and a concern for the cultural context surrounding chosen materials and processes.

3.7.4. Cultural Differences between Craft and Design

It may be asserted that each of the features listed above offers points of differentiation between crafts practitioners and designers.

The issue of context as a creative stimulus may be considered particularly significant in this respect. As discussed in section 3.5, the context-rich nature of crafts practice locates it in opposition to Modernism. Conversely, the culture of industrial design is considered to be interwoven with Modernist ideologies which, whether consciously or not, continue to influence educational and professional practice (Metcalf 1993, Alföldy 1992). Theorists suggest that this has resulted in a preoccupation with the 'autonomous object', defined by its own existence rather than its context of user, and with the notion of universality, which suggests consistency between the meaning and significance attributed to the object by both the designer and the user (Metcalf 1993, Alföldy 1992).

Crafts practitioners undertaking design activities may therefore be considered to be at an advantage, in a culture where design is becoming increasingly more user-centred, and, in particular, concerned with user appropriation through the construction of personal meaning (Walker 1990 p.5, Adolph 1999 p.2, Rhea 1992, Zaccai 1995 p.12).

The crafted object embodies social, individual, ritual and domestic meanings (Metcalf 1993), whose plurality evokes individual responses from users (Bristow 1998 p.116). Its cultural complexity creates an intimacy between maker, object and user (Johnson 1997 p.293, Alföldy 1997 p.337) which provides potent, non-verbal symbols for the construction of personal narratives (Johnson 1997 p.10). The crafted object may also be considered to oppose the notion of universality, as many makers consider their work to be completed by the context into which it is placed by the individual user. Takeshi Yasuda's ceramic vessels, for example, both respond to and initiate rituals of cooking and eating: function, he says, does not belong to the object but to the user's imagination (cited in Aylieff 1999). By constructing personal rituals, users also construct a unique significance for the object, which intersects with their own value framework.

In terms of the issue of collaboration as a creative stimulus, the role of collaboration in the acquisition of crafts knowledges suggests that it may be more deeply embedded in the creative process for crafts practitioners than for designers. Fisher states that designers typically learn the social dimension of the design process through professional practice rather than education, and that the designer's creative self-image, at least on graduation, is often derived from that of the 'lone inventor' (Fisher 1998). This characteristic of crafts practice may however be considered to be dependent on discipline – hot glass, for example, necessitates team work, whilst embroidery does not – and on the individual's motivations.

3.8. New Product Development

3.8.1. NPD in Context

3.8.1.1. manufacturing competitiveness: the current situation:

Statistics relating to the decline of the crafts-based industries have proved impossible to locate: as one industry source explains, companies operating in the sector are generally reluctant to disclose performance indicators¹. However, it is generally acknowledged that the decline is severe, and has accelerated in recent years. In addition to job cuts, the sector has seen significant restructuring, particularly within the pewter and ceramics industries, where the SMEs characterising the local economies of Sheffield and Stoke-on-Trent respectively, have been replaced by a smaller number of larger manufacturers.

Literary sources have, however, provided insight into the difficulties facing the manufacturing sector as a whole, and possible strategies for its survival and growth. This has proven particularly useful: as chapter 4 will demonstrate, the problems afflicting manufacturing in general are often manifested in an extreme form within craft manufacturing companies.

A 1998 Department of Trade and Industry (DTI) report attributes the slow and fragmented recovery of the manufacturing sector during the 1990s to a number of factors. These include external influences, such as the maturing of the economy, and the associated shift in emphasis from products to services, together with the fall in manufacturing-related employment caused by out-sourcing, as companies increasingly focus on their core activities (DTI 1998b). In addition, the price in real terms of goods sourced from the Far East has decreased, due to the strength of the pound and the Asian economic crisis, which has also ensured the broad availability of fashion-oriented housewares at low prices (Mintel 1999).

Meanwhile, consumer tastes have evolved (DTI 1998b) to reflect changing social patterns. At the lower end of the market, the purchase of the housewares produced by crafts manufacturers is increasingly influenced by fashion rather than quality and tradition (Mintel 99), whilst at the higher end of the market, there is an increasing demand for sophisticated and customised products (DETR 1998b p.4-5).

¹ Interview with Cathy Steel, executive of the British Association of Pewterers and of the Workshipful Companies of Silversmiths and Cutlers, April 2001.

Together, these changes to world markets mean that UK companies are no longer able to compete on traditional assets of the industrial economy, such as raw materials, land, machinery and cheap labour (Leadbeater 1998). This issue is particularly significant for the crafts manufacturing sector: as chapter 4 will demonstrate, many crafts-based manufacturers have continued to produce traditional designs, attempting to remain competitive in this diminishing market by cutting costs and eroding the quality of their goods.

The DTI report recognises that the low available working capital caused by these factors has caused a lack of investment in new manufacturing and information technologies, and in the training required to integrate them into the firm's core activities (DTI 1998b). This is an issue of equal importance for manufacturing companies, as for organisations operating in high technology and service sectors (Leadbeater 1998): as Selzer, Kimberley and Bentley (1999 p.15) explain,

'Even in manufacturing, standardised work routines are being replaced by more complex processes involving the application of higher order thinking skills that were once associated only with white collar work.'

3.8.1.2. the role of NPD:

New product development (NPD) is perceived as crucial to creating and sustaining economic growth, particularly for companies wishing to compete on the basis of quality (Johne and Snelson 1996 p.45). Its commercial benefits may be measured in terms of the impact of NPD activities upon profits, assets, sales, return on capital or equity growth (Cooper 1996a p.75). However, there may also be further benefits which, although less easily quantifiable, also contribute to growth. These include prestige, technological advances, entry into new markets and strategic gains (Cooper 1996 a p.76).

The processes entailed in NPD can also enable companies to gain knowledge and learning capabilities, thereby improving their flexibility and responsiveness to market demand, and hence their competitiveness (Selzer et al 1999 p.9, Leadbeater 1998). For example, the identification of a 'productivity gap', or discrepancy between the client's requirements and the supplier's capabilities, can alert a company to new commercial possibilities (Dibella et al 1996). Alternatively, by adopting a cross-functional approach to NPD, assumptions can be challenged

and new knowledge created: as Selzer et al explain, innovation frequently occurs at the interface between different kinds of knowledge (Selzer et al 99 p.21). The ultimate outcome is products whose knowledge component increases profit margins, or gross value added (GVA). This in turn generates the capital required to fuel growth and further developmental activities, whilst providing resistance to economic downturn (DTI 1998b p.24). As the DTI explains,

'British business must compete by exploiting capabilities which its competitors cannot easily match or imitate. These distinctive capabilities are not raw materials, land or access to cheap labour. They must be knowledge, skills and creativity, which help create high productivity business processes and high value goods and services.'

(DTI 1998a) p.124

Some theorists emphasise the benefits of the process involved in generating knowledge-based resources, above their influence on product outcome: Huber, for example, defines organisational learning as the *process* by which a company expands its potential, rather than the knowledge created (Huber 1991). This emphasis reflects the fact that organisational learning capabilities are context-specific, derived from experience and essentially incommunicable, and therefore constitute a particularly strong source of competitive advantage (DTI 1998, Edmondson and Moingeon 1996, Collis in Edmondson and Moingeon 1996). Their importance is evident in the contribution that they make to companies' stock market valuations, which often reveal a significant discrepancy between physical and actual assets (Peters and Waterman 1982, Caulkin 1999). In addition, inter-disciplinary collaboration and problem-solving activities are considered to have the potential to effect organisational change, challenging entrenched workforce attitudes towards progress (Jordan 1997). However, it is important to remember that, in order for the organisation to benefit fully from its learning activities, the resulting knowledge must be effectively disseminated and institutionalised (Orton in Edmondson and Moingeon 1996 p.187).

This learning process is also considered to impact positively on individual employees as well as organisations, enabling them to develop the skills in inter-disciplinary collaboration, communication, information management, self-organisation, risk management and reflection considered crucial to self-reliance in the new economy (Selzer, Kimberley and Bentley 99 p.21). It is argued that by actively encouraging organisational learning, companies may address issues of social exclusion as well as their own competitiveness, empowering their employees by improving the transferability of their skills and hence their self-esteem (Selzer et al 99 p.9).

This issue may be considered particularly significant for the crafts-based industries. Analysts predict further decline in the number of companies and jobs operating within the manufacturing sector as a whole and its various sub-sectors (South Yorkshire Forum 1999). Regions currently over-reliant on manufacturing as a source of employment are implementing strategies designed to shift employment towards 'high growth' sectors such as ICT and biotechnology (South Yorkshire Forum 1999). However, it appears that, given the narrow, sector-specific nature of their skills, current employees are equipped for employment in neither the customer-oriented, flexible manufacturers which may be anticipated to survive, nor alternative industries: as Selzer et al explain,

'Because of the emphasis on ideas and flexibility, people who have built up detailed knowledge over time find themselves at a disadvantage if they do not know how to apply what they know in different ways. The 'new basic skills' are about how people think and act, not just what they know.'

3.8.2. Factors Influencing NPD Project Outcomes

Prompted by the high degree of both risk and reward involved in NPD, theorists have sought to understand the dynamics involved in the process, and to identify the features characterising successful projects. A large and complex literature has evolved, drawing on disciplines ranging from marketing and management to engineering, R&D and economics (Hart in Bruce and Biemens 1995 p.15).

It is not the aim of this section to review the entirety of this literature, but to investigate those issues with particular relevance in interpreting the empirical data presented in chapter 4. However, before proceeding to those particular issues, it is helpful here to locate them within the context of those identified by theorists adopting a more generalist approach.

One body of literature has been concerned with mapping the entire spectrum of factors influencing NPD outcome: Johnes and Snelson, for example, proposed a taxonomy of factors relating to strategy, values, style, structure, skills, staff and systems (Johnes and Snelson 1996). Hart surveyed this literature, and revealed two over-arching themes: the organisation and the project (Hart in Bruce and Biemens 1995 p.17). In terms of the organisation, the literature had been concerned with internal and external organisational strategy, the role of top management,

and the organisational structure and style. In terms of the project, it had been primarily concerned with issues relating to the management of the NPD process, the nature and organisation of the people involved, and the role of information (Hart in Bruce and Biemens 1995 pp.15-40).

Cooper's empirical study (Cooper 1996a) challenged the validity of attempting to develop universally applicable categories of influencing factor, given the relative and subjective nature of 'success' as defined by the researcher (Cooper 1996a p.7). Instead, he proposed a hierarchy of eighteen inter-related dimensions, each conveyed as a continuum whose status impacted upon every other dimension.

Three of these dimensions were characterised as 'keys to success': product uniqueness and superiority, market knowledge and marketing proficiency, and technical and production synergy and proficiency. Product uniqueness and superiority was defined as a high degree of innovation, quality and market uniqueness, incorporating unique features for the consumer, and enabling the consumer to reduce costs or to do something previously impossible. Market knowledge and marketing proficiency was defined as expertise in undertaking market-oriented activities, a high degree of market knowledge, and a focused and well-resourced sales and distribution strategy. Technical and production synergy and proficiency was defined as proficiency in technical and production activities such as prototyping and piloting, and a high degree of design and manufacturing knowledge.

The second group of three dimensions were described as 'barriers to success': factors whose negative influence was significant, yet to a lesser extent than the positive influence exerted by the 'keys to success'. These barriers were all market-related, consisting of over-pricing, and of the product's location in a marketplace which was either highly dynamic or extremely competitive.

The third group of dimensions were categorised as 'facilitators'. Again, these factors were market related. They concerned marketing and managerial synergy, marketing communications and launch strategy, and the size and growth potential of the market itself. A group of two 'weakly related' factors were then identified: the company's experience of product development, and the origins of the new product in terms of its market or innovation derivation. A group of four 'dimensions with no impact on success' was then identified. This group consisted of early market entry, proficiency of pre-NPD research (although these activities did

facilitate later, more significant marketing activities), the degree of market competitiveness, and production capabilities.

The remainder of this section is concerned specifically with the investigation of influencing factors which are directly relevant to the study's empirical analysis. Following a discussion of the importance of contextual fit, the remaining influencing factors have been grouped under Hart's over-arching themes of 'the organisation' and 'the product' (Hart in Bruce and Biemens 1995).

3.8.2.1. contextual fit:

Cooper's study (1996a) is concerned with the outcomes of NPD, in terms of the product and its success in the marketplace. It is therefore understandable that his definition of production synergy – or contextual fit – as a key influencing factor on NPD outcome (Cooper 1996a p.16) emphasises the benefits of such synergy in terms of production efficiency and quality. However, other theorists have identified a dynamic relationship between contextual fit and organisational learning. It is argued that by seeking a high degree of contextual fit, designers engage in a process of exploring a company's strengths and weaknesses in relation to market opportunities, thereby enabling a maximum stretch of available resources (Jevnaker 1997 p.5). In this way, the client's options may be expanded beyond their original vision (Goldfarb 1996 p.16): as O'Connor explains, contextual understanding is required in order to challenge convention, rather than perpetuate it.

Further advantages of contextual fit include its potential to influence organisational culture: it is considered that by introducing products which are easy to manufacture, managers can effectively challenge and reduce workforce resistance to change (Jordan 1997, Burnside 1995). Such resistance has been identified as particularly common in times of threat, when insecurity can cause employees to covet familiarity, and to display resentment towards any instigator of change (Tuschman and Nadley in Hart 96). Oakley, for example, reports a constant rejection of new designs, refusal to supply information, and general obstruction in companies unaccustomed to NPD activity (Oakley 1990 p.333).

The difficulty of designing for context fit is that the context-specific information that it demands – such as available skills, expertise and technologies (Jevnaker 1997 p.17), organisational strategy and management systems (Ingolls 1996 p.11) – is often difficult to acquire (Jevnaker

1997 p.5). As Jevnaker explains, such information is often tacit, remaining unarticulated or even unacknowledged within the company. This can render it relatively inaccessible, especially to consultant designers (Jevnaker 1997 p.5). The problem may be exacerbated by industrial designers' tendency to 'design by drawing', using images as their primary means of communication. As Lawson explains, this common characteristic of the design process can inhibit the gathering context-specific information, creating an 'icon trap' which emphasises the product's visual aspects to the detriment of its suitability for its user context (Lawson 1990 p.171), and, by implication, its suitability for manufacturing within a particular environment.

3.8.2.2. project related factors

3.8.2.2.1. degree of designer-client integration:

The developing relationship between designer and client – and of the management structures designed to guide their interactions – has been the subject of continuing research. Whilst many companies continue to maintain in-house design departments, outsourcing is now considered the predominant model for NPD activities (O'Connor 1996 p.72, Aldersey-Williams 1996 p.44). This trend, which gathered momentum during the late 1980s, resulted from corporate downsizing, and from the recognition of design as a diverse activity, which requires a spectrum of skills and talent too broad to maintain in house (Walton 1996).

Despite its benefits, however, outsourcing can be problematic. The designer's lack of familiarity can cause problems in making the transition from concept to product (Bruce and Morris in Bruce and Jevnaker 1998 p.43). Because they are not included in the company's informal social systems, consultants can face particular difficulties in obtaining the type of organisational information described above, and this in turn can result in a lack of feedback, and in prolonged interpersonal conflicts (Raffii and Perkins 1995 p.63).

During the mid to late 1990s, theorists investigated the emergence of the 'design alliance', a model of client – consultancy relationship which appeared to offer solution to these problems (Aldersey-Williams 1996, Bruce and Jevnaker 1998). Such alliances are now advocated as a means of integrating the design consultant's fresh viewpoint and broader perspective with the in-house designer's familiarity with technological and market requirements (Aldersey-Williams 1996 p.44). They are also championed as a means of synthesising design and company strategy (Jevnaker in Bruce and Jevnaker 1998 p.28), and of averting the implicit constraints which can

be imposed upon in-house designers by company politics and a restrictive organisational culture (Bruce and Morris in Bruce and Jevnaker 1998 p.43). In this model, knowledge generation and application are believed to result from the design relationship itself, rather than from the 'vision' of an individual designer (Jevnaker in Bruce and Jevnaker 1998 p.120).

3.8.2.2.2. NPD methodology:

The structural shift from in-house to outsourced design expertise has been reflected in – or has perhaps contributed to – a methodological shift, from a linear approach to a cross-functional NPD methodology described as 'concurrent development'. This concurrent methodology is also known as the 'Rugby Approach', in reference to the passing of a ball backwards and forwards, between players in pursuit of a common goal (Takeuchi and Nonaka 1986, cited in Johne and Snelson in Hart 1996). The linear approach, meanwhile, has been compared to a relay race, where the 'baton' of NPD is passed from one individual to another in a sequential process (Cooper and Press 1995).

The popularity of this approach is demonstrated by a 1997 survey, to which one of half of all respondents indicated the use a concurrent NPD methodology (Griffin 1997). Other studies show its impact to be generally positive. By involving technical staff in the NPD process, for example, a concurrent methodology can encourage knowledge synthesis, by increasing the accessibility of technological expertise (ibid p.162). This process is increasingly valued as a means of attaining product uniqueness: it is thought that conducting NPD within a team composed of uniquely diverse individuals, generates unique product solutions (Rhodes and Carter 1995). Competitiveness is ensured not only by the resistance to imitation offered by the product itself, but by the team's capacity to generate further innovations (Rhodes and Carter 1995, Ruckert 1995 p.51, Jevnaker 1998 p.120). This strategy reflects the realisation that manufacturing technologies alone afford diminishing competitive advantage, due to their inflexibility and to rapid diffusion rates (Rhodes and Carter 1995).

Even when knowledge synthesis is not a priority, a concurrent approach offers significant advantages, encouraging the frequent communication between designer and client which is considered a pre-requisite for effective NPD (Bruce, Leverick and Littler in Bruce and Biemens 1995 p.172). It also provides a framework for creative interaction between designers and other key internal staff (Jevnaker 1998 p.120). This interaction can in turn improve problem-solving and learning capabilities, thereby increasing organisational creativity (Bruce and Biemens 1995

p.147). It is said to provide the shortened lead times which are becoming increasingly important as product life cycles shorten and the pace of technological change increases (John and Snelson in Hart 1996 p.53, Bruce, Leverick and Littler in Bruce and Biemens 95 p.162). By involving specialists in sales, marketing and user behaviour, it can heighten customer awareness (ibid p.147) and provide access to new markets (ibid p.162). In addition, it can encourage the development of the problem-solving capabilities and cross-functional knowledge (Ruekert 1995 p.51, Jevnaker 1998 p.120) described by Reich as 'collective entrepreneurship':

'Workers at all levels add value not solely or even mostly by tending machines and carrying out routines, but by continuously discovering opportunities for improvement in process and product.... [the] collective capacity to innovate becomes something greater than the sum of its parts.'

(Reich 1991 p.67 – 69)

It appears that the adoption of a concurrent approach to NPD can initiate an iterative process of organisational development in this respect, increasing the organisation's NPD capabilities whilst providing optimum conditions for its current project. Conversely, a linear NPD methodology is considered to discourage interpersonal interaction and collaboration, thereby reducing contextual fit, creating conflict and delays and failing to mobilise internal resources, synthesise knowledges (Nanda in Moingeon and Edmondson 1996), or stimulate organisational learning: as Ruekert explains (95 p.53),

'[any] absence of manufacturing involvement in the early stages of the development process frequently leads to frustrations on the part of the operations managers, as they try to implement production processes for poorly conceived products.'

However, it is important to remember that not all NPD activities require a high degree of cross-functional interaction (Ruekert 1995). As Griffin explains, the adoption of strategies designed to encourage interaction and collaboration should be made in accordance with the amount and type of integration required, itself determinable by factors such as familiarity and levels of project uncertainty (Griffin 1996).

3.8.2.2.3. cultural differences:

The issue of cultural differences between the individuals involved in NPD and its implementation is the first of a number of ‘people’ factors which – as Hart’s taxonomy of influencing factors shows – are common to many studies of NPD. In particular, the need to identify and overcome problematic organisational boundaries is recognised as crucial to the success of concurrent NPD (Gunz 1990 p.170). Although a concurrent NPD methodology can remove obstacles to collaboration created by organisational structure, cultural barriers between the organisation and the designer can still exert a detrimental influence on the project’s progression (Moss Kanter 1991 p.59): only when both the establishment of formal collaborative work practices and the development of a ‘team spirit’ are encouraged, can the potential for cross functional NPD be optimized (Johne and Snelson 1996 p.53).

Overcoming these cultural boundaries can be problematic, however, due to the cultural differences existing both internally – between the company’s functional and hierarchical strata – and between each internal function and the designer. The client – designer relationship has been described as ‘two tribes at war’ (Walker 1990 p.145). The relationship between designers and other key functions is less well documented, although ‘typical’ – and seemingly conflicting – characteristics of designers, technicians and marketers have been identified (VanGundy 1988, Lumsdaine and Lumsdaine 1995).

Cultural conflict between these different professional groups is said to be caused by differences in education and experience (Jevnaker 1997 p.2), outlook, objectives (Walker 1990 p.145) and motivation (Gunz 1990 p.170): groups working together on a continual basis tend to develop their shared background into a unique team culture - manifested in its beliefs, attitudes and language – which can be impenetrable to outsiders (Biemens 1995 p.146).

Certain theorists assert a cognitive basis to cultural differences (Walker 1990 p.145, Becht and Gommer 1996 p.66): whilst designers are considered essentially creative, emotive, ‘right-brain’ thinkers, their clients are perceived as more rational, analytical and ‘left-brain’ in their thinking (Becht and Gommer 1996 p.66).

The generalisability of this assertion may be considered debatable, given the diversity of design activities (Walton 1996) and of the individuals who practice it. However, regardless of its validity, the *notion* of designers as ‘creative’ – and hence liable to behave according to

perceptions of creative people - remains significant, exerting an influence the nature of their interactions with clients and other colleagues. It therefore demands further investigation.

For Fletcher, creative people are driven by a fundamental, innate need for self-expression, which leads them to derive self-esteem primarily from the work that they are judged upon (Fletcher 1998 p.27). This means, he claims, that work, personal identity and self-esteem are unusually intertwined. Characteristics resulting from this self-oriented motivation include volatility, perfectionism, introversion, absent-mindedness, stubbornness and,

'an egocentricity so powerful that it can disregard.... the attitudes and opinions of the rest of society'

(Fletcher 1998 p.25).

Fisher explains this behaviour not as an inherent character trait, but as the manifestation of a particular creative self-image, derived from the 'romantic genius' stereotype prevalent in Western culture (Fisher 1997 p.14). Whether inherent or learned, however, this mindset is considered inconsistent with the teamworking and communication demanded by cross-functional collaboration (Fisher 1997 p.14). Problems are considered likely to remain unresolved, compounded by the creative's lack of the analytical debating skills favoured by managers, which in conflict situations cause them to display a combative stubbornness (Fletcher 1998 p.30). The conflict between the creative self-image and the requirements of NPD may be exacerbated further by a need for control over every stage of the creative process, resulting from the individual's perfectionism and subsequent demand for similar standards from others (Fletcher 1998 p.67).

The need for control identified here may be considered significant in relation to crafts-trained designers, whose primary motivation for making is often a desire for control in the form of independence or self-sufficiency, and whose working methodologies typically reflect a need for control over the entire production cycle (Ball and Price 1999 p.38). Recent research suggests demonstrates the importance of this need, revealing the desire to retain control as a major factor constraining the growth of crafts enterprises: even when demand exceeds supply capacity, practitioners are often unwilling to sub-contract any aspect of production (Ball and Price 1999 p.38).

However, chapter 4 will demonstrate that this need – and therefore the ‘romantic’ self-image - is not generic to all practitioners, and that, over time, many practitioners develop a different creative self-image, based on creative collaboration. Fisher offers a rationale for this progression: drawing on Giddens, he suggests that the creative self-image is refined and readjusted over time through the individual’s experiences, and that in the case of designers, may develop in response to company culture (Fisher 1997 p.12). As he explains,

‘If the company values communication, interaction and teamwork, then these qualities may override the romantic stereotype and be integrated in the designer’s self concept to the extent that the designer defines themselves according to that set of ideas.’

3.8.2.2.4. interpersonal relationships:

A second ‘people’ factor considered essential to the outcome of ongoing design alliances is the nature of the relationships between the key people involved in NPD. According to Spekman et al, the interpersonal and commercial aspects of any business alliance may be represented as a double helix, whereby each strand is dependent upon the other. The key personnel involved in successful alliances of all types tend to develop personal relationships which transcend the business’s requirements, and the collapse of one strand inevitably results in the demise of the other (Spekman et al 1996 p.351).

Particularly in the early stages of a successful alliance, both parties tend to invest substantial effort in establishing a positive interpersonal relationship (Spekman et al 1996 p.351), expressing their mutual commitment to common goals, and demonstrating their shared responsibility (O’Connor 1996 p.72). This process continues throughout successful projects, together with ongoing expressions of trust and respect (Goldfarb 1996 p.16, Spekman et al 1996 p.351).

By managing the interpersonal aspect of their relationship as well as its commercial development, it is considered that designers and managers equip themselves both to anticipate problems, and to respond to those problems which arise nonetheless (Spekman et al 1996 p.351). By developing an understanding of each others’ motivations, objectives and behavioural patterns through social contact, they are better able to maintain conflict as a creative activity, rather than allowing it to degenerate into the type of personal, emotional conflict which blocks creativity (Ekvall 1991 p.75).

3.8.2.2.5. communication style:

The implicit organisational information required by designers in order to design for contextual fit can appear inaccessible to external consultants. The adoption of a concurrent NPD methodology encourages the interaction and collaboration required to elicit this information. However, its success is considered dependent upon the designer's ability to establish and maintain open communications with all staff members of the client company (O'Connor 1996 p.74). Achieving this level of communication can be problematic, however: as Becht and Gommer explain, differences in language and vocabulary can cause misunderstandings which influence both the design process and its outcomes (Becht and Gommer 1996).

Exploring the role of verbal and bodily communication in the NPD process requires us to draw upon theoretical studies of cognitive psychology. Vygotsky, for example, asserts that all human thoughts are stabilised in words and phrases (Vygotsky 1978, Fielding 1994 p.149), and that speech enables the full range of memories and perceptions relevant to a particular situation to be accessed (Vygotsky 1978). In relation to the design scenior, it is argued that verbal articulation enables designers to reflect upon their current situation, assimilating their learning into the conceptual and methodological frameworks which guide their practice (Mitchell 1996).

It is considered that explanation can also assist in avoiding the 'icon trap' described in section 2.1. (Lawson 1990 p.170, Forester 1989, Cuff 1991): verbal articulation allows all parties concerned – not only the designer – to challenge the design rationale, thereby identifying hidden problems and possibilities (VanGundy 1988, Lumsdaine and Lumsdaine 1995). Verbal conversation play a further role in eliciting tacit organisational information, which is commonly retained only as informal narrative, in contrast to procedural organisational knowledge, which is typically encoded in documents such as codes of practice and annual reports (Spender in Moingeon and Edmondson 1996).

As explained in section 3.5.3.1, the body acts as a receptacle for skill-based knowledges, which are typically encoded and accessed through physical action. However, the benefits of using gesture, demonstration and imitation in this context transcend the accessing of tacit knowledge: by embodying preliminary ideas, the process of explaining through a verbal – visual – bodily language enables knowledge to be synthesised and disseminated more effectively, and organisational culture to become more conducive to creativity (see chapter 4).

A theoretical evaluation suggests that these findings are not unusual. As Peters and Waterman explain, the manifestation of design progression in tangible form releases it from participants' personal knowledge, providing accessibility to others throughout the company (Peters and Waterman 1995). This both encourages the informal comment defined as 'legitimate peripheral participation' (Lave and Wenger 1990), and contributes to a culture conducive to innovation. By embodying progression, active management participation is encouraged (DiBella et al 1996) alongside the climate of experimentation acknowledged as common to innovative companies: as Peters and Waterman (1995) explain,

'The richness of the experience.....that occurs solely when one is exposed tangibly to a subject, material or process is unmatched in the abstract, via paper analysis or description.....it is much easier for people to think creatively about a product.....if a prototype, which is to say a low level of abstraction, is on hand.'

In manifesting mistakes as well as progress, the process also legitimises failure, fostering a climate of openness considered important in facilitating organisational learning (DiBella 1996), again encouraging input from throughout the company.

As chapter 4 will demonstrate, the crafts practitioner's employment of a verbal – visual – bodily language brings further benefits for the case study companies, in terms of their ability to apply the tacit knowledge gained in this way to future projects. Literary sources suggest that this capability constitutes a significant competitive advantage. Theorists recognise the effective dissemination and institutionalisation of new tacit knowledge as crucial to the development of the learning organisation, yet inherently problematic (Edmondson and Moingeon 1996, Spender in Edmondson and Moingeon 1996). The incommunicability of such knowledge constitutes a potentially powerful source of competitive advantage, as its resistance to verbal encoding impedes imitation by competitors. Paradoxically, such incommunicability is equally capable of restricting the transfer of new knowledge within the organisation, preventing its actual implementation to core activities (DTI 1998). As Collis states,

'Whatever is learned, wherever it is learned, must be transferred to other appropriate personnel and institutionalised if the organisation as a whole is to continually improve its performance.'

(Collis in Edmondson and Moingeon 1996)

3.8.2.3. organisational factors

3.8.2.3.1. organisational structure and strategy:

Organisational strategy – defined as the way in which the organisation operates both internally and in relation to its external environment (Hart in Bruce and Biemens 1995 p.18) - is considered a crucial influencing factor on NPD outcome (Cooper 1996a).

Contemporary theorists do not propose generic rules by which organisations should identify appropriate organisational strategies and structures for NPD activities. Instead, they tend to advocate the adoption of a resource-based, systems perspective (DiBella et al 1996 p.128, Handy 1993 p.252), in recognition of not only the uniqueness of the individual organisation, but also the evolving nature and increasing sophistication of NPD activities (Griffin 1997). As Ekvall states (1991 p.76), a management system poorly suited to organisational culture will be,

'rejected like an unfit transplanted organ, the immune defence being the prevalent values, norms, attitudes and analogous actions.'

This systems perspective demands that all aspects of the company's internal capabilities and external influences are taken into consideration in determining appropriate NPD strategies and structures (Nanda 1996, Larson and Gobeli in Hart 1996). Recognition of project objectives is also considered important, as the most effective structures and strategies for achieving particular objectives can actually conflict (Cooper 1996b p.107).

One particular problem with implications for organisational structure and strategy is that of the conflicting needs for diversity and uniformity. As Handy explains, this situation is common in evolving organisations, which need standard manufacturing operations and NPD activities to proceed simultaneously (Handy 1993 p.263). Handy, drawing on the work of Lawrence and Lorsch, identifies the need for a 'differentiated organisation', in which goals, timescales and working practices differ widely. In his opinion, a differentiated structure is particularly appropriate to organisations adapting to new markets or technologies, enabling standard and developmental activities to co-exist (Handy 1993 p.264).

The project team represents one recognised method of differentiating the organisation in this way. This involves assembling a project-oriented team of specialists from each of its internal functions, and by according it appropriate timescales, goals, deliverables and responsibilities appropriate to the project (Tushman and Nadler 1996). In addition to the benefits stated above, this approach can increase opportunities for innovation and knowledge synthesis by encouraging employees with diverse skills and specialisms to work in collaboration (Selzer, Kimberley and Bentley 1999 p.16), temporarily removing the functional and hierarchical barriers which can normally impede the flow of knowledge (Rhodes and Carter 1995 p.112). However, it can result in a localisation of knowledge, as the temporary and autonomous status of the project team may impede sustained learning across the organisation (Jevnaker 1998). The factors most likely to influence its outcome are considered to include resource availability, clarity of objectives, and the priority that it is accorded within the organisation (Larson and Gobeli in Hart 1996).

3.8.2.3.2. organisational culture:

Organisational culture is considered a key determinant of the degree of organisational learning arising from NPD activities (Dibella et al 1996 p.40). In the ideal scenario, creative conflict would be valued as a chaotic yet essential aspect of innovation (Tushman and Nadler 1996), unanticipated demands would be perceived as challenges rather than impossibilities (Sebell and Goldsmith 1997), and a climate of experimentation and openness would prevail throughout the organisation (Handy 1993 and DiBella et al 1996).

The literature suggests that the degree of creativity implicit in an organisation's culture is largely determined by the manner in which employees are treated. As Selzer, Kimberly and Bentley explain, employees must feel trusted to deviate from standard procedures, to take risks and to learn from mistakes. They must also be given tasks which present an achievable challenge, balancing available skills with a capability gap. They should be encouraged to engage in an interactive exchange of knowledges and ideas, whereby feedback and evaluation is constantly exchanged. They should be offered work in a variety of contexts, in order to encourage the transfer of skills and knowledges between tasks and functions. Finally, they should be given the opportunity to see the impact of their work (Selzer, Kimberly and Bentley 1999 p.10).

DiBella et al propose a model of organisations as learning systems, which divides organisational cultural as an influencing factor into two sub-sets: facilitating factors (structures and processes) and learning orientations (values and attitudes) (DiBella et al 1996 p.42).

In terms of facilitating factors, the company's interest and awareness of its external environment is considered important, as is its perception of a 'performance gap' between actual and desired performance as an opportunity for learning. An experimental mindset is considered essential, and most effective when complemented with a climate of openness which tolerates debate, creative conflict and errors. These factors may be consolidated by continuous workforce education at all levels, as well as by leadership involvement and a focus on the interdependency of the organisation's various functions (DiBella et al 1996 p.42).

In terms of learning orientations, the company's preference for developing knowledge internally – rather than imitating others – is perceived as important, as is a culture which values individual, tacit knowledge. An emphasis on informal – rather than procedural - methods of knowledge dissemination is believed to be useful, as is a focus on incremental learning and on the development of individual learning skills rather than solely those of a team or group (DiBella et al 1996 p.47).

3.8.2.3.3. project management and product championing:

Theorists cite effective project management as a primary influencing factor on the outcome of NPD activities, particularly in relation to project definition and predevelopment activities (Cooper and Kleinschmidt 1987). An appreciation of roles and responsibilities, together with an awareness of needs and the ability to respond pro-actively to them are considered crucial to success (Cooper and Jones p. 95, O'Connor 1996 p.73). Establishing realistic objectives before the project commences is also considered crucial to success (Bruce, Leverick and Littler in Bruce and Biemens 1995 p.173). The communication of company strategy is also considered important, ensuring that goals remain organisational rather than functional, and thereby averting one of most severe problems afflicting company – consultant relationships (Raffii and Perkins 1995 p.65).

Oakley explains this need for particular managerial skills in relation to the discrepancy existing between the mechanistic nature of industrial operations, and the 'organic' nature of the design process. As he explains, manufacturing is typically organised according to rational,

standardised and predictable systems, with accurately timed operations producing identical products. It thereby conflicts with the 'organic' management style advocated as most appropriate for NPD, which is characteristically task-oriented, flexible and non-hierarchical, utilising expertise and knowledge located throughout the company (Oakley 1990 p.332). He proposes that design managers differ from general managers in terms of their ability to adopt a flexible, situation-specific decision-making process - as opposed to a rule-based approach - and to unite a team in pursuit of common goals (Oakley 1990 p.333).

Theoretical studies have found that, in order to cope with this discrepancy between standard manufacturing activities and the NPD process, managers tend to adopt product championing roles when engaged in managing NPD activities. This shift in managerial responsibilities, which involves advocating the needs of the product or NPD process, rather than those of a particular organisational function, is recognised as a significant influence upon the outcome of design alliances (Jevnaker 1997 p.16, Markham and Griffin 1998).

Product champions (or 'change masters' or 'alliance managers') are described as individuals who 'bring ideas to life' (Tuschman and Nadler 1996). They advocate the project's needs within the organisation, act as networkers and facilitators, link individuals, functions and organisations in a manner which enhances the flow of information, mediate when conflicts occur, and manage the project's progression (Spekman et al 1996). Although they have traditionally been perceived to support radical innovations, recent research shows that their role is equally common and valuable in supporting incremental innovations and product line extensions (Markham and Griffin 1998).

The NPD literature does not examine whether the product champion's skills and attitudes are inherent or acquired as a result of this emotional commitment: as Spekman et al state, they may be either born or developed (Spekman 1996). However, it does provide an analysis of the factors influencing an individual's capacity as a product manager.

Product champions typically display a strong degree of emotional commitment to a project, capable of overcoming any type of negativism amongst colleagues (Fox 1996). Their belief in the project (Becht and Gommer 1996) is reinforced by initiative (Ingolls 1996), tenacity and a pro-active approach to participation in the project (Moss Kanter 1991). In terms of skills, product champions are able to motivate others by communicating their vision for the project (Westley and Mintzberg in Henry and Walker 1991), often developing a common vocabulary

and frame of reference amongst the participants which promotes mutual understanding (Spekman et al 1996). They are able to solve problems creatively by assimilating knowledge gained from others and from their own experiences (Moss Kanter 1991). They think from the perspective of others, developing an appreciation of each party's objectives which informs their understanding of the project's development (Becht and Gommer 1996, Spekman et al 1996), and recognising the value of each individual's contribution (Moss Kanter 1991). They gain trust (Spekman et al 1996) through their ability to demonstrate their own integrity (Westley and Minzberg in Henry and Walker 1991), and maintain objectivity in their decision-making, despite their emotional involvement in the project (Fox 1996).

Whilst many theorists present generic characteristics of product champions, Sonnenwald offers a taxonomy of five groups of product championing roles, based on the type of boundaries that they span: organisational boundaries, task boundaries, discipline boundaries, personal boundaries and multiple boundaries (Sonnenwald 1996). Evidence of each role is evident in the case study analysis (chapter 4).

According to Sonnenwald, organisational boundary roles are necessary in order to reconcile project objectives with organisational structure, by integrating expertise from across the company, for example. Within this group of roles, product champions may adopt one or more of five roles. As a 'sponsor', they assist in securing acceptance and resources for the project. As an 'interorganisational star', they ensure consistency between the project's objectives and organisational strategy. As an 'intraorganisational star' they collect and disseminate relevant information across hierarchical and functional levels within the company. As an 'intragroup star', they facilitate interaction amongst individual group members.

Task boundary spanning roles, meanwhile, ensure that the project's objectives retain priority, despite the conflicting constraints experienced by different functions and individuals. Task-oriented product champions may adopt the role of 'intertask star', where they facilitate interaction and negotiate conflict between individuals engaged in different tasks, or the role of 'intratask star', where they assume a similar role within a task.

Discipline boundary spanning roles, Sonnenwald explains, involve the creation of new knowledge, through the assimilation of disparate bodies of knowledge. Within this group of roles, an 'interdisciplinary star' integrates knowledge from different disciplines in order to

resolve NPD problems, whilst an 'intradisciplinary star' transmits new information from within the discipline.

The purpose of personal boundary spanning roles are to facilitate interaction amongst individuals. People-oriented product champions may adopt the role of 'mentor', filtering and transmitting career information to individuals, or of 'interpersonal star', creating social links which assist in collaborative working.

Multiple boundary spanning roles, finally, include that of the 'agent', who both facilitates interaction and arbitrates conflict amongst participants in NPD, and that of 'environmental scanner', who transmits information from outside the design context, but relevant to it, to participants (Sonnenwald 1996).

3.9. Crafts – Industry Collaboration

This section reviews accounts of, and theoretical perspectives on, crafts – industry collaboration in the UK, investigating how the limited appreciation of the crafts discussed in section 3.7 have influenced the perceived nature and value of collaboration. The decision to focus on UK manufacturers reflects the differences between individual countries in terms of their approach to crafts education, perceptions of crafts-based manufacturing, and the particular cultural significance accorded to the crafts: as Huygen explains, design (and by implication, craft) embodies national culture and characteristics (Huygen 1988 p.20). In Japan, for example, the status of the crafts is at least equal to that of the fine arts, and traditional techniques are seen as important in developing and utilising new textile technologies (Braddock and O’Mahoney 1998 p.10). In Scandinavia, the ‘humanistic philosophy’ shared by a homogeneous society is considered to have had a significant impact on the close relationship between craft and industry (Haslam 1998), together with a faith in tradition as the root of innovation, a paucity of natural materials and a strong domestic, decorative craft tradition (Sparke p.114 p.182). In Italy, an emphasis on alliances between art / craft and industry is considered the outcome of post-Facist ideals, combined with a strong artisan tradition dating from the Renaissance period (Sparke p.203). For these reasons, it was considered that an international literature search on this subject would introduce too many variables for it to be useful in data interpretation.

3.9.1. Social Conscience

Harrod’s history of the 20th century crafts movement identifies the economic and social concerns of the 1930s as a primary impetus to the first collaborations between crafts practitioners – in the modern sense - and manufacturers. According to her analysis, Gropius’s lecture at the Design and Industry Association in 1934 acted as a catalyst, introducing the notion of craft as a research and experimentation facility for industry, rather than as skill for its own sake. Gropius’s ideas were, Harrod claims, adopted by Read, who developed them into his vision of art, craft, design and architecture as contributors to the progression of society and industry, rather than as a celebration of the individual (Harrod 1999 p.118).

Read’s influential book, ‘Art and Industry’ (Read 1934), reinforced the political debate ongoing within the arts community, leading crafts practitioners to question the social and economic value of making by hand (Harrod 1999 p.118). Certain individuals began to counter the charges of elitism levelled against them by finding means of broadening the impact of their work:

Bernard Leach made plans to operate a factory at Dartington Hall, whilst Ethel Mairet wrote about the links between hand weaving and industrial textile manufacturing (Harrod 1999 p.118). Leach also proposed in his seminal work, 'A Potter's Book,' that crafts practitioners work in collaboration with manufacturers, contributing a practical understanding of materials and processes to the design process (Leach 1940).

It is clear that, within the ceramics, glass and metalware industries, theorisation was more common than practice at this time. A number of collaborations were undertaken in the textiles industry (Schoeser 1996, Weaver 1989, Worden and Seddon 1995), and artists were invited to produce designs for Royal Brierley Crystal, Stuart Crystal, Mappin and Webb and Wedgwood (Bryan 1964, Cooke 1986). However, within the holloware industries, the only documented NPD project undertaken in collaboration with a crafts practitioner involved Michael Cardew, who undertook a self-financed project at Copelands pottery in Stoke-on-Trent (Harrod 1999 p.159).

Cardew criticised industrially produced ceramics, claiming that the methods involved in producing them deadened the material's character. His aim was to re-introduce the warmth and depth he valued in hand-made ceramics (Cardew 1969 p.241) to a wider audience (Clark 1995). Cardew had identified that the use of the industrial manufacturing processes he criticised had resulted from the manufacturers' need for efficiency, and were oppositional to those employed in hand making. He himself explained how manufacturers used a high bisque / low glost firing cycle, designed to minimise warping and cracking, whereas he used a low bisque and high glost firing, which fused body and glaze (Cardew 1969 p.241). However, he persisted in his belief that it would be possible to 'convert' Copelands to his methods (Clark 1995 p.157). The technical impossibility of implementing this vision may be considered to have been compounded by cultural differences, implied by Copelands' owner's habitual dislike of 'arty farty pots' (telephone conversation with son 14/01/1998). Finally, Cardew confessed that he,

'...had been too often invited to admire the smooth, pure white surfaces of fine earthenware and bone china not to know that the potters in Stoke were not about to be converted to something else.'

Clarke 1995 p.197

3.9.2. Craft as Materials Understanding

Between the late 1940s and the 1960s, the primary impetus for collaboration between crafts practitioners and industry appears to have been the supposed benefits for the manufacturer, in terms of improved product attributes, resulting from the practitioners' 'feel for materials' (see section 3.6).

This attitude was, according to Harrod, largely attributable to the Crafts Centre of Great Britain's responsibility to the Board of Trade, which, as its sponsor, insisted that the crafts be valued in terms of their contribution to the economy, rather than as a cultural asset (Harrod 1999 p.342). In particular, it was proposed that crafts practitioners could offer 'artistic advice' to industry, teaching designers sensitivity to materials, and experimenting with new forms and materials in a workshop situation (Harrod 1999 p.212). As Gordon Russell, head of the Council for Industrial Design 1947 – 59, argued in 1963,

'[craft] can provide a continual point of reference on quality for industry. It can also prove a most valuable stimulus for machine made products if brought into close touch with a large factory.'

This emphasis on product aesthetics is illustrated by the work of two leading ceramicists who undertook collaborations with manufacturers, during the 1960s.

Hans Coper became involved in three projects, designing ceramic wall tiles for The Kemer Tile Company, bathroom furniture for SGB of Dudley, and acoustic cladding bricks for Blockley's Brick Company. Hans defined the technical boundaries imposed by each product, then produced an immense range of tests and variations within them (Birks 1983, p.48), imitating, it may be asserted, his crafts methodology, which was characterised by endless refinement of limited forms and surface treatments (see section 3.5.1). The outcome of the SGB project is undocumented, but in the case of both the bricks and the tiles, the designs were found to be too expensive for current market conditions (Birks 1983, p.1948).

Meanwhile, in 1963 Coper's teacher and colleague Lucie Rie was invited by Wedgwood to develop a range of prototypes with a view to a limited edition production run. The company imposed no restrictions on Rie's choice of clay body, and was surprised at her choice of Jasperware (Queensbury 1998), which, on attempting to throw, she found 'unsympathetic'

(Reilly 1989 footnote to p.533). The project did not progress beyond the prototype stage, due to its perceived unsuitability for market requirements: as Robin Reilly, then co-director of the firm explains, the inlay technique specified by Rie was expensive, due to the time and skill it involved, yet produced simple decoration which is not perceived as 'expensive' by customers (Reilly 1998).

It is evident that both Rie and Coper concentrated on the aesthetic dimension of their work, to the detriment of its appropriateness for manufacturing and retailing: in particular, neither took into consideration the relationship between perceived value, price-point and process. The outcome in both cases were designs which were aesthetically pleasing yet impossible to market.

Nevertheless, Rie and Coper's work was celebrated by critics including Frankel (1997), Birks (1987) and Goodison (1999). Despite the problems caused by the project's focus on aesthetics, the notion for collaboration as an improving influence on product attributes persisted and continues to influence contemporary writing, Goodison (1997) and Dormer (1985), for example. Levien in particular, considers that the 'sensibility' gained through making enables designers with a crafts background to humanise manufactured products, introducing warmth, personality and sensuality and thereby introducing essential product differentiation (Levien 1998). Its influence on practitioners' approach to collaboration may also be considered persistent, and is illustrated in the literature by Harrod's account of the collaboration between ceramicists Janice Tchalenko and Carol McNicholl, retailer Next Interiors and manufacturer Fleshpots, documented in chapter 4. Harrod – writing at the time of the project - expresses disbelief at manufacturers' inflexibility and conservatism, as well as their failure to recognise Tchalenko and McNicholl (Margetts and Harrod 1986). She fails, however, to question whether the expectations of large factories with an efficiency-oriented culture and manufacturing plant, together with a high degree of job specialisation, was realistic.

3.9.3. Craft as Skill and User Proximity

In some cases, theorists have identified other aspects of crafts knowledges with potential application for collaboration with industry.

In terms of skills, prototyping is the most commonly cited example: Hughes (1994), Goodison (1998) and Woodhuysen (1996) all argue that the crafts practitioner's model making capabilities could be useful to industry in this respect, assisting decision-making and market testing

(Woodhuysen 1996), and enabling lead times to be cut (Hughes 1994). Materials research and development is another skill believed to be applicable to NPD (Hughes 1994), and substantiated by a successful project which involved ceramicist Jacqueline Poncelet investigating ceramic finishes at Danish firm Bing and Grøndahl (Margetts and Harrod 1986).

Crafts practitioners' proximity to their customers is another applicable attribute: as Woodhuysen explains, this enables crafts businesses to begin the product innovation cycle early, with a strong appreciation of customer needs (Woodhuysen 1996). There is, he explains, strong potential for collaboration, which could enable larger manufacturing companies to customise their existing products according to user need, and to invest in the development of new product innovations.

3.9.4. Craft as Process

Theoretical advocacy for crafts – industry collaboration has emphasised applications for crafts knowledges: skills, capabilities and materials understanding. Only Dormer and Thackara have recognised any potential benefits relating to crafts cognition, and the iterative, context-specific approach characterising it. Firstly, they propose that the increasing retailer and consumer demand for high quality and value products requires designs which are easy to manufacture. This in turn, they claim, creates an imperative for aesthetics and fabrication to be accorded equal status in the NPD process, which can be addressed by crafts practitioners, with their integrated approach to design and making (Dormer 1994). Secondly, Dormer draws on Jones's comparison of crafts cognition and software design (see section 3.3), proposing that crafts cognition be employed as a model for the future development of NPD processes within the microelectronics and software industries (Dormer 1985).

3.9.5. Problems and Influencing Factors

Theorists have recently begun to speculate why, despite the apparent benefits of crafts – industry collaboration, relatively few projects are actually undertaken (Hughes 1996): according to a 1993 Crafts Council survey of UK crafts practitioners, only 3.8% of craft makers also undertake work as designers (Knott 1994, p.179).

As mentioned above, manufacturers' conservatism has, in many cases, been criticised (Harrod 1986, Birks 1987, Goodison 1998, Hughes 1994). The structure of the industries within which

both parties operate has also, however, been identified as an inhibiting factor. Dormer suggests that batch production is often an unrealistic option, within an efficiency-oriented manufacturing culture (Dormer 1985). Lundhölt furthers this argument, explaining that UK manufacturers are less inclined than those in other European countries to develop niche markets, and are therefore less interested in the innovative ideas produced by independent designers (Lundhölt 1996). In addition, she states, the separation of crafts and industrial design at undergraduate levels means that many crafts practitioners are poorly equipped to work in industry. Moreover, the lack of regulatory constraints to starting a business mean that many crafts practitioners operate micro businesses, and are therefore less interested in collaboration with larger manufacturers than their European counterparts, who may require employment as a designer in order to survive commercially (Lundhölt 1996).

Lundhölt also proposes that, in the UK, certain industry sub-sectors are more conducive to collaboration than others. For example, she claims, the limited market for one-off furniture encourages many crafts practitioners to initiate links with industry, whilst the healthy crafts micro-business economy within ceramics inhibits it (Lundhölt 1996). Her assertion that the relative strength of the textiles manufacturing base encourages collaboration is substantiated by the 1993 Crafts Council survey of craft makers in the UK, which found that 40.6% of crafts practitioners undertaking design work make textiles (Knott 1994 p.179). However, her argument that the crafts techniques still employed in many glass factories encourages collaboration is contradicted by the same survey, which revealed that only 3.5% of crafts practitioners undertaking design work were glass makers (Knott 1994 p.179).

Other theorists attribute blame for the lack of collaborative projects to the nature of crafts practice: practitioners, it is claimed, are often too individualistic and concerned with self-expression to design for mass production (Levien 1998), or too concerned with plagiarism and the need to retain control over making (Hughes 1996). Ball and Price's empirical investigation into entrepreneurship amongst crafts graduates suggests that the issue presents a dilemma for many practitioners, with the need to expand production capacities in order to match market demand often conflicting with a desire to retain control and creative autonomy (Ball and Price 1999 p.38).

Margett's account of Poncelet's work with Bing and Grondahl suggests that collaborations may indeed be more successful when practitioners reframe their usual practices to accommodate the project situation. Poncelet described how she had 're-approach[ed] possibilities whilst holding

onto certain intrinsic traits,' rather than simply translating her own work into the factory environment (Margetts and Harrod 1986). A comparison between this approach, and that demonstrated by Tchalenko and McNicholl, Cardew, Coper and Rie suggests that the practitioner's personal motivations influence project outcome considerably. In particular, it appears that attempting to 'convert' existing systems (Cardew), to impose existing designs onto inflexible manufacturing processes (Tchalenko and McNicholl), or to work without consideration for market requirements (Coper and Rie) increases the likelihood of failure.

The picture emerging from the literature is one of crafts-industry collaboration as potentially rewarding yet difficult partnership. However, no literature specifically addresses the management issues which could assist in overcoming its inherent problems. This indicates that a lack of understanding of management issues particular to crafts – industry collaboration could be an influencing factor on their relative failure. The only such issue evident within the literature concerns product championing: Weaver documents Enid Marx's reliance on support from a client representative, who 'backed her to the full against manufacturers' foibles' (1989 p.45), whilst Harrod describes how Bing and Grondahl provided support through two individuals, who between them nurtured the project's technical and artistic development (Margetts and Harrod 1996).

The limited success of crafts – industry collaboration may also be attributed to the influence upon both manufacturers and practitioners of the limited perceptions of craft detailed in sections 3.5 – 3.7. It is evident that theoretical advocacy for collaboration has concentrated on those tangible aspects of crafts knowledges which are evident in the product itself (materials understanding, skill and user proximity). Little mention is made of potential applications for craft as a cognitive process: only Jones (1970) has suggested that a crafts-derived style of cognition may be adopted by non-craft activities, and his argument relates solely to the design of computer software. This valuing of craft as knowledge rather than cognition may be considered to have influenced the expectations of both parties concerned. For example, those practitioners who sought to impose their particular aesthetic and technical preferences upon manufacturing companies were not applying crafts cognition to the industrial environment, but adopting the linear approach characteristic of industrial design.

3.9.6. New Opportunities

According to Woodhuysen, small crafts businesses are faced with many new opportunities, as larger companies increasingly demand the specialist skills, quality workmanship, flexibility and innovation capacity that they are capable of providing (Woodhuysen 1996). Conversely, crafts businesses are increasingly able to benefit from the scales of production and manufacturing technologies offered by larger companies, due to the proliferation of CAD systems, which enable crafts practitioners to find competitive rates for smaller, specialised, bespoke production runs (Hughes 1994).

A discussion group at a 1995 Crafts Council conference identified the need for both theoretical and practice-based research, if collaboration between crafts practitioners and manufacturers was to fulfil its potential. In particular, it was proposed that the nature of contemporary practice should be defined in relation to manufacturers' requirements, and that the potential benefits for manufacturer and practitioner be investigated in more detail than previously (Podschiefs in Dormer 1995).

3.10. Conclusion

This chapter has investigated the nature of crafts knowledges, cognition and practice, and their relevance to design. The investigation reveals significant cognitive and cultural differences between craft and design. Moreover, it suggests that the limited perceptions of crafts knowledges in Western epistemology and culture have restricted the potential of crafts – industry collaboration.

The process of reviewing this literature has also served to highlight its paucity. It has been necessary to rely on a small amount of academic writing (Johnson, Harrod, Dormer), supported by limited anecdotal and journalistic reportage (eg Birks, Hughes, Margetts and Harrod), practitioner accounts (eg Leach, Pye, Martin), one discipline-specific history (Klein and Ward) and the work of theorists who allude to the crafts, whether directly or indirectly (Schön, Polanyi, Gardner).

The chapter has also investigated those aspects of the design management, organisational learning and communication literatures, with relevance to the interpretation of the empirical data presented in chapter 4. This process has revealed the importance of NPD to the evolving organisation, presented some of the problems characterising its implementation, particularly in traditional manufacturing companies, and explored the factors influencing its success. The literature has been found to be both broad and in-depth, drawing on a range of other academic disciplines.

4. Empirical Analysis

This chapter contains four case studies and eleven single interviews, conducted between November 1996 and November 1998.

The early interviews played an important role in identifying and refining appropriate research questions, in addition to identifying potential case studies for more in-depth analysis. The later interviews, meanwhile, offered further insights, in some cases confirming the case study findings, and in others challenging the assertions drawn from them.

In practice, the processes of conducting interviews and developing case study analyses were intertwined. In this section, however, the four case studies are presented first, in order that the main themes arising from the research may be developed in full. Although case study three preceded case study two in order of chronology, here the two exemplary case studies (one and two) precede those which offer more scope for comparative analysis (three and four). Each case study is presented as a story, with a history of the participants' education and experience being followed by a full case description and analysis. Literature relating to design management, communication in design and organisational learning is drawn upon, in order to explain the development of assertions. At the end of the section, an analysis table summarises the outcomes and influencing factors characterising each case, in order to facilitate comparison.

The reports arising from the interview transcripts are presented second, offering additional perspectives on these themes, whilst indicating their presence beyond the case study subjects. The narratives are presented in a format appropriate to their content. Some recount the interviewees' actual experiences, and others their own analyses of broader issues; some are concise, whilst others are more detailed.

A listing of individuals and companies contributing to the analysis is included in Appendix 1.

4.1. Case Study 1: Nazeing Glassworks and Jane Beebe



Interviews were conducted with David Royce (sales manager) and Bob Garraway (foreman) at Nazeing Glassworks, Hertfordshire, and with Jane Beebe at her home and office in Cardiff. Frances Lambe of Mada Trading was interviewed by telephone. The opportunity was also

taken to visit Nazeing Glassworks, to talk to production staff and to view drawings, prototypes and final products.

4.1.1. History

4.1.1.1. designer:

Born in 1961 in Manchester, Beebe's interest in glass making began at Manchester Polytechnic, where she undertook a degree course from 1980 to 1983. She graduated in metalwork with glass, although in practice 80% of her time was spent working in the glass department. Beebe considers this time to have been important in equipping her with an understanding of materials and their fabrication which she 'draws on all the time' and is able to transfer across media. The course also offered her the combination of freedom and guidance that she believes she needed in order to develop her creative outlook: as she explains,

'Your time at art college is precious because.... you've got to have learnt then how to feed yourself... creatively.... you've got to find your sources.'

Following her graduation, Beebe was persuaded to work on the new 'Foundry' project at Royal Brierley Crystal. This initiative, which consisted of a small hot shop within the factory, had two objectives: to increase visitor numbers, and to feed new skills and ideas into glass manufacturing. The project's failure to fulfil this latter objective introduced Beebe to the extent of cultural differences between production staff, management and 'studio' craft makers, and to the conservatism and resistance to change characteristic of the glass industry. It also confirmed her own belief that she lacked the experience necessary for this type of project, whilst demonstrating the importance of personal 'chemistry'.

A six-month period working as a studio assistant for glass makers Neil Wilkin and Rachael Woodman followed, during which Beebe improved her making skills by producing her own work for exhibition at weekends.

An MA at the Royal College of Art (RCA) ensued. At this point, Beebe recognised that whilst her creativity and use of materials were inseparable, her limited making capabilities were restricting her ideas. She describes 'making the decision to let go', stopped making glass

herself, and began working in collaboration with Neil Wilkin, producing vessels such as those illustrated in figures 3 and 4.

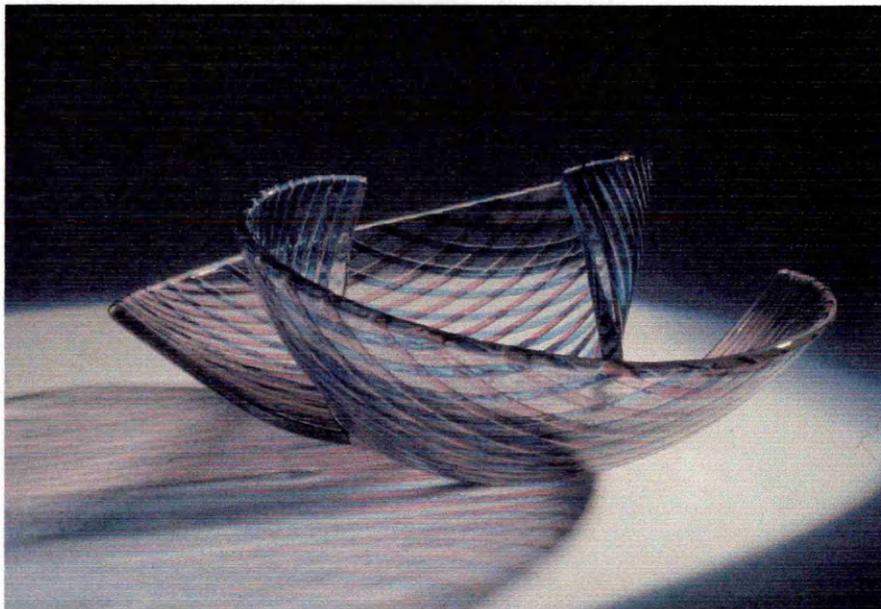


fig.3 (top): 'Assymmetric Form'; fig.4 (above) 'Twisted Bowl'.

The methodology that Beebe developed through this association extended the craft maker's dialogue between process and intent, with Wilkin's skills replacing her own as the creative constraints which fed her ideas. Beebe would begin work with an unresolved idea, reinterpreting and refining it in response to her observations of the making process, rather than

adhering rigidly to her original intention. This way of working proved liberating, not only freeing her from skill-related constraints, but also in terms of knowledge synthesis. The relationship introduced her to the concept of collaboration as a creative catalyst, demonstrating the new potential offered by integrating others' specialist expertise with her own vision, and the importance of communication in achieving the mutual understanding crucial to success. As she explains,

'Neil puts as much of himself into making something as I do, so it's like the sum of everything that you get, instead of one person.'

During the first year of her course at the RCA, Beebe won the Royal Society of Art's Dartington Glass Attachment Award, which involved a placement at the company and led to permanent employment following her graduation (see figure 5).



fig.5 Clocks designed for Dartington Crystal: Beebe's most commercially successful design for the company.

The post built on Beebe's experiences at Royal Brierley Crystal, providing her with an extensive knowledge of large-scale glass manufacturing, and of the NPD process.

One major lesson was the impact on NPD outcome of the designer's relationship with production staff. In this respect, Beebe learned from the experience of a colleague, who complained to the managers about production staff attitudes and whose designs were

subsequently sabotaged. Conversely, she learned that overcoming the production team's perception of designers as 'people who get in the way' could bring further advantages, introducing both parties to new skills. As she explains,

'It was brill, because I would work alongside them, so I was learning stuff off them and they learning stuff off me because they'd never done this.... they didn't have the skill to flat a base, initially.'

Recognising the advantages of production staff co-operation, Beebe devised a strategy for overcoming their resistance towards designers. Firstly, she removed hierarchical and cultural barriers from the relationship, defying the labels 'pen-pusher' and 'suit' by working in the factory. Secondly, she established a rapport based on humour, and ensured that she was 'jolly and lively', so that her presence would be welcomed in the factory. Thirdly, she demonstrated a respect for the team's skills which she felt was lacking from the company's managers.

Beebe developed further motivational strategies during her work co-ordinating the production of a limited edition range of sculptural vessels. These pieces required the production team to develop new hand finishing skills to an exceptionally high standard. This was tedious, uncomfortable work, which the team evidently had little interest in. Beebe realised that the project's context had not been explained, nor the rationale behind the need for the high quality finish. She therefore explained the project in relation to company strategy, but emphasised the opportunity that it presented for the team to demonstrate its skill, thereby tapping into the 'skill machismo' that she felt characterised the workforce:

'I said, well, this piece is going to be about 700 pounds. It's not enough for it to be good, it's got to be utterly gorgeous..... You know, I said, these pieces are for you, to show off, you know. OK we do this every day, but look we can do. Now isn't this gorgeous, and we're really proud of ourselves, you know.'

The project received a high-profile launch, with a publication and a London exhibition. Beebe made a point of compensating for the company's lack of recognition for the production team's achievements: as she recounts,

'I said, you know, there ought to be a list of credits on the bottom of here [the publication], because you did all of this. You know, they're looking through the pictures, and saying this

is really good, look at this! They gave me the photos back, and I said no, I've got a set for each of you. And they were like, you're joking, because nobody had ever done anything for them. And I said, well you should treasure those. You did them.'

Together, these motivational tactics successfully established strong relationships with production team who, from then on, were pro-active in resolving any difficulties that Beebe encountered in transferring her products from design to manufacture. Beebe had not only learned that her motivational tactics could not only overcome cultural barriers, but could also realise latent potential amongst production staff.

Beebe also learned much at Dartington about manufacturing, and in particular about the relationship between processes, price-points, market suitability and sales. Watching the production team 'for hours', she became aware of how even a small movement such as cooling the rim of a glass would increase its cost, and would require justification in terms of adding to the product's perceived value in the marketplace.

Beebe learned that because of this dynamic between process and price-point, NPD often became a battle between designers and sales managers. Meetings were 'four-hour slanging matches' between the two functions, with the sales department advocating for mainstream designs with high profit margins. In retrospect, Beebe criticises her own belief that design could create market demand, and had no need to follow existing market preferences. She attributes this attitude to the teaching she received at the RCA, which she believes encouraged a certain 'preciousness', and a belief in the superiority of design knowledge in relation to that of other functions involved in NPD.

This on-going argument introduced Beebe to the politics involved in NPD. In particular, she learned about the impact upon design of poor communication between functions: on many occasions, designs were rejected as incompatible with company or marketing strategies, without those strategies ever being articulated. Moreover, the design team was physically separated and metaphorically given a lower status than other departments, by its location in a Portakabin, located on the company car park. Beebe believed that Dartington's apparent commitment to design was superficial, and that the managers lacked any true belief in its value. Her strategies were to take a diploma in industrial management, in order to inform her arguments with theory, and to counter her managers' negativity with enthusiasm:

“the only way I could tackle Eric [was to] just bounce on him. I just wouldn’t let him get a word in edgeways! So he wouldn’t be able to ask any awkward questions then.”

The effort involved in these negotiations proved exhausting, and when Beebe left the company, she resolved only to work with clients on her own terms.

Since making this decision, Beebe has worked as a freelancer on a variety of NPD projects, including one undertaken in collaboration with Portuguese manufacturer JM. Here, she found her ‘ideal’ company, where the owner’s belief in the value of design to company image, together with his non-commercial interest in the venture, meant that manufacturing could be re-scheduled in order to maintain the same production team. At another company, Cumbria Crystal, she developed new products which not only fulfilled the company’s aims in terms of market diversification, but also built an element of training into its NPD strategy, designed to overcome an impending skills shortage.

To summarise, Beebe’s design methodology reflects her crafts background, but allows her to extend her ideas beyond the parameters imposed by her own skill levels. Her experiences have taught her the value of positive relationships with both managers and production staff, as well as strategies for achieving them. She is motivated by a need for creative fulfillment and the desire to ‘make beautiful things which make people around me happy’, but also by the desire to gain respect from colleagues and to enjoy the collaboration involved in the NPD process.

4.1.1.2. manufacturer:

Nazeing Glass is a Hertfordshire glass manufacturer, established in 1928 and currently employing 70 staff and 6 furnaces (figures 6 and 7).

The company’s turnover in 1999 was approximately \$5million. It produces only to order, and employs no in-house designers, preferring retailers and distributors to shoulder the risks and costs involved in NPD.

Its production systems are semi-automated, yet both blown and pressed ware remain partly reliant on hand skills. Its products range from traditional stemware to limited edition corporate trophies, soap dish components and traffic light lenses, which are exported to Australia, India and Pakistan.

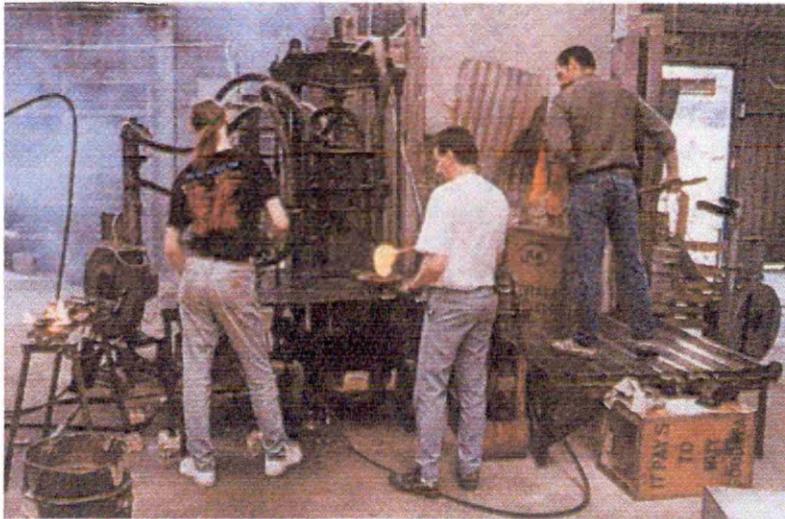
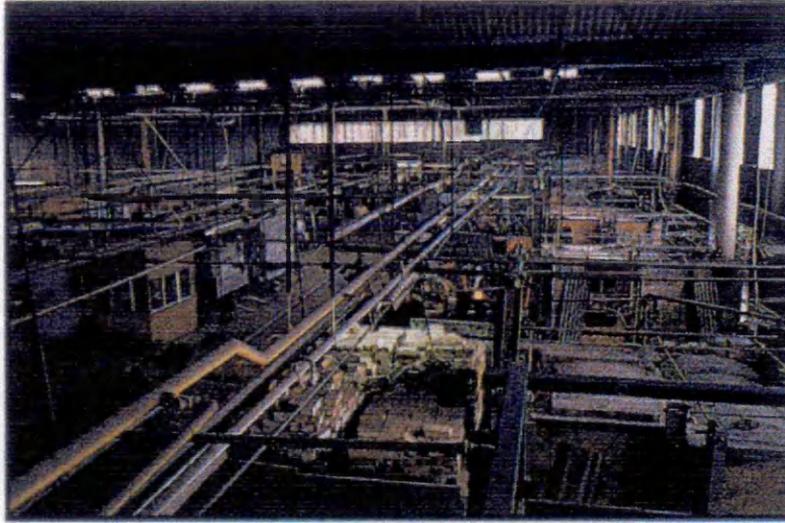


fig.6 (top): Nazeing Glassworks' manufacturing plant.
fig.7 (above): The pressing process, used in the manufacture
of glass ashtrays and plates.

As a bespoke manufacturer, Nazeing does not consider a brand identity to be necessary. It does not exhibit at trade fairs, although its products feature on the stands of many exhibitors: instead, Royce uses events such as the International Spring Fair as an opportunity to secure future business by establishing and developing contacts within the industry. The company advertises only in 'Promotions and Incentives', a trade journal for advertising agencies, finding that word of mouth provides it with sufficient business. Although it has undertaken mail shot advertising during lean periods, it has never found this activity cost-effective. Because of the company's reputation for undertaking unusual products however, it is often able to secure editorial coverage for new products.

Like many UK manufacturers (DTI 1999 p.4 – 5), Nazeing faces increased competitiveness in its traditional markets, particularly since the introduction to UK retailers of Eastern European stemware, which combines high quality with low prices. This has contributed to a lack of confidence amongst buyers, which has resulted in smaller, more frequent orders from a diminishing client base. In addition, demand for the cut crystal which had always constituted the company's core business has been eroded by the trend towards casual dining, and pressed industrial light fittings and lenses now account for 60 – 65% of its total turnover. As Royce explains,

'You can buy very cheap, good quality glassware now from Poland, Czechoslovakia, you know, beautiful vases in John Lewis for under a tenner. Well, they're probably buying it for a couple of pounds, and we can't get near that. Why keep on banging your head against a brick wall with something that you know you're not necessarily competitive with? In the old days we could always say, ah yes but their quality's rubbish. Now, I have to admit their quality's come up, it's really very good.'

Within this increasingly price-oriented market, Nazeing's survival is dependent, according to Royce, on developing its capabilities in value-added NPD processes and customer service. As he explains,

'Quite a few customers are coming back to us, saying yes you can get very cheap glassware from Poland, but we ordered a container full and when it arrived, a third of it was broken, the rest of it wasn't quite what we expected, when we phoned up to complain they couldn't understand what we were saying, although they did understand very well when we were placing the order.'

The solution, according to Royce, is for Nazeing to offer a level of customer service and reliability unparalleled by European manufacturers, essentially representing a shift from commodities to knowledge-based products. This strategic shift is consistent with the company's existing strengths: because of its history of working to client requirements, its managers have developed skills in navigating the NPD process on behalf of its clients. In addition, the small workforce and continuing use of hand skills provide a degree of adaptability and responsiveness. The company also occupies an unusual position within the British glass

industry, encumbered by neither the traditional handmade crystal manufacturers' conservatism, nor by the large-scale producers' tooling costs and production constraints.

Whilst recognising its strengths, the strategy also attacks Nazeing's competitors' weaknesses in terms of customer service. Many of the company's clients have complained that working with these companies represents a false economy, as goods tend to arrive broken due to poor packaging, or not to match specifications. Communication is inevitably a barrier to overcoming these problems, and clients would often return to Nazeing, willing to invest in the speed, accuracy and problem-solving capabilities that the company offers.

Nazeing's strategy was consistent with the DTI's vision for enhancing the competitiveness of the manufacturing sector, in terms of retaining or regaining competitiveness by adding value to products and production processes, and by recognising the demand for more sophisticated and customised products (DTI 1999 p.4-5). However, despite the strength of its rationale, the company faced barriers to implementation experienced by many similar companies.

Firstly, it suffered from a resistance to change amongst its production staff, who resented any attempt to introduce new types of work or working methods. As Tuschman and Nadler state (Tuschman and Nadler in Hart 1996), this is common in times of threat, when insecurity can cause employees to covet familiarity, and to display resentment towards any instigator of change. At Nazeing, it was compounded by a system of productivity-related pay that prioritises output over quality, and favours existing procedures and products: for production staff, the learning required by new products represents a reduction in productivity and subsequent loss of earnings. In addition, Beebe identified a fear amongst the production team that they lacked the skills to fulfil her requirements. As Royce and Beebe were aware, the impact of such resistance to change can be extreme, and include the constant rejection of new designs, refusal to supply information, or simply general obstruction, particularly in companies unaccustomed to NPD activity (Oakley 1990 p.333).

The second barrier to Nazeing's adoption of its new strategy was the mistrust of designers evident amongst its production team. Royce attributes this to the team's experience of designers and clients as arrogant and inflexible idealists, badly informed about glass making and over-demanding of the processes available. As he explains,

'They [production staff] tend to think that because they make it they're the ones that know about glass, and the designers come up with these stupid designs that can't be made.'

Again, this problem is common to many manufacturing companies, originating in the diverse culture, backgrounds, attitudes and languages differentiating professional groups (Biemens 1995 p.146). It is considered extremely detrimental to alliances requiring an integration of diverse knowledge and skills (Nanda in Moingeon and Edmondson 1996), particularly when 'creatives' are involved and the persistent stereotype of the demanding, isolationist perfectionist (Fletcher 1998) influences perceptions of the designer. At Nazeing, it is compounded by the status of clients and designers as outsiders, as mutual respect of competencies rarely has time to develop.

Finally, Nazeing's capacity to implement its new strategy was impeded by its usual NPD methodology, which involved clients approaching the company with a completed design proposal, rather than designing to match its strengths and weaknesses. This linear method opposes theoretical best practice, rendering the transition from concept to product problematic (Bruce and Morris 1998 p.43): as Ruekert explains (1995 p.53),

'[any] absence of manufacturing involvement in the early stages of the development process frequently leads to frustrations on the part of the operations managers, as they try to implement production processes for poorly conceived products.'

By generating designs which fail to accommodate their manufacturing context, this method can also reinforce workforce resistance to change (Jordan 1997, Burnside 1995). The problem has been exacerbated by the increasing use of CAD systems, which enable 'realistic' designs to be drawn up with no understanding of materials or processes. This creates high client expectations: as Royce explains,

'They actually now can produce pretty good things on a computer that have never been made but look as though they have been made. They then go along to the end user who might be United Distillers or somebody huge, and sell an idea for a promotion. And then often they'll get the go-ahead for that, then they will decide to go out and get prices. They'll send a fax to me with this item on there, and I'll look at it and say, we can't make it like that. And they'll say, well you must be able to, and I'll say, no we can't.'

Conversely, as explained in chapter 3, a concurrent NPD methodology can provide shortened lead times, improve problem-solving and learning capabilities, heighten customer awareness, increase organisational creativity, and provide access to new markets and technological expertise.

To summarise, whilst Nazeing Glass's size, management style and company policy were conducive to involvement in this design-led and unpredictable project, its weakness was a resistance amongst production staff towards designers and new products.

4.1.1.3. client:

Mada Trading researches, sources and supplies luxury tea and tobacco products to the Jeddah based distributor Linjawi Holding Company, part of the Al-Maglif Corporation. Its products are characterised by quality of manufacture, and by a distinctive and sophisticated style which combines traditional Eastern and contemporary Western aesthetics.

The company had decided to diversify into smoking accessories, and was seeking to develop an expensive, top quality glass hookah pipe (or narghile) which was to be marketed as British made lead crystal. The long tradition of hookah smoking meant that the pipe's accepted form had evolved through use rather than design, and that there was little understanding of how it actually functioned. Mada Trading therefore had no technical knowledge to inform the design process, meaning that the project required technical solutions as well as an aesthetic one.

In evaluating the importance of the case, it is important to acknowledge the product's commercial success. The original order for 200 units has now been repeated twice, with Linjawi Holding Company experiencing difficulty in matching supply to demand. Standard components from the original design have been used to extend the range, which now includes a cheaper, metal stemmed version, a travelling version with no neck but a portable case, and an ornate two-headed version intended for sharing and for combining different flavours of tobacco.

4.1.2. Starting Point

Frances Lambe of Mada Trading had been recommended to Beebe by colleagues, and located her through the Chartered Society of Designers. An initial meeting with Lambe served to introduce Beebe to the project, and – in Beebe's opinion – to vet her professionalism and the

suitability of her work, before she was introduced to Mr Linjawi. A freelance rate was then offered for a set of concept drawings, on the condition that if they were used, a royalty fee would also be paid.

4.1.3. Case Description

4.1.3.1 pre production:

From her first meeting with Mada Trading, Beebe began evaluating her client's sense of style, assessing verbal cues as well as those afforded by the office environment. As she states,

'You could tell from the office, you could tell from the way he spoke, you know, and you could tell from the character of his PA, of how they were, what they would like.....'

Beebe describes how this process necessitated her challenging her own preconceptions of Arab taste. She admits that she had expected her client to favour bright colours and extravagance, and was surprised to identify instead a strong sense of refinement and a preference for elegant, classical form: as she explains,

'Their offices are very very sophisticated. Very heavily draped, sort of lovely Chesterfield sofas. Very very classical. So, there you are. They're classical people, they want classic shapes.... And it showed because the pewter ones are the best sellers, not the gold.'

Discussions revealed that the company's reputation in its home market was built upon a Middle Eastern perception of 'Englishness': notions of 'quality', 'craftsmanship' and 'tradition' were important, and Mr Linjawi was eager to promote the hookah as 'hand made in England.'

Beebe concluded that her designs would need to offer a contemporary interpretation of traditional Arabic form, whilst emphasising quality of materials and workmanship.

Bearing this in mind, Beebe began the design process by doodling, producing 'fag packet drawings' of basic forms for the hookah pipe, derived from the company logo. She knew from her discussions with Mr Linjawi that the product would require a tube, a bowl and a cap, and was immediately struck by the idea of threading the tube with glass beads. Once she had determined the basic form, she worked on a series of variations, depicted using pencil in her usual pointillist style (see figure 8, overleaf). This reflective process enabled her to determine

appropriate proportions and manufacturing methods, by relating the emerging designs to her knowledge of glass and glass making. For example, she knew that the heavy base required for stability would necessitate a large gather of glass, which could prove difficult to insert into the mould if the base's aperture was too narrow. By drawing and re-drawing variations on the basic form, she was able to propose nine designs which she was satisfied would fulfil both aesthetic and practical criteria.

Although these drawings were intended only to stimulate discussion, three of the designs were immediately commissioned by the client for manufacture. Beebe recalls that,

'.....he phoned me up from Jeddah and said, "I want to congratulate you Jane, they're beautiful... they are exactly what we're looking for."'

Although the concept drawings had been informed by her knowledge of glass and metal, Beebe realised that translating them into actual products required more specialist expertise. She therefore began approaching glass manufacturers, engineers and metal workshops, drawing on her network of professional contacts. This was an opportunity to identify potential manufacturing partners, as well as to seek advice, and Beebe monitored carefully each individual's ability to grasp her requirements as well their technical capabilities. Her previous experiences had taught her the value of open communication and strong interpersonal relationships with her suppliers, and she rejected any who appeared not to be 'on my wavelength': as she explains,

'Sometimes you meet up with people that have a little tiny business somewhere, go and pick their brains and they're willing to chat and to help.... Some people aren't bothered. Sometimes they just can't the jist of what you want. And other people just twig it straight away, oh yes that's no problem! And you're away then. You've got to be prepared to go and talk to lots and lots of different people. I'll try for hours to go and talk to somebody face to face, because you're sure then that you've got it across. Whereas things can be interpreted different ways, and there can be misunderstandings, and that's when the process starts to go wrong.'

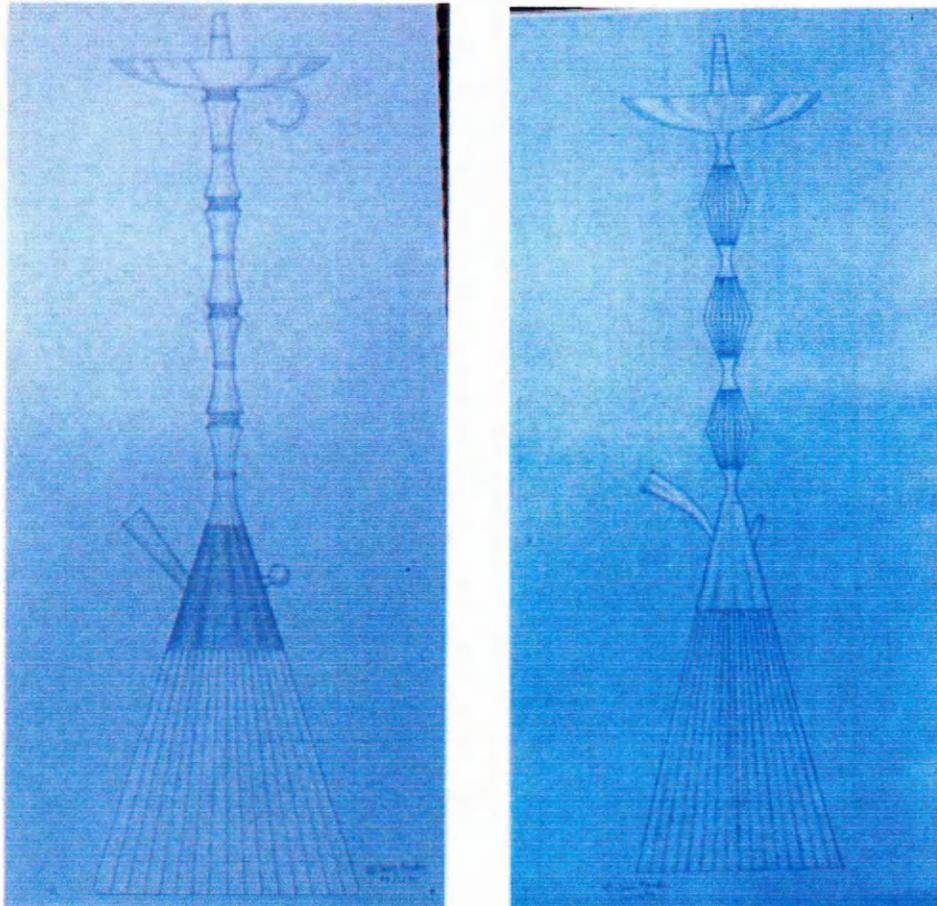


fig.8: hookah pipe options 1 and 2.

Identifying suppliers for the hookah's metal components proved problematic, as Beebe had no prior contacts in the trade. Beebe considers that her difficulties in establishing new relationships in this field was due partly to her lack of credibility as an independent designer and the unusual nature of the project: as she explains, she had no 'corporate muscle', and quickly learned to mention her client's name and the potential value of the order within seconds of opening a conversation. She believes that she was also impeded by her unfamiliarity with engineering terminology: as she recounts,

'I'm talking to engineers on the phone, and I don't know what an APSP thread is. And they just don't want to know, and I'm getting to the point where I'm almost screaming down the phone, "do you want this bloody work or don't you?" Because it's deadly serious. Because as soon as you mentioned what it was, they just laughed. I said, "this is deadly serious."'

Sourcing a glass manufacturer proved easier, due to Beebe's contacts in the industry. A Polish manufacturer was considered, but disregarded due to the project's complexity and the subsequent need for good communication: Beebe had previously sourced components from the company, and considered that working across language barriers could only be cost-effective when problems were unlikely to occur.

Eventually, Beebe contacted David Royce, sales director at Nazeing Glass. Beebe and Royce had worked together before, producing prototypes for components to be used in a range of decorative lighting, which involved Nazeing developing new capabilities in centrifugal casting. Beebe was confident at this point of Nazeing's capabilities, being already aware of both its strengths and weaknesses in relation to glass manufacture, and of Royce's skills as a project manager. Although she knew that Nazeing would charge higher rates than their Polish counterpart, she considered these capabilities meant that its involvement constituted a worthwhile investment.

Royce evaluated the project fully at this stage: like Beebe, he had been made aware through experience of the problems that can occur when the 'spark' between designer and manufacturer is absent, when the designs are poorly suited to manufacturing processes, or when the designer is not sufficiently flexible. As he explains,

'I get very enthusiastic and naturally I wear my sales hat, and I see some lovely designs and think, that's brilliant you know, that will sell. But I know that maybe it's not for us, it won't suit our guys here or the way we produce things, or the way we can finish things, so therefore I have to turn things down... and it's not just the physical side of, can you actually produce this... You've got to enjoy working together if you like, and just have the will, all of you, to succeed.'

In this instance, however, Royce saw the project as an opportunity for Nazeing implement its overall development strategy, whilst extending its technical skills: the company had gained valuable new competencies during its previous collaboration with Beebe, and Royce saw this project as an opportunity to introduce gold leaf, colour and optic work, under her guidance. According to Beebe, this was a significant factor in determining Nazeing's involvement: the company had invested considerable time in the centrifugal casting project, and therefore clearly valued to opportunity to extend its capabilities. Royce's belief in the project's potential was confirmed by Beebe's involvement: as he states,

'We took it more seriously than we would anything else, because it came through Jane. I knew her, and I knew that she wouldn't be wasting her time unless she thought it could fly.'

According to Beebe, Royce 'stuck his neck out', taking on responsibility for the project in order to gain the other managers' approval. This opinion is substantiated by Royce, who talks of 'having to do in-house selling' to production and quality control managers, convincing them of current market trends, and the opportunity to make substantial profit margins on this project.

At this stage, Beebe introduced Royce to Mada Trading. Although there was no obligation for her to take this step, she believed that meeting the client would assist his understanding of the project and its potential, whilst allowing him to take responsibility for Nazeing's involvement: as she explains,

'If I'd tried to keep them out of it, he probably wouldn't have given me as much time as he did, because he could see there was good business at the end of it. And I thought, well he can judge for himself then, and it's not on my word. And he'd make his own decision. I'm sort of protected, but also, you know, he can see it's a serious thing.'

Once Royce's commitment had been secured, Beebe visited Nazeing in order to tour the factory. This allowed her to further her understanding of the company's working practices and particular facilities, skills, strengths and weaknesses. For example, observing the production team's work on a lamp shaped similarly to the hookah's base reinforced her confidence in their capacity to manufacture her own designs. In addition, she discussed the design proposals in detail with Royce, comparing the design and the manufacturing techniques it required to those used for previous projects undertaken by the company. As Beebe recalls,

'I could point out to him where I thought that the problems would come, and then he would say, well I think this could be a problem for our guys because when we did this, it didn't work.'

Beebe now began developing her concepts into realisable technical drawings, using the knowledge gained from her visit to Nazeing in order to maximise synergy with the company's manufacturing capabilities. This was a matter of matching design to potential capabilities rather than existing one. Although the designs did require techniques which were new to the

production team, such as the application of gold leaf and coloured chips, Beebe was careful not to demand too much: as she explains,

'...you have to understand, that Nazeing are not particularly brilliant at jugs. Dartington are excellent at jugs... You know, it's sort of, you can't ask them to do too much. You really want to make it as easy as possible.'

A period of testing and evaluation began, using prototypes made by Neil Wilkin in his Somerset workshop. The decision to undertake this activity away from the factory reflected Royce's recognition of the production team's resentment of designers. Royce believed that introducing the designs at this formative stage would antagonise the production team further by interrupting work and decreasing their productivity, and would not provide Beebe with the opportunities for experimentation that she needed. Beebe believed that by minimising manufacturing problems, she and Royce also averted the tensions inevitable in introducing a new product which demanded high levels of skill from the production staff: as she explains:

'It's really funny because you've got experienced glassmakers, and if they're put in that position, they're shaking! They're scared of making fools of themselves in front of you, you know, guys with 25 years' experience, 30 years, but they're nervous because they don't want to be made a fool of in front of their mates.'

This appears to have been a wise strategic decision, which significantly eased the transition from prototype to product: as foreman Bob Garraway explains,

'When people [designers] usually come in they don't really know what they want..... [they'll] come in with a mould and say, can you do that, when they've not seen it done before. And you have to take it right from the beginning: no, you can't do that to that mould because of this. But she come in, she was there, she'd already seen it made, she said this is the sample I've got, can you make it to that?'

The prototyping activity also enabled two major functionality problems to be identified and resolved. The first of these involved achieving a tight seal at the joint between the base and its metal cap. Although Beebe believed the problem to be caused by irregularities in the hand blown glass, Royce's experience of other projects convinced him that Nazeing's version would be similar. In consultation with Beebe's husband, an engineer, they devised a solution which

prevented smoke leakage by altering the funnel's shape to provide a closer join between the metal components (figures 9 and 10).

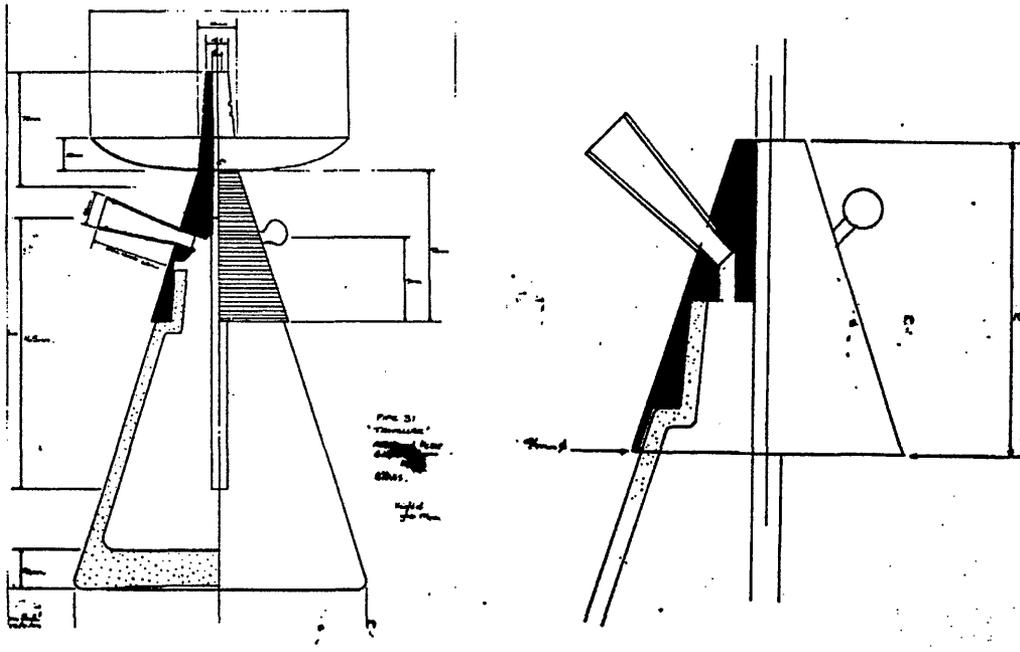


fig.9 (left): The first technical drawing.
fig.10 (right): The second technical drawing, incorporating Royce's recommendations.
Here, smoke was prevented from escaping by alterations to the funnel's shape, which provided a closer seal between the two metal components.

The second problem concerned the width of the base's neck: whilst a large diameter caused the smoker to choke through excess inhalation, a small diameter impeded the blowing of glass into the mould. In addition, enabling sufficient smoke to ascend the pipe necessitated reducing the base's size - and capacity - twice. Reconciling these two critical dimensions without compromising the design's elegance could only be achieved through prototyping and testing, as even the client had no technical understanding of how the traditional hookah pipe actually worked.

Prototyping overcame this knowledge gap, disproving the client's belief that the height of the tube was critical, and identifying the base capacity as the crucial dimension. This later led to the development of a 'traveller' version, using the same base and screw-on adapter as the standard model, but no tube.

After several months of prototyping and development work, Beebe and Royce decided that the designs were as fully resolved as possible, and were therefore ready for introduction to the production team. Royce then briefed the team, pre-empting their hostility by emphasising Beebe's expertise. Beebe then spent a day working in the factory, identifying and resolving minor manufacturing problems. This process is described by Garraway:

'I blew a couple of samples, and she just said, "I don't like that one, that one's what I want, do a couple more like that", and that was it. A few problems did arise, but we sorted them out in a couple of minutes.'

Beebe's description of the process suggests that her flexibility and awareness of manufacturing constraints were instrumental in this problem-resolving phase. As she explains,

'I will move, as long as it's not at critical points, that would just destroy the design.....I'd say, does this dimension here give you a problem? Because I can alter that if you want. I would prefer it like this, but if it makes it easier, I will take it out 2 millimetres. I will move, as long as it's not at critical points that would just destroy the design.'

The production team were also introduced to decorative techniques involving gold leaf and coloured glass chips, which Beebe was considering incorporating into the design. They had previously attempted to apply gold leaf papers to hot glass, but had found that the papers would be lifted by the draft from the furnace, wrinkling them as they came into contact with the hot glass. Beebe was able to suggest a solution commonly used by craft practitioners, in the form of a board with a fan positioned underneath.

The day in the factory was also an opportunity for Beebe to begin developing a rapport with the production team. Demonstrating an informed interest in their work, how certain effects were being obtained and the rate of production, she was able to gain professional respect for her understanding of glassmaking. By establishing a dialogue in this way and working in the factory itself, she was able to demonstrate a respect and a lack of arrogance which was appreciated by the production team. As Michael (glass blower) explains,

'She seems to communicate a lot more [than other designers]. And she doesn't mind being in the factory, you know what I mean? She doesn't mind getting her hands dirty. She'll talk to

you. She seemed to have quite a good idea of how we went about it. I mean, she ended up telling us what to do in the first place.'

Beebe appreciated the demands that she was placing on the team, and their subsequent fear of failure. However, she managed to diffuse tension through humour: as Royce explains,

'She can come down onto the shop floor and talk to them, pull their legs, and it's just something that you build up Whereas we've had other designers, and they've just got up people's noses here.'

Beebe was also sensitive to the potential impact of disrupting manufacture on bonus pay, and her speed in resolving problems and choosing samples was appreciated by the production team.

The most serious problems did not actually occur in the factory, but in assembling the glass and metal components. Both major problems resulted from breakdowns of communication in the specification process: in one instance the mould for the glass base was too big, and in the other the glass was cut too high by the subcontractor. The latter problem was identified by Beebe during a chance visit to the metalworker, and resolved through consultation Royce. According to Royce, this joint responsibility for all aspects of the project was fundamental to the team's problem-solving capabilities: as he explains,

'if I was handling it with somebody else, and somebody else was doing this, somebody else was doing that, then everybody could blame everybody else and not take responsibility..... When things go wrong, because we all talk so much and so openly, it gets sorted.'

Just prior to the production run, Royce and Beebe held a meeting attended by the entire product development team - company management, foreman, blowers and finishers. At the meeting, the prototype (figure 11: see over) was presented to be handled and dismantled, enabling everyone to see how the glass components fitted into the product as a whole, how it would be packaged and what type of tobacco and accessories would be used.

The meeting's objective was essentially to encourage the production team to produce high quality work and to solve any problems which arose. Beebe and Royce's approach was three-

fold. Firstly, they provided the team with an opportunity to identify any final problems, thereby transferring responsibility for the decision to proceed. As Beebe explains,

'All the guys had their input, because I said "right, have a look at this, now is there anything you want to alter? because it can be changed now. You know, I don't mind" I gave them the opportunity for their input, so if it went wrong then, they couldn't blame me.'



fig.11: Two prototype hookah pipes, photographed with Al-Maglif's standard pipe, mouthpiece and tobacco, and fitted with ceramic burners.

Secondly, by taking this participative approach, Beebe and Royce were consciously attempting to transfer ownership to the team, building a sense of team spirit as well as encouraging the production staff to undertake responsibility for their work: as Beebe explains,

'Letting everyone say their bit makes them feel that they've actually made a valid contribution..... so then they'll take a pride in it and make it beautiful. Because otherwise they won't put that effort it..... I mean, I always view anything that's coming out as a team effort. It might be my design, but as far as I'm concerned it was everyone who was involved who made it

happen. It's not really mine, I'm not really precious about anything I do. It's nice to see it actually happen and to think, I made that happen.'

Finally, the meeting stimulated interest in the product and its meaning for the company in terms of market diversification. Royce explained the importance of the client and his expectations for a 'superb, hand made, crafted product', stressing the need for unusually high quality workmanship and attention to detail. He consciously built the product into a 'story', intended to reinforce enthusiasm for it:

'it was up to the management if you like, to me, to make it more interesting, by... telling them about where it's going... about the client, and that if they've don't get it right they have their hands chopped off!'

4.1.3.2. production:

According to both Beebe and Royce, the manufacture of the glass was unproblematic. The production team's commitment was however tested at one point. When the actual moulds were used for the first time, it was discovered that the sharp angle where the shoulder of the base met the pipe caused the glass to crack: as Garraway explains,

'The worst part is the neck. It's got such a tight should on it for the seal, that you get little cracks in there. And once you get those, you have to stop and sort the mould out because you then, we use a paste, so that affects the finish there. So that tends to come off, and it comes off on the sharpest part. And then, that acts as a knife on the glass and cuts the glass. So as I'm blowing it and turning it, it's cutting it. As I come up, I come up and bits tend to fall off, and then, it's a big smash and oh, dear, got to sort the mould out again!'

Although maintaining an effective seal precluded any change to the shape itself, the blowers discovered through experimentation that filing the edge slightly with emery paper was sufficient to prevent the problem. Establishing the precise amount of filing to be undertaken required persistence: whilst too little failed to remedy the problem, too much caused a poor seal between the components.

The manufacture of the hookah's metal components was more problematic: an error on a specification drawing meant that a secure fit could not be achieved between the glass and metal

sections. Fortunately, Beebe noticed the error during a routine visit to the metal manufacturer, and in consultation with Royce was able to identify and implement a solution: as Royce explains,

'She said, "the glass is cut too high." I said, "it can't be, we cut it before and it fit before, why isn't it fitting now?" Anyway, we went through it all, and it now looks as though one of the drawings is wrong for the metalwork. So I said, "God, what can we do?" And she said, "they've produced half, they've produced all of the metal but haven't done the bores yet." So I said "Well OK, it's going to be easier to cut the glass down than to alter all of the metalwork." So we'll cut one glass base down, send it down to the metalwork people, see if they can make it all fit and we're away again.'



fig.12 (left): Hookah pipe base, being blown into a mould.

fig.13 (right): Hookah pipe base, being shaped.

(photographs: Trudie Ballentyne).

Although Mada Trading had originally intended to undertake assembly in Jeddah, it decided due to the product's complexity and the likelihood of breakage, to centralise the entire operation at Nazeing. Assembly, packaging and shipping were therefore all sourced and overseen by Beebe and Royce, with custom-made, preformed polystyrene packaging being manufactured locally.



fig.14: The hookah pipe base, being incised with decorative lines.
(photograph: Trudie Ballentyne).

4.1.4. Analysis

4.1.4.1. project outcomes:

For Mada Trading, the outcome of the project was a product which could be retailed successfully at \$870, and which generated enough retailer interest to result in two repeat orders (see figures 15 and 16).

Frances Lambe attributes the product's success to its virtual immunity to imitation, achieved through a combination of quality workmanship and appropriate design. In addition, in terms of intellectual capital, the company gained new technical understanding of the hookah pipe, unexpected product diversification in the form of the travelling hookah, and a positive working relationship with both Beebe and Nazeing Glass.

For Beebe, the project provided creative fulfillment as well as reasonable remuneration: she felt great pride in the product itself, particularly when one was purchased by the Corning Museum

of Glass. She also derived satisfaction from the professional respect she had gained from Royce and the company as a whole, as well as from the creative process itself. She valued the opportunity the project had created to develop the relationship between herself and Nazeing, thereby opening up new possibilities for future projects as well as reinforcing her network of professional contacts: as she states,

'there's a goodwill gain which is priceless. And if I'm stuck I know that they will help me. And it goes the same with them. If they're stuck, I'll help them. So it's all about that. It's about building up this sort of trust around you.'

On the negative side, she faced her usual problems of lack of security due to her royalty-based fee. She also found the project extremely stressful at times: as she states,

'there were times when I just sat on that step and thought, oh no! oh no!'

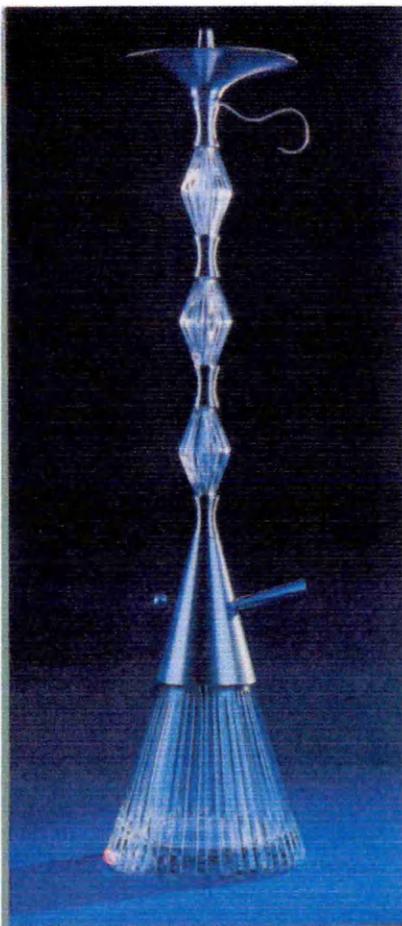


fig.15: Option 1

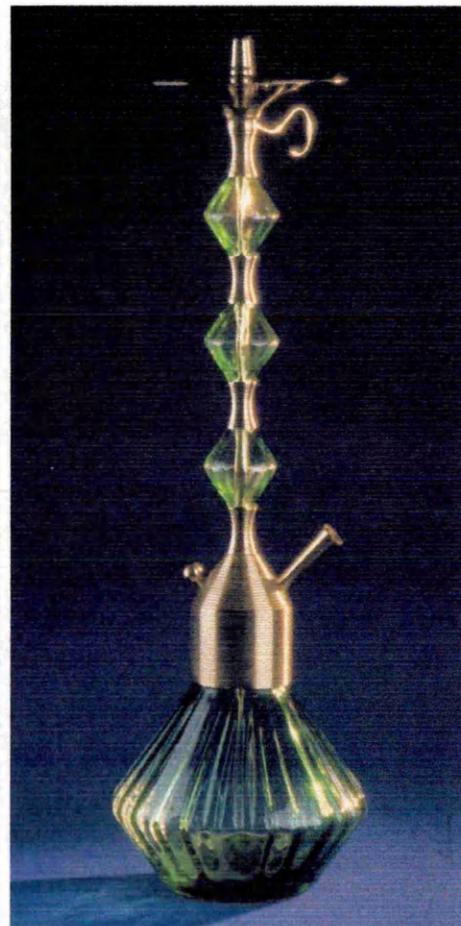


fig.16: Option 2

(photographs: Trudie Ballentyne)

For Nazeing, the project produced 'a top ten product' in terms of profit, despite the relatively small number of units produced. This indicates a high Gross Value Added (GVA), or discrepancy between the amount that the product costs to produce and the amount that it is sold for. This is significant because it confirms the company's ability to derive profit from knowledge, service and design: the company was paid not only for its manufacturing capabilities, but also for the service it offered, the responsibilities it undertook, the research and development work necessitated by the project, and the pro-active approach it took to the whole project. As Royce explains, this is consistent with the strategy it must adopt if it is to survive in current market conditions:

'A lot of glass manufacturers will say, I'm sorry, we'll supply the glass, the rest we don't want to know. Somebody else has to put all the other bits together. Then, the risk for the customer is that if he goes to us for the glass, somebody else for the metal bits, somebody else for the box, somebody else for other little components and they don't fit, everybody blames everybody else. We've had the boxes made, got the metal made, obviously we've made the glass. We've bought the rubber seals and they all fit, so we're totally responsible for the whole thing. And there's not to many people who are prepared to do that. So therefore.... I think it's probably going to be more of this type of work for us in the future.'

Frances Lambe's comments (see 4.1.4.1.) demonstrate that the product's high GVA is also attributable to the uniqueness of the product solution. In this respect, the company also adopted theoretical best practice. As Rhodes and Carter explain, innovations in manufacturing technologies alone afford little competitive advantage, due to their inflexibility and rapid diffusion rates. Competitive advantage must therefore be sought by developing high levels of expertise and problem-solving capabilities across the workforce, and by synthesising the diverse forms of knowledge resulting from this process into products whose subsequent uniqueness offers resistance to imitation. This concept is echoed by other theorists (Ruekert 1995 p.51, Jevnaker 1998 p.120), and its implications for project management explored by others: Reich, for example, describes NPD as a process of 'collective entrepreneurship' (Reich 1991 p.67 – 69).

Both Beebe and Royce believe that through the process of developing the product, Nazeing had developed attributes and capabilities which would assist it in undertaking similar projects in the

future, thereby continuing the shift from commodities to knowledge-based products. In addition, Nazeing had enhanced its reputation and extended its network of associates through its relationship with Jane. As Royce explains,

'It's a small world if you like, the glass people. And a lot of people have said to me, I've got your name through Jane, or I've got your name through a friend of Jane Beebe's. So, it goes around.'

Firstly, the company had added to its own knowledge base, assimilating new knowledge from Beebe, engineers, metalworkers, packaging manufacturers and rubber component suppliers. Foreman Bob Garraway comments that,

'You see, it wasn't really our cup of tea, because it's like studio work, but we got round it, the problems, eventually, and it turned out very well, so we learned something out of it.'

At the same time, it was able to further its capabilities in synthesising existing and new knowledge: in contrast to other projects, the final product was not the embodiment of the designer's vision, but of the various forms of expertise listed above.

Secondly, a degree of cultural shift had occurred. For the first time, positive relationships between a designer and the production team meant that ownership of - and responsibility for - the product could gradually be transferred to its makers, ensuring quality workmanship and willingness to resolve problems. Through communication and inclusion, Beebe's achievements became those of the team as a whole, whose self-image shifted gradually from passive to active participants in the project's success. In a typical project, for example, the production staff would not have attempted to stop the glass from cracking: the problem would have been seen as a design fault which it was not their responsibility to resolve. This was an important development for the company, in terms of realising the latent potential of its workforce: as Pfeffer explains, encouraging involvement and responsibility for decision making amongst employees increases input and commitment. In addition, both production staff and management had developed a respect for Royce, Beebe and their 'hair-brained scheme', which would improve their responsiveness to future projects.

Thirdly, through its collaboration with Beebe, the company had developed a new NPD methodology which produced a strong degree of contextual fit, and which could be applied to

future projects. This would enable the company to progress from the traditional, linear NPD model, with its associated problems of poor contextual fit, to the concurrent, cross-functional approach favoured by theorists. This in turn would allow it to displace the functional and hierarchical barriers which impede the type of knowledge flow required for knowledge synthesis and the release of latent workforce creativity (Rhodes and Carter 1995).

In addition, Nazeing had furthered its alliance with Beebe, developing the interpersonal relationships which are considered as essential as business processes and familiarity, to the establishment of an ongoing association (Spekman et al 1996 p.351). As Spekman et al explain (1996 p.351), the key personnel involved in successful alliances of all types tend to develop personal relationships which transcend the business's requirements. In this case, Beebe and Royce expressed a clear respect for one another's skills and integrity, as well as a liking of each other and of working together. As Royce explains,

'You really naturally stick, and develop relationships with people where they can appreciate the way you work, you can appreciate the way they work, and you work together as a team.'

Combined with Beebe's increasing familiarity with organisational competencies and culture, the development of these interpersonal relationships had thereby laid the foundations for further collaboration. The company had thereby initiated the type of on-going alliance advocated as a means of integrating the design consultant's fresh viewpoint and broader perspective with the in-house designer's familiarity with technological and market requirements (Aldersey-Williams 1996 p.44), and as a means of synthesising design and company strategy (Jevnaker in Bruce and Jevnaker 1998 p.28).

The final project outcome for Nazeing was the trade press which accompanied the product's launch, which was to prove valuable in advertising its newfound skills and flexibility to other potential clients. As Beebe states,

'They've got then to show their clients.... And it was like, well if we can tackle this we can do something else'

4.1.4.2. language and cultural barriers:

It is evident from the case description that the project's success was largely due the quality of the relationships that Beebe developed with all parties involved in the project. By observing and evaluating her client, for example, she was able to interpret his requirements and sense of style. By collaborating closely with Royce, she was able to develop various tactics designed to facilitate the project's acceptance by production staff, from prototyping outside the factory to inclusive decision-making. By working with the production team, she was able to gain the information she needed to balance aesthetic considerations with contextual fit, whilst gaining their support for the project. By seeking advice from a range of engineers and metalworkers, she was able to further her own understanding of the product's functionality. Royce describes her behaviour as 'chameleon-like': as he explains,

'When Jane is talking with the glass blowers, she's got to be one of them. When she's talking to prospective clients who might be directors of a chain of stores or whatever, she's got to be one of them. She's got to blend in.'

As explained in chapter 3, the need to identify and overcome problematic organisational boundaries is recognised as crucial to the success of any cross-functional NPD project (Gunz 1990 p.170). Relationships between designers, managers, technical staff and clients can be problematic, due to differences in experience (Jevnaker 1997 p.2), outlook, objectives, education and cognitive style (Walker 1990 p.145, Becht and Gommer 1996 p.66), as well as discrepancies in levels of motivation (Gunz 1990 p.170). When these cultural barriers are not overcome, the active participation of all parties required to implement change cannot be attained (Moss Kanter 1991 p.59).

Beebe had strong motivations for overcoming these cultural barriers. Her time at Royal Brierley and Dartington had taught her the value of positive relationships with production staff: she appreciated the technical expertise and problem-solving capabilities they could add to product development, and the implications of a lack of co-operation in terms of product quality and even sabotage. She was also aware of the legacy left by other designers with whom the company had worked, and the impact of this on the production team's attitudes towards her. She appreciated that previous designers had presented the team with near impossible tasks, and had demonstrated an arrogance and inflexibility that merely reinforced their negative assumptions. Moreover, she understood from what she describes as her own arrogance and

impetuousness as a young designer, that previous designers with whom the production team had worked would probably have treated them with a lack of respect. The accuracy of this evaluation is confirmed by Royce, who states that,

'The relationship can be very fraught at times. I think the designer has to be very skilled in public relations, because the attitude of a production glass factory shop floor is "bloody designers".'

Appreciating this, Beebe made a concerted effort during her first factory visit to establish positive relationships with the production team. The importance of this approach is highlighted by Royce, who values a designer's ability to work in collaboration above their technical knowledge. As he states,

'You could come in and you could be the most technically skillful person and know it all, and still upset the factory floor. It's more, it's more a willingness to work together as a team, and to put no one person as being more important than the other. The designer is important, as is the guy who's blowing, as is the guy who's cracking it off, as is the guy who's finishing it.'

This process of integration with Nazeing's production staff required Beebe to draw on her experiences of working with production staff at Dartington Crystal. Her understanding of the factory environment allowed her to identify with and accommodate the production team's needs, by causing minimum disruption to the manufacturing schedule, for example, and by resolving technical problems through prototyping rather than in situ. Her experiences of motivating production staff, meanwhile, enabled her to implement strategies designed to transfer ownership and develop pride, by asking for their input and including them in the pre-production meeting, for example.

Establishing and developing her relationship with the production team also required Beebe to draw heavily on her crafts knowledge. Her understanding of the glass making process enabled her to demonstrate an informed interest in the team's work, thereby demonstrating an appreciation of their skill whilst engendering respect for her own expertise. As Royce explains,

'It will seem pretty obvious if someone [a designer] appreciates what you can and what you can't do with glass. And from the factory floor point of view, yes, that is important.'

Beebe's ability to actually manipulate glass, meanwhile, allowed her to work alongside the production team during in-situ testing, thereby demonstrating her lack of the arrogance and detachment they associated with designers. In this respect, crafts knowledge appears to have provided a shared language, capable of overcoming barriers created by functional specialism and culture. As explained in chapter 3, this assertion is substantiated by theorists, who suggest that because crafts cognition resides in physical processes centred on manipulation, it cannot be articulated fully in words (Dormer 1998). In a broader context, it has been suggested that practical knowledge is inextricable from both the experience of practice (Polanyi 1962) and the context to which it is applied (Vygotsky 1962). This suggests that when, as here, individuals with diverse skills yet a shared crafts knowledge work together, the language that they use, which combines physical demonstration with verbal language, becomes a powerful means of integrating tacit expertise.

In several respects, Beebe's knowledge of materials and processes, combined with her understanding of the glass industry, meant that she subconsciously adopted theoretical best practice.

Firstly, Beebe effectively adopted the role of 'product champion', defined as an individual whose emotional commitment to a project is capable of overcoming any type of negativism (Fox 1996). Mapping her methodologies and attitudes onto Sonnenwald's (1996) taxonomy of 'product champion' characteristics reveals that Beebe's championing activities focused on removing disciplinary and personal boundaries. In the disciplinary domain, Beebe combined her own knowledge with new information gathered from outside the design situation – from engineers and metalworkers, for example – to inform the design process. In the personal domain, meanwhile, she facilitated interaction amongst team members, providing support for the production team, instigating their commitment to the project, averting conflict between the various parties involved, and enabling alternative solutions to problems to be identified and evaluated by the team. Beebe also demonstrated many of the characteristics of the 'alliance manager' as defined by Spekman et al (1996 p.354). In terms of 'unteachable' competencies, these included her willingness to consider other people's points of view, her ability to learn from the past without being constrained by it, her optimism, creativity, pragmatism and vigilance. In terms of learned or earned competencies, meanwhile, they included the credibility and respect she had earned from production staff, the industry networks she drew upon, and her social skills, tact and cross-cultural awareness. By championing and jointly managing the

project in this way, she thereby created the interaction between design and other key functions considered critical to the success of collaborative NPD (Jevnaker in Bruce and Jevnaker 1998 p.24).

Secondly, Beebe adopted the role of 'change-master', defined as an individual who is not necessarily more creative than others, but who has the ability to initiate innovation by challenging established beliefs (Moss Kanter 1991 p.54). This is evident in her persistence, her belief in sharing credit for the project, her ability to articulate and communicate her vision with conviction, thereby enthusing others, and her status as a generalist who moves across disciplines, combining personal knowledge with that gained from others.

Questioned on her success in establishing the relationships which generated these outcomes, Beebe is bemused, recognising only that production staff appreciated her being 'prepared to shake the dirty hand'. Undoubtedly, her outgoing personality is an asset in this situation. However, her own comments suggest that her success is attributable as much to learned skills as to inherent character traits: she describes herself 'putting a different hat on' to visit companies, and states that,

'I think it's something you do develop, with a bit of maturity. That you realise that, I mean, the way I do things now is, if you can win over the factory floor first, that's a bloody good start. Because.... I mean I've seen it, they'll wreck a design.'

This statement confirms that Beebe's success in this respect is the result of her developing her observations of production staff into strategies designed to engender mutual respect and co-operation. As she explains,

'I used to get very scared, and I suppose I still hype myself up before I go. I always find it very hard being nice to people all day, and when I get in the car after doing that, I am knackered, absolutely knackered.'

4.1.4.3. the crafts-derived design methodology:

In contrast to Nazeing's usual, linear approach to NPD, where design ends before production begins, here specifications remained provisional until the last possible moment. This is a process of design through making that demonstrates obvious parallels with crafts practice. As

discussed previously (see chapter 3), the craft object embodies a dialogue between its maker's vision and the opportunities and constraints presented by chosen materials and processes. Through their practice, craft makers develop an experiential understanding of these factors, alongside the judgement required in order to resolve their often conflicting demands.

Just as the craft maker operates within a dialogue between intent and craft materials or processes, so here Beebe oversaw a dialogue between intent and the factory environment. Her experiences of working with Neil Wilkin had indicated how sacrificing some degree of control could allow her work to escape the limitations of personal skill, whilst continuing to be informed by crafts knowledge. At Nazeing, the same methods were applied to working with the production team, with observation, reflection and reassessment replacing the linear process that Royce had observed other designers employing. Industrial manufacturing techniques and materials became tools offering new creative possibilities, rather than limitations to the realisation of an aesthetic vision. The factory environment, meanwhile, became a location for testing and refinement through prototyping and testing, where the information gained from the production team could be applied and developed.

The result is a design tailored to accommodate Nazeing's strengths and weaknesses, which stretches its competencies whilst producing an achievable solution. As Royce enthuses,

'The beauty of it is that you're working with a designer who's sympathetic to glass making, and in particular not just glass making, but what we can make and what we're good at.'

By providing this high degree of contextual fit, Beebe adopted the best practice described in chapter 3 (section 3.9). By informing her designs with context-specific information – such as available skills, expertise and technologies – she stretched available resources as described by Jevnaker (1997 p.17), whilst developing a product which was easy to manufacture (see Ingols 1996 p.11). She overcame the problems typically encountered in acquiring implicit organisational knowledge (Jevnaker in Bruce and Jevnaker 1998 p.24), using verbal and bodily forms of communication to counteract the 'icon trap' described by Lawson (1990 p.171).

Typically, a shared verbal language between designer and client requires development through a long term alliance (Bruce and Morris 1998 p.44), rather than a one-off commission. In this case, however, the verbal and bodily languages developed by Beebe enabled her not only to gain support for the project by overcoming cultural barriers, but also to gain context-specific

information and expertise throughout its duration. In this sense, crafts knowledge created new communications channels within the company, enabling tacit knowledge to be explicated and assimilated into design during the course of a single project.

4.1.4.4. influencing factors:

The manufacturing processes employed at Nazeing could be considered conducive to the collaboration's success: effectively consisting of a large-scale, well resourced version of the typical studio workshop, the processes and equipment in use were easily understood by a crafts practitioner. Aspects of the company's culture were also favourable: its managers' appreciation of the need for market diversification, for example, meant that it was willing to invest time and effort in a project which carried an element of risk. In addition, the adaptability afforded by its small size, lack of tradition and project-based approach created an appropriate environment for innovation.

There were, however, less positive influencing factors, centred on the production team's mistrust of designers, and their resistance to change. The crucial factor in overcoming the problems created by these negative factors was the involvement of David Royce, who, in collaboration with Beebe, was able to devise ways of overcoming them and averting conflict.

Royce's description of his own job suggests that he is not only a first point of contact for designers approaching the company, but also an assessor of their designs' suitability for manufacture at Nazeing: even designs with strong market potential are often turned down due to their incompatibility with existing skills and techniques. He bases these decisions on a 'gut feel' which is closely tied in with his experience with the company: as he explains,

'..... you have a feeling sometimes that because you've been down this route before, you might not be able to put your finger on it but somewhere, somewhere in the grey matter something's going, be careful, you've done this before and it didn't work out!'

Once a design has been accepted, however, Royce undertakes a project management role. His approach is consistent with the 'organic' management style advocated as most appropriate for NPD (Oakley 1990 p.332): it is task-oriented, flexible, non-hierarchical, and utilises expertise and knowledge located throughout the company.

Royce's role is, however, also an advocacy one. Evaluating his work in relation to Sonnenwald's taxonomy, he appears to concentrate on championing the product within the organisation, securing acceptance and investment – if only in terms of time - from reluctant managers. He also undertakes an 'agent' role, facilitating interaction amongst all participants, averting conflict, ensuring that information needs are met, defining agendas, retain the group's focus, asking critical questions, and ensuring that objectives and targets met. He also fulfils every criteria for effective alliance management according to Spekman et al (1996 p.354). In terms of learned competencies, he combines organisational knowledge with earned credibility, respect and extensive networks and interpersonal skills including tact and cross-cultural awareness. In terms of 'unteachable' competencies, meanwhile, he brings optimism, pragmatism, pragmatism, a questioning approach, the ability to simultaneously consider multiple points of view, and the ability to learn from past experiences without being constrained by them. He thereby adopts theoretical best practice: as Jevnaker states (Jevnaker 1997 p.16), the involvement of a member of the company's management team in a championing role is a significant influencing factor on project outcome.

The above evaluation suggests that, in this project, Royce and Beebe undertook complementary 'product championing' roles which succeeded in breaking down organisational, disciplinary and personal boundaries. Given the acknowledgement of the impact of championing on the outcome of design alliances (Bruce, Leverick and Littler in Bruce and Biemens 1995 p.175), this may be considered a significant influencing factor in this case.

4.1.5. Conclusion

This case study challenges the view traditionally held by manufacturers of craft makers as inflexible and over-specialised 'artists'. It indicates a boundary-crossing role within the NPD process for the crafts practitioner, who may facilitate the adoption of design methodologies appropriate to changing priorities in the manufacturing industries.

Previous research has documented the imposition of practitioners' designs onto production, the use of practitioners as materials researchers, and the establishment of crafts studios within the factory, in the hope that technology transfer will automatically occur between craft and production (see chapter 3). This new role, however, concentrates on applying the practitioner's skills and knowledge in a new way, actually contributing to the NPD process as well as its product outcomes.

In essence, Beebe's background in craft making - combined with her skills in communication and empathy, and the support of an in-house advocate - allowed the cultural differences that are often encountered by consultant designers and craft makers to be overcome. This enabled active participation to be encouraged from all areas of the company during design development and pre-production. A crafts-based design methodology could then be employed, stressing interaction with the object as it was subjected to the demands of the production line, and accommodating both constraints imposed by the processes and opportunities created by it. The product therefore grew from within the company: by incorporating contributions to design development from both management and factory floor, the final solution became a team effort rather than an imposed vision. This process in effect initiated a feeling of involvement in - and ownership of - the design within the manufacturing company, ensuring high workforce motivation reflected in quality workmanship and a willingness to overcome problems.

4.2. Case Study 2: A.R. Wentworth & Sons Ltd
and Various Crafts Practitioners / Designers

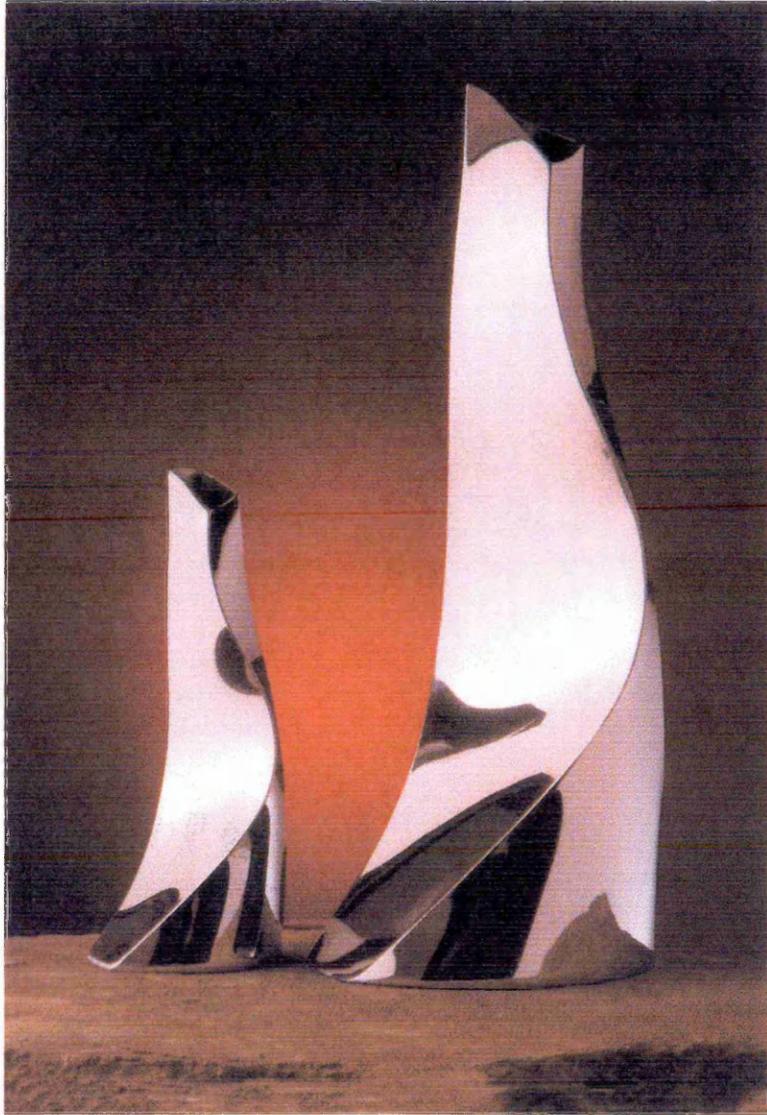


fig.17: vases designed by Catherine Tutt, manufactured by Wentworth and sold as part of Wentworth's 'Design Gallery' range, as well as by the designer.

Interviews were conducted with Richard Abdy (NPD Manager, A.R. Wentworth Ltd) and Stephen Abdy (NPD Manager) at the company's Sheffield offices and factory, and with Sarah Jordan at Jordan Accessories' Bounds Green offices and workshop.

4.2.1. History

A.R.Wentworth Ltd has been operating in Sheffield city centre since 1949, housed in a small, dilapidated factory accommodating around fifty production staff. Its technology and skill levels, traditional NPD strategy and methodology, and vulnerability to changing market requirements and competition are familiar from case study 1.

Manufacturing centres on standard ranges of traditional giftware (figure 18), typically in production for many years, whose familiarity and inherent suitability for existing technology enables high levels of production output. Such products are purchased from the company in quantities of up to two thousand units. New additions to these ranges were typically devised by the management team, often by reconfiguring existing moulds, for example combining an existing vase body with a spout and handle taken from a coffee pot, in order to produce a 'new' coffee pot design. Although this method imposed obvious design limitations, it ensured continuing efficiency, as 'new' designs were always well suited to established manufacturing methods, and their introduction involves no learning curve. Exclusive new product development was occasionally undertaken for individual clients, according to their buyers' specifications: for example, the company had manufactured ranges of 'Macintosh' and 'Art Deco' giftware for specialist retailer Past Times. Such product proposals were generally inflexible and made without consultation, frequently resulting in manufacturing problems and production staff hostility.

Wentworth's customers range from UK high street multiples such as H Samuel, to other manufacturers including Wedgwood, to small, independent jewellery retailers. Its traditional products are also exported to the USA, South Africa, New Zealand and Australia, whilst its 'Design Gallery' range is beginning to become established in the European market. Wentworth does not consider itself to have developed a strong brand identity, and currently exhibits and markets its traditional and contemporary ranges similarly. It attracts new customers by exhibiting at trade fairs, typically the International Spring Fair and the Harrogate Gift Fair, and by its associations with retailers and other manufacturers. Like Nazeing, it advertises in 'Promotions and Incentives', and also in 'Navy News', as well as in trade journals such as 'Gift Buyer' and 'Progressive Gifts' when an editorial feature is offered in return for its advertisement.

Although pewter manufacture has become semi-automated, certain processes - such as spinning and metalsmithing - remain dependent upon the crafts skills gained through a twelve-year apprenticeship, and improved incrementally through experience.

Production workers' tacit knowledge therefore constitutes a core organisational competence. As at Nazeing, this offers a particularly significant source of competitive advantage, when combined with the company's low tooling costs, and the flexibility afforded by non-mechanised manufacturing processes. Within an industry competing increasingly on cost in a diminishing market for traditional products, Wentworth appears well equipped to respond to demands for short production runs, customisation and renewed interest in pewter as a material suited to contemporary design.



fig.18: two tankards from Wentworth's standard 'Sports' range, engraved with tennis and golfing scenes, and featuring novelty handles.

In practice, however, the company's success in strategically aligning existing resources with its changing environment has been impeded by a resistance to change common in materials-based manufacturing companies (see case study 1). Here, as at Nazeing, it is exacerbated by a system of productivity-related pay. A resulting culture of efficiency is reinforced by a high level of job specialisation, which often restricts individual competence to a particular technique. As NPD manager Richard Abdy explains,

'Most of them started at fourteen or fifteen, trained as metalsmiths, spinners, buffers, or polishers, and that's all they know how to do. They look at a piece and say 'I can't do it', because they've done the same tankard for thirty years.'

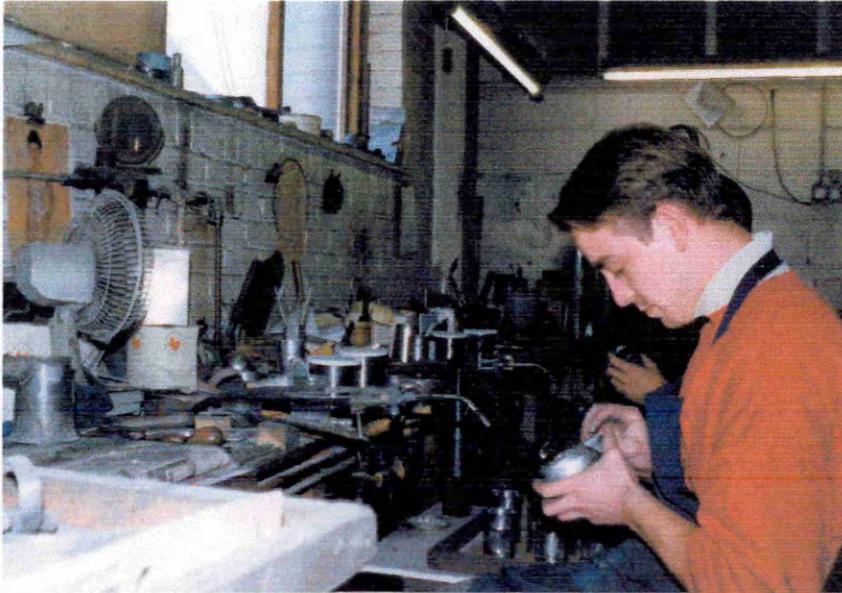


fig.19: Wentworth's metalsmithing workshop.

Together, this resistance to change, combined with the restrictions imposed by productivity-related pay and job specialisation, has traditionally impeded the organisation's learning capabilities, as has its ability to recruit new apprentices for a job where pay compares unfavourably with service industry alternatives. This is an issue of increasing concern: organisational learning, defined by Huber (1991) as the process by which a company expands its potential, is established as crucial in creating the responsiveness required in order to maintain competitiveness in changing markets (Garvin 1993), acting as a means of bridging strategy and existing resources. As explained in chapter 3, its continuing importance is substantiated by current debate on competitiveness, which acknowledges the generation and application of knowledge as essential to economic growth (DTI 1998).

4.2.3. Case Description

In 1989, Wentworth was approached by the first of many independent designers and crafts practitioners, whose objectives were to develop new product ranges through collaboration with

a manufacturing company. As at Nazeing, this was a new approach for a company accustomed to accommodating pre-determined designs.

Crafts-based designers working at Wentworth were discovered to differ fundamentally from existing clients in their approach to product development. Perhaps because of the interdependency of processes and intent inherent to crafts cognition (see chapter 3), greater appreciation was evident of the need for congruence between product specifications and manufacturing resources. In contrast to other clients' inflexibility and detachment, crafts-based designers therefore tended to actively seek context-specific knowledge with which to inform design development, spending time talking to production staff and familiarising themselves with manufacturing equipment.

An integrated approach to design and making had clear potential to overcome the problems that Wentworth often encountered in manufacturing designs specified without any real understanding of manufacturing materials and processes. As Abdy explains,

'What these guys do is they come in, they look around, play about with a bit of metal, and go away and think about it. So what they come back with isn't going to cause us headaches, because it fits our machines and our materials.'

However, early attempts at collaboration proved problematic as, unguided by experience or company protocol, crafts-based designers inevitably prioritised their own needs. When insufficient communication occurred between designer and production staff, the usual problems of inconsistency between specifications and capabilities persisted. Conversely, excessive demands for contact with production staff constituted a distraction from standard production, engendering resentment despite the resulting designs' improved suitability for manufacture. Abdy describes a typical scenario:

'You'd wander round and he'd [the designer] be there and he'd been there all morning, badgering one of the guys. He'd literally draw on the walls. He was there on the guy's shoulder saying "can you put a bit more curve in there? Can you straighten that bit up?" or whatever.'

Production staff were understandably resentful of such interruption, and of its impact on productivity-related bonuses. As more crafts-based designers began working with the company,

the degree of co-operation offered by the production staff decreased: requests for information would receive the response, 'not paid to talk', and new products were even sabotaged by manufacturing schedules which prioritised standard orders. Together with the lack of formal advocacy for product development activities, this meant that crafts-based designers' requirements and concerns were frequently neglected: as Abdy states,

'New products weren't really what we were about. I think in those days, it was very much a case of fitting things in as and when. I know Nick [the first crafts-based designer to work with the company] sometimes had to wait weeks for his stuff to come through.'

In response to its dissatisfaction with the product development process, in late 1996 Wentworth began an informal process of self-evaluation, assessing its strengths and weaknesses, resources and competencies, and position in relation to competitors. This led to the evolution of a resource-based perspective consistent with that described in chapter 3 (section 3.9), which synthesised the company's strategy, structure and project management approach with its environment and existing capabilities.

Self-evaluation revealed that whilst profitability in the company's traditional markets was decreasing, alliances with independent designers begun in 1989 were now generating almost one quarter of annual turnover. The decision to seek further alliances with crafts-based designers therefore centred on the greater profitability and long term gain of catering for markets competing on quality and uniqueness rather than cost. As Managing Director Stephen Abdy states,

'Our belief is that this type of work has got to be the future. These products can command a better price because they are articles of quality and because they have a higher perceived value in the market place. With a tankard, you can make the best tankard in the world and it's still just a tankard, just a commodity.'

The self-evaluation exercise led to the acknowledgement of problems in existing alliances, specifically in relation to workforce culture and the management of external expertise. It was recognised that, without management or structure, project success was largely dependent upon the individual designer's experience, flexibility and interpersonal skills, with each negative experience reinforcing production staff antagonism and unwillingness to co-operate.

It was therefore decided to limit designers' interaction to the newly appointed product development manager, and to two key staff, identified as appropriately motivated and skilled. Both key staff were relatively young, and were considered not only highly skilled, but also to be capable of working on their own initiative. In addition, both had recently approached Stephen Abdy independently, requesting a more varied and challenging role within the company. It was decided that when required, these key personnel could effectively operate as a temporary project team, independent from production line activity and exempt from productivity-related pay. Collaborating closely with crafts-based designers, product proposals could then be redefined as appropriate, before being taught to other production staff. As (Richard) Abdy explains,

'It was all about making it easy for us to get new product [sic] in, by the back door if you like. Our guys on the shop floor had nothing to moan about, because all the problems had been ironed out by Sean and Stevie [project team staff] before they saw anything of it [the new product].'

Wentworth's new approach to NPD paralleled the theoretical best practice described in chapter 3 in several respects. For example, its appointment of a product development manager created a general advocate for product development, a product champion (Moss Kanter 1991) capable of undertaking boundary-spanning roles (Sonnenwald 1996) both within the company and in its external alliances. It is interesting to note that, whereas in case study 1, applying Sonnenwald's taxonomy of product championing roles revealed responsibilities divided between the designer (Beebe) and the sales director (Royce), in this case all responsibilities were adopted by the NPD manager (Abdy). In terms of organisational boundaries, Abdy sought to secure acceptance and investment in NPD projects, ensure synergy between NPD activities and company strategy, and plan and co-ordinate NPD activities to fit with standard orders, thereby reducing resistance to development activity and increasing the availability of staffing resources allocated. In terms of disciplinary boundaries, he brought a new market awareness to the company, whose NPD decisions had previously been sales-driven: as crafts-based designer Sarah Jordan states,

'Wentworth's have a good knowledge of design and where it's headed than PMC [rival manufacturer] do, and that's down to Richard really.'

In addition, Abdy sourced new information from outside the company in response to specific design problems, consulting woodworking manuals, for example, in the hope of identifying a lateral solution to a particular metal-forming problem. In this way, he increased the

organisational capabilities that he refers to as 'our arsenal of skills', and gathered and transmitted information regarding new technologies. In the personal domain, meanwhile, he facilitated interaction within the project team, introducing a non-specialist perspective when necessary: he describes the value of his ability to 'stand back' and to 'ask the stupid question'. In addition, through the provision of a point of contact and an unusually high standard of customer service, the on-going client relationships which are widely accepted as a productive form of design alliance (Jevnaker 1998, O'Connor 1996) were nurtured and further new product proposals encouraged: as he explains,

'It's up to me really, to keep on top of it all and keep up to date with everyone: I just make sure that I'm in touch every couple of months, well every month really, with the big clients, see what people are doing and tell people what we've been up to. It keeps us in their minds and then hopefully they'll come back to us next time they've got a job on.'

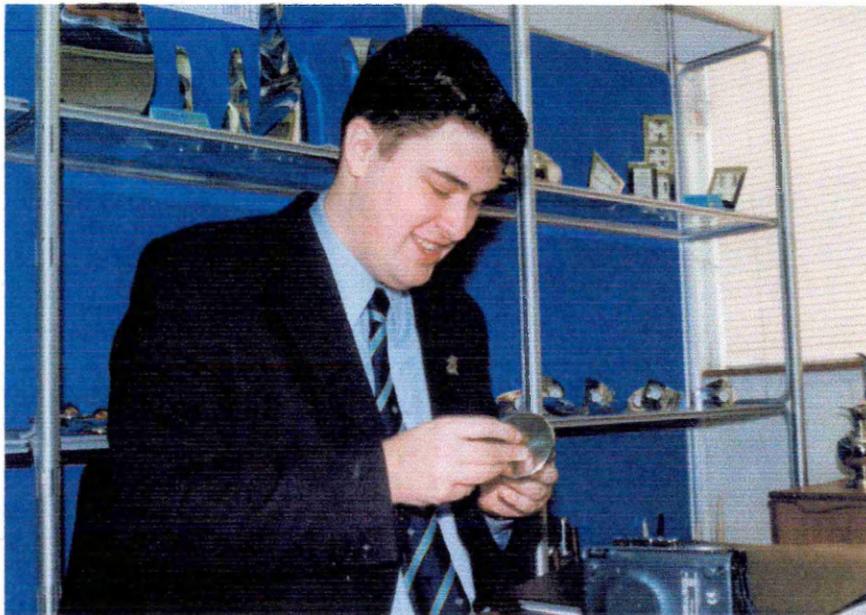


fig.20 NPD Manager Richard Abdy, photographed in the company's showroom.

Across these activities, Abdy displayed skills consistent with those identified by Moss Kanter as essential in championing innovation: tenacity and the creative assimilation of broad experience in problem solving, an ability to communicate vision, active participation in and commitment to each project, and recognition of each individual's contribution (Moss Kanter 1991). Tenacity appears to have been particularly important, as despite the structural changes to the company

and its managers' strategic vision, a degree of resistance to change persisted. As the sole advocate for NPD, commitment and involvement were also important, and Abdy's attitude in this respect is evident in his comments that,

'I always think of them as my products, my customers, my designers.'

Further parallels exist between management theory and Wentworth's approach, in terms of the company's development of an autonomous and task-oriented project team. In its adoption of a differentiated organisational structure capable of accommodating varied goals, time-scales and working practices between its constituent departments, Wentworth's approach is consistent with methods particularly advocated for adapting to changing markets and technologies (see Handy 1993). Comparison with existing models of organisations as learning systems (DiBella et al 1996) demonstrates how the company's new approach effectively transformed its learning capabilities, establishing an environment where attitudes and working practices conducive to innovation could temporarily exist alongside those required to maintain uniformity and efficiency in standard production.

For example, exemption from productivity-related pay meant that evaluation criteria appropriate to the project could be applied (as advocated by Handy 1993), transferring emphasis from output to learning and problem solving. Problems caused in achieving the transition from prototype to product would previously have been considered an intolerable waste of time-based resources. However, in this context, creative conflict could be valued as the chaotic yet essential aspect of innovation described by Tushman and Nadler (1996), presenting an opportunity rather than a threat. Similarly, crafts-based designers' unfamiliarity with manufacturing technology would previously have been derided by production staff, as a sign of their incompetence and of the inappropriateness of their designs. Now, however, it could be seen as a means of challenging assumptions and, when combined with relevant expertise, of implementing the apparently impossible (see Sebell and Goldsmith 1997). Within the project team, a climate of experimentation and openness contrary to that of the production line could be cultivated (as advocated by Handy 1993 and DiBella et al 1996), and initiatives originating from any hierarchical strata encouraged (see DiBella et al 1996): as Jordan explains,

'They've got young people that are open-minded and creative, and they're willing to try out ideas and different ways that they've never thought of using before. They'll give it a go and see if it works.'

It is evident that the managerial-level commitment to product development signified by investment in technological and human resources influenced attitudes throughout the workforce. Together with the establishment of a project team, it led to the development of a systems perspective (DiBella et al 1996), whereby the dynamic and interdependent nature of production line and project team activities could be acknowledged and more effectively managed. This is illustrated by Abdy's description of his relationship with production managers:

'It's different at this time of year because I've been told, you know, no product development for six months because we're just too busy, which is fair enough as long as I know that. But at the same time I can go to our production manager and say look, it's building up again, I really need Sean [project team member], just to clear the backlog. Whereas before it was just a case of, 'sorry, go away, we're not taking anything on while [until] February', so it was just stupid.'

4.2.4. Analysis

Wentworth's development of a new approach to product development succeeded in overcoming the problems encountered in its initial collaborations with crafts-based designers. However, by introducing conditions conducive to innovation, new and significant potential was also revealed for crafts knowledge as a strategic resource.

4.2.4.1. innovation:

Product proposals made by crafts-based designers were typically found to be clearly defined in terms of the product's aesthetic qualities and 'feel', yet flexible concerning precise techniques and forms. Because of the synthesising of materials, processes and intent characteristic of craft making, negotiation between such variables appeared not only to be accepted, but also to be valued as a catalyst to creativity (see Butcher in Johnson 1998, Johnson 1998).

Given conditions appropriate for innovation, this crafts-based cognition now revealed unexpected potential as a communication tool, enabling a two-way negotiative dialogue to be established between crafts-based designer and project team member. This dialogue has proved crucial in stimulating organisational learning, through its capacity to challenge assumptions and

indicate discrepancies between manufacturing potential and existing capabilities. Abdy explains the benefits of introducing a new perspective, enabled by the crafts-based dialogue:

'What these guys [crafts-based designers] give us is the fact that they turn round and say, 'yes you can do this. Because I'm not trained as long as you have been, I haven't been trained in just one side of working metal like you are, look, I can produce this.'"

As explained in chapter 3, this type of creative conflict is considered vital in stimulating organisational learning through its indication of a 'performance gap' to be bridged (DiBella et al 1996), and was recognised by Abdy as a means of creating new competencies. However, its benefits can easily be nullified by the need for ease of manufacture, which imposes restrictions based on perceived limitations and encourages design within existing capabilities. At Wentworth, the two-way nature of the learning that occurred is apparent from crafts-based designer Sarah Jordan's comment, that,

'We pushed them to get more adventurous in what they'd try out, and at the same time they gave us technical stuff like they have to be this thick for the pewter to run through the gap, or they can't be too thin or too thick or too heavy, else you get all the porosity. So the second time round they were much better, it was a lot easier to get the new products through.'

Collaboration through the actual processes and materials of manufacture resulted in a gradual assimilation of new knowledge by the crafts-based designer, establishing industrial methods as a creative tool rather than a constraint. In this way, the apparently contradictory aims of maintaining creative conflict whilst improving appropriateness for manufacture could co-exist. Success in this respect is illustrated by Wentworth's relationship with Jordan, who approached the company following the termination of her alliance with PMC. The difference in attitude between the two companies in this way is evident in Jordan's comment that,

*'They're [Wentworth] open-minded and creative, they're willing to try out ideas and different ways that they've never thought of using before. They'll give it a go and see if it works.....And they **will** solve the problem.'*

4.2.4.2. knowledge synthesis:

Having created the impetus for innovation, the continuing employment of a crafts-based dialogue was instrumental in formulating product solutions which both resolved problems through a synthesis of available expertise, and accommodated the objectives of both designer and production staff. The process allowed designs to be redefined as appropriate and cost-effective for manufacture, whilst maintaining the particular aesthetic and tactile qualities characterising the original product concepts.

By employing a crafts-based dialogue, innovation is encouraged to occur at the interface between crafts-based designer and key production staff. The dynamic relationship between process and intent can be explored collaboratively, through a dialogue centred on the object and articulated through parallel verbal articulation and practical demonstration. This process of two-way negotiation is illustrated by Jordan's account of her work with the project unit:

'If we're coming up with something new then they'll say, "could you maybe change this a bit and that'll make it easier here. Wiggle this little bit here and make it a bit thicker here."'
'Somebody will say "I can't join this to this", and maybe the subtleness of saying "hmm, well have you thought of maybe doing this and this?" and they'll say "hmm, good idea"' or "hmm, but ah then there's x that can be brought in"', and that will achieve the same final effect.'

This integration of expertise has resulted in technological innovation: for example, one crafts-based designer discovered that by encasing fibreboard blocks in pewter sheet, the vocabulary of shapes available in the material could be extended. The process has also found product applications for existing technology, for example the employment of a recognised yet unused technique of embedding pewter with steel in strengthening a wine bottle stopper and thereby improving its function. As Abdy explains,

'There's so much redundant, or seemingly redundant, equipment in the factory, that we can use again, because whilst it was used for one product twenty years ago and hasn't been used since, it's still relevant.'

Further benefits have resulted from the employment of the crafts-based dialogue as a means of problem solving. For example, the identification of 'capability gaps' that it made possible has

led the company to initiate external alliances with materials suppliers and casting specialists: as Jordan explains, rather than admit defeat, the company will initiate an alliance with a company with complementary capabilities. Jordan's description suggest that these alliances have been managed skillfully: as she explains,

'Wentworths can get in the people when they need them, so if they want somebody who understands how to make big moulds they can go to the guy and get the guy in that understands how to make big moulds, and he doesn't upset the guy who's good at making little moulds.'

The alliances also appear to have been commercially effective: particularly strong competitive advantage has resulted when such an alliance has complemented technological innovation, as in the case of the pewter wrapping technique, which benefited from an alliance with a fibreboard manufacturer. This represents a significant development from the company's previous strategy for skills acquisition, which had been to buy out these companies, rather than to collaborate with them.

In addition, the collaborative process enabled by the crafts-based dialogue has encouraged production staff to develop their own product ideas, several of which now contribute to the Design Gallery range: Sean Bellamy's range, for example, were inspired by experiments with surface pattern conducted in the course of assisting a crafts-based designer (see figure 26). Finally, the process has highlighted and found new applications for crafts-based designers' knowledge of allied specialisms, such as tool making and market awareness: as Abdy explains,

'We're looking at where we can sell the Design Gallery collection, and she [Jordan] was able to give me an awful lot of information about the Japanese market and the American market. So we learnt a lot from her in that way.'

Jordan agrees that the collaboration has effectively constituted a two-way learning process, and describes her willingness to share her market awareness and knowledge of particular design courses, in recognition of the company's interest and investment in her.

The collaborative process also enabled design progression to be embodied in tangible form, thereby releasing it from participants' personal knowledge, and providing accessibility to others throughout the company. This had several beneficial effects. Firstly, it encouraged the

'legitimate peripheral participation' described by Lave and Wenger (1990). Jordan describes how both the company's sales director and its owner became involved in the development process, whilst Abdy explains that,

'Sometimes I'll see the guys are stuck on some problem. And sometimes, because I'm seeing it fresh, I can see something that they can't. And then we can sometimes find a solution that's so obvious that they can't see it.'

In addition, the collaborative process established a culture conducive to innovation (see DiBella et al 1996, Peters and Waterman 1995), encouraging the experimentation considered common amongst innovative companies (Peters and Waterman, 1995). Thirdly, by manifesting mistakes as well as progress it legitimised failure, fostering a climate of openness considered important in facilitating organisational learning (DiBella 1996).

In each of these ways, by facilitating the communication and integration of tacit knowledge, the company optimised its resources, creating new knowledge-based competencies, and producing products whose embodiment of diverse expertise provides resistance to imitation. As explained in chapter 3, products embodying an integration of diverse expertise are increasingly recognised as a source of competitive advantage, due to their uniqueness and subsequent insusceptibility to imitation (Rhodes and Carter 1995, Ruekert 1995, DTI 1998). By assimilating heterogeneous fields of expertise and embodying them within the product, Wentworth accrued a particularly strong competitive advantage (Rhodes and Carter 1995). By fostering creative interaction between designers and key staff, it succeeded in attaining the integration which is considered essential to this process (Jevnaker 1998 p.120), yet notoriously difficult to attain (Nanda in Moingeon and Edmondson 1996).

4.2.4.3. knowledge dissemination and stabilisation:

As explained in chapter 3, the effective dissemination and institutionalisation of new tacit knowledge is recognised as crucial to the development of the learning organisation, yet inherently problematic (Edmondson and Moingeon 1996, Spender in Edmondson and Moingeon 1996). The incommunicability of such knowledge constitutes a potentially powerful source of competitive advantage, as its resistance to verbal encoding impedes imitation by competitors. Paradoxically however, such incommunicability is equally capable of restricting

the transfer of new knowledge within the organisation, preventing its actual implementation to core activities (DTI 1998).

Such problems may be expected to be exacerbated when, as at Wentworth, product development is undertaken by project teams. It is evident that the temporary and autonomous status of such teams, whilst facilitating actual innovation (Handy 1993, Peters and Waterman 1982), may impede sustained learning across the organisation, due to their separate status (Jevnaker 1998).

At Wentworth, crafts knowledge played a crucial role in committing the new knowledge generated through product development to the collective organisational memory. A crafts-based language similar to that occurring between crafts-based designer and project team member was now employed between project team member and production staff. Abdy describes this process of concurrent demonstration, verbal articulation and imitation:

'Sean and Stevie [project team members] will sit down and show the guys how they did it, demonstrate it to them, then they can have a go for a bit until they're confident, and then we'll make the thing. With Scott [trainee spinner], Sean will stand over his shoulder for a bit and say 'you're doing this wrong, you're doing this right', whereas with Mick and Brian, who've been here thirty years, just a couple of illustration spinnings and they'll get it.'

In this way, new knowledge can be transferred directly from project team to production staff despite its resistance to verbal or written articulation. Whereas verbally conveyed learning is commonly stored as informal narrative (see Spender in Moingeon and Edmondson 1996) or documentation, in this case learning is encoded and stabilised in production workers' crafts knowledge.

This institutionalisation of new knowledge allowed incremental improvements through use, application to the demands of new projects, recollection following a period of non-use, and conveyance to outsiders and newcomers. In addition, the directness of the crafts-based language minimised the distortion of information considered detrimental to learning on an organisational scale (Edmondson and Moingeon 1996) through its avoidance of verbal encoding and decoding. It is evident that crafts knowledge has the potential not only to create organisational learning, but also to assist in its implementation.

The division of organisational learning into two stages, addressing knowledge generation and implementation as separate processes, was initially developed solely as a means of remedying problems encountered during the company's initial alliances: as at Nazeing, it was considered advantageous to identify and address problems prior to the product's introduction to the production line. However, further and unexpected advantages have resulted from the dissemination process in terms of increased production staff competencies. According to Aaby, the challenge and variety introduced by NPD activities has stimulated gradual yet significant learning amongst younger production staff, improving both technical competence and problem-solving capabilities. In the longer term, it is possible that by involving project team members and finding new applications for their skills, entrenched attitudes towards progress may be challenged in the manner asserted by Jordan (1997). This assertion is substantiated by Jordan, who states that,

'I think initially they [the production staff] thought "oh my life", but now I think because they've made them umpteen times the people on the shop floor know, they get a sort of pride out of it because they've actually achieved and now can see the final product.'

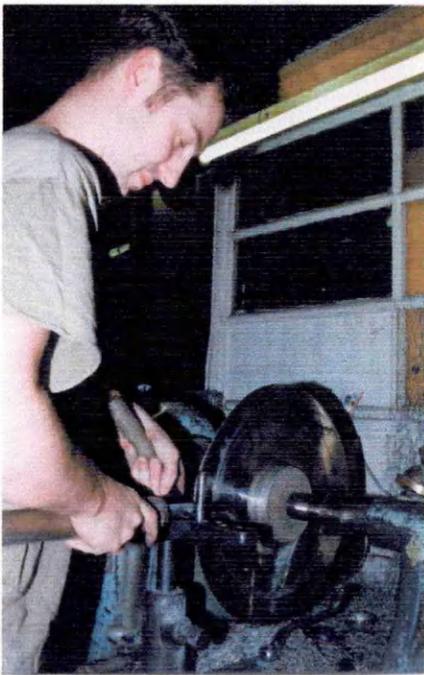


fig.21: Apprentices are trained as metalsmiths, spinners, buffers or polishers. Here, spinner Sean Bellamy works on a tankard.

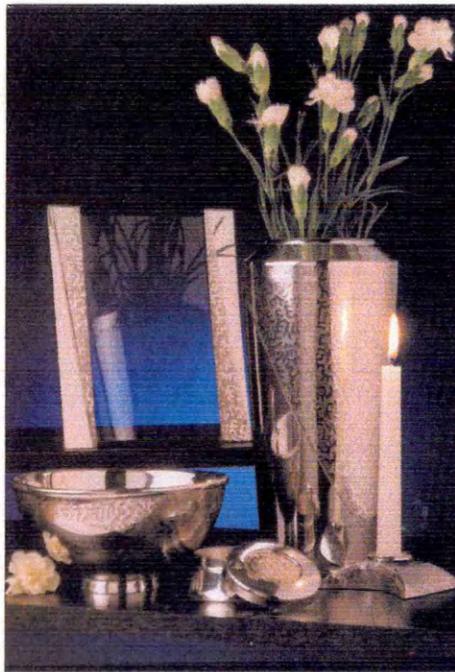


fig.22: A range designed by Bellamy for Wentworth's 'Design Gallery' range, resulting from his involvement with the NPD team

4.2.4.4. project outcomes

The key outcome from Wentworth's alliances with crafts-based designers has been the development of a product development process capable of explicating, synthesising and exploiting existing hidden capabilities, whilst simultaneously creating, disseminating and institutionalising new tacit knowledge. The learning stimulated by this process represented significant strategic gain, expanding organisational knowledge centred on technical competencies and problem-solving capabilities. As explained in chapter 3, because such knowledge is unique, derived from experience and essentially incommunicable, it is considered a strong source of competitive advantage (DTI 1998, Edmondson and Moingeon 1996, Collis in Edmondson and Moingeon 1996).

Through its alliances with crafts-based designers, Wentworth has established competitive advantage based on the intangible, knowledge-based assets of responsiveness, flexibility and quality. In the context of increasing price-related competition, such capabilities now enable the company to command higher profit margins in recognition of its products' knowledge component. In an industry characterised by inflexibility and resistance to change, the ability to accommodate unique demands represents a source of competitive advantage that is both valuable to clients and unique. As Abdy states,

'We can now tackle just about anything. There's no project or no product that scares us too much. There's no job that we'll turn away, and there's actually very few jobs that we fail on.'

Wentworth's new capabilities are not infallible: Jordan received one delivery of salt and pepper pots with no base, and one batch of vases with stands, which had distorted to such an extent that their function was compromised. As Jordan states,

'The first batch they made was appalling, everything went back.'

Overall, however, quality standards have improved exponentially, and the company's new approach may be considered to have significantly enhanced its new problem-solving capabilities and flexibility. In addition, customer service is considered efficient enough by its clients to remedy problems without significant inconvenience: in the case of the goods mentioned above, for example, replacements were made and delivered within two days. Jordan

values the company's openness in its dealings with her, and Abdy's ability to appreciate her perspective: as she explains,

'Wentworths are always really happy to come down here [to London]. They'll phone and say you know, "well look, we can ship out these pieces now but we've got a van coming down to London tomorrow, and you can have these other pieces as well, what would you rather do?" And I'll say "oh, wait til tomorrow", and they're more than, they'll drive themselves to the house to deliver stuff.'

The company's overall development is illustrated by its successful completion of the commission undertaken for Jordan, which involved developing 100 new products from designs originally made by hand in silver. The need to reconcile pre-determined designs with manufacturing capabilities and to accommodate a different material and scale of production to that originally envisaged proved problematic, as will be seen in case study 3. However, the devising of new applications for existing technology and the sourcing of external expertise allowed manufacturing solutions to be devised for 99 of the proposed products, including 4 of the 5 designs originally considered unsuitable for manufacture. The significance of this achievement is demonstrated by case study 3, which documents a failed relationship between the same designer and a rival manufacturer.

The impact upon competitiveness of Wentworth's new, knowledge-based capabilities is evident from an analysis of company accounts, which show the contribution to turnover from sub-contracting work gained from independent designers to have risen from 1.2% in 1989 to over 25% in 1998. The actual number of alliances, meanwhile, reached 39 in 1998.

Crucially, new product development has been affected to a lesser extent than standard production by the national 1997-1998 downturn in productivity. Moreover, development work has not, according to company managers, detracted from standard production, but represented an additional contribution to revenue. Potential for further growth is signified by the actual number of independent designers sub-contracting manufacture, which since Abdy's appointment in 1996 has risen from four to thirty-one. Given the company's commitment to the development of on-going alliances, a high proportion of these may be expected to develop further.

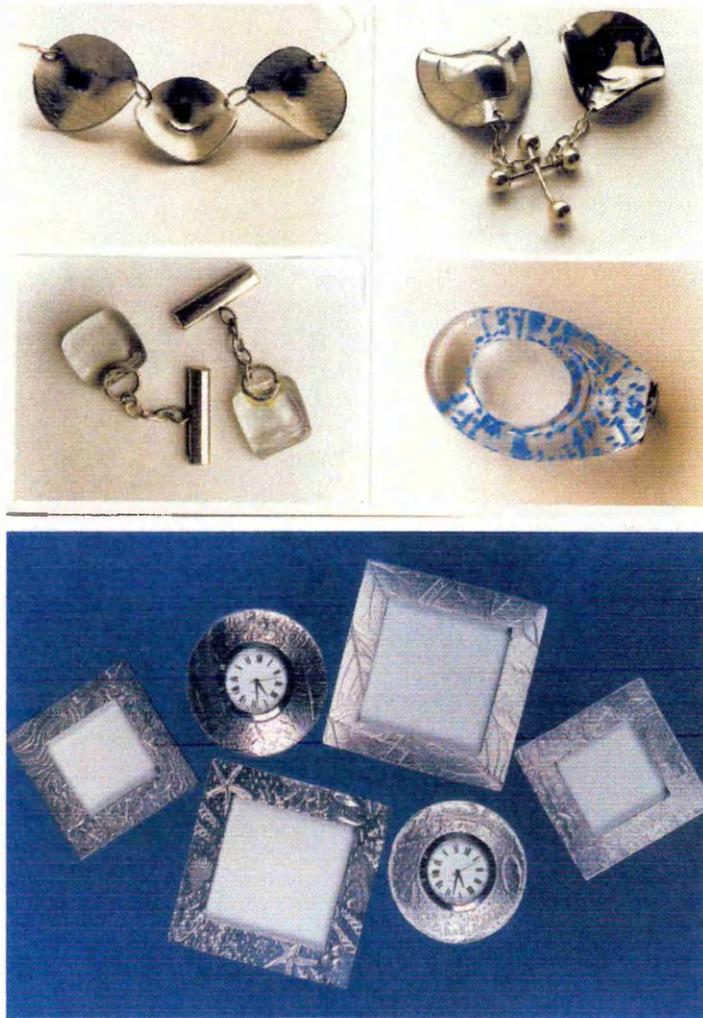


fig.23: Products manufactured on behalf of independent designers and crafts practitioners.
 Top: jewellery for Kathryn Thexton-Flint.
 Bottom: picture frames and clock surrounds for Multiply.

Collaboration with crafts-based designers has also increased Wentworth's competitiveness as a supplier to retailers. In addition to its traditional products, it now manufactures the 'Design Gallery' ranges, including products sourced from both independent designers and production staff (see figures 17, 22 and 24).

By manifesting its new organisational knowledge in a tangible form, the new ranges have attracted exclusive commissions from retailers including The Conran Collection, which operate in Wentworth's target market and are prepared to remunerate knowledge-based competencies. They have also created new opportunities in continental Europe, a market where Wentworth's

traditional products had never been retailed successfully. Due to their uniqueness, quality and design, the new ranges command high profit margins, which doubled their contribution to turnover between 1994 and 1997. Together, increasing subcontract work, orders for the Design Gallery ranges and exclusive commissions have resulted in a predicted fifteen per cent increase in turnover this year, comparing favourably with an estimated thirty per cent general downturn in productivity in the pewter industry.

A further benefit of the new ranges, according to Abdy, is as an illustration of the company's increasing learning and technical capabilities. As he explains,

'People come and say, "I can't believe you can do that. I want something a little bit more mundane, but as you guys are capable of doing that, you're bound to be capable of doing what I what.'"

4.2.5. Conclusions

This case furthers the understanding of the role of crafts knowledge in the NPD process developed in case study 1. In particular, it reveals the extent of its potential impact in terms of creating, disseminating and stabilising new organisational knowledge.

It explicates the processes underpinning the shared language identified in case study 1, explaining how a process of concurrent demonstration, imitation and articulation facilitates the communication of ideas directly through the manipulation of materials and objects. It also describes how, through this language, innovation is encouraged to occur at the interface between design and manufacturing, allowing creative conflict to be maintained, functional objectives to be upheld and solutions developed from a unique configuration of expertise. In essence, it demonstrates how this language may create the impetus for innovation, provide a means of achieving it, and optimise its potential by facilitating dissemination and stabilisation.

As chapter 3 explains (section 3.9), the need for congruency between organisational strategy, structure and resources is a commonly recognised influencing factor on NPD outcome. In relation to the integration of crafts knowledges, however, it appears to play a particularly significant role. The case description demonstrates that the dialogue identified as crucial in stimulating organisational learning cannot be established within a culture where priorities for efficiency impede creative experimentation. Here, the establishment of conditions conducive to

innovation proved crucial to success, both in the fulfillment of existing objectives and the identification of further strategic potential. The implications for similar companies in the crafts-based industries are significant, given their apparent similarities in terms of workforce resistance to change and its negative effect on strategy implementation.

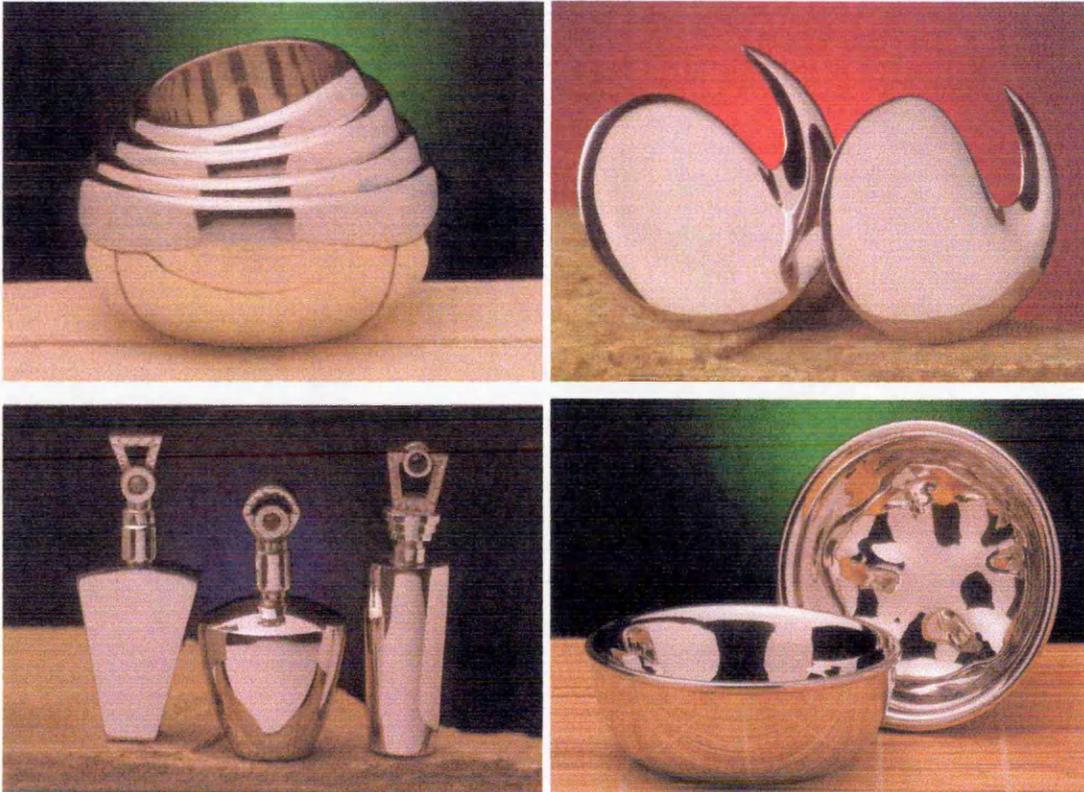


Fig.24: products from Wentworth's 'Design Gallery' range.

Top left: interlocking bowls by Ruth Curtis.

Top right: paper cutters by Alan Pickersgill, now amongst Wentworth's best selling products.

Bottom left: perfume bottles by Carol LeGresley.

Bottom right: bowls by Karen Roper.

Finally, the case has enabled connections to be made between theories of organisational learning and crafts cognition, and actual practice, and their generalisability evaluated. The company's iterative development of strategy, resources, capabilities and structure substantiates the established importance of a resource-based perspective in determining organisational approaches to product development. It may therefore be asserted that those methods documented should not necessarily be adopted literally by other companies, but adapted or replaced in accordance with specific circumstances. The self-reflective nature of the company's approach to strategy formulation does not however preclude generalisability, as where the

problems and resources which determined the revised strategy are replicated, the methods described would potentially form an appropriate basis for reorganisation. Antagonistic company culture and problems in the management of external expertise are common to other skill-oriented companies, as are similar market pressures and potential strengths in the provision of added-value products. Moreover, the methods themselves cannot be considered unique or in themselves revolutionary, but consistent with theoretical best practice in the management of innovation.

The establishment of an autonomous, highly motivated and task-oriented project team, overseen by a manager with boundary-spanning and advocacy capabilities, may therefore be considered a model which, with appropriate adaption to circumstances, has broad application in overcoming resistance to change in the crafts-based industries. Combined with recognition of crafts knowledge as a synthesis of cognitive, social, technical and aesthetic skills, crafts-industry collaboration has the potential to transform skill-oriented manufacturing companies into learning organisations, which derive new competitiveness from knowledge-based capabilities.

4.3. Case Study 3: PMC Hadrien International Plc. and Sarah Jordan



fig.25: silver jewellery designed by Sarah Jordan, intended for reproduction in pewter by PMC.

Interviews were conducted in Bounds Green, London, at Jordan Accessories' offices and workshops, and at the PMC factory in Darnall, Sheffield. They involved Sarah Jordan (Jordan Accessories), Gill Wood (Managing Director, PMC), Peter Howard-Jones (Chairman, PMC) and Tony Houldsworth (Marketing Manager, PMC) of Hadrian PMC International. Access to PMC production staff was restricted: one short interview was permitted, with an employee with poor command of English, and in the presence of Gill Wood.

4.3.1. History

4.3.1.1. designer:

Sarah Jordan runs Jordan Accessories in partnership with her brother, from a building housing her home, office and workshop in Bounds Green, London. The company, which specialises in silver jewellery (see figure 25) and giftware, employs two recent graduates to assist with manufacture, and subcontracts certain casting and finishing processes to specialist workshops. It sells to quality retailers such as Heals, The Conran Shop and Oasis, and via agents located in Japan and the US. Jordan is the company's only designer, and its main point of contact in

alliances with manufacturers. In managing the business she draws on experience gained during a two and a half year period of employment as a jewellery designer, during which she learned business related skills including market awareness, administration procedures, marketing, and client liaison.

Jordan's involvement with craft making began at Middlesex Polytechnic, where she undertook a BA course in jewellery and silversmithing. Her description of the course suggests that it encouraged self-expression through the development of crafts knowledge: although 'it was all self-expression work', the exploration of materials was intrinsic to the development of a personal style or 'voice'.

This crafts-derived methodology remains central to Jordan's way of thinking and working: guided by an initial idea, she works in dialogue with the materials, allowing their particular characteristics to influence the form. As she explains,

'As a designer modelling with the thing in your hands, it's moving and changing direction, and you have to be able to flow with it rather than trying to force what might have been in the 2D sketch. It won't necessarily work, so you have to be able to listen to that, to flow.'

The need for self-expression through making is another strong influence on Jordan's work: she is motivated by a desire to produce objects which embody her personal sense of style. Her business is structured in a manner conducive to realising this ambition: she does not accept briefs from clients, but instead produces a new collection each year, which is presented at trade events such as London Fashion Week, and from which buyers select appropriate products.

Jordan evidently values her own creative vision as a major source of competitiveness for the company: as she states, 'people have always come to me for my style.' In addition however, her comments suggest that design and production are essential to her sense of personal fulfilment. This is reflected in a definition of 'good design' which excludes market and manufacturing knowledge: for her, good design requires originality, innovation, functionality and finally, producing designs which are 'not so difficult to manufacture'. This connection between self-expression and self-fulfilment appears fundamental to Jordan's creative development. Fostered during her degree course, it was reinforced by the experience of employment, which left her feeling confined: she states bitterly that,

'if a client wanted a range of swirly rings then you did a range of swirly rings; you just did what they wanted.... After the 2 years, I knew I could never work for somebody again! Because they were working within much stricter confines than I wanted to, I wanted to do my own thing.'

Jordan's decision to establish Jordan Accessories resulted directly from this sense of frustration, and from the subsequent recognition that her creativity was inseparable from a sense of personal integrity which made designing for others seem too great a compromise. For her, therefore, the business can be said to represent creative liberation, and a means of achieving artistic and personal fulfilment.

The importance attached to this notion by Jordan is evident in the commitment and personal sacrifice she has made in establishing the business. As she states,

'Considering I was so poor, I'd say I am definitely motivated by the design side of it. Because you work so hard for so little reward, I'd say that if you were motivated by money you'd have given up years ago.'

Jordan had previously employed out-workers and specialist workshops in Hatton Garden to undertake certain aspects of the metal finishing process. However, she had no knowledge of pewter, and had not realised that it was available in sheet form, or could be soldered. Moreover, she had never felt that the making process had been delegated: as she says, in these alliances the process was 'basically under our own control.' She had always felt that her sex and class prevented her from being taken seriously in these relationships: as she explains,

'[it's] a female thing. I mean... I went into a shop to buy some tools and the guy in there said to me, 'oh what do you want those files for love? Your nails?' A lot of people will just presume that we [women] just don't know what we're talking about.'

4.3.1.2. manufacturer:

PMC is an established mass manufacturer of pewter ware (since 1969), located in a large, well maintained factory in an industrial district of Sheffield. The company employs approximately 35 production staff. Its core business is in traditional style commemorative and corporate giftware, including tankards, trays, hip flasks, boxes, clocks, decanters, goblets and vases.

These products are easy – and therefore cheap – for the company to manufacture. This is due partly to the parallel development of design and technology and the resulting high degree of contextual fit. However, it also reflects the specialist nature of the production staff's expertise: each team member is highly skilled in applying a certain technique to forming the metal into a particular shape.

The company undertakes all manufacturing processes in-house, unlike Wentworth (see case study 2), which sub-contracts processes which are beyond its own capabilities. The core processes, spinning, casting and polishing, are only semi-mechanised and remain reliant upon craft skills, although some new machinery was being introduced at the time of interview. Manufacturing is large scale and rapid, and the company is a major supplier of promotional agencies, and retailers including Ratners, H Samuel, Debenhams, Timpsons and House of Fraser. The company also benefits from a large scale contract with Jack Daniels, which places annual orders of around 34,000 promotional hip flasks and giftware items.

PMC markets itself under the brand 'Sheffield Mint', using a traditional-style logo which combines a navy blue background with silver lettering. Its marketing strategy for 1998 is not recorded, although it is known that the company exhibited at the International Spring and Autumn fairs.

Sixteen months prior to the interview, in December 1996, PMC had been purchased by Hadrien International plc, a company also operating a factory in Newcastle-upon-Tyne which produced pewter, silver plate and cut crystal giftware. PMC's new managers faced the challenge of regaining profitability, in a market where diminishing market demand was forcing rival manufacturers to continually cut profit margins, in order to compete on cost. However, they were new to the industry, and lacked experience in NPD. Wood and Howard-Jones had a successful track record in managing mergers and acquisitions, and described their expertise to rest in 'turning ailing manufacturing companies around'. Houldsworth, as former Marketing Director of Dartington Crystal, was the only team member with experience of NPD. Although she had been assigned responsibility for NPD, Wood had no knowledge of design or innovation.

The need to stabilise loss had led the managers to introduce short term rescue measures, including redundancies and short-time working. This had been followed, according to Jordan, by a spate of voluntary redundancies. Productivity-related pay was also introduced at this stage

but later abandoned, due to its negative impact on workmanship. In the longer term, the new managers had begun devising an NPD strategy, intended to break the price wars by manufacturing added value products with higher profit margins. They identified two market opportunities for contemporary pewter: modern, 'female-oriented' products such as perfume bottles, and contemporary versions of standard products, described by the chairman as 'a tankard that a young person will want'. Company image was seen as important: Wood described the need to be seen by the trade press as 'becoming design-led'.

This strategy represented a significant departure for PMC, as the small amount of NPD undertaken previously had been limited to re-configuring existing components, as described in case study 2. As at Wentworth, the key barrier to innovation had been a lack of the capital needed for investment in design and new tooling, and for cushioning the impact on production rates of introducing new products.

There was some evidence of tension between PMC's managers and production staff. Many production staff had, according to Jordan, left the company since its acquisition: as she states,

'A lot of PMC employees are now working at Wentworths. They've actually left within the last year, there's been quite a flow of people between the two. Quite a few left voluntarily. Quite a few got sacked too, well, made redundant!'

The existence of tensions was confirmed by Wood's criticism of those employees remaining as apathetic and lack interest in their work: as she states,

'They could take a bit more pride from time to time, certainly in the finishing area... I mean that sounds a bit derogatory I know, but there is a certain mindset in Sheffield, where let's have the easy task.'

However, Wood also claimed that reactions to the new strategy had been positive: the company's problems were apparently understood by every production staff member, as was the need to move up-market. She believed that by introducing the strategy, she had articulated implicitly held fears for the company's future. Moreover, she appeared proud that she had offered the staff the opportunity of a more fulfilling lifestyle: as she explains,

'It's natural really, because it's far nicer to work on a beautiful piece than to churn something out on the machine where you don't have to do anything. It's far more satisfying, and they feel the same.'

In interview, the managers emphasised their belief in the importance of communication across hierarchical strata. Both Wood and Howard-Jones claimed to be in daily contact with production staff, to actively seek an open relationship with them, and to operate an 'open door policy'. As Wood explains,

'I always go around the shop floor and talk to them [production staff] in any case, you know, chat about the new products.... We do make a point of speaking to each one. We do that regularly.'

In reality, it appeared that Wood was not as familiar with production staff as her comments suggested. During our tour of the factory floor, one employee commented that,

'We don't see you for weeks, then we see you twice in a day!' to which Wood retorted,

'When I give you pleasure, I give you a lot of pleasure.'

This exchange highlights the infrequency of Wood's contact with production staff, thereby contradicting her previous statement. In addition, the intentional use of innuendo suggests the existence of a power hierarchy which cannot be considered indicative of the 'open' relationship that Wood and the other managers had described. Wood's relative unpopularity with production staff was confirmed by Howard-Jones, who suggested that the staff found her 'a bit home counties', preferring to deal with him because of his working class background.

The managers had undertaken design activities only once prior to their involvement with Jordan, engaging metalworker Jacqui Sneyd to design a range of womens' giftware. This project had followed a linear format, with the design being completed on paper without prior consultations with production staff. The process cannot be considered to have been successful, as the prototyping stage had revealed problems in relating manufacturing costs to the product's perceived market value. This had resulted in the designs being drastically altered: costs had to be reduced by saving materials through size reduction, and by saving labour through the

elimination of certain decorative processes. Despite this failure, the managers had not considered adopting a different approach for the company's alliance with Jordan.

4.3.2. Starting Point

Jordan's aim at the project's outset was to reproduce 100 of Jordan Accessories' existing silver products, in pewter. Her objectives were three fold. Firstly, she wanted to decrease the unit cost of her products to a level acceptable to retailers, and had calculated that mass manufacture in pewter could reduce wholesale prices by 75%: as she states,

'The retailers always really liked the shapes in silver, but they just couldn't afford to buy them.'

Secondly, she wanted to delegate production of these ranges, allowing herself time to concentrate on 'creative' work such as NPD and silver jewellery production. As she explains,

'The idea was to be able to just hand things over to the factories and it would just turn up with us and we'd put it in a box, and then we'd send it out to the customer.'

Thirdly, Jordan required the high standards of workmanship expected by her existing clients: increasing profit margins meant decreasing prices, whilst maintaining quality in terms of form, finish and accuracy to her original designs. As she states,

'...it is a cheap material, but cheap quality is definitely not what we are aiming for. It's design integrity.'

Like Jordan, PMC's managers appeared to have had multiple motivations for undertaking the project. Firstly, the job offered a cash flow boost which the recent staffing cuts indicate was urgently needed. Secondly, it presented an opportunity to begin implementing the company's NPD strategy, through association with a designer with knowledge of its new target market and established relationships with leading retailers.

4.3.3. Case Description

4.3.3.1. pre-production:

Jordan identified PMC by consulting the Pewterers' Association's index of manufacturers. An initial meeting found the company managers enthusiastic about her ideas, and confident in their capacity to fulfil her requirements.

Early on, Jordan was given a tour of the manufacturing facilities. It is evident from her description that she did not see the visit as an opportunity to learn about the factory's unique characteristics: as she explains,

'All the machines they were using I was familiar with, we had them all at college. I mean casting, I'd done tons of. I understand the casting process, I understand the spinning process.'

During our interview, Jordan displayed a lack of interest in discussing this initial visit: she talked dismissively of 'being taken on the factory tour', and of 'just (wanting to learn) whether it would be possible to have the things made at all.' She had not used the opportunity to seek advice from production staff: as she states,

'We did it blind really. We just came up with the shapes and took them.'

PMC's managers did not encourage communication between Jordan and the production staff, but introduced her simply by name, without any explanation of the reason for her visit. They accepted the commission without consulting technical staff: despite their lack of experience of pewter manufacturing, they chose to base their decision on their own examination of the original silver products and wax masters. A relatively high price was agreed, reflecting the products' complexity in relation to PMC's standard products.

4.3.3.2. production:

Major problems began on commencing production, when it was found that certain designs required 'drastic alteration' in order to be manufactured. These products included a shaving set whose components could not be made to fit together, and salt and pepper pots whose stoppers did not fit. Other products suffered from quality problems: often, subtly engraved lines were lost due to hurried finishing. Many other products suffered aesthetically, as pewter failed to replicate the qualities of silver which had originally defined their character. A T-shaped vase -

for example - appears forced, its delicacy and precision eradicated by pewter's poor definition of edges and corners. In some cases these problems prevented Jordan from fulfilling existing orders, leading her to fear a loss of credibility with buyers. PMC's habit of delivering late orders directly to retailers – thereby bypassing Jordan's quality control system – was also a cause for concern: as Jordan explains,

'What really concerns me is that I keep getting stuff off them which is poor quality, so if they're delivering stuff direct to House of Fraser that's the same quality, then that's going to look really bad on me.'

Attempting to resolving these production and quality issues required Jordan to make weekly visits to PMC. The frequency of these visits engendered a resentment evident in Jordan's comment that,

'I actually spent a lot more time than I thought I'd have to, visiting them and communicating via phone and fax.'

The managers also appeared resentful, finding difficulty in understanding why Jordan would not compromise on design and quality in order to improve profit margins and ease of manufacture. Wood suggests that Jordan had unrealistic expectations of the material, and that her designs were poorly suited to pewter and its associated manufacturing processes. As she explains,

'...we're having a few problems at the moment, because.... she wants it absolutely top quality..... You get a better finish with silver than with pewter, which is a little more coarse.'

Jordan attempted to resolve these problems by working directly with production manager Peter Atkinson, who she considered to have a strong influence over the manufacturing process: as she explains,

'I've gone over and talked with him a lot actually, about the way that things are made, and try to get him to understand how they should come out in the end, because he's the one who walks around the workshops and checks that they're all making everything alright.'

When this strategy failed to improve product quality, Jordan proposed resolving these problems by according responsibility for certain products to particular members of the production team, thereby allowing them to develop skills and raise quality standards. She also suggested that her brother worked alongside production staff until quality standards had been well established. Both strategies were initially agreed upon by PMC's managers, but never implemented, thereby causing further resentment from Jordan.

According to Jordan, her own dissatisfaction with product quality exacerbated the resistance she had felt from production staff since the project's outset. She had always felt uncomfortable, 'being a woman, working with very Northern, sexist men', and was aware of class divisions between herself and the production staff. Now though, she felt that she was being deliberately kept away from production staff, due to her potential to cause friction. As she describes the situation,

'At the moment it's sort of like Sarah Jordan's a bit of a bad name around the place. Trouble with this, trouble with that, rejects this for bad quality, they don't want you to be seen, else you might get punched or something.'

In contrast, marketing manager Tony Houldsworth states that the lack of communication between Jordan and PMC's production staff was no fault of the company. Instead, he blames Jordan's decision to 'maintain an arms' distance relationship', and to see herself and the production staff as specialists in separate fields, with distinct and separate responsibilities. Like many other companies (as discovered by Bruce, Leverick and Littler in Bruce and Biemens 1995 p.172, Cooper and Jones p.95), he believed that frequent communication was a pre-requisite for effective NPD.

As the project progressed, customer service emerged as another problematic area of the alliance. Difficulties were encountered in placing orders, in identifying the reason for delays and in specifying delivery times. Transparency was also an issue, as Jordan felt that she had been deceived regarding both the company's acceptance of her initial order, and the prices that she was expected to pay: as she explains,

'If they can't make something or they don't want to make something, they just don't touch it and they don't tell you that they're not going to do it either.'

A lack of flexibility was evident in the fact that PMC would always insist on holding meetings in Sheffield, in contrast to Wentworth, who were willing to travel to London. In addition, orders were cancelled at the last moment and delivered directly to retailers instead of to Jordan, thereby preventing her from undertaking quality control checks. For Jordan, these problems were symptomatic of an attitude of indifference: as she states,

'PMC will very, very rarely do you favours. They will do you what they consider to be a favour when they've had something for two months and I've got the deadline that Friday, and I've gone absolutely ape shit to them. Then it will turn up on the Monday. Following the Friday.'

Relations between Jordan and PMC's managers were put under strain by these manufacturing and service problems, and by the subsequent attribution of blame. They deteriorated further when Jordan located a press release, stating that she was undertaking exclusive design work for the company: when questioned about this incidence, Wood countered that the press release had been misinterpreted. Jordan was not satisfied with the response, however, and resented what she perceived as the use of her name to enhance company credibility, particularly considering PMC's lack of commitment to the relationship. As she explains,

'They want something for nothing, basically. That really pisses me off.....they lie, basically..... they want the kudos of having us, but they don't want to put in the effort.'

4.3.3.3. postscript:

PMC entered receivership in May 1999, and was subsequently bought out by its employees. The Sheffield Star of May 20th 1999 reported Mike Frizelle, head of the local trade union which had provided capital to support the initiative, as stating that,

'There had been serious problems at PMC for many months, and we ended with a workforce that was demoralised and demotivated under a regime that clearly did not value them. The chance to prove themselves again, with themselves as shareholders, has rejuvenated them.'

4.3.4. Analysis

4.3.4.1. project outcomes:

At the point of interview, a small number of products were being manufactured by PMC. However, Jordan had halted any further work until manufacturing problems could be overcome, and had found an alternative supplier in A R Wentworth Ltd (see case study 2). PMC stated that they were investigating how Jordan's demands could be accommodated by making alterations to manufacturing systems, but were not hopeful of finding a solution.

It is clear that each party had failed to fulfil the other's expectations. For the designer, the alliance had proved more demanding than she had anticipated, whilst failing to meet her requirements for quality, design integrity and low unit cost. PMC had gained the desired press coverage, with articles published in FHM and Tableware International, but had failed to secure the repeat orders and further development required to generate income.

Little organisational or individual learning can be considered to have resulted from the project: the only legacy was a further entrenchment of resistance to designers amongst production staff. Interpersonal relationships also deteriorated during the course of the project. Jordan was mistrustful of PMC's managers, especially Wood: as she states,

'I don't have much contact with Gill Wood any more. I don't actually like Gill Wood.
[whisper]'

Jordan clearly lacked respect for both the management team's motivations and the capabilities of their production staff. The managers, whilst more diplomatic, appeared frustrated with Jordan's commitment to 'design integrity' and unconvinced of her abilities as a designer.

Wood: *'We're having to look at ways of adapting the process and the finishing to satisfy her needs. Now to be honest, I don't know whether we ever will.'*

Jordan: *'Until we can actually get the things going through I'm very, very loath to continue. So in that respect I'm actually halting design.'*

The problems in the relationship between Jordan and PMC may be attributed to three major causes: poor contextual fit, poor problem solving capabilities and deteriorating interpersonal relationships. It is evident from the interviews that each party believed the other to be primarily responsible for these problems. Because each interviewee's narrative reflected their own agenda – the managers, for example, had a need to portray a positive company image in interview – it is impossible to confirm or deny their beliefs, or to establish a hierarchy of influencing factors. Such an analysis would not in any case be desirable: in order to understand the influencing factors on project outcome, it is necessary only to appreciate that this particular combination of circumstances produced this particular outcome.

4.3.4.2. contextual fit:

As explained in case study 1, the problem of poor contextual fit is common to many NPD projects, and can be particularly acute in the materials-based industries, where both resistance to change and cultural differences between designers and production staff can be severe. Lack of contextual fit was evidently a serious problem in this case: its effects can be seen both in both the quality problems encountered in manufacturing, and in the deterioration of inter-personal relationships between Jordan and the company.

Clearly, design for contextual fit demands a high degree of cross-functional collaboration: a product is unlikely to match manufacturing capabilities and market requirements without a constant flow of information and cross-functional evaluation. However, neither Jordan nor PMC's managers appeared eager to approach the project in a collaborative manner. Jordan resented and minimised her visits to the factory, and did not attempt to communicate with production staff or to discuss her ideas. PMC's managers, meanwhile, accepted her 'arms distance approach', failing to involve production staff in meetings or to introduce them to Jordan during her tour of the factory. Such detachment opposes models of best practice for managing business alliances advocated by theorists. It appears that the appreciation of roles and responsibilities, awareness of needs and responsiveness to them, effective communication and commitment necessary for successful collaboration (Cooper and Jones p. 95) are only made possible through professional and social interaction over a significant period of time. (Jevnaker 1997 p.5, Spekman et al 1996 p.351)

Closer examination reveals that behind each party's non-collaborative approach lies a combination of influencing factors.

In Jordan's case, it appears that these factors centred on her objectives, her lack of experience, and the nature of her creativity. Her lack of experience of working with manufacturers certainly had a significant impact on her attitude towards collaboration. Firstly, it meant that she was inexperienced in thinking from the client's perspective: a common problem, according to Becht and Gommer (1996 p.66), considering that designers are essentially creative, emotive, 'right-brain' thinkers who must adopt a more rational, analytical, 'left-brain' cognitive style in order to communicate effectively with their clients.

Secondly, Jordan's lack of experience meant that she was unaware of her own lack of context-specific technical expertise, and of the need that this created to gain knowledge from others. For example, she was unaware of the pewter's particular characteristics and their influence on functionality, form and surface. As she states,

'silver and pewter look very similar when they're finished, so if you were to make a model in silver you'd have a very, very good idea of what it's going to be like in pewter.'

This belief – which interviews with other makers suggest was a misapprehension – meant that Jordan saw no need to seek information relating to materials from PMC. Similarly, because she recognised and believed herself to understand most of the factory's machinery from her experiences at college, she saw no need to gain information relating to manufacturing processes.

Lack of experience may also explain Jordan's apparent unawareness of the potential contribution that production staff could make to design development: according to Wood, Jordan saw design and manufacturing as separate activities, conducted by specialists with different roles and responsibilities. She later stated a belief that 'if I could get them onto my side it would be good, yes, definitely very beneficial.' During the project, however, she saw no need to engage with people whom she neither liked nor respected: to her, production staff were simply implementors, fabricating her designs but not contributing to them.

Jordan's objectives for the project also contributed to her lack of collaboration at the specification stage. Because her designs had already been received positively by retailers and orders taken, she was eager not to alter them in any way, other than to decrease their cost by manufacturing in pewter. She was also eager not to spend more time than necessary at the

factory, as her secondary objective was to shift the emphasis of her own work from manufacturing standard products, to developing new ones.

It may be asserted that the very nature of Jordan's creativity – and her creative self-image – also contributed to her non-collaborative approach.

On a commercial level, Jordan's belief in her own creative vision as a major source of competitiveness for her company, indicates that any 'compromise' to it could appear to threaten sales. On a personal level, meanwhile, her comments (see 4.3.1.1) indicate that she shares the fundamental need for self-expression considered characteristic of creative people, who tend to derive self-esteem primarily from the work that they are judged upon (Fletcher 1998 p.27). For Jordan, it may therefore be speculated that 'compromising design integrity' represents not only a commercial threat, but also an unwelcome compromise of self.

Jordan's attitudes may be considered indicative of a creative self-image based on the 'romantic' stereotype described in chapter 3 in terms of volatility, perfectionism, introversion, absent-mindedness, stubbornness and egocentricity (Fletcher 1998 p.25). As chapter 3 explains, this type of creative self-image can impede the teamworking and communication demanded by cross-functional collaboration (Fisher 1997 p.14).

It is explained in chapter 3 that the type of creative self-image adopted by the individual reflects not only their inherent character traits, but also their experiences as creative professionals. This finding is borne out by the case study data, which demonstrates fundamental differences in creative self-image between Beebe and Jordan. It may be asserted that whilst, like other 'commercial creatives', Jordan and Beebe were both motivated by the opportunity for self-fulfilment (Fletcher 1998 p.73), the nature of this self-fulfilment was very different for each of them. Jordan's creative self-image reflects her need for self-expression (developed during her degree course) and her dislike of designing outside of her own personal style (developed during her employment). Beebe's creative self-image, meanwhile, reflects her discovery of the creative potential inherent in collaboration (through working with Neil Wilkin), and in adopting available skills and technologies as creative catalysts (through working at Dartington Crystal). Beebe now considers her frustrations at Dartington Crystal to have been largely attributable to the 'preciousness' and 'arrogance' she considers herself to have displayed early in her career: as she explains,

'The argument that used to come to me was, "how can somebody with no training qualifications judge what I do? What right have they to criticize what I do? I'm the one that knows, I'm the one that's got the MA." I used to be so arrogant, because what does the man in the street now? And that's ultimately where you're work's going to be, to be chosen by somebody who hasn't even got, they buy it because they like it!'

PMC's managers did not attempt to compensate for Jordan's non-collaborative approach: as the case description shows, they neither consulted production staff themselves before accepting the designs for manufacture, nor encouraged dialogue between them and Jordan.

One interpretation of this behaviour is that it simply reflected the managers' lack of experience of the pewter industry, NPD management and the company itself. As relative newcomers to the industry, they may have failed to appreciate the difficulties in translating a design made for manufacture in silver into pewter, and therefore to have seen technical consultation as unnecessary. Similarly, as the company's new owners, they may not have recognised the inflexibility of its manufacturing processes, or the resistance to change evident amongst its workforce. As relative newcomers to NPD, the managers may not have appreciated the impact upon project success of collaboration and contextual fit, or developed the skills and attitudes required to support it. Theorists (see chapter 3, section 3.9) suggest that design managers differ from general managers in terms of their adaptability, flexibility, situation-specific decision-making (as opposed to a rule-based approach), goal-oriented planning, reflection, and team-based problem-solving capabilities. Even their cognitive style is considered different: it is acknowledged that rational, analytical, 'left brain' people, managers have to learn new ways of thinking, in order to work successfully with designers (Becht and Gommer 1996 p.66).

Another possible explanation of the managers' non-collaborative approach is the formal manufacturing procedures and highly mechanised management style traditionally employed at PMC. As explained in chapter 3, industrial operations are typically rational, standardised, and predictable, with accurately timed operations producing identical products (Oakley 1990 p.332). Creativity and initiative are not usually developed within the production team, and all work is closely controlled for maximum efficiency. The management of these operations is usually hierarchical and inflexible, devised to support stable, consistent manufacturing activities. This environment poses significant problems in introducing NPD activities, with their irrational and unpredictable nature, and their need for flexibility. It is possible that, lacking the experience necessary to devise solutions such as those found in case study 2, PMC's managers decided

simply to introduce the products to the production line, rather than undertake any developmental work.

The managers' objectives for the project may also have influenced their non-collaborative approach. Their need to improve cash-flow may have made the risk involved in excluding production staff from the consultation process appear to be worthwhile, due to the short-term cost savings it created. Their need to realign the company as design-led, meanwhile, may have made them eager to avoid the objections likely to be raised by production staff at this stage.

Finally, the managers' non-collaborative approach may also be partly attributed to their perception of the designer's responsibilities. As the case description shows, these perceived responsibilities included design management: both Jordan and Beebe (see case study 4) determined for themselves the nature of their relationship with production staff and the way in which the project was managed. Perceived responsibilities also included the assimilation of context-specific information relating to materials and processes. This attitude is evident in Wood's belief that providing context-specific information was not her responsibility, but 'more a matter of choosing the right designer'. Despite theorists' assertion that clients have a responsibility to formulate and communicate their needs to designers (see Williamson et al 1996 p.80), Wood's comment implies a criticism of Jordan's design capabilities. However, it also suggests that both parties' failure to clarify roles and responsibilities created confusion: whereas Wood expected pro-active information-seeking from Jordan, Jordan did not see information-seeking as necessary to NPD. This assertion is substantiated by Cooper and Jones (p.95) and by Bruce, Leverick and Littler (in Bruce and Biemens 1995 p.173), who discovered through empirical research that establishing realistic objectives and responsibilities before the project commences is crucial to its success.

Aside from lack of experience and their failure to clarify roles and responsibilities, it is possible that PMC's managers' non-collaborative approach to NPD was influenced by their need to generate cash flow. This may have meant that speed in reaching production was a priority, and one which they imagined could be compromised by holding discussions and negotiations with production staff.

As stated previously, Wood was critical of the production team's desire to maintain familiar work practices. It is therefore perhaps understandable that she believed consultation could result in rejection of the project, whereas an accepted order would offer an incentive for

production staff to overcome technical difficulties. This assertion is substantiated by Jordan's admittance that,

'if we had really spoken with them [production staff], I don't think we'd have ever done it.'

4.3.4.3. problem solving capabilities:

As the case description shows, many of the fabrication, functionality and quality difficulties encountered during manufacturing were never resolved. As explained above, this was partly attributable to poor contextual fit: Jordan herself acknowledges that her limited knowledge of pewter was responsible for problems such as a bottle stopper failing to function because it was too soft. However, it may be asserted that the difficulties this created were exacerbated by poor problem solving capabilities.

Jordan's approach to the project, once her designs had been accepted by PMC's managers, was one of low involvement: Houldsworth criticised her adoption of an 'arms' distance relationship', and Jordan herself expressed frustration at the need to deal with the company, even by telephone or fax. Her disappointment is understandable, considering that the managers had assured her of the company's capacity to fulfil her requirements. Now, the products' 'integrity' – or total consistency with her original designs – appeared to be under threat every time that a problem occurred or an alteration was made. Moreover, she feared that her aim of spending less time working on standard products, and more on prototyping and one-off pieces, would be compromised by any time spent in negotiation.

Clearly, the difficulties presented by Jordan's objectives for quality and delegation were exacerbated by the conflict between them. As case study 1 shows, high standards of workmanship and accuracy to specifications are most achievable when the designer is closely involved in NPD and the early stages of manufacturing. In this case, however, Jordan apparently expected high standards without any ongoing collaboration with the company. Again, this can be attributed to her inexperience, combined with implicitly held beliefs regarding roles and responsibilities: as stated previously, she saw herself as the 'creative' and the factory as the 'implementor'. She seems to have assumed that, having accepted her designs, the company was capable of reproducing them without input from her, and that having delegated responsibility for manufacturing to the company, there would be no need for on-going involvement.

Jordan's testimony does not, of course, support this assertion, but attributes blame to PMC. As she states,

'They want to have an understanding, like desperately, they want to be able to make small, design-led pieces, but they very little understanding of how to go about it.'

In particular, Jordan criticises the management team's failure to grasp her objectives. In her view, this was evidence of short-termism, of their desire to reap the profits resulting from 'becoming design led', but without investing time in developing understanding of her target market, its need for high quality manufacturing and finishing, and the implications of this for the company. As she states,

'They saw the project as being something completely different, and they saw that they could make a lot of money out of it, but then once they'd actually seen that, seen the pound sign, they stopped.'

As evidence for this lack of market understanding, Jordan cites differing perceptions of appropriate press coverage and retailers. Whilst she favoured press coverage in Vogue and retail in the style-oriented Heals and The Conran Shop, Wood was targeting PR activities at trade journal Tableware International and encouraging Jordan to approach budget jewellers Ratners.

Jordan's main contention, however, appeared to be with the managers' selective understanding of the concept of added value, which she attributes to their commercial background. Jordan expresses her frustration in recounting an ongoing argument between herself and the management team:

'I'd say pick up this ashtray, and they'd say, "oh, that's a one quid piece of pewter", but I wholesale them – it's a set of three – at £25. And trying to get them to understand that people will actually pay for something that's completely thought out and considered for the angle that it's being sold at... they'll go 'yes, but's only worth one quid', how can you? Different mentality that you have to work with, for them to understand that it's um, a Nichole Farhi thing as opposed to a Mr Byrite thing.'

This poor comprehension of her target market evidently affected product quality: Jordan complains that whilst the managers were happy to accept the high fee that she was willing to pay for quality workmanship, they did not convey her requirements to production staff. As Jordan explains,

'The people at the top, they work out the prices, but the guy down at the bottom who's making it still thinks it's a 25p thing, and so doesn't give it the attention, whereas I'm actually paying £5 for it.'

According to Jordan, this problem was compounded by a lack of initiative amongst production staff: she believes that the technical difficulties and quality problems encountered at this stage could have been overcome, had the staff been prepared to challenge conventional methods. Jordan suggests that this problem was due both to a skill deficit and an unwillingness to resolve problems, due to a resistance to change and interpersonal difficulties between herself and the team. As she states,

'With a subtle loosening of the factory I think [enunciated as 'I know'] the technical restrictions could have been overcome.'

Jordan's comments also suggest that Wentworth's solution to irresolvable problems – to develop alliances with specialist suppliers – was inappropriate here, in a working environment characterised by fear of redundancy:

'The guy who makes big moulds will get really upset if they bring in a guy to make little moulds.'

In evaluating these criticisms, however, it is important to remember that the project marked a significant departure from the production staff's usual work. Producing new shapes was in itself demanding, considering the high degree of specialisation to which they were accustomed, and the familiarity of the standard product range. The high standards of craftsmanship required were also demanding, in an industry where practical skills have been eroded by increasing commoditisation (see chapter 3). In addition, the problem-solving capabilities demanded in order to resolve the manufacturing problems resulting from poor contextual fit, had not previously been a job requirement.

For the production staff, the criteria by which their performance was evaluated had shifted, from output and efficiency to quality of workmanship, interpretation and problem-solving. This not only presented a challenge to their capabilities, but also a threat, heightening the pressure to perform caused by job insecurity.

4.3.4.4. customer service:

The issue of customer service highlighted in the case description may be considered further evidence of a short-term approach to NPD: for PMC, the company's needs in terms of image and immediate cash flow were more important than the development of the goodwill required to establish a long term alliance.

There was clearly a lack of willingness to anticipate or respond to Jordan's needs as a client, particularly in comparison with Wentworth, who – as explained in case study 2 – were willing to hold meetings in London and to stretch delivery schedules. In addition, at the time of the interview Jordan had been attempting to finalise a contract with the company for seven months, but had been continually hindered by complicated bureaucratic procedures and 'buck-passing': as she states,

'They can't seem to or they won't give up an hour of their day to actually sort it out, and I've been up to Sheffield umpteen times.'

There was also evidence of a failure to establish the administrative systems needed to support both the small, sporadic orders required by a small, independent business, and the large contracts to which the company was more accustomed. For example, Jordan believed that several of her orders had been delayed by poor planning: as she explains,

'They'll start to process a big order on the Monday when they want it on the Friday, although they've had the order in the office since February. And they'll send it through on the first of June, because they'll suddenly see that the deadline's there. So then all the little things they have to do, like my order, get side-tracked.'

4.3.4.5. interpersonal relationships:

The mutual trust and respect acknowledged as essential to any business alliance (Spekman et al 1996 p.351, Bruce, Leverick and Littler in Bruce and Biemens 1995 p.174) disintegrated gradually throughout the project. Jordan admits to disliking Wood, whom she accuses of deception and dishonesty in relation to the press release incident. This dislike was exacerbated by her frustration with the poor customer service she received, and by her belief that this was due solely to a lack of effort. Underlying these criticisms is her sense that the managers had lied in order to gain her order, and failed to fulfil their obligations to her as a client.

PMC's managers, whilst less personal in their criticism, expressed a lack of respect for Jordan's professional capabilities, claiming her to be unrealistic and demanding, and criticising her perfectionism and unwillingness to compromise. Her dislike of spending time at the factory was seen as unprofessional, as was her failure to pro-actively seek context-specific information. According to Jordan, her personal appearance was also interpreted as unprofessional: as she explains,

'If you're talking about the difference between me and a guy in a suit, then I think they'd take the suit more seriously.'

This lack of recognition of her professional status was in itself a source of frustration for Jordan, who exclaims that,

'In actual truth I am a damn sight more professional than they are, and if I get an order I'll do a delivery date and it'll be there. Absolutely on that delivery date, not an hour late, it'll be there. If I say something then I absolutely honour it, you know if I have to work through the night, through the weekend whatever, I will absolutely deliver. So, for them to doubt my professionalism, really it's a joke.'

Relations between Jordan and the production staff also became increasingly strained as the project progressed, with the initial lack of respect between the two parties being compounded by the stress resulting from the manufacturing problems. Jordan believes that production staff bore the brunt of the managers' ill-informed decision to accept her designs for manufacture: as she explains,

'They'll [the managers] say "yes, yes, of course we can make it", and then they'll probably kick and scream about it, you know, the people down in the craft workshops, they can't do it, and they'll say "well you've got to do it" and they'll say "but we can't do it", and so everything gets a bit stubborn'.

This statement suggests that, in order to mask their incompetence in accepting Jordan's design for manufacture without consultation, the managers attempted to transfer blame for manufacturing difficulties to the designs themselves. This assertion is substantiated by the managers' portrayal of the designer as a stereotypically stubborn and egocentric artist, and their care in articulating the connection between her lack of communication with production staff and problems in meeting her requirements.

In any case, the loss of trust and the ensuing deterioration of interpersonal relationships had serious implications for the project, fulfilling Spekman's prophecy that the collapse of either commercial or interpersonal activities inevitably signals the demise of the other (Spekman et al 1996 p.351).

4.3.5. Conclusions

It is evident from the above analysis that the primary problem afflicting the alliance between Jordan and PMC was the lack of appropriate project management, manifest in poor contextual fit, problem solving capabilities, customer service and interpersonal relationships.

Of the four cases documented, this is the only one in which no individual adopted a product championing role. In case study 1, championing was undertaken by the designer and sales manager in collaboration; in case study 2, it was the responsibility of the NPD manager; in case study 4, it was undertaken by the designer alone. In this case, however, there was no-one to break down organisational and disciplinary boundaries, to facilitate interaction between the individuals involved, or to bring relevant knowledge from outside of the situation in order to address emerging problems. In addition, no individual was responsible for clarifying the roles and expectations of each party, for ensuring high standards of client care, or for questioning the products' acceptance for manufacture.

This is also the only company documented, in which the mechanistic nature of the manufacturing systems was not recognised, and no strategies were devised to overcome their

incompatibility with NPD activity. At Nazeing, initial prototyping was undertaken away from the factory and careful motivational tactics were employed; At Wentworth, meanwhile, a separate project team was established in order to maintain both standard production and NPD. Here, however, new products were simply launched onto the production line.

It is evident that the inappropriate project management resulting from a lack of experience and company knowledge, combined with idealistic objectives and misperceptions of design expertise, can cause poor contextual fit, poor problem solving capabilities and deteriorating interpersonal relationships.

This is substantiated by a comparison with case study 2, in which Jordan was one of the many crafts practitioners and designers who enjoyed positive relationships with Wentworth. At Wentworth, the NPD management system in operation actually encouraged her to adopt a crafts-based methodology, thereby enabling her to benefit from the capacity of crafts knowledge as a language to solve problems which appeared insurmountable at PMC. The acute differences between her experiences of working with the two companies, in terms of problem-solving and customer service, is evidence of the impact of management style and strategy on project success.

4.4. Case Study 4: PMC Hadrien International Plc. and Jane Beebe

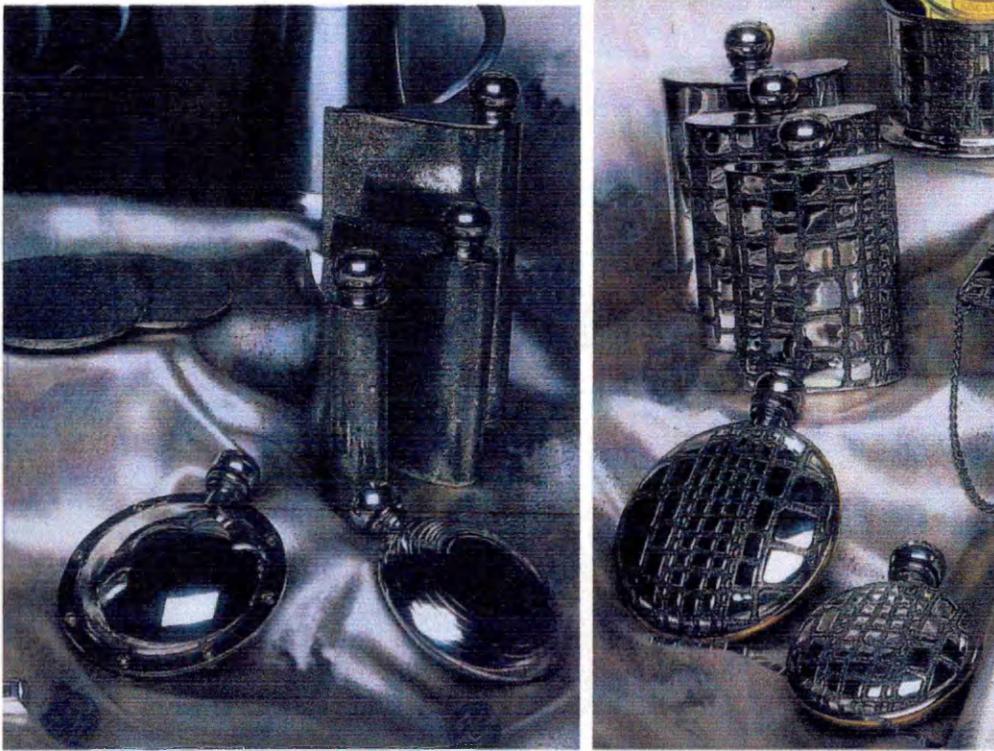


fig.26: products designed by Beebe, photographed for PMC's 1999 catalogue.

Interviews were undertaken with PMC's management team, as detailed in case study 3, and in Cardiff with Jane Beebe.

4.4.1. History

Designer: see case study 1.

Manufacturer: see case study 3.

4.4.2. Starting Point

Unlike Jordan, Beebe did not approach PMC as a client. Instead, she was seeking a hybrid client / consultancy arrangement, whereby both parties would invest time and effort in developing a new product range. Beebe's interest in metalwork, which stemmed from the small

amount she had undertaken during her degree course, had been renewed by her work on the hookah pipe project. She was now keen to find a commercial application for some emerging ideas which furthered the classical yet Eastern imagery characterising her work for Linjawi Holding Company.

Beebe's objectives for the project combined creative fulfilment with commercial rationality. As usual, she sought the opportunity to develop an affordable and desirable product in which she felt personal pride. However, she also needed to produce a design which would not only sell, but would also help to sustain the factory until her investment had been recouped through royalty payments: she was aware of the company's recent instability, and was concerned for its survival during this phase.

PMC's motivations and objectives were similar for this project as during the collaboration with Sarah Jordan: indeed, for a while the two projects were running simultaneously, although the designers did not meet. The circumstances affecting NPD cannot be considered to have been improved by its experiences of working with Jordan, and the experience may even have had a detrimental effect, by reinforcing workforce resistance to change and undermining management confidence in design.

4.4.3. Case Description

4.4.3.1. pre-production:

The alliance began with a chance meeting between Beebe and Tony Houldsworth, PMC's marketing manager, on PMC's exhibition stand at the 1997 NEC Spring Fair. Beebe and Houldsworth had previously worked together at Dartington Crystal, where Houldsworth had been employed as a marketing manager. Discussing recent working experiences, they quickly identified the opportunity for collaboration: PMC needed to develop new products, whilst Beebe was seeking an opportunity to design in collaboration with a metal manufacturer. It is evident from Houldsworth's comments that, at this stage, Beebe was the pro-active party: as he states,

'I could have put her off but I didn't. I let her come up and visit, do some work on it.'

Knowing only that PMC had identified the need to diversify into new market sectors, Beebe produced a series of preliminary sketches, which she presented to the management team during her first visit to the Sheffield factory. These sketches featured a range of large trinket boxes, decorated with beading, metal sprigs and coloured stones in a restrained style with an Eastern influence. They were, however, only partially resolved: it was Beebe's intention to present concepts that would excite the management team, and to develop final designs only in response to context-specific information gained from the visit.

The sketches were received favourably by Wood, who was impressed by the synergy between them and her own perception of the company's target market sector: as she states,

'They were elegant, classy. Exotic without being tacky. Really, they were just what we wanted for affluent female giftware.'

Beebe's capacity for re-invention was also noted with approval by Wood, who saw the opportunity for Beebe to find new applications for existing moulds and manufacturing processes. This process also proved satisfying for Beebe: as she explains,

'They've got so much stuff there! And really, all it takes is someone new to the place, to go round and see what potential there is. I mean, they had this tankard, awful shape, really dumpy, you know? And all it took was to turn it upside down, use a handle with a bit more curve on it, and you'd got something that was really nice, really flowed.'

Like Jordan, Beebe was given a tour of the factory during this first visit. She was surprised when Wood did not introduce her to the production staff, and left her guide in order to engage the metalsmiths and spinners in conversation. Initially, she encountered what was, in her experience, a high degree of hostility. As she explains,

'I said "I need to know [about the process] so that I'm not going to make your life difficult." [he said,] "Oh, we don't get bloody designers like that. Normally we just get this stuff, there's no time for development, we can't make it....."'

Beebe began investigating the reasons for this hostility, questioning her guide about work processes and pay systems, and continuing to request information regarding manufacturing and materials from production staff. It was evident that the company's problems in undertaking

NPD were partially attributable to the linear methodology that it had employed: as Beebe states,

'It's like they buy in a design it seems. And try and get it to work instead of working to the material...'

It was also apparent to Beebe that the difficulties that this approach had created had been compounded by poor interpersonal relationships between the production staff and Jordan, and that resistance to NPD in general was therefore high. In addition, although productivity-related pay systems were no longer employed, workforce morale had suffered from the company's acquisition and subsequent redundancies. Beebe concluded that the production staff resented any diversion from familiar, easily achievable tasks, particularly when new designs were poorly suited to manufacturing technologies: as she explains,

'It's so often the way. When things are going well then there's no time for new designs. But when it's all going wrong and they've got time on their hands, well then they start to panic, and there's no confidence then. It's a bit like sticking to the knitting, you know, head down and stick to what you know best.'

Having gained this insight into organisational culture, Beebe re-approached the production staff, explaining her lack of knowledge relating to metal manufacturing and her need to learn from their experience, if she was to produce designs which would be easy to manufacture. By taking this approach, she believes that she reduced hostility, at the same time as eliciting valuable information with which to inform her designs. As she recalls,

'There's two sisters at the factory, that sit next to one another... And one of them just said to me, "So you're a designer are you? Well, just bear in mind, if you're going to do sharp corners and square corners that we have a sand blasted inside please, because there's no way that they'll polish them." I was like, hm, taken aback. And then I was like, "yeah, thanks, that's a very good point. I'll bear that in mind." It's just straight up with them, which was brilliant.'

Wood observed Beebe making a conscious attempt to learn about manufacturing processes - and about the company's particular strengths and weaknesses - by watching each process 'intently', as well as by questioning production staff, and by relating the knowledge gained to

her own, previously limited experience of metalworking. At this stage, Beebe appears to have been attempting to gain a broad understanding of pewter manufacturing, not only those aspects relating directly to her designs: the company's head spinner recalls Beebe observing and asking about the tooling and manufacturing processes involved in 'everything.... Flasks, goblets, coffee pots,' Throughout this process, she was also developing a strong fascination with pewter, evident in her description of the spinners at work:

'It's very soft, it softens as you spin it, so they can do a ship's decanter out of a flat sheet. I said, you can't do that, and they said, you can. And it just like moves, and it doesn't wrinkle. You can push it around, it's like clay in that way.....This chap was showing me.... Knocked that up in seconds..... They dance! It's really funny, because they've got to put their body behind it. And the polishers do this!.....It's incredible, the detail. You see, I got quite excited about all this.'

The process of gaining familiarity with the production staff continued during the design development phase, as Beebe worked in the factory, testing ideas through consultation and experimentation. This was a two-way process: as Beebe's knowledge of the material's characteristics increased, she was increasingly able to question established practices: as she explains,

'I'm there to ask, "why do you make it this way?" And they say, "because we do." And I say, "but why?"'

During this phase, Beebe worked particularly closely with Quality Control Manager David Buffrey, who was able to verify her new understanding of metal manufacturing, and to identify any potential problems: as Wood describes,

'He'd say "yes, but you can't actually do it that way Jane, because it won't bend that way" or whatever, so she had the full understanding of what was required from the metal, and how much it could be adapted.'

All three of PMC's managers emphasised their respect for Beebe's 'hands on approach' and willingness to 'get her hands dirty'. This was important, they believed, not only in developing Beebe's understanding of the material and the factory environment, but also in overcoming the

production staff's perceptions of designers as arrogant idealists, which had been entrenched by their experiences working on Jordan's products. As Tony states,

'...with Jane it's a process of collaboration, not just co-operation. And everyone appreciates that.'

Wood particularly appreciated the way in which contextual information, gained through on-site experimentation and consultation, informed Beebe's design work throughout the development phase: 'what it [the information] did,' she explains 'was to prompt the thought process'. For example, experiments in texturing sheet pewter for use on the trinket boxes, could then applied to new shapes for hip flasks and tankards. Observing the effect of this process on the spun shapes enabled her to appreciate the exact degree of malleability with which she was working, and to exploit this in a new range of shapes. As Wood explains,

'I think what it [Beebe's first visit] sparked a lot of new ideas..... so the texturing for instance that she achieved on the trinket boxes, she then suggested that we ran it on the flasks and the tankards. And she then understood how flexible the material was, so that sparked off ideas for new shapes.'

Beebe appreciated the opportunity to develop her relationship with Wood during the visits to Sheffield that she undertook throughout the pre-production phase. Staying overnight, she appreciated the benefits of working with a female manager, in terms of being able to spend an evening drinking and talking together, without the implicit sexual agenda that she had often experienced in comparable situations with male colleagues. Beebe did not appear to see the evening as a particularly sociable occasion, but as an opportunity for the two colleagues to learn about each other's motivations and approach to work, as a basis for a sound working relationship. As she explains,

'I could understand the way that she [Wood] was thinking, that she wanted to get to know me, because you know,[with] the amount of work, she wanted to get to know what I was like underneath.....'

Wood appeared to see the relationship in more personal terms, stating that,

'The two of us get on extremely well together. I not only admire her work but I like her as a person, and I can't imagine that anyone wouldn't.'

4.4.3.2. production:

At the start of the production phase, both Beebe and PMC's managers appeared excited by the products and their reception from production staff. Beebe enthused that,

'I really like this [drawing]. I'm really excited about that, and so are they. You know, the makers are just going, we can make that. Yes, no problem, no, we haven't got a problem with that.'

Wood expressed her admiration for Beebe's determination, discipline and professionalism, and valued the speed at which she was capable of working: particularly in the giftware industry, which she considers to be characterised by plagiarism, she felt that this capability enabled PMC to optimise the potential of one of its latent strengths. As she explains,

'Because it's a craft industry it's simple, and you can turn around a prototype very quickly. And the first designs that Jane brought in were ready, certainly within a month I think. [Jane's] Just one of those people who gets a bee in her bonnet and then, it's "oh yes I've got to do it." And she's also quite disciplined, I think. She's a very professional lady. Very responsive. Whereas another designer that I worked with, she was not as responsive. It took several meetings before she understood what I was getting at, where I wanted to go in terms of the product development, and then weeks more before producing designs that were not practical.'

Wood also expressed admiration for Beebe's ability to engage with the production staff: as she states, 'they love it when she's here; they adore her.' This was a significant point of differentiation between the project and the company's former collaboration with Jordan, which had been characterised by poor relations between the designer and production staff.

By this stage, however, Beebe was less satisfied, having recognised that company culture at PMC was intensely political, due to the recent management buy-in and subsequent redundancies. Remembering how her involvement with company politics at Dartington had tired her and inhibited her creativity, she now decided to limit the time that she spent at the

factory, visiting at her own convenience and in order to sort out specific problems, rather than becoming a regular visitor. As she states,

'The mistake is to get too close. The game's still there, and you still play it, but from a distance, and you don't get involved.'

As manufacturing began, PMC's production staff appear to have been satisfied with the products, appreciating the high degree of contextual fit between the designs and the company's manufacturing processes: as the head spinner explains,

'She has got some ideas, and I think her designing is quite good, which, we can easily make them really. I mean, certain things are difficult, but we can always find ways of doing it.'

However, quality problems began to emerge at this stage, and on visiting the factory to view the trial production run, Beebe – like Jordan – was dissatisfied with the quality of surface finish achieved. The production staff appear to have been surprised by the quality of workmanship required: as the head spinner explains,

'Making one off is easy, but you've got to think of production and to keep the price low... I said it's alright, it's a good design, but it's the cost. She wanted perfection every time, but when a man is turning them by hand you can't get them absolutely perfect.'

Wood acknowledged that the difference in quality standard between prototypes and production items had not been made clear, and pledged to ensure that standards were as high as possible. However, it was recognised that the problem could not be fully resolved, unless tools were made to replace the hand-formed decorative features with moulded ones. As this required an investment of several thousand pounds which neither party were prepared to make prior to market testing, Beebe conceded that the products' surface quality could not – at this stage - match her expectations.

Beebe also compromised at this stage on the marketing of one product, a doughnut-shaped hip flask (figure 27: see over) which Houldsworth and Howard-Jones suggested should be sold with a golf ball, in a 'Hole in One' gift pack. According to Howard-Jones, Beebe's acceptance of this suggestion was evidence of her expertise as a designer: unlike Jordan, he professed, she did not let her 'preciousness' get in the way of a good commercial opportunity. Unknown to

them, Beebe was disappointed by the 'Hole in One' proposition, which in her view transformed an elegant and desirable object into a gimmick, but decided that the sacrifice was worthwhile in the interests of maintaining goodwill.

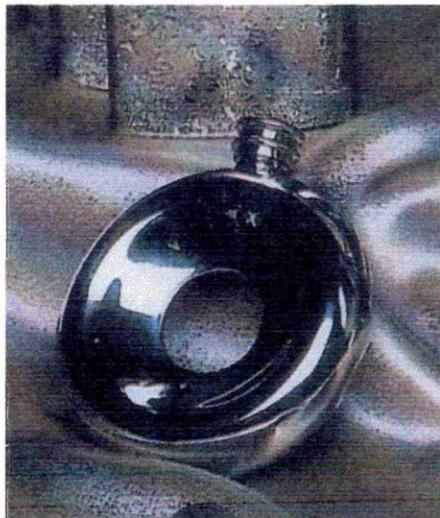


fig.27: the 'hole in one' hip flask.

Despite the managers' professed liking and respect for Beebe, at this stage they acted in a manner which Beebe considered unethical, issuing both her and Sneyd with a brief for a new product range, without telling either party of the other's involvement, and with the intention of manufacturing only one of the two ranges. This development reinforced Beebe's decision to distance herself from the company slightly: as she explains,

'It didn't affect things too much, in that it wouldn't have stopped me working with them. But it has meant that I've got a little more guarded really: you know, I'm not really going to go too far out of my way for them now.'

4.4.3.3. postscript:

The alliance did continue, with the development of a range of perfume bottles, which combined coloured glass bottles made by Beebe's contact Neil Wilkin, with metal stoppers made by PMC. However, the management changes following PMC's receivership and subsequent buy-out meant that the products were never manufactured. Because this was the third occasion on which Beebe had received no royalty payments, she has since suspended all design work: she could not consider the investment of time and energy involved in speculative projects

worthwhile, in an industry characterised by such a high degree of instability. Although Beebe considered selling her designs to another manufacturer, she decided that this would be inappropriate as the products had been designed to fit PMC's capabilities.

4.4.4. Analysis

4.4.4.1. project outcomes:

Although the products did not reach production, they were exhibited at the NEC Spring Fair, where, according to Wood, they received an extremely positive response from retailers including H. Samuel, Debenhams, Timpsons and House of Fraser (see figure 29).

In terms of organisational knowledge, the company extended its range of competencies without any investment in new technology, learning to use existing machinery to produce new shapes and surface effects (fig. 28: see over). In terms of organisational culture, it may be speculated that their success in producing new shapes and surface effects increased the production team's confidence in their own adaptability. In addition, from the welcome they extended to Beebe during a subsequent visit, it appears that their acceptance of designers may have improved.

PMC's managers, meanwhile, not only learned how to conduct NPD in a collaborative, cross-functional manner, but also gained insight into the value of this approach. This is illustrated by their own descriptions of their experiences with Beebe and Jordan: they described their alliance with Jordan as 'bad' because of her decision to distance herself from the company, whilst describing their relationship with Beebe as 'good' because of her collaborative approach. The fact that the managers had not encouraged any communication between Jordan and the production staff demonstrates that this concept had not previously been familiar to them.

The managers did not, however, appear to have developed any real appreciation of the value of on-going design alliances, or for the need for trust and respect in developing them. As both Beebe and Jordan's recollections demonstrate, they continued to offer poor customer service and to act with a degree of dishonesty during the projects' post-production phases.



fig.28: the design of this tankard demonstrates Beebe's optimisation of existing manufacturing technologies: the traditional tankard shape has been inverted in order to produce a more elegant form, whilst a new decorative technique has been devised by treating the metal twice with a single process.

For Beebe, the project produced more in terms of creative fulfilment than financial gain. During the pre-production phase, she exclaimed that she was,

'a little bit obsessed in this project. This is my life's work!.... I don't feel the need to do my own work [crafts work] at the moment.... Not at all. I'm getting all the creative sort of outpourings without having to go through the pain....'

Another positive outcome for Beebe was the strengthening of the network of expertise with which she likes to surround herself: during the course of the project she established connections between PMC and Mada Trading, and secured a commission for PMC to produce promotional pewter gifts for Linjawi's Saudi customers. However, although this was the first project in which she felt creatively fulfilled as a designer, due primarily to the lack of remuneration it was also to be her last design project, at least for the moment.

4.4.4.2. influencing factors:

As stated previously, Jordan's association with PMC was still underway when Beebe's began. This means that both designers worked with the same production and management teams, and that a comparative analysis may explain the differences in project outcome.

There were several differentiating factors between the two projects, which should be taken into consideration. Firstly, it is likely that the production team's resistance towards designers became further entrenched by its experiences of working with Jordan, and that Beebe therefore faced greater problems in terms of organisational culture. Secondly, whilst Jordan was a client, Beebe was essentially a partner. This meant that Beebe experienced fewer customer service problems than Jordan and that, subsequently, relationships between her and PMC's managers were more easily maintained. Thirdly, whilst Jordan's products were designed for a younger market with values different to Wood's, Beebe's were intended for a mature market in which Wood herself was included. This may have influenced the products' quality: because Wood understood the need for high standards of finish and workmanship in appealing to this market sector, she was perhaps more able to convey it to the production team.

It is clear from the case description, however, that perhaps the key factor influencing the projects' outcomes was the difference in design methodology employed by Beebe and Jordan.

In their studio-based work, both designers employed the reflective dialogue characteristic of crafts practice (see chapter 3). In the factory environment, Beebe extended this to form the basis of a design methodology: as in case study 1, she employed a method of design through making, which allowed her work to evolve in response to her increasing understanding of the company. Her creative and problem-solving activities were focused on the pre-production phase, meaning that only minor problems had to be resolved during production itself. Using this method, once again Beebe was able to produce designs which balanced aesthetic vision with context-specific information relating to workforce capabilities and available manufacturing technologies. Outcomes included not only a product which fulfilled both design and manufacturing criteria, but also organisational learning and a certain degree of cultural change.

Jordan, in contrast, had not applied her usual craft methodology to her work with PMC. Instead, she had adopted a traditional, linear NPD methodology, presenting the factory with pre-developed designs for manufacture. Due to the reasons outlined in case study case study 3, the

pre-production phase had been rushed, leaving manufacturing and quality problems to be resolved in situ.

The use of these two opposing methodologies resulted in Beebe and Jordan adopting very different attitudes towards the project. Whereas Beebe was willing to visit the company as much as possible without becoming involved in its politics, Jordan resented the comparably small amount of time communications cost her. Whereas Beebe was eager to learn from these visits, for Jordan they were a formality. Whereas Beebe made a conscious effort to develop a personal relationship with Wood that would benefit their working relationship, Jordan allowed her personal dislike of Wood to influence the alliance. Whereas Jordan did not become involved in any aspect of project management, Beebe undertook to demolish disciplinary and personal boundaries within the company in her usual manner (see case study 1).

The most significant difference between the two designers' attitudes, however, occurred in their relationships with the production team. Beebe knew from her previous experiences, that in order to develop a design that was easy to manufacture, she would need to gain context-specific information from production staff, and to secure the support needed to resolve any unforeseen problems emerging at the onset of production. This resulted in her engaging the production staff in conversation despite the lack of any formal introduction, and making a conscious effort to discover the reasons for their hostility. As in case study 1, it resulted in her using her crafts knowledge as the starting-point for informed conversation, intended to express her respect for their skills whilst initiating respect for hers. It also led her to re-evaluate her own response to the directness displayed by the production staff she met, looking beyond their apparently aggressive manner to see the usefulness of the information they were providing her with. In addition, as at Dartington and Nazeing, it led her to undertake a 'product champion' role, motivating the team and generating interest in the project. Finally, it led her to strive to establish a strong rapport with both production team and managers, without becoming an advocate for either party: as she explains,

'It's this line between mates and bosses.... You've got to get on but you've got to be professional. I mean, sort of like, getting on with them because they like you and they'll think around problems and sort it out for you, but.... you see you're in a desperate position because you're between the bosses and them.'

Conversely, Jordan's linear approach to NPD meant that she had seen no need to communicate with production staff, to understand their perspective, to motivate them or to learn from them.

The two designers possessed similar intellectual capital in terms of their crafts knowledge, but differed in the applications that they chose for it. It could be argued that this decision was influenced for Jordan by her established retail base, and her subsequent objective to provide existing designs at lower cost. However, she had no actual obligation to provide these retailers with known designs. Her inflexibility may therefore be seen as a reflection of her aversion to compromising design integrity and self (see case study 3), compounded by a lack of awareness of the potential difficulties in adopting this approach. Beebe, conversely, understood the value of a collaborative approach to NPD and the pitfalls of attempting to impose an unsuitable design onto inflexible manufacturing processes, and had developed the strategies needed to overcome common problems.

4.4.5. Conclusions

A comparison of Beebe's and Jordan's experiences of working with PMC suggests that crafts knowledge alone will not produce a successful relationship between a practitioner and a manufacturing company. It suggests instead, that in order for crafts knowledge to fulfil its potential to encourage cross-functional NPD, stimulate organisational learning and catalyze cultural change, the practitioner must extend the cognitive style used in their studio work, into a design methodology.

This requires the practitioner to perceive the machinery, techniques, materials and knowledge found in the factory environment not as constraints, but as creative stimuli to be investigated and extended through experimentation and reflection. Secondly, it requires recognition that realising the potential of these resources will necessitate collaboration with managers and production staff, and that such collaboration can itself become a creative activity, with the resulting synthesis of knowledge producing unexpected and creative outcomes. Thirdly, it requires the development of the observational and analytic capabilities necessary for the practitioner to identify opportunities and cultural barriers within the factory environment. Finally, it requires the development of skills and strategies for overcoming barriers to communication and collaboration, often using crafts knowledge as a linguistic tool and a means of developing rapport.

This case, together with case study 1 suggest that for Beebe, the extension of crafts cognition into a design methodology was implicit, developing subconsciously through her experiences of working in collaboration with manufacturers and other practitioners. This is confirmed by her reaction to the analyses themselves: whilst recognising her own methodologies and stating that they had been clarified by the analyses, she had not previously conceptualised them herself. As discussed previously (see case study 1), Beebe's strategies for overcoming barriers to collaboration appear also to have been learned, but learned implicitly.

The case also reinforces the need for the crafts-based designer to use the language and understanding of the factory environment provided by their crafts knowledge, in order to rapidly develop familiarity with the company and identify appropriate project management strategies. In case study 3, Jordan's passive, detached approach to the project and its management had disastrous consequences, when combined with PMC's managers' lack of design management experience. Here, however, Beebe's ability to identify and accommodate the company's working practices and culture was a significant influencing factor on the project's outcome.

4.5. Case Study Summary Tables

4.5.1. Product Outcomes

	case study 1	case study 2	case study 3	case study 4
project completion	yes	yes	no	yes
client's objectives fulfilled	yes: <ul style="list-style-type: none"> ▪ sales high ▪ product considered resistant to imitation ▪ product extension ideas for future NPD 	n/a: designers are clients	n/a: designer is client	n/a: speculative project
manufacturer's objectives fulfilled	yes: <ul style="list-style-type: none"> ▪ high degree of contextual fit ▪ capabilities stretched ▪ top 10 profit-maker (600 units sold) ▪ high GVA, consistent with company strategy ▪ trophy piece, embodying competence 	yes: <ul style="list-style-type: none"> ▪ contextual fit ▪ capabilities stretched ▪ significant and increasing contribution to turnover ▪ trophy pieces embodying competence 	no: <ul style="list-style-type: none"> ▪ little impact on profitability however: <ul style="list-style-type: none"> ▪ some media attention gained 	yes: <ul style="list-style-type: none"> ▪ high degree of contextual fit ▪ positive response from retailers (sales figures unavailable)

case study 1: Nivea + Jane Beebe
 case study 2: Wentworth + various designers
 case study 3: PMG + Sarah Jordan
 case study 4: PMG + Jane Beebe

designer's objectives fulfilled	Yes:	Yes*:	no:	Yes:
	<ul style="list-style-type: none"> ▪ creative fulfilment ▪ professional credibility ▪ remuneration <p>however:</p> <ul style="list-style-type: none"> ▪ high levels of stress 	<p>Yes*:</p> <ul style="list-style-type: none"> ▪ products true to original designs ▪ high standards of service allow minimum involvement 	<p>no:</p> <ul style="list-style-type: none"> ▪ functionality and quality standards unmet ▪ unanticipated need for ongoing involvement 	<p>Yes:</p> <ul style="list-style-type: none"> ▪ high degree of creative fulfilment and personal satisfaction <p>however:</p> <ul style="list-style-type: none"> ▪ low remuneration

* in relation to Sarah Jordan project.

4.5.2. Intangible Outcomes

	case study 1 Nazceing Jane Beebe	case study 2 Wentworth various designers	case study 3 PMIC + Sarah Jordan	case study 4 PMIC Jane Beebe
alliance development	<ul style="list-style-type: none"> new alliances between manufacturer and packaging / component suppliers new alliances between client and other parties strengthened alliance between designer and manufacturer expanded network of industry contacts 	<ul style="list-style-type: none"> new and strengthened alliances between manufacturer and other specialist SMEs new alliances between manufacturer and designers: establishment and development of professional network. 	<p>no: Poor and deteriorating interpersonal relationships between each faction involved</p>	<p>yes: positive interpersonal relationships established. potential expansion of professional networks, through designer's contacts. However: trust lost between designer and manufacturer.</p>
NPD process development	<p>system devised (by designer and NPD manager) which:</p> <ul style="list-style-type: none"> encourages flow of contextual information throughout NPD, without disrupting standard production activities transfers product ownership to production staff 	<p>system devised (by NPD manager) which:</p> <ul style="list-style-type: none"> allows conditions conducive to innovation to co-exist with those appropriate for standard production then facilitates dissemination of new knowledge 	<p>no: NPD process essentially unmanaged</p>	<p>incremental improvements introduced (by the designer):</p> <ul style="list-style-type: none"> increased communication in-situ testing
knowledge generation	<ul style="list-style-type: none"> new, crafts-derived techniques and technologies new applications for existing skills and processes broader capabilities through alliances 	<ul style="list-style-type: none"> new, crafts-derived techniques and technologies new applications for existing skills and processes broader capabilities through alliances new market awareness 	<p>no</p>	<ul style="list-style-type: none"> new, crafts-derived techniques and technologies new applications for existing skills and processes

<p>developments in organisational culture</p>	<ul style="list-style-type: none"> ▪ management confidence in NPD ▪ product ownership amongst production staff, resulting in improved workmanship and mobilisation of latent capabilities ▪ possible increased acceptance of change and NPD within production team 	<ul style="list-style-type: none"> ▪ project team involvement, resulting in release of latent design skills and problem-solving capabilities ▪ production staff acceptance of NPD 	<ul style="list-style-type: none"> ▪ further entrenchment of production staff resistance to change and wariness of designers 	<ul style="list-style-type: none"> ▪ possible increased acceptance of change and NPD within production team
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4.5.3. Influencing Factors Relating to the Designer

	case study 1 Nazeing Jane Beebe	case study 2 Wentworth various designers	case study 3 PMG + Sarah Jordan	case study 4 PMG Jane Beebe
experience	<ul style="list-style-type: none"> ▪ crafts knowledge and creative dive established during education and professional practice as glass maker ▪ professional practice also developed business skills and collaborative approach to making. ▪ employment as designer provided understanding of production staff culture, factory environment and company politics, as well as skills in motivation, cross-functional collaboration and communication, NPPD management. 	Various	<ul style="list-style-type: none"> ▪ crafts knowledge and need for self-expression through making developed during education and professional practice as jeweller. ▪ employment as a designer provided business skills and reinforced need for creative independence 	<ul style="list-style-type: none"> ▪ see case study 1
design methodology	<ul style="list-style-type: none"> ▪ collaborative and crafts-derived, an iterative dialogue between process and intent. Ideas are stimulated by context-specific information, and refined through in-situ testing 	<ul style="list-style-type: none"> ▪ collaborative and crafts-derived. Ideas are refined in situ, in a dialogue between manufacturing processes and intent 	<ul style="list-style-type: none"> ▪ linear, with pre-existing designs presented for manufacture 	<ul style="list-style-type: none"> ▪ see case study 1

project objectives	<ul style="list-style-type: none"> ▪ creative fulfilment ▪ remuneration ▪ extension of professional networks 	<ul style="list-style-type: none"> ▪ various 	<ul style="list-style-type: none"> ▪ truth to original designs ▪ high quality workmanship ▪ low cost ▪ minimum involvement 	<ul style="list-style-type: none"> ▪ see case study 1
personal qualities	<ul style="list-style-type: none"> ▪ involvement / enthusiasm ▪ determination (persistence) ▪ perfectionism ▪ optimism ▪ energy ▪ humour ▪ egalitarianism ▪ empathy ▪ flexibility 	<ul style="list-style-type: none"> ▪ various 	<ul style="list-style-type: none"> ▪ detachment ▪ determination (stubbornness) ▪ perfectionism ▪ perceived superiority ▪ inflexibility 	<ul style="list-style-type: none"> ▪ see case study 1
learned skills	<ul style="list-style-type: none"> ▪ communication ▪ negotiation ▪ professionalism ▪ social skills ▪ product championing ▪ capabilities ▪ cross-cultural awareness 	<ul style="list-style-type: none"> ▪ various 	<ul style="list-style-type: none"> ▪ professionalism 	<ul style="list-style-type: none"> ▪ see case study 1
motivations	<ul style="list-style-type: none"> ▪ production of aesthetically pleasing objects ▪ satisfaction through working in collaboration with others ▪ eventual remuneration ▪ reputation amongst peers 	<ul style="list-style-type: none"> ▪ various 	<ul style="list-style-type: none"> ▪ creative fulfilment through self-expression ▪ delegation of manufacturing ▪ improvement to profit margins 	<ul style="list-style-type: none"> ▪ see case study 1

(influencing factors: designer, continued)

4.5.4. Influencing Factors Relating to the Organisation

	case study 1 Nizking Jaime Beebe	case study 2 Wentworth various designers	case study 3 PMIC + Sarah Jordan	case study 4 PMIC Jaime Beebe
date of incorporation	1928	1949	1969	1969
location	industrial estate in rural Hertfordshire location	Sheffield City Centre	Darnall (industrial region of Sheffield)	Darnall (industrial area of Sheffield)
current management	owner-manager Stephen Pollock-Hill	family-run	acquired by Hadrien International plc in 1996: under management of new owners	acquired by Hadrien International plc in 1996: under management of new owners
turnover	\$5m approx. in 1999	figures not available	figures not available	figures not available
number of employees	70	50	35	35
typical NPD activities	<ul style="list-style-type: none"> ▪ domestic: components for household accessories, stemware, promotional giftware ▪ corporate: giftware, trophies ▪ industrial: lenses 	<ul style="list-style-type: none"> ▪ additions to own product range: traditional giftware and tableware ▪ retailer-led designs: various giftware and tableware 	<ul style="list-style-type: none"> ▪ additions to own product range: traditional giftware and tableware ▪ retailer-led designs: traditional giftware and tableware 	<ul style="list-style-type: none"> ▪ additions to own product range: traditional giftware and tableware ▪ retailer-led designs: traditional giftware and tableware
major clients	<ul style="list-style-type: none"> ▪ high street multiples ▪ wholesalers / distributors ▪ promotions agencies ▪ corporations ▪ other manufacturers 	<ul style="list-style-type: none"> ▪ high street multiples ▪ independent retailers ▪ promotions agencies ▪ armed forces 	<ul style="list-style-type: none"> ▪ high street multiples ▪ promotions agencies ▪ full records unavailable 	<ul style="list-style-type: none"> ▪ high street multiples ▪ promotions agencies ▪ full records unavailable
international markets	<ul style="list-style-type: none"> ▪ any: at time of case study, included Australia, India, Middle East and Pakistan 	<ul style="list-style-type: none"> ▪ traditional designs: USA, South Africa, New Zealand, Australia ▪ contemporary designs: Europe 	<ul style="list-style-type: none"> ▪ USA 	<ul style="list-style-type: none"> ▪ USA

marketing activities	<ul style="list-style-type: none"> advertising in 'Promotions and Incentives' trade journal attendance at International Spring Fair editorial coverage in trade journals occasional mail-shots 	<ul style="list-style-type: none"> advertising in 'Promotions and Incentives', 'Navy News', 'Gift Buyer' and 'Progressive Gifts' participation in International Spring Fair and Harrogate Gift Fair advertising in trade journals, to accompany editorial features 	<ul style="list-style-type: none"> participation in International Spring Fair and Autumn Fair other activities unknown: no records of marketing strategy at that time. 	<ul style="list-style-type: none"> participation in International Spring Fair and Autumn Fair other activities unknown: no records of marketing strategy at that time.
evidence of interest in contemporary design	collaboration with Royal College of Art	sponsorship of annual 'Pewter Live' competition	none	none
brand identity	none	none	branded as 'Sheffield Mint'	branded as 'Sheffield Mint'
main markets	<ul style="list-style-type: none"> UK and International manufacturers and large retailers of domestic and industrial products UK corporations 	<ul style="list-style-type: none"> UK and International retailers of all sizes 		
current organisational strategy	<ul style="list-style-type: none"> to initiate a shift from commodities to knowledge-based products, trading on service, design and breadth of expertise rather than cost, in order to compete with cheap imports 	<ul style="list-style-type: none"> as case study 1 also, to diversify from traditional giftware into more lucrative, contemporary markets 	<ul style="list-style-type: none"> as case study 2 	<ul style="list-style-type: none"> as case study 2
initiation of this strategy	<ul style="list-style-type: none"> ongoing since 1970s 	<ul style="list-style-type: none"> 1989 	<ul style="list-style-type: none"> 1997 	<ul style="list-style-type: none"> 1997
project objectives	<ul style="list-style-type: none"> to implement organisational strategy 	<ul style="list-style-type: none"> as case study 1 also, to build capabilities applicable to future projects 	<ul style="list-style-type: none"> as case study 1 also, to present a positive company image through association with designer 	<ul style="list-style-type: none"> as case study 3
commitment to NPD	<ul style="list-style-type: none"> senior and middle management sceptical but willing to take a risk NPD manager very committed 	<ul style="list-style-type: none"> senior management enthusiastic middle management sceptical NPD manager extremely committed 	<ul style="list-style-type: none"> senior management appeared enthusiastic, but actions indicate lack of commitment 	<ul style="list-style-type: none"> as case study 3

production staff culture	<ul style="list-style-type: none"> resistance to NPD and change, due to productivity-related pay wariness of designers, caused by failure of previous projects 	<ul style="list-style-type: none"> as case study 1 also, inflexibility due to a high degree of job specialisation 	<ul style="list-style-type: none"> as case study 2 also, insecurity and tension in relation to managers, due to recent acquisition 	<ul style="list-style-type: none"> as case study 3
manufacturing technology	<ul style="list-style-type: none"> semi-automated and reliant on crafts skills, therefore accessible to crafts practitioners 	<ul style="list-style-type: none"> as case study 1 	<ul style="list-style-type: none"> as case study 1 	<ul style="list-style-type: none"> as case study 1
usual NPD methodology	<ul style="list-style-type: none"> linear 	<ul style="list-style-type: none"> linear 	<ul style="list-style-type: none"> linear 	<ul style="list-style-type: none"> linear
usual organisational structure	<ul style="list-style-type: none"> hierarchical and structured, with some flexibility for individual projects 	<ul style="list-style-type: none"> hierarchical, structured and highly inflexible 	<ul style="list-style-type: none"> hierarchical, structured and highly inflexible 	<ul style="list-style-type: none"> hierarchical, structured and highly inflexible
NPD manager's position	<ul style="list-style-type: none"> Sales Manager 	<ul style="list-style-type: none"> Business Development Manager 	<ul style="list-style-type: none"> Managing Director (with responsibility for Marketing and Design) 	<ul style="list-style-type: none"> Managing Director (with responsibility for Marketing and Design)
NPD manager's experience	<ul style="list-style-type: none"> many years' NPD, undertaken with a number of clients 	<ul style="list-style-type: none"> little experience prior to appointment, but high degree of familiarity with company 	<ul style="list-style-type: none"> none 	<ul style="list-style-type: none"> none
NPD manager's personal qualities	<ul style="list-style-type: none"> optimism pragmatism vision creativity humour energy enthusiasm 	<ul style="list-style-type: none"> pragmatism creativity vision 	<ul style="list-style-type: none"> willing to exploit others dishonesty disrespectful of others' needs 	<ul style="list-style-type: none"> as case study 3
NPD manager's learned skills	<ul style="list-style-type: none"> market awareness product championing capabilities motivation communication cross-cultural awareness 	<ul style="list-style-type: none"> market awareness product championing capabilities communication cross-cultural awareness 		<ul style="list-style-type: none"> as case study 3

4.5.5. Influencing Factors Relating to the Project

	case study 1 Nazeing Janne Beebe	case study 2 Wentworth 1 various designers	case study 3 PAC + Sarah Jordan	case study 4 PAC + Janne Beebe
NPD management mechanism and methodology	<ul style="list-style-type: none"> appropriate structural mechanisms devised and implemented (see strategic outcomes) concurrent methodology adopted 	<ul style="list-style-type: none"> as case study 1 	<ul style="list-style-type: none"> no NPD management mechanism linear methodology 	<ul style="list-style-type: none"> no formal NPD management mechanism new (concurrent) methodologies introduced by designer compensate to some extent
product championing responsibility	<ul style="list-style-type: none"> product championing activities divided between designer and NPD manager: designer adopts interpersonal and boundary-spanning roles, whilst NPD manager undertakes intra-organisational responsibilities. 	<ul style="list-style-type: none"> NPD manager adopts interpersonal, boundary-spanning and intra-organisational roles. 	<ul style="list-style-type: none"> no product championing activities. 	<ul style="list-style-type: none"> designer adopts intra-organisational, interpersonal and boundary-spanning activities.
preparation	<ul style="list-style-type: none"> brief from client mutual understanding of roles, responsibilities and expectations between designer and manufacturing team project planning undertaken jointly by designer and NPD manager emphasis on pre-production phase 	<ul style="list-style-type: none"> briefs vary roles and responsibilities defined by NPD management mechanism 	<ul style="list-style-type: none"> no brief or contract poor mutual understanding of roles, responsibilities and expectations little emphasis on pre-production phase 	<ul style="list-style-type: none"> no brief designer shifted emphasis onto pre-production phase designer ensured mutual understanding of roles, responsibilities and expectations
designer-client relationship	<ul style="list-style-type: none"> very strong working and personal relationship, based on trust, respect and humour 	<ul style="list-style-type: none"> functioning professional relationship: no personal rapport 	<ul style="list-style-type: none"> deteriorating professional relationships poor and deteriorating personal relationships: mistrust and lack of respect 	<ul style="list-style-type: none"> strong personal and professional relationships, tempered by emerging loss of trust (by designer) towards project completion
cultural differences	<ul style="list-style-type: none"> initially strong cultural 	<ul style="list-style-type: none"> irreconcilable cultural differences 	<ul style="list-style-type: none"> strong and worsening cultural 	<ul style="list-style-type: none"> initially strong cultural

(designer and production staff)	<ul style="list-style-type: none"> ▪ differences gradually eroded (see intangible outcomes) 	<ul style="list-style-type: none"> ▪ no significant cultural barriers between designer and NPD project team 	differences	<ul style="list-style-type: none"> ▪ differences gradually diminished
communication style (designer and production staff)	<ul style="list-style-type: none"> ▪ rapport based on humour and respect ▪ collaboration during pre-production based on verbal – visual – bodily language 	<ul style="list-style-type: none"> ▪ no rapport evident ▪ collaboration during pre-production based on verbal – visual – bodily language 	<ul style="list-style-type: none"> ▪ no rapport evident ▪ no direct collaboration with production staff 	<ul style="list-style-type: none"> ▪ rapport based on humour and respect ▪ collaboration during pre-production based on verbal – visual – bodily language

4.6. Interview Analyses

4.6.1. Interview Reports

4.6.1 1. Keith Tyssen:

Keith Tyssen (figure 29) is a prominent silversmith and educator: born in 1934 and trained at the Royal College of Art, he held the post of Head of Design at Sheffield Hallam University for many years. He had also worked in industry, designing high volume production cutlery and spectacle frames. The interview – which was the first to be undertaken in the course of this research – sought to acquire some initial understanding of the potential benefits and problems experienced by a crafts practitioner working in industry.

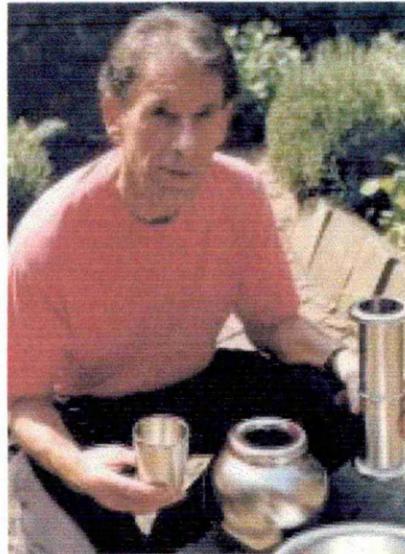


fig.29: Tyssen, photographed with limited edition pewter products, for his own publicity material.

Since retiring from full-time lecturing seven years previously, Tyssen had undertaken occasional design work whilst pursued two methods of making pewter and silverware. Working from a studio in Sheffield, he continued to make silver candlesticks, cigarette boxes and imaginative one-off commissions (figure 30: see over).

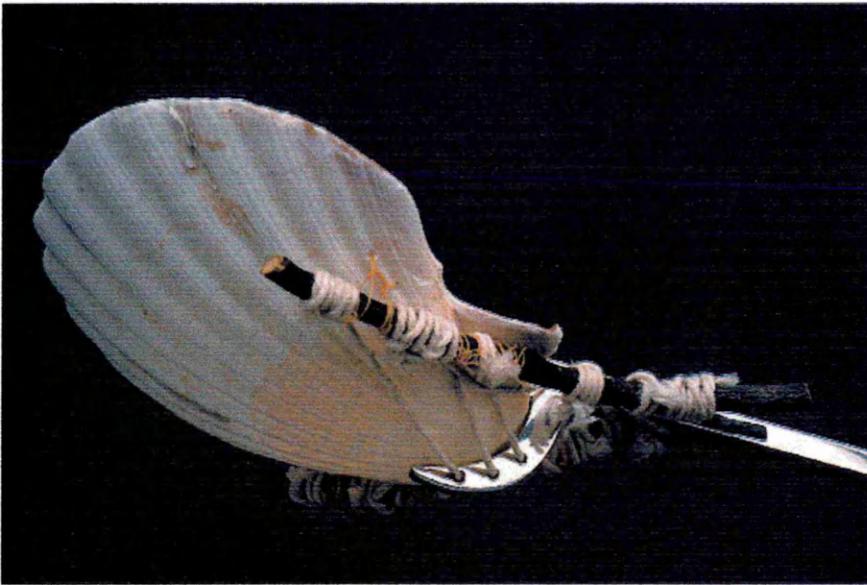


fig.30: detail of a silver spoon, made by Tyssen in 1998 for the Sheffield Millennium Canteen, a collaborative public art commission. Tyssen describes his work as 'a personal comment on the evolution of the spoon', acknowledging the tool's significance as both functional object and social signifier.

In addition, he had developed a number of limited edition, table-top vessels, to be manufactured by local pewter factories, finished in his own workshop and sold through select retail outlets in the UK, US and Far East (see figures 31 and 32). He believed that sub-contracting aspects of the production process was becoming increasingly common, particularly amongst newly established crafts practitioners / designers, who lacked the capital required for investment in machinery.

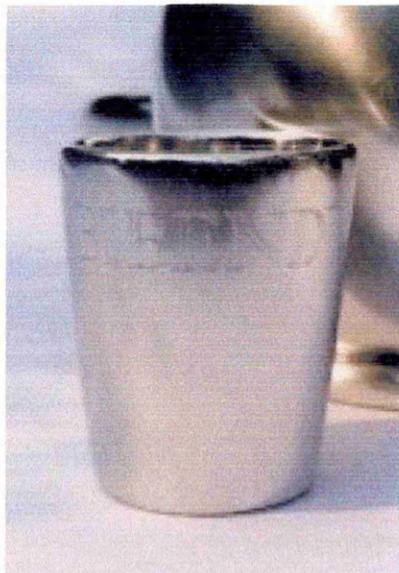


fig.31: limited edition pewter beaker.

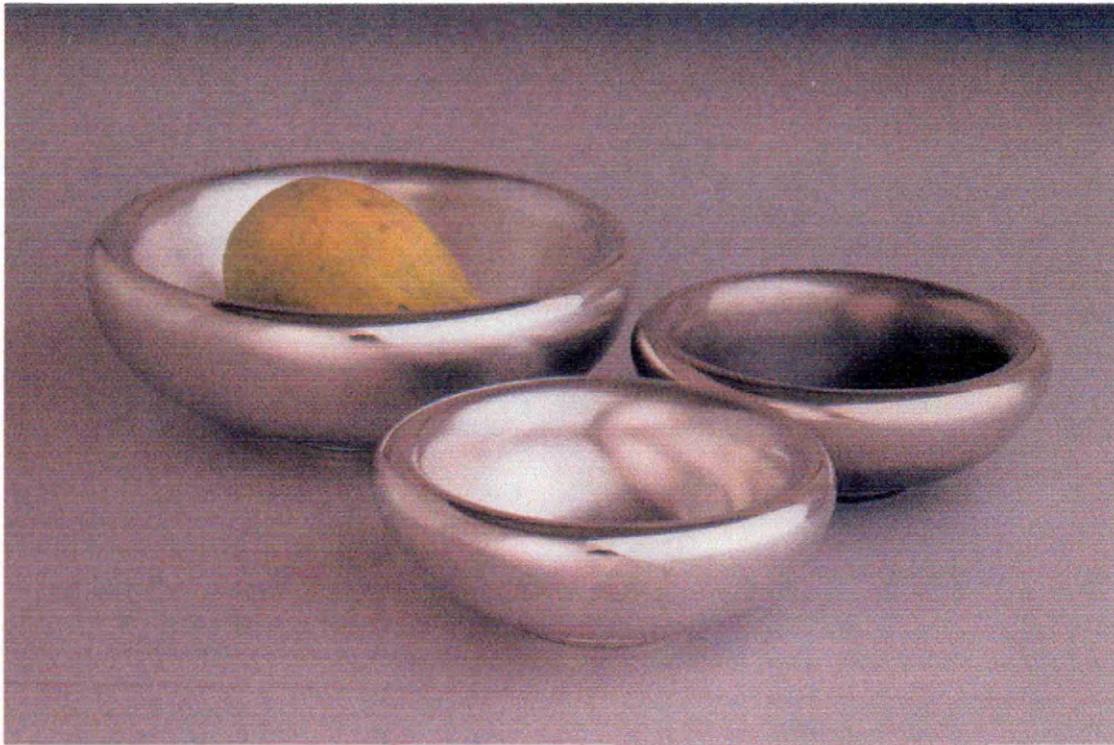


fig.32: limited edition pewter bowls.

Tyssen initially compared his relationship with pewter manufacturing companies to that between a photographer and a photography processing shop, describing how the facilities and materials they offered enabled him to work on a larger scale than was possible in the studio. This description suggested a straightforward commissioning process, with collaboration acting as a means of implementing pre-determined ideas. However, later in the interview, Tyssen's description of his work revealed that the relationship between himself and the manufacturing company was often a creative one. In particular, working with skilled production staff could reveal new possibilities and challenge assumptions in his own work. For example, the rolled rim characteristic of his pewter vessels (see figure 32) was developed in collaboration with the spinners who would be manufacturing the pieces. Whilst recognising that some makers enjoy working in isolation, he described finding excitement in the process of combining disparate yet complementary types of skill and knowledge.

Tyssen had experienced two major difficulties in working with manufacturing companies as a client. Firstly, he had found that subcontracting to a company producing its own ranges inevitably brought prioritisation problems: it was difficult to work to short deadlines or even to ensure that longer deadlines would be met, as the company's own work inevitably took precedence.

Secondly, he had encountered suspicion and resentment from both production staff and managers. In relation to the production staff this was, he believed, was partly attributable to job specialisation and the use of productivity-related pay systems. As he explained, production staff valued the efficiency and continuity which yielded maximum pay under productivity-related pay systems. Understandably, they resented any interruption to their work, and disliked the disruption involved in learning how to make a new product.

Another barrier to his acceptance from production staff, Tyssen believed, was their perception of him and other independent designers as 'weird' and 'arty'. Differences in accent and education could, Tyssen believed, exacerbate this hostility. However, he had always found that mutual respect and understanding would develop as his skills and his knowledge of materials and processes were explicated through conversation and demonstration. As he explains,

'Being from a crafts background and spending time at the factory fosters a good relationship, whereas the crafts person who has followed a theoretical or paper-based course is at a disadvantage. Once respect for the maker's skills and eye for quality have broken down communication barriers, there is usually a good response.'

Managers, apparently, were often more hostile than production staff, typically seeing the project as an unwelcome distraction from standard manufacturing operations. Profit margins were small, due to the small number of units commissioned, the time involved in resolving problems and the high cost incurred by mistakes and poor finishing.

Tyssen had also encountered problems in working as a designer in one company. He complained of a haphazard approach, whereby NPD was 'governed by opportunity rather than strategy', and there was a lack of any real supporting infrastructure. He attributes this to the company's lack of experience, combined with a resentment towards paying for design: until recently, NPD had typically consisted of reconfiguring old handles, spouts, bodies and lids into a 'new' product which required no design or new tooling, and incurred no learning curve for production staff. However, it meant that the company's lack of objectives and expectations was also problematic: as he states,

'...all they know is that they want immediate success in the middle market, and see that a more "modern" range may be a way of accomplishing this.'

This lack of NPD strategy meant that the company had failed to provide any brief or guidance, expecting Tyssen to identify and understand potential new markets, as well as to provide designs appropriate to them.

Tyssen believed that the solution to these problems lay in assembling a management team which combined a passion, enthusiasm and understanding of the material with business and financial acumen: without this, he believed, the product would continue to be treated as a commodity, and NPD would not be given the investment it required in order to succeed.

Despite these problems, Tyssen considered his relationship with manufacturers to be mutually beneficial, often bringing the company a new level of market awareness. Company managers were, he claimed, often astonished at the high prices his work commanded, and his success in selling internationally.

4.6.1.2. Stuart Garfoot:

Stuart Garfoot is a freelance glass designer with a crafts background: educated at the Royal College of Art, he combines lecturing at Wolverhampton University with working for German tableware manufacturer Rosenthal (see figure 33) and designing his own product ranges. He has a strong interest in crafts – industry collaboration, and at the time of the interview was establishing a studio within the university, intended to overcome the problems that he had encountered in working with manufacturers. The interview was conducted early in the research, with a view to gaining further insight into the potential and problems encountered by the practitioner in collaboration.

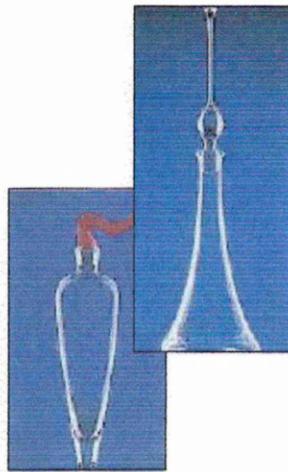


fig.33: glass decanters, designed for Rosenthal.

Garfoot's crafts education and lecturing position within in a university glass department suggested a crafts orientation. However, he considered himself to be primarily a designer: he described himself as 'a user of materials, rather than personally a manipulator of materials', referring to his ongoing fascination with designing and making moulds, rather than glass or metal themselves. He had never developed high levels of skill in glass blowing, preferring to realise his designs by working with others.

Garfoot had found the knowledge, methodologies and attitudes developed through this way of working easily transferable to design for mass production. His description of his work for Rosenthal suggested that his understanding of materials and processes enabled him to communicate effectively with technicians at the company, and therefore to assimilate their

knowledge into his designs. He considered that this predisposed him to Rosenthal's cross-functional approach to NPD, enabling him to act as 'an axle at the centre of a wheel', refining his ideas in response to the input of design managers, marketers and production staff. He recognised, however, that in undertaking this approach he was supported by the company, who worked with many consultant designers and had developed management mechanisms intended to combine external and in-house resources.

Garfoot considered himself unusual in this latter respect, believing that his attitudes differentiated him from crafts practitioners. Crafts practitioners, he believed, were hampered by a preoccupation with their own skills. Their work as designers was also impeded by the 'esoteric', self-gratifying nature of their practice, which precluded collaboration with others by causing them to become defensive about their work and its ownership. They were, he complained, rarely 'big enough' (implying 'mature enough') to refine a design in response to input from other specialists. According to Garfoot, the managing director of Rosenthal had complained that,

'they [craft practitioners] have a problem going into industry because they can't actually distil from what they do something which is able to be used in an industrial context.'

The interview also covered Garfoot's recent experiences of prototyping a range of decorative vessels, which he had been undertaking in collaboration with local metal workshops. The vessels consisted of a glass bubble, blown into a metal cage which was retained as part of the final design. Initially, he had envisaged sourcing both glass and metal components from local workshops, then,

'snap[ping] A and B together to make a craft-based product.'

This objective had proved more difficult to fulfil than anticipated in the glass industry: indeed, the proposed university-based studio had evolved as a response to this problem. Garfoot considered small, crafts-based companies (such as Blowzone in Stourbridge) neither capable of the consistency he required, nor willing to disrupt their own production schedules. The only bespoke UK glass manufacturer, Nazeing Glassworks, was unable to accept orders of under 250 units, again due to the cost of interrupting standard production.

The vessels' metal components had proved less problematic, due – according to Garfoot – to the structure of the Birmingham metalwork industry, which consists of a wide diversity of differently sized factories and workshops, each with its own specialisms. As Garfoot explained, each company undertakes core processes in-house, outsourcing non-core processes to the most appropriate sub-contractor. Infrastructures were in place to support this way of working: for example, Birmingham Metals Industries Association will provide lists of all companies providing any particular service.

This infrastructure had provided not only accessibility and a range of manufacturing options, but also a collaborative way of working which Garfoot found rewarding. The metalworker he engaged ran a two person business, which was flexible enough to accommodate his unusual requirements. The metalworker would typically begin a job by producing a prototype from a drawing, with the client watching and discussing it during the making process. Because this project was more complicated however, this process was extended over several weeks. Garfoot spent two days initially, working with the metalworker before altering his drawings in response to their tests and ensuing discussions. He then re-designed the project to assimilate his new knowledge of metal fabrication and the creative possibilities the discussions had raised. On his next visit, prototype components were made and taken to the glass studio, where hot glass was blown into them to create the whole product. Because the metalworker attended this session, he was able to resolve the ensuing glass forming problems by altering the metal component. As Garfoot explains, sharing crafts knowledge through observation and testing was a fundamental part of the design process:

'I couldn't have done what I've done without him understanding, and I couldn't have asked him to do what I wanted without knowing exactly how he did it. So... .. standing and watching how somebody worked, was central to the way that the product evolved.'

4.6.1.3. Janice Tchalenko:

Janice Tchalenko's work as a ceramicist is highly acclaimed: she has exhibited extensively, is represented in nineteen international collections, and enjoys a high profile in *Crafts* magazine and other publications. She is particularly well known for her thrown tableware and rich glazes (see figure 34). Tchalenko has an established interest in crafts – industry collaboration, demonstrated by her involvement in initiatives including the pioneering *Next Interiors* project (see chapter 3), and her involvement with *Dart Pottery*. The interview, which was the last to be conducted, sought primarily to gain an additional perspective on the *Next Interiors* project, but also provided the opportunity to gain additional insight into issues raised by earlier interviews.

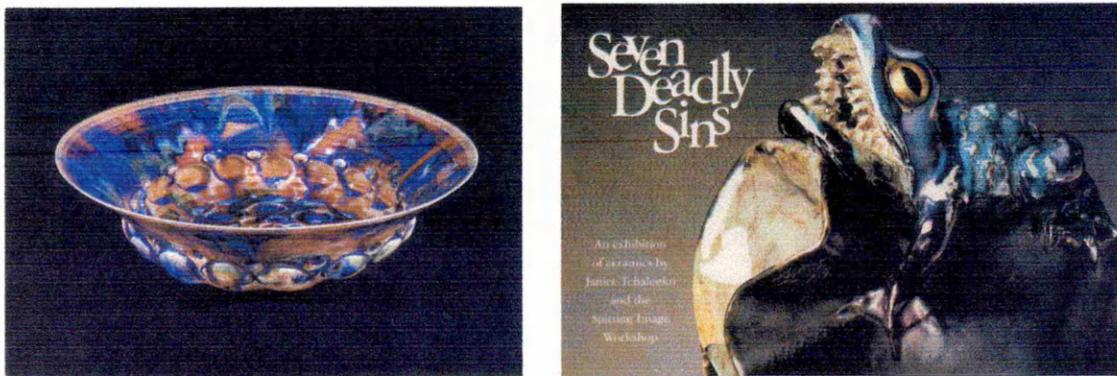


fig.34 (left): 'Reduced Stoneware Bowl with Indentations'
fig.35 (right): invitation to Private View of exhibition for a series of sculptures,
made in collaboration with the Spitting Image Workshop.

Tchalenko was one of the two ceramicists involved in the *Next Interiors* project discussed by Emma Bridgewater. Together with Carol McNicholl, she was invited to participate by Tricia Guild of The Designers' Guild, who was retailing her work and had been commissioned by *Next* to oversee the project. The team selected existing products, both hand made and hand decorated, which they then took to Stoke with the intention of identifying a manufacturer capable of reproducing them. Tchalenko describes the experience as 'horrendous'. Despite their quarter of a million pounds order, they were not considered a serious proposition: as Tchalenko explains,

'We were thrown out of I don't know how many factories.... One factory, they kind of patted me on the head and said, "who made that?" And I said, "I did". And they said, well that's very well potted for a woman.' And then we went to Carltonware and they chucked us out, they said, we don't do this kind of rubbish.'

Eventually, a subcontractor was found in the form of Fleshpots, a manufacturer of novelty kitchenware which was unable to reproduce Tchalenko and McNicholl's products, but produced an imitation which fulfilled sales expectations.

Since the Next project, Tchalenko had undertaken further design work in industry, collaborating with Royal Doulton, Poole Pottery and – only recently – at Park Rose, in association with Sue Pryke (see 4.6.1.4).

This work has not been financially motivated: rather, it represents a search for creative stimulation: as she explains, the craft and design aspects of her work 'nourish' each other. She states that,

'I don't call myself a designer... I do design work.'

In each relationships, Tchalenko had drawn heavily on the knowledge gained through crafts practice. In terms of the product itself, her experience of throwing domestic ware proved invaluable, providing her with a sense of three dimensional form and volume which she believed was not shared by sculptural ceramicists. In terms of the design process, her crafts knowledge became an essential communication channel, enabling her to gain respect from production staff, and to convey her ideas effectively. In addition, it had enabled her to identify attempts to sabotage her designs: at Poole Pottery, for example, a glaze that she had specified ran persistently, causing the ware to adhere to the kiln shelf. Drawing on her own experience of developing and testing glazes, she realised that the kilns were being fired higher than she had specified, and was able to argue her case with production managers.

Tchalenko had found this capacity to defend her own designs particularly useful, due to the increasing incidence of materials illiteracy amongst company managers, which enabled production staff to block NPD by claiming that new designs were technically impossible to manufacture. She had discovered that collaborations were far easier when she felt she had support from a member of the company's management team. She had also learned to employ motivational tactics, flattering production staff, 'grovelling' and being 'obsequious' in order to gain their support, and, following the failure of her collaboration with Royal Doulton, to work only with smaller companies whose flexibility was greater than large manufacturers. In terms of design methodology, she now tended to design in accordance with available capabilities and constraints,

'going into a factory looking at what they can do rather than what you want them to do.'

However, she believed that her influence within manufacturing companies would always be limited by her status as an outsider, and particularly as a woman, as well as by the obstacles posed by conservatism and the need for manufacturing efficiency. These problems had persisted even at Poole Pottery, where she had 'sat on the factory floor, absorbed in what they were doing', and now considered herself to have developed a positive relationship with the company.

Tchalenko also commented on crafts education, suggesting that the majority of ceramics students are unable to articulate a definition of crafts knowledge. This affirmed the comment made by the manager of Rosenthal (see 4.6.1.2), who had commented on crafts practitioners' inability to distil and transfer useful elements of their work.

4.6.1.4. Susan Pryke:

Susan Pryke is known for her work on IKEA's 365+ range, and the objective of the interview was primarily to investigate the potential for a case study of that relationship. Although difficulties in attaining access to Pryke's contacts at IKEA prevented the development of this idea, the interview provided the opportunity to gain a new perspective on the crafts practitioner's relationships with manufacturers.



fig.36: Pryke, photographed for IKEA publicity material.

Pryke's education and training had spanned both craft and industrial techniques: originally a thrower in a Lincolnshire pottery, she had explored hand-building during her undergraduate course, followed by slip-casting at the Royal College of Art (RCA).

During the third year of her BA course, Pryke (figure 36) had won a Royal Society of Arts bursary, awarding her a six week placement in Wedgwood's design studio. This had led to permanent employment following her graduation, which lasted for one year. Realising that the company's conservatism had 'knocked some sort of spirit out of [her]', she then applied to the RCA, with the aim of re-discovering her own creative voice whilst finding a means of working as a designer outside of the industrial ceramics manufacturing arena.

Pryke spent her year at the RCA researching markets suitable for her style of work and manufacturers capable of producing it, in parallel with designing a lemon squeezer and a giftware range (figure 37).



fig.37: Pryke's RCA degree show, which formed the basis of her first production ranges.

Following Pryke's graduation, her products were sold in Heals, The Conran Shop and small retail outlets. Various manufacturing options were tested. The first of these was an alliance with Gloucestershire manufacturer English Country Pottery, who proved unable to attain Pryke's quality standards. One new Stoke factory run by three, highly skilled former Wedgwood employees was approached, but proved unable to interpret technical drawings.

Eventually, following a year of employing a small team to manufacture on her behalf, Pryke was recommended to visit Park Rose, a small, Bridlington manufacturer which produces its own ranges, whilst supplying retailers including Boots, BhS and Laura Ashley. The company had not previously undertaken custom work, and initially considered Pryke's order for 10,000 units per annum too small to be worthwhile: Pryke believes that only her association with IKEA and the design awards that she had won convinced the company to invest in her as a long-term proposition, in the hope that the volume of her orders would increase over time.

Park Rose succeeded in manufacturing the lemon squeezer design, despite its lack of a foot ring, which caused difficulties with adherence to the kiln shelf. Pryke attributes this success to the company's determination and problem-solving capabilities: as she states,

'if it doesn't quite come out right, then they'll try their hardest to put it right, to how I want it to be.'

This success provided the foundations for a relationship that Pryke described as being characterised by increasing mutual understanding. As she explained, the company had been developing a strong, intuitive feel for her requirements, whilst both her knowledge of its capabilities and her belief in the necessity of designing in accordance with this, had increased. As an illustration of this, she described the development of a lidded box. Pryke had known from previous experiences that a flat lid would slump during firing, and consequently incorporated a convex curve into the plaster model from which the mould was made. However, she had not allowed for the weight of the lid's knob, which increased the severity of the slumping. When the first lids emerged from the firing, the Park Rose technician acknowledged their discrepancy with Pryke's designs, and increased the degree of curvature on the model, in order to compensate for the knob's weight.

At the time of the interview, this alliance was set to continue, and a collaboration with ceramicist Janice Tchalenko (see 4.6.1.3) was being planned.

In the meantime, English Country Pottery had approached Pryke with a commission to re-design its entire collection: although the company was unable to manufacture her degree show work, its managers were impressed by her sense of three dimensional form. The current collection was considered by the company to require rationalisation, as shapes had originated from a number of disparate sources.

Pryke began the project by making several factory visits, in order to learn about both market requirements and manufacturing constraints. She immediately felt at ease with the production team, and began to develop a strong relationship with Managing Director John Collett. She identified the need for an enduring, 'classic modern' style, and for flat surfaces, due to the company's emphasis on hand painting. Her initial designs were refined in collaboration with John, who was able to evaluate them in relation to his knowledge of markets, price-points and

production processes. One design, for example, was reduced in size in order to decrease its cost to an amount appropriate to its retail destination, whilst another was increased in order to allow a thicker wall, more appropriate to the shape of the mould required by it.

Pryke considered her knowledge of craft materials, forming and decorative processes to be crucial to her success in designing to meet English Country Pottery's requirements: as she states, her interest in the company was informed by an experience which could not be matched by theoretical understanding. Comparing her experiences at the company with her attempts to source metal components for another project, she realised that,

'[I feel] completely ill at ease really, when I go into another factory [not a ceramics manufacturer], because I don't know what on earth anybody's doing, and it's not as if I can go up to someone and say, what are you doing.. [because] I probably won't understand the processes of it.'

Pryke particularly appreciated the dialogue and subsequent learning resulting from her crafts knowledge. She considered it to be easier to achieve in a small company, such as English Country Pottery, where positive relationships were easier to establish with individual production staff, and where a limited budget increased the pressure to succeed.

Pryke's RCA degree show was not only the springboard for the development of her own product range, but also the starting-point for an alliance with IKEA which was to last two years and to result in the award-winning 365+ range of cookware and tableware.

Pryke's show was admired by IKEA project manager John Michael for its 'quirkiness' and apparent appropriateness for manufacture. Her brief, in collaboration with textiles designer Anke Spets and industrial designer Marcus Lundström, was to up-date the company's 'starter box', which included basic tools for preparing, cooking, eating, storing and serving food. The designs were to be microwave and dishwasher safe, and to be sustainable across a twenty-year time-scale.

From the start of the project onwards, Pryke noted some significant differences between IKEA's approach and that which she had experienced at Wedgwood.

On the positive side, she was impressed by IKEA's friendliness and non-hierarchical culture, in particular the lack of dress codes, and the importance accorded to design, which was reflected in a far higher fee than that offered by the company's UK counterparts. The project's research and developmental phases were well resourced and managed, with all three designers meeting in London and Stockholm to visit retail outlets and work through ideas together.

On the negative side, however, Pryke was surprised to discover a lack of integration between design and manufacturing. At Wedgwood, designers and modellers had been encouraged to work 'hand-in-hand', in order to achieve a balance between aesthetic, functionality and manufacturing criteria. At IKEA, conversely, suppliers were not identified and – in some cases – materials not specified, until the design phase was complete, when quotes would be obtained from alternative manufacturers. Although a prototyping team existed, it was only consulted immediately prior to the final designs being sent to the factory, and although meetings took place between IKEA and the factory, they did not involve Pryke. Pryke states that she was encouraged to see the project as 'purely a shape thing, you know, a design thing,' and that IKEA's attitude was that, 'you just do the shapes and we'll do the technical bit.'

Pryke was not asked to make a factory visit until after the specification phase was complete. The visit's purpose was not explicated, and although Pryke assumed that she would be checking finished samples, in actual fact she was required to discuss manufacturing difficulties. These difficulties had primarily resulted from Pryke's use of a 'square' theme, employed in order to 'give some excitement to the table'. This had proved more difficult to manufacture than standard, circular shapes, which are easily extracted from moulds and which absorb glaze and heat evenly. A square mug proved impossible to manufacture, square foot rings had to be replaced with round ones, and the plates could not be manufactured with flat rims (see figure 38). On the larger dishes, the clay could not be made thick enough to prevent the hollow caused by the foot ring from being visible as an impression, when viewed from above.

The factory staff were initially unwilling to accept Pryke's arguments, and a battle between aesthetic and manufacturing criteria ensued. As Pryke explained,

'It's very difficult... I mean, as far as the people in the factory were concerned, if this had a higher arc on the side here it didn't matter.... But I think it's really important.'

Although compromise solutions were found, by the end of the visit, Pryke felt that she had ‘lost ownership’ of the designs. She did not attribute blame to the manufacturer’s capabilities or adaptability, but to language difficulties and to IKEA’s management of the project. Acknowledging the impossibility of manufacturing some of her designs and recognising in retrospect the need for context-specific information, she resented IKEA’s failure to involve her in earlier meetings.



fig.38: examples of Pryke’s work for the IKEA 365+ range, including a round mug which replaced the original, square design. The indentation made by the green platter’s foot ring is clearly visible in this photograph, where glaze collects in the recess.

Pryke remained perplexed by her experiences with IKEA, particularly as she knew of other designers who had been encouraged to make factory visits throughout their projects. As she states,

‘I know they shouldn’t be teaching me how to do my job, but I’m not that qualified in industrial ceramics. I mean, I’ve only worked in the industry for a year.’

Despite her difficulties in finding a manufacturer for her own designs, Pryke considers sub-contracting manufacture to be a realistic option for independent ceramic designers. In her view, there are many factories prepared to undertake short production runs, set-up costs are reasonable at between £130 and £240 per mould, and manufacturing technologies are accessible to those with a crafts background.

The major problem, she considers, is the conservatism inherent in Stoke-on-Trent factories, and the poor quality of both products and customer service. In particular, she found that her designs were criticised according to conventional criteria: for example, a single motif printed onto a vessel was not considered appropriate decoration as it did not conform to expectations of 'a pattern'. As Pryke explained,

'Stoke-on-Trent [factories] are a bit like, "you don't want to do it like that." ... They don't want to change: anything new, they're not interested in it... you almost feel like they're laughing behind your back.'

4.6.1.5. Rachael Woodman:

Rachael Woodman (figure 39) enjoys an international reputation as a glass maker, illustrated by her representation in six national collections. She is considered one of the few individuals to have adopted a fully integrated approach to her work as a crafts practitioner and as a designer. She may also be considered an exemplar of the 'journeyman' tradition in the contemporary crafts, having trained at the Orrefors Glass School, as well as the Royal College of Art. The purpose of the interview, which occurred after the case studies, was to gain insight into the attitudes and working methodologies of individual considered exemplary in the field.

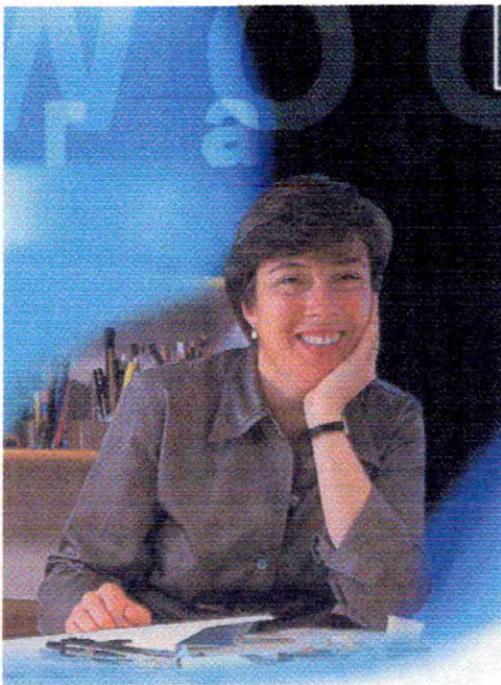


fig.39: Woodman, photographed for Dartington Crystal publicity material.

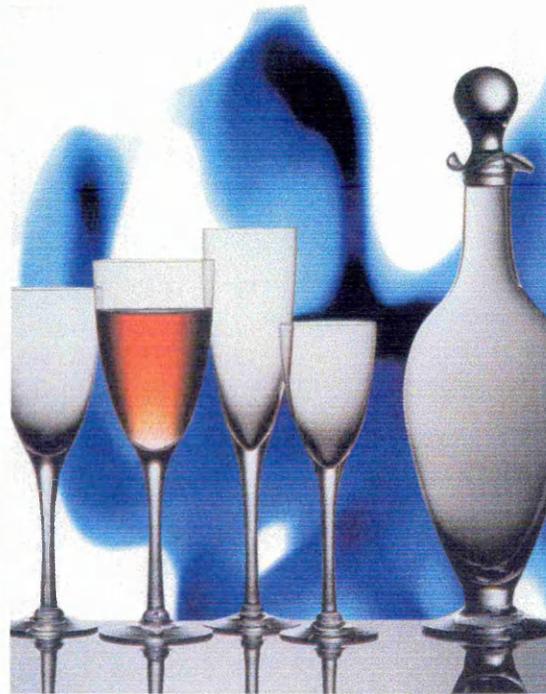


fig.40: Woodman's best selling Rachael wine suite, for Dartington Crystal.

Woodman had trained and practised as a glass maker, but now chose to work in collaboration with more highly skilled makers, rather than to realise her ideas herself. She considered her understanding of glass, together with the appreciation of form that she had developed through making it, essential to her work. However, she had been eager to relinquish the frustrations involved in making itself: as she stated emphatically,

'been there, done it, don't want to do it any more.'



fig.41: an example of 'Design by Dartington'.

Woodman was continuing to work for Dartington Crystal, a company she described as 'hidebound and set in its ways', and criticised for its superficial commitment to design. She had been responsible for the design of the company's best-selling Rachael wine suite (figure 40: see previous page), as well as its recent Design by Dartington range of mass-produced, everyday glassware (figure 41). In addition, she was continuing the development of her vessel forms, which were produced in collaboration with Neil Wilkin, and enjoyed an international reputation (figure 42). She considered there to be no conflict between the various aspects of her work, which she considered equally fulfilling.

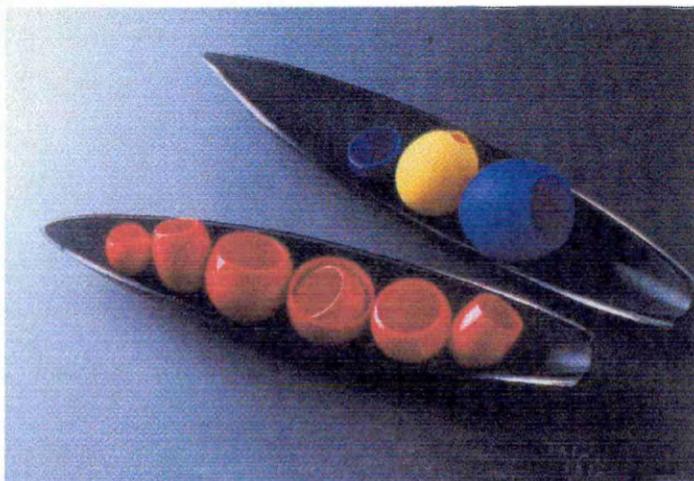


fig.42: 'pods'.

Woodman considers it essential for design to be conducted in accordance with a company's strategy, manufacturing capabilities and retail base. As she explained,

'if, at the end of the day, you achieve a good looking design that's profitable to produce, then you have designed a good piece. If you design a beautiful article that can't be produced, then you haven't done a good design, have you, because it can't be made.'

This approach is evident in her Bar Excellence range for Dartington, whose design was intended to differentiate itself from mass produced equivalents and thereby regain a market sector being eroded by improving manufacturing technologies. Woodman met the challenge of adding value to the products without adding significantly to their cost, by designing simple shapes embossed with a small 'D' stamp at their base (see figures 43 and 44). Although she initially met with resistance from production staff, who 'threw up their hands in horror', believing that the addition of an extra process would 'cost the glass out of existence,' the range's success proves her accuracy in evaluating both manufacturing capabilities and marketplace, and in translating her knowledge into product attributes.

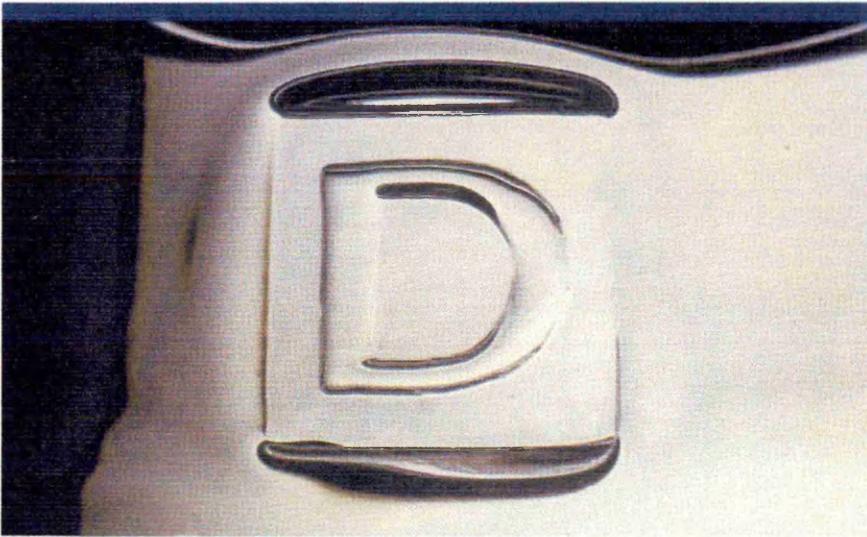


fig.43: detail of stamp, Dartington Bar Excellence range.

Throughout the interview, Woodman referred to the discrepancy between this holistic approach to design, and the attitudes fostered by her education at the Royal College of Art. She considered that she had graduated with a creative drive and skill base that had proved essential

in designing for industry, but also with an attitude of ‘preciousness’ which had inhibited her. She criticised her own arrogance as a young designer, her belief in the superiority of her own knowledge of design, and her need to defend the ‘integrity’ of her designs against managers, sales and production staff. It was only through working in industry, she claimed, that she had learned to combine her capabilities in designing form, her understanding of the glass making process, and an holistic, team-oriented approach to NPD.



fig.43: cider glass from Dartington’s Bar Excellence range.

Woodman believed that effective management at both organisational and project levels was essential to successful NPD. In her opinion, a supportive, people-centred management style at senior level permeated throughout the company, creating an organisational culture conducive to NPD. Management commitment to design was also essential: Woodman criticised many managers for supporting design in principle, yet failing to carry their beliefs through to practical support measures. She believed that much design talent was wasted, due to a lack of investment in design management on an organisational level: as she explained, only those designers willing and able to manage themselves could succeed in many companies. On a personal level,

she considered that she had developed self-management capabilities out of necessity, despite the difficulties she experienced in evaluating her own work, evident in her comment that,

'It is hard [to self-evaluate], because you get so close [involved], and there's some elements in all of it that you love, but you have to be brutal.'

As well as self-management skills, Woodman considered that the development of particular interpersonal skills had been essential to her success: as she stated, she 'works very hard at getting on with people.' This approach had resulted from her early experiences at Dartington, where she had discovered the importance of good relationships in securing support for her designs. On one occasion, she had complained to the production manager of a lack of commitment amongst the blowing team, and in consequence had suffered long-term ostracisation from the production team, to the detriment of her design work.

In relation to production staff, Woodman believed that developing positive relationships involved demonstrating respect, good manners, common sense and a lack of arrogance. In relation to company managers, it involved maintaining professionalism, and in particular, guarding against being stereotyped as a 'girly' or as a 'creative': as she explained,

'we joke about, Rachael works best in dark places, she needs to go off and do this creative urge bit, you know. But basically, you're just another professional person same as they are, with a job to do.'

Social skills were also important, Woodman claimed, particularly in dealing with senior managers. She described a recent social event with the management team of the French factory producing the Design by Dartington range as,

'a tremendous strain..... All very nice, but it's not jolly at all. Not jolly at all. It's hard work.'

In terms of personal attributes, Woodman considered her persistence, stubbornness and self-conviction to have been essential in transcending organisational boundaries and challenging convention. Woodman described feelings of intimidation – and a need for complete self-conviction – when challenging established ways of making glass in a factory where,

'everything's moving along at a great pace, and everyone knows where they're going, what they're doing and why they're doing it.'

The interview also elicited further criticisms of crafts education, which reinforced Woodman comment on RCA graduates' attitudes towards design. Woodman believed that crafts education was increasingly neglecting the fundamentals of crafts skills, aesthetic sensibility and intellectual development, which she considered crucial to transferring crafts knowledge to design for industry. As she explained, a grasp of form and proportion, together with an understanding of materials and processes, were the basic requirements for working in the glass industry. Intellectual capabilities, meanwhile, were essential in adapting ideas in response to changing contextual factors.

Woodman attributed this neglect of fundamental skills to an increasing emphasis on evaluating the craft product rather than the processes underpinning it, as well to the decreasing availability of studio time and the perceived need to provide pressure to provide basic business skills training. Meanwhile, she claimed, the predominance of crafts practitioners – rather than designers – amongst lecturing staff was embedding a narrow focus into courses.

4.6.1.6. Martin Hunt:

Martin Hunt is a partner in Queensbury Hunt Levien, a design consultancy renowned for its ability to imbue mass produced products with 'craft' qualities. It specialises in the design of ceramic tableware and sanitary ware, and their work for Ideal Standard, Hornsea Pottery and Thomas has been particularly highly acclaimed (figure 44). As Walker suggests (1992), its incorporation of a 'craft-like' concern for detail and materials, together with their emphasis on model-making, produces designs which are simple, effective, functional and human-centred (Walker 1992 p.7). The interview sought insight into applications for crafts knowledge in its broadest sense, in a design environment.



fig.44: Hunt's Contrast range,
designed for Hornsea Pottery in the 1960s.

Like both other partners in the company, Hunt began his education as a ceramicist, specialising in hand building during his undergraduate degree. He then studied at the Royal College of Art, where the course's industrial emphasis presented a 'whole wealth' of new techniques, processes and materials unavailable to studio ceramicists.

Hunt continues to use the model-making skills he developed at the RCA as an integral part of the design process, resolving form using a plaster model, before inputting its co-ordinates into a CAD system which generates colour alternatives, checks volume capacities and creates

technical drawings. He considers this a differentiating factor between himself and industrial designers, whose model-making skills he considers to be less well developed, due to the more general nature of their education. Using a model in this way is time-consuming, but allows him to employ free-flowing curves not yet achievable using CAD technology, and to evaluate and refine his proposals in three dimensions (see figure 45).

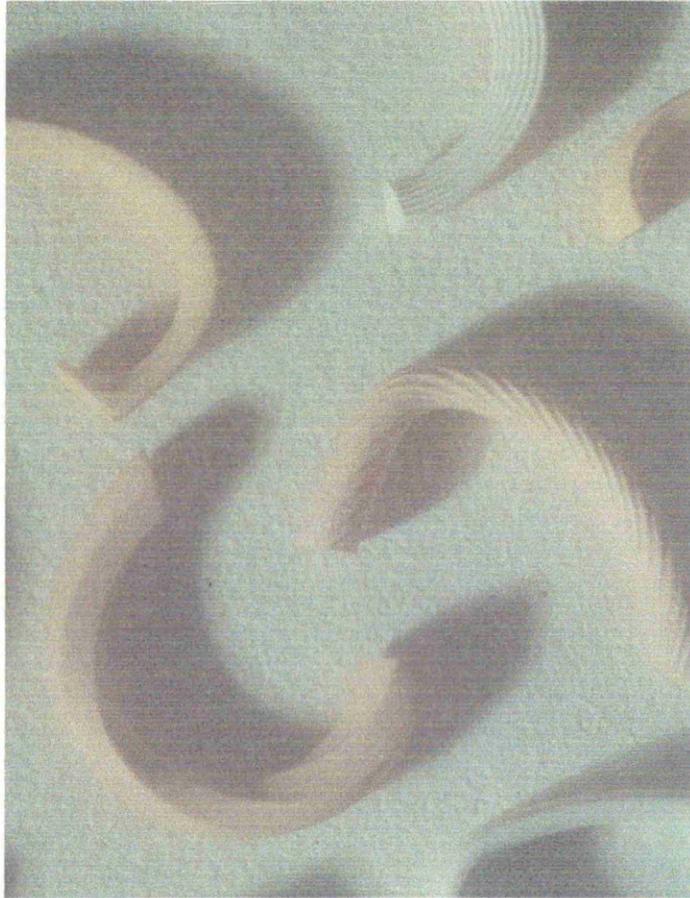


fig.45: a range of prototype handles for Thomas, modelled directly in plaster.

The plaster models are used at other stages in the NPD process. In client meetings, they are presented in conjunction with glaze tests, technical drawings and a verbal description, in a manner which Hunt believes assists mutual understanding of the product concept. They also play a role in product advocacy: Hunt finds that whereas the virtual nature of CAD renderings encourages clients to demand refinements, the permanence of the actual prototype encourages acceptance of his proposals.

In meeting manufacturers, meanwhile, Hunt finds that the plaster model is easily understood by production managers, and is usually effective in establishing his professional competence. As he states,

'they know where I am in the pecking order of making plaster models!'

It thereby provides a foundation for the development of interpersonal relationships based on respect, a 'fraternity', as Hunt described it, between skilled people. Meanwhile, the processes of identifying and resolving problems involved in its creation served as a thorough preparation for the inevitable questioning from production managers, which could otherwise 'destroy' a design proposal.

Hunt considered his crafts knowledge to be essential in other aspects of his relationships with production managers, enabling him to overcome the resistance and pessimism characterising production staff (see case studies 1 – 4), by 'talking their language' and proving his proposals to be realistic manufacturing propositions. As he explains,

'...in many cases I can do many of the processes just as well as they can, certainly on the model-making side..... having got that confidence of craft in your fingertips, then you do speak to industrial people in a way that perhaps a more general person can't.'

In terms of the product itself, Hunt considered himself more aware than many industrial designers of the subtle differences between material qualities, and their ability to imbue a product with a unique, living character. He described a need to visualise the essence of the object – 'a very glowing rim', for example – and to find ways of translating this vision into real material qualities. This involved drawing upon his knowledge of ceramic finishes and the techniques that produce them, specifying a certain variation on a crazed, celadon glaze for example, rather than a semi-matt, pale green finish. As he explains, the knowledge required in order to both visualise and specify a mutually enhancing form, colour and surface finish is rarely developed by industrial designers.

Hunt believes that this type of knowledge is particularly valuable in today's retail-driven market. Buyers, he explained, want to differentiate their product ranges by using distinctive material qualities, as well as colour and form. However, they often encounter difficulties in

translating their overall concept into manufacturing specifications, and require designers with materials understanding who can translate aesthetic requirements into actual techniques and materials.

Hunt described how, on occasion, his ability to combine his experiential knowledge of ceramics with the theoretical understanding of other materials amassed through his design practice, had led to materials innovations. One job, with Hornsea Pottery, had led him to experiment with a terra sigillate, a non-glazed yet vitreous surface made from a polished, high-density slip (liquid clay). Although terra sigillate was traditionally uncoloured, Hunt and Hornsea required a wide range of colours. This proved impossible using ceramic colourants, which do not melt and disperse in slip to the same extent as they do in glazes, with their inherent fluidity. A solution was found by mixing the slip with plastics colourants, whose microscopic granules dispersed more easily than ceramic colourants. Hunt believes that he was uniquely capable of finding this solution, and that few designers have the breadth of knowledge required in order to transcend boundaries between industries.

Whilst Hunt considers a crafts background to be useful to industrial design practice, he believes it to be extremely difficult for any one individual to practice successfully as both designers and craft maker. In his opinion, design is an all-consuming activity, which cannot be practiced as a 'sideline'. In any case, he considers crafts practitioners to be inhibited by a 'preciousness', or need to defend work because it constitutes an expression of self. As he explains,

'Anything that kind of rocks the boat is going to cause the lower lip to tremble..... when they put the object that they've most preciously been working on for the last few weeks.... There is that terrible risk that you actually know how deficient it is, because suddenly you're seeing it through other people's eyes, not the kind of introverted world you're in.'

Hunt attributes this 'preciousness' to crafts education, which he believes encourages a narrow focus, with students developing a small range of ideas and objects, without consideration for their social and cultural context. Overall, however, he considers himself a 'great advocate of the British art school as it has been,' believing that the diversity of approaches, materials and techniques found within a ceramics department, for example (eg artists, designers and artist-craftspeople) stimulates the cross-fertilisation of ideas and technologies between craft and industry.

The interview also covered the Crafts Council's role in encouraging collaboration between manufacturing and the crafts. Five years previously, Hunt had been involved in one initiative, whereby retail buyers had been invited to view a selection of craft objects which were considered possibilities for mass manufacture. The project had not succeeded, due primarily to the conflict between aesthetic, manufacturing and retail criteria: the degree of compromise involved in making the craft objects suitable for mass production and retail had been considered too great. . Hunt believed that the Crafts Council's should continue to take an advisory role, but in relation to crafts businesses themselves, and to both their commercial and creative development.

4.6.1.7. Brian Asquith:

Brian Asquith (figure 46) was described by Crafts magazine in 1993 as 'the ideal man to call upon... in the continuing debate about the links between craft and industry' (Burden 1993). Born in 1930, he trained as a sculptor at the Royal College of Art, before establishing Asquith Design Partnership during the 1960s, which he now runs with his two sons, from rural premises in Derbyshire. The company works with a diversity of clients, designing products ranging from tools to gas fires and garage doors (see figure 47). Asquith also continues to accept ecclesiastical, corporate and private silversmithing commissions (figure 48: see over), and at the time of the interview was working on a high-profile urban development project in Sheffield City Centre. The interview, which took place early in the course of the research, sought insight into the interviewee's dual roles as a designer and crafts practitioner.

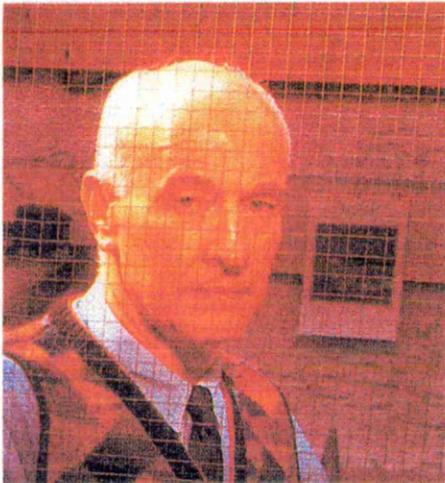


fig.46: Asquith, photographed for a Crafts magazine feature.

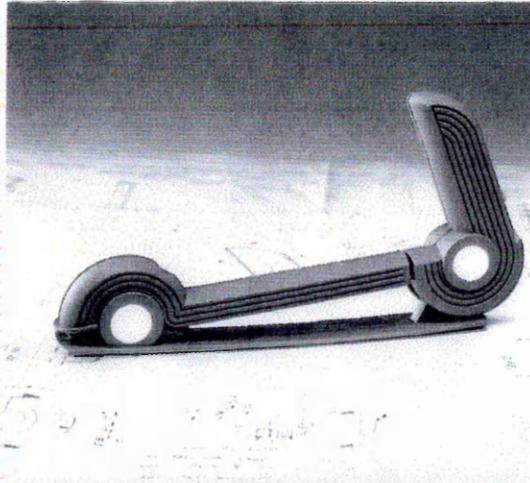


fig.47: Asquith's Trimmatool, designed for Avon Tools.

Asquith's two interests – craft commissions and design for manufacture – appear to be interdependent. His design methodology may be considered crafts-oriented in its emphasis on modelling skills: styrofoam is used to resolve the object's form, before its co-ordinates are plotted into a CAD system which ensures an accurate interpretation by the manufacturer. Similarly, his crafts methodology may be considered unusually design-oriented in his preference for commission-based work – which effectively constitutes a brief – and in its linear format: he typically plans his work on paper before executing it, rather than working in dialogue between materials and intent (see chapter 3).

Asquith held a strong belief in the potential for crafts practitioners to improve standards in product design, imbuing the designed object with subtle material qualities which often eluded the industrial designer. In terms of the design process, he believed that the transferability of their knowledge to manufacturing technologies enabled crafts practitioners to communicate more effectively than industrial designers, with technical staff: in his own work, he found that modelling in styrofoam resulted in a high degree of accuracy in making specifications. Asquith believed that crafts practitioners' fascination with how objects are made could improve contextual fit, thereby ensuring the minimal lead times increasingly required for NPD. Moreover, he considered the challenge posed by any discrepancy between their requirements and existing manufacturing capabilities to be valuable in terms of stimulating innovation within the manufacturing company.



fig.48: Dinner knife and fork, designed and made by Asquith for the Sheffield Millennium canteen.

Asquith also identified some benefits of collaboration with manufacturers for the crafts practitioner. In particular, he believed that the restrictions imposed by the factory environment could stimulate creativity, by offering the practitioner new techniques for exploration within their personal practice.

Despite these potential benefits, however, Asquith recognised the existence of significant barriers to collaboration between practitioners and manufacturers. Firstly, he considered that neither party had the cross-cultural sensitivity and appreciation required for project initiation.

Secondly, he saw a lack of the long-term perspective required from manufacturing companies, if such collaborations are to develop to their full potential. Thirdly, he saw the ‘individualistic’ nature of crafts practice as problematic: he believed that Morris’s ideals of fulfilment through control of the entire creative process still influenced crafts practitioners, thereby precluding teamwork and delegation. In addition, he believed that crafts practitioners were disadvantaged by poor CAD capabilities, resulting from the intuitive, emotive aspects of their practice: as he explained,

‘it doesn’t necessarily come very quickly to a crafts person, who doesn’t like playing around too much with knobs.... they tend to work straight out from their gut really. You know, the calculation isn’t quite there.’

Drawing on his broad experience, Asquith also suggested a number of factors which he considered could influence the outcome of collaborative NPD. In terms of attitudes, he believed that mutual respect was of paramount importance, particularly in building the relationship between maker and point of contact within the production team. Flexibility and a team-oriented approach were also crucial in attaining contextual fit: the crafts practitioner had to be accommodating towards suggestions made by others, and to ensure that all parties were involved in discussions and decision-making. In terms of skills, meanwhile, communication, empathy, negotiation skills and professionalism were all fundamental to success, when harnessed to the practitioner’s drive to ensure a high quality product outcome.

4.6.1.8. Emma Bridgewater:

Bridgewater Pottery is regarded as a pioneer of the ‘casual dining’ trend in ceramics, having established its reputation in the mid 1980s with the ‘Blue Toast and Marmalade’ range (figure 50: see over). Emma Bridgewater herself (figure 49) has also been accoladed, winning the Businesswoman of the Year award in 1987 for her achievements in an industry of which she had no prior experience. The interview, which took place relatively early in the research, sought to gain insight into the experiences of a non crafts-practitioner, undertaking similar activities to the crafts practitioners already interviewed.

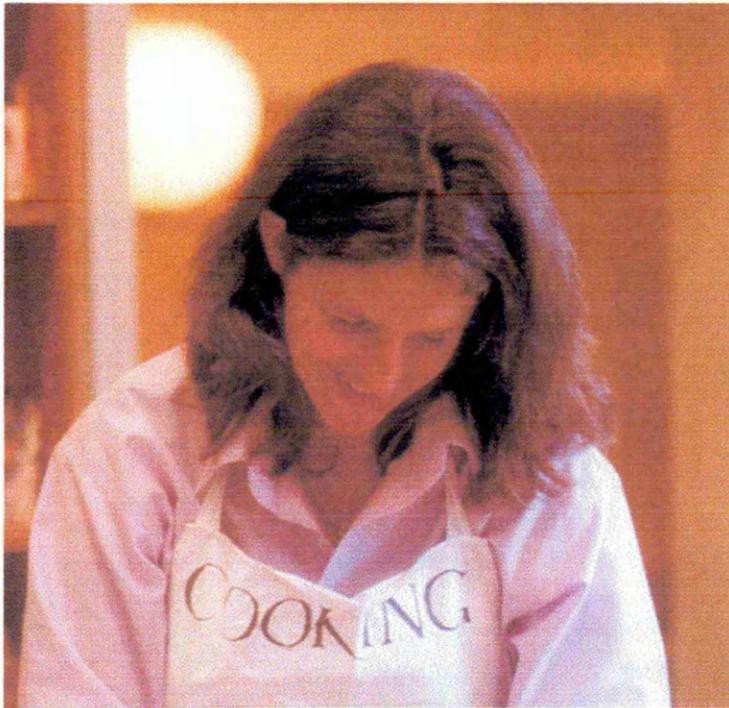


fig.50: Emma Bridgewater, photographed for Bridgewater Pottery’s product catalogue.

Born in 1960, Emma Bridgewater (see figure 50) had established Bridgewater Pottery in 1985, identifying a gap in the market for ceramics which interpreted traditional, domestic kitchen and tableware in a contemporary manner (figure 51: see over). Despite expanding its production capacities and developing new designs and decorative techniques, it is evident that the company has remained committed to this particular market sector, adding value to its products through the domestic and industrial romanticism conveyed in its product catalogues (see figures 50 – 52).

Having recently graduated in English Literature and worked temporarily in a small, dynamic knitwear company, she was looking for an opportunity to establish her own, design-led business. Her proposition centred on the use of hand decorating techniques, which she had realised could add value to the products without increasing their cost, thereby generating substantial profit margins. Despite her lack of formal education in design or business, she considers that she had an entrepreneurship nature, having observed her father build and sell a successful business during her teenage years.



fig.51: Bridgewater Pottery's
Blue Toast and Marmalade range.

Bridgewater's original plan had been to source an existing earthenware mug, plate, bowl and jug from a factory which would allow her to introduce her own surface decoration, developed through experimentation. She had searched for a small, family-run, privately owned company,

but failing to find a manufacturer fulfilling these requirements, had commissioned both design and manufacture from a bespoke slip-casting workshop. Bridgewater had placed one order per month, collecting the greenware, biscuit firing it, and transporting it to London for decorating, glazing and distribution to retailers. After a year's trading, when the volume of orders received exceeded her decorating capabilities, Bridgewater had taught her decorating techniques to staff at the workshop.

After ten years of trading, the company's relationship with the workshop ended as, despite significant expansion, the workshop was unable to attain the manufacturing outputs required in order to meet the company's demands. Bridgewater Pottery, meanwhile, built its own manufacturing base, renovating an 18th century factory in Stoke-on-Trent. The company was now managed by Bridgewater, her husband and two directors, and employed 80 staff in total, operating three retail outlets and a mail order service, and sourcing complementary linen, cutlery and glassware from elsewhere.

Bridgewater recalled several specific problems she had encountered in attempting to identify a suitable manufacturer. Primarily, these centred on her lack of crafts training: she believed that her technical ignorance, combined with her inability to fully visualise her proposal or produce a prototype, had constituted the major barrier to her acceptance by manufacturers. Her informality, age, gender and lack of qualifications had also, however, contributed to this. Manufacturers' insularity had also been a problem, however, due to the companies' minimal, responsive approach to NPD: as she explains,

'people aren't looking for design to arrive from the outside world. And they certainly aren't in Stoke.'

As the primary influencing factor on her success, Bridgewater describes how being 'poised half way between London and Stoke' had enabled her to combine her market awareness with her continually improving technical knowledge. She had observed at the time how unusual this was. Coincidentally, she was visiting a factory at the same time as a party of buyers from Next, and noted their limited knowledge, inflexibility, and unwillingness to learn. The Next approach, she had observed, consisted of requesting a reproduction of an existing piece of pottery: the buyers appeared uninterested in the explanations made to them of technical considerations. Her own approach, in contrast, she described as one of investigation through talking to staff, and of applying her findings to design. As she explains,



fig.52: Bridgewater Pottery production staff, photographed for the company's product catalogue.

'I really liked the practical details of why you can and can't, and how you do this..... what I wanted was to try to really genuinely understand what you can and can't do in a pottery, and what, the way that different potteries have specialist things that they do.'

Bridgewater considered other influencing factors on her success during this initial phase to have included her confidence in herself and her proposition. Whilst subcontracting manufacture, the relative proximity of Stoke to London - in comparison with Portugal, where her products could have been produced more cheaply - was also important, allowing her to resolve problems in person, and minimising communications problems. Throughout the venture, Bridgewater considered her team's business acumen to have been crucial to the company's success: the emphasis had always been on supporting the product proposition with NPD, manufacturing,

management and quality control infrastructures, and on encouraging skills development and diversification within the workforce. Finally, Bridgewater believed that her success had been influenced by her tendency to see problems as challenges, which had prevented her from becoming intimidated by them: any experience of sexism, for example, was

'.....like a red rag to a bull: I just can't wait to prove them wrong.'

Bridgewater believed that her company had established new benchmarks for the pricing of earthenware, discrediting the established hierarchy of ceramic materials and proving that consumers are willing to pay for design and craftsmanship. She believed that her products are not overpriced, considering that a high proportion of the profit they generate is used to create the infrastructures to support design and quality control.

Bridgewater commented that the Stoke-on-Trent ceramics industry had changed to such an extent over the past 15 years, that an entrepreneur would now be unlikely to succeed by following her example. Whilst attitudes at managerial level had become more accommodating towards 'outsiders', there were very few firms left in existence who were small and therefore flexible enough to accommodate entrepreneurial designers. She believed this situation to be further advanced in the glass industry, where manufacturing was 'very streamlined': she herself had investigated the potential for a machine-made glassware range, but had eventually sub-contracted production to craft maker Neil Wilkin, despite the low profit margins this alliance generated for her.

4.6.1.9. David Williams-Thomas:

At the time of the interview, David Williams-Thomas was Chairman of Royal Brierley Crystal, one of the major Stourbridge glass manufacturers and a significant local employer. The company had been operating since 1776, and during the mid and late nineteenth century was one of the UK's most prominent and innovative glass manufacturers. At the time of interview, it was continuing to trade in the traditional giftware market (see figure 54: over), generating turnover of £5.3 million and employing 254 staff. As the first interview conducted with a manufacturer, the interview aimed to elicit Williams-Thomas's experiences of managing collaboration with crafts practitioners.



fig.53: A 1970s advertisement for Royal Brierley Crystal factory tours, depicting Williams-Thomas (centre right) with production staff.

Williams-Thomas's responsibilities as Chairman of the company included devising and implementing NPD strategies, and he had overseen a number of initiatives involving crafts practitioners over the past twenty years.

In the mid 1980s, in response to increasing interest in studio glass making, he had established The Foundry, a small glass-blowing workshop attached to the factory shop (see case study 1). This project's aims had been to increase visitor numbers, particularly to the factory shop, whilst generating new ideas for manufacture in the main factory. However, whilst The Foundry operated satisfactory as an independent unit, Williams-Thomas admits that it had failed to generate the envisaged technology transfer.

Williams-Thomas attributes this failure partly to production staff attitudes: the company's comfortable status in the marketplace at the time had caused a degree of complacency, reinforcing resistance to change and conservatism. The production staff had little respect for the craft practitioners' skills or understanding of their perspective, and consequently saw no reason to communicate with them.

However, the crafts practitioners themselves were, according to Williams-Thomas, also to blame for the lack of cross-functional collaboration resulting from the project. Their skills and knowledge were, he agrees with the production team, 'fairly limited', but they were more seriously hampered by a problem which he considers common to all craft practitioners with whom he has worked: the nature of their creativity.

Williams-Thomas considers that crafts education prepares the student for self-employment, encouraging the development of an individual aesthetic which will differentiate the practitioner's products from others in the marketplace. Practitioners therefore suffer, he believes, from a preoccupation with their own skill and the development of a personal style, which prevents them from responding creatively to contextual factors, such as market and manufacturing constraints. As he explains,

'What we tend to find is that they've got a particular trick or a particular look that is them. Once they've exploited that, that's it... they don't have the breadth to look at the marketplace, to look at the customers... to look at our processes and to bring them together.... they do perhaps a couple of sessions with us, and I say, "well now, what can we do next?" And they say "well, you know, that's what I do.''

Recently, Williams-Thomas had invited two crafts practitioners with broader experience in architecture and product design respectively, to work in the factory during the summer shut-down. These two projects, he stated, had been 'productive in terms of what I call creative work' and provided the company with useful technical information, but had ultimately failed in their objective of identifying new product opportunities acceptable too the company.

Williams-Thomas complained that the designs produced on these occasions had been,

'too far away from anything that we were expected [by retailers] to be making.'

This criticism related to a problem that he had identified in retailers' perceptions of Royal Brierley: as he explained, the company is perceived as a manufacturer of cut crystal rather than studio glassware (see figure 54). This, he believed, restricted NPD activities to new designs which complement those already in existence. A new range of 'art glass', for example, was to be decorated using colour rather than cutting, but to use traditional shapes and an essentially 'very mainstream' style. It was to be marketed alongside current ranges, in existing retail outlets, and its marketing was to consist of exclusively-designed packaging.



fig.54: a typical example of cut crystal made by Royal Brierley.

The future of Royal Brierley has been in doubt since the time of the interview. In 1999, following the departure of the Williams-Thomas brothers, the company announced plans for relocation to a new, £5 million visitor centre. However, by May 2000 it had entered negotiations with potential buyers, due its cashflow problems. It went into receivership in

October 2000, having cut its workforce from 254 to 125, but was rescued by an undisclosed management team in December of that year (ukbusinesspark.co.uk). At present, however, all manufacturing activities are suspended.

4.6.1.10. Peter Clark:

At the time of interview, DemaGlass Tableware was the second largest UK glass manufacturer, operating eleven automated, computer-controlled production lines. The aim of the interview was to investigate the potential for collaboration between crafts practitioners and large-scale manufacturers in comparison with the smaller-scale manufacturers such as Royal Brierley Crystal.

Clark had trained as graphic designer and evolved into what he described as a ‘surface product designer’. He had been in post at DemaGlass for a number of years, and now managed a studio of four designers, all trained in graphics, who designed both the shape and surface decoration of the blown drinking glasses, giftware and pressed ash trays (figure 55) with which DemaGlass supplied the retail and licensed trades.



fig.55: candle holders and wine glasses, manufactured and screen printed by DemaGlass.

Clark explained that, at DemaGlass, internal NPD began with conceptual sketches, produced by his department, which were then analysed and altered by the technical design staff. Manufacturing innovations were occasionally developed by technical team, who would isolate one machine head from the production line, in order to undertake experimental work. Clark criticised the technical design department for its conservatism and production-oriented mentality. As he explained, the need to meet production targets had created a resistance to

designs which stretched the machinery's capabilities, thereby creating large volumes of seconds or requiring an investment of time in order to resolve manufacturing problems. Meanwhile, being trained to think within the machinery's affordances had, he considered, encouraged an attitude of 'you'll have to sell what we can make,' amongst technical staff.

Technical staff were apparently unwilling to share their knowledge with the design department: as Clark explained,

'They very rarely give you reasons [why something won't work]... They keep things close to the chest.'

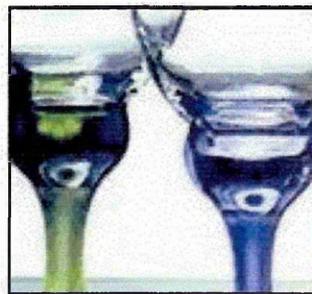


fig.56: DemaGlass's best-selling Baroque wine glasses.

Furthermore, Clark found difficulty in championing new products rejected by the technical team, partly due, he believed, to his own inexperience of glass making. As an example, he described the development of the Baroque range of wine glasses (figure 56), a best selling design which had originated from the design department. The design had originally been rejected by the technical team, who considered the glass ball located at the top of the stem impossible to manufacture. Eighteen months later, however, the same team had discovered a solution, by gathering extra glass onto the machine head, inflating the bubble as usual, and then heating only the lower half of the glass remaining below the bubble rather than the full amount. The resulting heat difference within the glass from which the stem was pulled meant that the lower half was more fluid than the top, and that consequently that a ball of glass remained at the top of the stem. Clark suggested that by working alongside the technical team, a crafts practitioner could perhaps find new, innovative ways of using the existing machinery, in order to reveal new product possibilities and challenge convention.

Clark suggested that collaboration with a crafts practitioner could also benefit his own department, in terms of introducing a 'handmade' aesthetic with an enduring market appeal. However, he did not believe that a crafts practitioner could provide the flexibility and breadth of skills he required from design staff. Whilst graphic designers were employed to design three-dimensional products, he did not believe that glass makers were capable of designing surface pattern.

4.6.1.11. Charles Hajdemack:

Broadfield House Glass Museum (figure 57) houses one of the UK's largest collections of glassware. As Principle Museums Officer, Hajdemack has developed an extensive historical knowledge of the UK glass industry, and of Stourbridge manufacturing companies in particular. He is a respected scholar within his field, and served as a juror for the 1998 Jerwood Prize for glass. The interview, which took place early on in the research, aimed to identify companies who had worked in collaboration with crafts practitioners, and to seek an external perspective on their effectiveness.

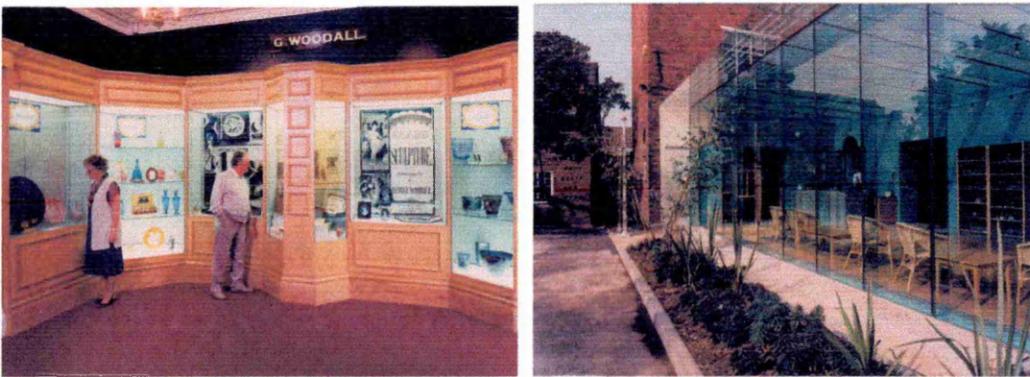


fig.57: Broadfield House Glass Museum.

Guided by his interest in technological innovation in the glass industry during its 'golden era' at the end of the 19th century, Hajdemack evaluated the success of the collaborations he knew of in terms of technology transfer. This gave him little cause for optimism: he recounted several failed projects which had aimed to introduce crafts techniques to the factory environment at Royal Brierley Crystal, through collaboration with crafts practitioners. These included the Foundry project (see case study 1), and an investigation into electroplating and other surface treatments, whose findings were hardly used by the company. They also included an attempt by glass maker Ray Flavell to introduce the Scandinavian ariel technique to the company, which had been successful until he left the company, when a lack of project advocacy and supervision had led to deteriorating production standards.

The fundamental problem, Hajdemack believed, was that manufacturers within the UK glass industry had become trapped within extremely limited niche markets, and were

Corbett, he explained that diversification had become difficult because each company was trading on its own tradition. This conservatism he considered to be firmly entrenched, having originated in the Edwardian era, when a revival of the neo-classical style had slowed the innovation characteristic of earlier decades. It was, he considered, reinforced in the 1920s by designer Keith Murray, whose influential articles and lectures advocated that design should cater to market demand, rather than stimulate it.

According to Hajdemack, any shift away from these markets was destined for failure because of a lack of appropriate marketing, which meant that buyers representing contemporary markets were unaware of the new products. At the same time, diminishing demand for those niche products – combined with increasing global competition - was encouraging manufacturers to compete on price by cutting standards of workmanship: for example, the vigorous acid polishing used to remove surface blemishes was causing a loss of definition and crispness.

Secondary problems identified by Hajdemack included job specialisation: as he explained, introducing new products can be especially problematic, when production staff's skills are limited to one particular operation, such as attaching a foot and stem to a wine glass. Tooling costs also inhibited NPD, and designers were often asked to alter new designs, in order that existing moulds could be used. In addition, Hajdemack had found through discussions held with managing directors of these companies that there was never an appropriate time for NPD activities to take place, as no resources could be made available during busy periods, and there was always a need to conserve capital during quiet times.

Hajdemack suggested that the failure to reinforce NPD with appropriate marketing initiatives not only ensured their failure, but also served to reinforce production staff resistance to change: observing poor sales for a badly marketed product, he claims that production staff typically become disillusioned with the idea of NPD, and resentful of any subsequent new products.

Hajdemack also described the development of approaches to NPD within the industry during the twentieth century. Prior to the late 1840s, he explained, design had been the responsibility of the gaffers heading the production teams, perhaps in collaboration with the company's managing director or technical director. In 1847, however, the influential design reformer Henry Cole had established a manufacturing operation employing artists including Richard Redgrave as designers. Cole's approach became seen as a means of improving standards in British manufacturing, due to their documentation in his own publication, *The Journal of*

Design and Manufacture, and the support they received from Prince Albert. They were less influential from the 1890s until the 1930s, when the trend towards retrospection led companies to draw on their own pattern books for new products. However, they had been reintroduced in the 1930s, when, inspired by Orrefors' work with the artists Simon Garter and Edward Hald, Stuart Crystal began collaborations with artists including Graham Sutherland, Laura Knight and Paul Nash.

4.6.2. Interview Analyses

4.6.2.1. Potential Benefits of Collaboration

4.6.2.1.1. the manufacturer:

Prior to the research, it was understood from existing literature that collaboration with crafts practitioners could make a significant impact on manufactured products, imbuing a 'quality' which was perceived as unattainable by industrial designers (see chapter 3).

Those practitioners who had made the transition to working as designers (Asquith, Hunt) agreed with this assertion, describing how the product's 'essence' or 'living character' was defined by its material qualities, and identifying the crafts practitioner's unique capacity to both visualise and implement this.

However, it became apparent that the impact of collaboration could be seen in terms of strategic development, as well as product outcome. This issue was identified early in the interview schedule, when Tyssen described the role played by his crafts knowledge in overcoming cultural differences between himself and production staff. Combined with the fact that NPD was – in many companies – impeded by a lack of cross-functional communication (Tyssen, Clark, Pryke, Tchalenko, Woodman), this suggested that crafts practitioners could assist in overcoming barriers to organisational development. It became clear through case study analysis and further interviews that practitioners' ability to communicate knowledgeably with production staff enabled them both to build positive cross-functional relationships (Tyssen, Asquith, Garfoot, Woodman, Pryke), and to develop designs embodying a high degree of contextual fit (Tyssen, Garfoot, Woodman, Pryke, Tchalenko).

This phenomenon, it appeared, could benefit the manufacturer in several respects. Firstly, by reducing manufacturing problems, it could improve production efficiencies, thereby improving both profit margins and individual pay and thereby reducing resistance to NPD. Secondly, it encouraged production staff to take an active role in NPD, thereby optimising latent workforce potential in terms of problem-solving (Tyssen) and innovation (Asquith, Hunt). Thirdly, as Asquith suggested, it could play a role in stimulating innovation, by challenging the factory to

meet unprecedented requirements. At the time of the interview, this capability appeared to conflict with the practitioner's ability to design for contextual fit. However, further analysis was to suggest that it was the practitioner's capacity to stretch organisational competencies without demanding the impossible, which was key to the development of organisational learning capabilities (see case study 2).

The interviews also revealed the importance of these benefits in a contemporary context. In a retail-driven market, crafts knowledge could provide the missing link between buyers' refined conceptual thinking, and the realities of manufacture (Hunt). Moreover, in an economy where crafts-based manufacturers are increasingly caught in a 'commodity trap', design and quality workmanship could add value and provide the profit margins required for further investment in NPD (Bridgewater, Tyssen).

4.6.2.1.2. the crafts practitioner / designer:

Existing literature had suggested that collaboration with manufacturers had the potential to expand the economic potential of crafts businesses, by removing the barrier to growth imposed by limited production capabilities (see chapter 3). However, it soon became apparent that, for many practitioners, the experience of collaboration with manufacturers had been at least as important to their creative development, as to the growth of their businesses.

It was clear that, for many crafts practitioners, working with manufacturers was a creative process: a means of generating and developing ideas, rather than of simply implementing them. Combining the disparate yet complementary forms of knowledge possessed by practitioners and production staff not only enabled problems to be solved (Garfoot), but could also challenge practitioners' assumptions about the making process, revealing new possibilities for further work (Tyssen, Woodman). Industrial processes themselves were seen as a creative stimulus rather than a constraint (Asquith, Hunt, Pryke, Tchalenko), as was organisational strategy (Woodman).

Many of the interviewees emphasised the role that their experiential knowledge of materials and processes had played in developing this context-related design methodology. Firstly, it had enabled them to learn from conversing with (Garfoot, Hunt) or observing (Pryke) technical staff, thereby facilitating the gathering of context-specific information with which to inform design development. Secondly, it had led them to demonstrate an informed appreciation of the

production team's skill (Asquith, Tyssen, Tchalenko) or, conversely, to demonstrate their own expertise through conversation (Tyssen) or the use of a prototype (Hunt). This had, in many cases, generated the mutual respect required for a meaningful dialogue to occur, by challenging perceptions of designers as 'weird' and 'arty' (Tyssen). Finally, as Woodman's Bar Excellence range shows, it had provided an appreciation of the impact of particular manufacturing processes on a product's price point, and hence its market position, thereby ensuring synergy between design and organisational strategy.

In addition to generating new creative possibilities, crafts knowledge had benefited interviewees by enabling them to champion their products effectively within the production team. In Tchalenko's case, an experiential understanding of glazes and firing had enabled her to detect and resolve attempts to sabotage her designs, thereby challenging the knowledge-based power hierarchies found in a company where technicians understood manufacturing to a greater extent than managers. In Hunt's case, prototypes played an advocacy role, assisting mutual understanding of the product concept, counteracting the tendency for clients to demand changes to virtual prototypes, and providing resistance to scrutiny from production managers, by ensuring that technical issues were resolved in advance of production meetings.

Prototyping capabilities produced further benefits for the two interviewees who had effectively made the transition from crafts practice to design, allowing three dimensional form to be developed without the constraints imposed by CAD software (Hunt), and manufacturing specifications to be understood by all parties (Asquith).

4.6.2.2. Problems

The early interviews confirmed that, despite their potential benefits, collaborations between crafts practitioners and manufacturers were inherently problematic (Dormer and Thackara 1984). Through case study analysis, it became apparent that the many difficulties of which both practitioners and manufacturers complained were symptomatic of larger cultural and economic issues. Later interviews provided a point of triangulation, confirming the prevalence of these issues within the crafts-based industries whilst informing understanding of them through the contribution of additional perspectives.

4.6.2.2.1. the manufacturer:

Many of the problems experienced by the interviewees appeared to be attributable to a culture of efficiency prevalent within the crafts industries.

Firstly, it appeared that the emphasis on standard manufacturing activities had led to a poor degree of integration between NPD activities and organisational strategy. This issue was introduced by Tyssen's criticism of a management style that is typically opportunistic rather than strategic, and affirmed by Hajdemack's condemnation of Royal Brierley Crystal and its failure to support its NPD activities with appropriate marketing initiatives.

Hajdemack's criticisms were substantiated by Williams-Thomas's own description of the same projects: it appeared that whilst the six projects had generated creative product outcomes and materials innovations, none had been marketed successfully. Hajdemack's belief in the need for brand diversification appeared credible, given Williams-Thomas's belief that the company was trapped in a niche market by retailers' perceptions of it. However, he appeared not to have considered this option, believing that a new 'art glass' range could be marketed through packaging which would not be visible at point-of-sale.

Secondly, emphasising standard manufacturing activities appeared, in many cases, to have left few resources available for NPD. Companies were unwilling to invest money in design or the new tooling it necessitated (Hajdemack, Tyssen), or to invest time in developing design alliances (Asquith). Tyssen had found manufacturers unable to fit his subcontracting work into production schedules, whilst Garfoot had not been able to find a glass manufacturer capable of short production runs.

Thirdly, there was considerable evidence of a resistance to change amongst production teams, an inevitable consequence of the production targets and productivity-related pay systems introduced in order to encourage productivity. All new products were resented by production managers, due to the threat they posed to attaining the targets by which their work was evaluated by senior managers (Clark). As Tchalenko's account of attempted sabotage shows, new products were also opposed by production staff, due to their direct impact on remuneration: as Tyssen explained, continuity and job specialisation increased efficiency and pay, whereas the interruption and learning involved in NPD decreased it.

Further evidence of resistance to change was found in production managers' tendency to use their technical knowledge as a barrier to innovation, discouraging risk and encouraging design to be limited to known capabilities (Clark, Tchalenko). Alternatively, production managers would continually delay NPD activities, arguing that there was either insufficient time available, or insufficient capital (Hajdemack). According to Hajdemack, resistance to change had been further entrenched by inflexibility: the high degree of job specialisation resulting from productivity-related pay systems had created an inflexible workforce, poorly equipped for the adoption of new products and processes.

As instigators of change, designers and practitioners were automatically subjected to suspicion and resentment (Tyssen, Pryke, Bridgewater, Tchalenko, Asquith). This was, it appeared, compounded by the cultural divisions existing, at least initially, between crafts practitioners / designers and production or technical staff. It is interesting to note that Bridgewater experienced similar resistance to the other interviewees, despite her lack of a crafts background. This suggests that cultural differences are not attributable to a crafts background in particular: indeed, as discussed already, in many cases crafts knowledge became a means of overcoming them. They were, it appears, more to do with practitioners' informality, gender - where appropriate - and 'outsider' status (Bridgewater, Tchalenko), as well as their accent and education (Tyssen).

Finally, it appeared that an efficiency-oriented culture – and manufacturers' subsequent failure to invest in NPD – meant that managers were often inexperienced or incompetent in design management, failing to provide context-specific information (Tyssen, Woodman), or to assist in product championing (Tchalenko).

This problem was illustrated by Williams-Thomas's narrative, which attributed blame for numerous failed projects to production staff and crafts practitioners. However, the resistance to change and failure to recognise crafts practitioners' competencies which he recognised amongst his own production staff during the Foundry project implied the need for preparation and support at a managerial level. Hajdemack's account suggests that this was not forthcoming: he recalled a lack of managerial support as the reason for the failure of Royal Brierley's earlier collaboration with Ray Flavell.

Williams-Thomas's account also suggests poor evaluation capabilities. Whilst he criticised the 'limited skills' of the crafts practitioners involved, one of them recalls protesting on her

appointment that, as a new graduate, she lacked the skills and experience required by the project (see case study 1). The failure of the project may therefore be considered to have been influenced by the management team's appointment decisions, together with its lack of preparation and ongoing support.

4.6.2.2.2. the crafts practitioner:

Problems caused by the nature of crafts practice were also identified, not only by designers (Clark) and manufacturers (Williams-Thomas), but also by practitioners considering the reasons for the limited success of crafts practitioners working in industry (Asquith, Hunt, Garfoot, Woodman).

The criticisms made emphasised the notion of individualism: practitioners were, it was claimed, preoccupied with their own skills (Garfoot, Williams-Thomas) and the development of a personal style (Williams-Thomas, Hunt). They therefore lacked the capability to respond creatively to contextual factors such as manufacturing processes or market conditions (Williams-Thomas, Garfoot). Their skills were perceived as extremely limited, and not transferable to design (Clark, Williams-Thomas) or to the manipulation of a digital environment (Asquith).

Only Garfoot attributed an individualistic attitude to the 'esoteric' nature of crafts practice: for the other interviewees, it was encouraged and developed by crafts education. Educators were criticised for perpetuating William Morris's ideals, which discouraged team work by emphasising creative fulfilment through control over making (Asquith). Institutions were criticised for the emphasis placed on the degree show, and the resulting emphasis on objects rather than the processes underpinning them. This, it was considered, neglected the intellectual and cultural contexts for making (Hunt, Woodman), and hence practitioners' ability to transfer their abilities to other disciplines and – in particular – to refine designs in response to the shifting parameters characterising the design scenario (Woodman). Crafts education was also criticised for the attitude of 'preciousness' or arrogance that it encouraged: a belief that, in working in industry, it is necessary to defend 'design integrity' against the ignorance of marketing, sales and production managers (Woodman, Garfoot). The prevalence of this attitude was affirmed by the tendency for inexperienced practitioners to impose unsuitable designs onto inappropriate manufacturing processes or market sectors (Pryke, Tchalenko, Woodman), and by the Next design team's attitudes of superiority in approaching manufacturers (Bridgewater,

Tchalenko). As Woodman explained, it precluded a collaborative way of working, whilst encouraging practitioners to value subjective aesthetic qualities exclusively, without consideration for other factors which should impact on design.

Crafts education was also criticised by Williams-Thomas, who attributed individualism to aspirations towards self-employment which he believed were encouraged by crafts education. Recent research suggests that crafts education encourages students to develop and apply their creativity in many different ways, and that even amongst those graduates who work within the crafts, few undertake the 'self-employed, designer-maker' model envisaged by Williams-Thomas (Press and Cusworth 1998). It was therefore interesting to observe the persistence of this particular stereotype, and its role in Williams-Thomas's rationalisation of crafts practitioners' behaviour.

Aside from their individualism, crafts practitioners were criticised for their inability to 'distil' and apply transferable elements of their knowledge, to design for industry (Garfoot). This criticism was substantiated by Tchalenko's comment on the ability of crafts students to articulate a definition of crafts knowledge, and again relates to Ball and Price's research, which suggests that encouraging students to articulate their own knowledge and working methodologies increases its transferability to other activities.

Other criticisms appeared to be less robust. For example, Hunt believed that individualism rendered design and crafts practice irreconcilable. However, his argument is challenged by the work of other interviewees, Asquith and Woodman in particular, who see no conflict between the design and crafts aspects of their practice. In addition, Asquith's belief that the intuitive dimension of crafts cognition precluded the use of CAD software has been disproved in both theory (see McCullough 1996) and by the work of numerous practitioners, himself included. Asquith's comment did, however, prove the persistence of the notion of crafts practice as oppositional to logical intelligence (see chapter 3).

4.6.2.3. Influencing Factors

4.6.2.3.1. the manufacturer:

In terms of the manufacturing company, flexibility was perceived as an important issue in relation to both design and subcontracting relationships, but one which varied according to industry sub-sector.

In the ceramics industry, company size appeared to be crucial: indeed, drawing on her experiences at Royal Doulton, Tchalenko proclaimed large manufacturers impossible to work with. Bridgewater confirmed this assertion, and suggested that the aggressive restructuring of the Stoke-on-Trent ceramics industry - and the resulting demise of the small manufacturer - would make new collaborations difficult to initiate. Her concerns were, however, countered by Pryke, whose investigations into manufacturing options had identified many small workshops which she considered flexible enough to undertake subcontracting. In the metal industries, Garfoot had found collaboration relatively easy to initiate, due to the prevalence of small, workshop-based companies with a strong tradition of outsourcing, and a useful supporting infrastructure in the form of the local Metals Industries Association. The impact of *company* size on flexibility is confirmed by Thackara, who identifies it as a major barrier to designer-initiated, small-scale manufacturing (Thackara 1986 p.11).

In the glass industry, flexibility was inhibited by conservatism and – according to Hajdemack – by a history of undertaking NPD in collaboration with artists rather than designers. Attitudes also influenced flexibility - as Pryke found in her comparison of English Country Pottery and Park Rose - and, even in the ceramics industry, manufacturers appear to be becoming more welcoming to outsiders, due to the threat to their survival caused by market conditions (Bridgewater).

Industry sub-sector also evidently influenced project success in terms of the actual manufacturing technologies employed. For example, observing the machinery at Demaglass Tableware suggested that the industrial factory environment presented significant opportunities for collaboration, due to the high degree of similarity between industrial manufacturing processes, and those employed by the craft maker. Observing the glass forming machinery in operation revealed that, in order to produce hollow ware, each machine head (consisting of a hollow pipe) would gather, shape and inflate a bubble of glass in a manner which imitated the glass blower. The processes employed in producing pressed ash trays, meanwhile, were familiar from craft techniques such as sand casting.

This similarity between craft and industrial processes affirmed Clark's suggestion that crafts knowledge could be applied to challenging assumptions regarding the machinery's limitations. For example, it may be asserted that, in the case of the Baroque project mentioned above, a craft glass maker would have easily identified the need to heat only the lower portion of the stem, drawing on their experiential knowledge of glass viscosity.

The impact of NPD process on product outcome and, in particular, the need for communication and cross-functional collaboration, was another critical influencing factor on project outcome. This was particularly evident from Pryke's experiences at IKEA, where her feeling of having 'lost ownership' of the designs suggested that IKEA's linear design methodology led her to perceive the designs as 'hers' rather than 'ours'. This opposes the best practice identified in case studies 1, 2 and 4, where team ownership creates opportunities for learning on both individual and organisational levels. Conversely, for Bridgewater Pottery, integrating understanding of market conditions and manufacturing capabilities appears to have been crucial to success. Bridgewater's metaphor of being 'poised halfway between London and Stoke' was indicative of an unusually broad perspective, particularly at a time when the ceramics industry was, she considers, more insular than today.

Other manufacturer-related influencing factors included company culture: Pryke's lack of creative fulfilment at Wedgwood indicates that an integrated approach to NPD does not necessarily stimulate creativity: it appears that, ideally, NPD requires structured integration combined with a creative organisational culture. The management team's appreciation of materials and products was also identified as an identifying factor: whilst Tyssen believed that a manager with a crafts background provided the best advocate for NPD within the company, Woodman believed this should be balanced with expertise in managing both the NPD process and the people it involved. She believed that, in many companies, design talent was wasted due to poor design management.

4.6.2.3.2. the crafts practitioner / designer:

The interviews suggested that whilst crafts knowledge can benefit both design process and product outcome significantly, its impact is dependent on the practitioner employing a range of interpersonal and self-management skills, as well as an appropriate design methodology.

In many cases, the skills employed by practitioners appeared not to be in-born, but learned through experience.

Bridgewater's case was particularly interesting in this respect because, whilst her objectives paralleled those of many of the crafts practitioners interviewed, her experiences and existing knowledge differed considerably. Her lack of crafts knowledge prior to establishing her business did not, however, appear to have impeded her success in approaching manufacturers. Indeed, her methodologies may be considered more effective than those employed by the *Next* design team she mentions: whereas the *Next* project was short-lived and resulted in products which barely resembled the proposed designs, Bridgewater achieved a productive, ongoing alliance which generated products matching her specifications.

This observation challenged the assertion which had been drawn tentatively from case study 1, that a designer with a crafts background necessarily adopts a crafts-based design methodology. If such a design methodology is considered to consist of an iterative dialogue between manufacturing processes and intent (see case study 1), then Bridgewater's approach would appear to be more crafts-oriented than that employed by the *Next* team. Bridgewater had approached the manufacturers with semi-formulated product concepts, informing their development with her increasing understanding of manufacturing materials and processes. She found machinery 'romantic' and was 'fascinated' by the manufacturing process. The *Next* team, conversely, had requested manufacturers to reproduce existing, hand made products (see 4.6.1.3.): the machinery was used to realise ideas, rather than to assist in their formulation. As Margetts states (in Margetts and Harrod 1986),

'McNicholl and Tchalenko's [the two crafts practitioners] work was not simply to be used as a basis for a mass-produced product; the intention was to accurately reproduce their work rather than to reinterpret it.'

This analysis suggested that crafts practitioners do not necessarily adopt a crafts-derived design methodology: indeed, other aspects of their practice, such as their creative self-image or project objectives, may cause them to adopt the linear methodology considered characteristic of industrial designers (see case study 3).

In this case, it may be asserted that it was Bridgewater's lack of crafts knowledge that encouraged her to subconsciously adopt an iterative, crafts-derived design methodology.

Recognising her own lack of technical understanding, she persistently questioned factory staff, informing the development of her designs with the resulting knowledge. In contrast, the *Next* designers, driven, Margett's report suggests, by a belief in the superiority of their knowledge over industrial expertise, did not attempt to learn from their factory visits.

Clearly, Bridgewater was unable to draw upon the shared language used by crafts practitioners in order to communicate across functional and hierarchical boundaries (see case study 1 for exemplar). Nonetheless, she managed to obtain the context-specific information she required from management and production staff, through persistence supported by her self-conviction and capacity to see problems as challenges. It may be speculated that this information-gathering process was more difficult for Bridgewater than for a crafts practitioner, or that it was less effectively assimilated due to the theoretical nature of her understanding (in contrast to the crafts practitioner's experiential knowledge). However, her success reinforces the impact of interpersonal skills, flexibility and willingness to learn on project outcome (see case studies).

It is interesting to note that the linear methodology employed by Tchalenko during her work for *Next* was later to be replaced by a more integrated approach: by 1998, the time of her collaboration with Poole Pottery, she was developing shapes and glaze specifications in response to the individual manufacturer's capabilities and constraints. This shift perhaps reflects changing perceptions of craft and industry: in 1985, Tchalenko had been berated by other crafts practitioners for 'letting the side down' by working in industry (Levien 1998), whilst *Crafts* magazine had criticised the manufacturers' failure to recognise her and her associates (Margetts and Harrod 1986).

Tchalenko's transition from a linear methodology to an integrated one was common to other crafts practitioners embarking on design work.

For Woodman, it had been initiated by the need for approval from sales, marketing and production staff, before a design was accepted for manufacture. It had involved re-evaluating her role as a designer, and challenging the 'arrogance' resulting - she states - from her education at the RCA. It had also involved her developing the capacity to champion her designs throughout the company, employing the knowledge and methodologies gained through crafts practice in order to communicate and collaborate with production staff.

For Pryke, the transition had been initiated by her difficulties in identifying a company capable of manufacturing her 'lemon squeezer' design, in attempting to match manufacturing processes to designs during her work for IKEA. This had meant that, whereas her RCA research into manufacturing options had focused on finding appropriate manufacturers for existing products, her work at Park Rose and English Country Pottery adopted a capabilities-based approach.

These practitioners' adoption of an integrative, crafts-derived design methodology suggests that crafts practitioners do not necessarily apply cognitive processes and methodologies characteristic of craft to their design practice, but learn to do so through experience. Moreover, it implies that only those crafts practitioners who learn to apply a crafts-based methodology to design, survive as designers. The prevalence of this approach - which was employed by Asquith, Tyssen, Garfoot and Hunt as well as the four practitioners who had made the transition from a linear methodology - confirms the employment of a crafts-derived methodology as a key influencing factor on project outcome. The transition undergone in many cases in order to develop it, meanwhile, means that experience, and practitioners' ability to re-evaluate their own attitudes and methodologies, must also be considered a crucial influencing factor on practitioners' capacity to work in industry.

The interviews suggested that practitioners tended to identify and develop a range of complementary skills, in order to apply the iterative methodologies characteristic of their crafts practice to design. Negotiation and communication skills were considered essential in dealing with the various stakeholders involved in NPD (Asquith), as were social skills (Woodman): interestingly, Woodman's account emphasised the need to develop the capacity to deal with all hierarchical levels of the company, as well all organisational functions. Professionalism was also considered important (Asquith), particularly in overcoming negative stereotypes of women and of creative people (Woodman). Self-management skills were also important: as Woodman explained, only those designers with the willingness and ability to evaluate and champion their own work could succeed in an industry which failed to invest in design management.

The product championing capabilities identified as a significant influencing factor on project outcome (see case studies), also appear to be developed through experience. It is interesting to note that at English Country Pottery, Pryke relied on the Managing Director to champion her products by managing the design process, identifying and resolving potential discrepancies between the products and their manufacturing and marketing contexts, and sourcing additional expertise where necessary. In this way, Pryke's behaviour was comparable with Sarah Jordan's

(see case study 3), another crafts practitioner with limited experience of working in industry. In contrast, more experienced crafts practitioners interviewed have adopted product championing roles themselves (Woodman) or in partnership with the company's NPD manager (Tchalenko).

Like the design methodology they supported, it was evident that these skills are not necessarily in-born, but may be developed through experience. For example, Woodman's comments reveal that, despite her success in evaluating her own work, integrating design and company strategy, and championing her designs within both production and management teams, she found these aspects of her work both difficult and exhausting. Together with the findings of case study 1, this suggested that those skills required by the crafts practitioner which are not developed through education, may be acquired through experience.

This chapter has presented and analysed four case studies and eleven interviews. The analyses have revealed significant points of differentiation between the work of crafts practitioners and designers, when working in collaboration with manufacturers. They suggest that, in addition to achieving successful product outcomes, particular characteristics of crafts knowledges and cognition can make a significant impact upon an organisation's culture and competitiveness, whilst providing new creative opportunities for the practitioner.

These findings reveal a significant yet previously unarticulated potential for crafts – industry collaboration. However, the analyses have also demonstrated that a crafts background or education cannot be considered a panacea when designing for manufacture, but that both product and process related outcomes are influenced by an array of influencing factors.

In the next chapter, both the potential for collaboration and the nature of these influencing factors will be investigated further.

5. Conclusions

This study has resulted in two primary sets of conclusions. These concern:

- the benefits of crafts – industry collaboration, in terms of the impact of crafts practitioners' specific knowledges and skills upon on their approach to NPD.
- the factors influencing the outcome of crafts – industry collaboration.

In this chapter, the presentation of these two sets of conclusions is followed by a redefinition of crafts – industry collaboration. It was not an explicit objective of the research to reconsider the nature of such alliances in this way. However, in analysing the empirical data in relation to theories of design and craft cognition and epistemology, a new perspective has emerged which constitutes one of the research's conclusions. The chapter concludes with an exploration of the implications of the findings of this research for craft-based industries, crafts education and the growing cultural industries sector.

5.1. Benefits of Crafts – Industry Collaboration

The research has revealed that a crafts education – or experience as a crafts practitioner – influences the approach adopted by designers working in the crafts-based manufacturing industries. It suggests that, in addition to achieving successful product outcomes, particular characteristics of crafts knowledges and cognition can make a significant impact upon an organisation’s culture and competitiveness, whilst providing new creative opportunities for the practitioner.

5.1.1. Collaboration and Organisational Change

The research revealed that the particular knowledges and skills displayed by crafts practitioners working as designers in the crafts-based industries, have the potential to catalyse change on an organisational level. Together, the application of crafts knowledges and crafts cognition to the NPD process can mobilise latent capabilities and influence organisational culture, thereby promoting the acquisition of competitive strengths appropriate to the knowledge-driven economy.

It is evident from empirical analysis, that practitioners’ experiential understanding of materials and processes enabled them to gain insight into the constraints and opportunities afforded by the manufacturing environment, through observation and reflective experimentation. In the manufacturers’ experience, this characteristic differentiated crafts practitioners from designers, who typically demonstrated limited interest in – or capacity to understand – specific manufacturing processes.

This understanding of the making process also facilitated practitioners’ interactions with production staff, enabling them to communicate from an informed perspective, and thereby to establish mutual respect whilst eliciting information relating specifically to the company and its manufacturing processes.

In this respect, however, the crucial factor in the practitioners’ success appeared to be their capacity to employ a specialist, verbal – visual – bodily language. This language, which employed a concurrent process of articulation, demonstration and – occasionally – drawing, was

evident in the work of both case study subjects. It enabled ideas to be conveyed directly through the manipulation of materials and objects, and knowledge from production staff, practitioner and NPD manager to be assimilated. The language also created a climate which, according to theorists, is conducive to innovation, by encouraging experimentation and legitimising failure.

This specialist language, together with the practitioner's experiential knowledge of the making process, had significant impact on the NPD process, enabling the reflective dialogue considered characteristic of crafts practice to be applied to the design scenario. Whereas industrial designers working in these companies had typically employed a linear design methodology, crafts practitioners' approach was iterative and cross-functional, evolving through reflective experimentation and in response to the assimilation of context-specific knowledge. Crafts practitioners engaged in a dialogue with the actual product and its manufacturing environment, rather than the visual representations of it employed by industrial designers.

The manufacturers studied recognised the benefits of this approach primarily in terms of contextual fit, acknowledging that practitioners' collaborative approach produced designs which were well suited to existing manufacturing processes and organisational capabilities. The significance of this outcome for them was its impact on the cost and effectiveness of NPD, as the manufacturing problems encountered following their involvement with industrial designers had constituted a barrier to further innovation.

The practitioners' crafts-derived design methodology resulted in other benefits, however, particularly in relation to organisational learning (see 4.2.3). Because practitioners developed an understanding of the affordances and constraints presented by industrial manufacturing materials and processes, they were able to suggest new applications for existing technologies. In addition, they were able to propose designs which stretched existing capabilities to an acceptable degree, effectively presenting a 'capability gap' to be bridged which stimulated creative thinking within the organisation. In this way, collaboration generated new knowledge, representing a strategic gain in terms of knowledge-based competencies which increased the organisations flexibility and responsiveness to customer demand. It also mobilised latent problem-solving capabilities, enabling the knowledge-based resources considered a primary means of adding value to products (DTI 1998 b) to be developed. By encouraging the employment of a verbal – visual – bodily language within the NPD process, it was able to develop the organisation's capacity to stabilise and disseminate this new knowledge. Finally, it

produced designs whose embodiment of a unique combination of expertise is considered to provide resistance to imitation from competitors (see 4.2.3).

Further benefits of collaboration were evident in relation to organisational culture, which, in all three case study companies as well as the experience of interviewees, had previously been characterised by a resistance towards NPD and the individuals who initiate it. The study demonstrated that, by involving production staff in the NPD process and by producing designs which presented few manufacturing problems whilst offering the opportunity for personal development, collaboration could challenge and even reverse this resistance to change.

In essence, the crafts practitioner's particular knowledges and skills were found to create an impetus for innovation, to provide a means of achieving it, and to optimise its potential by facilitating dissemination and institutionalisation. In this way, crafts practitioners were found to be more able than conventional, industrial designers, in facilitating the transformation of crafts-based manufacturing companies from commodities producers to knowledge-based enterprises.

5.1.2. Collaboration as a Creative Catalyst

The working methodologies employed by practitioners in their crafts work were also found to influence the individual's approach to collaboration with manufacturers. However, this aspect of the analysis drew a distinction between those practitioners who developed an iterative, crafts-derived NPD methodology, and those who adopted a linear approach (see 4.6.2).

For those working in a linear manner, attempting to reproduce existing products, the collaborative process was characterised by frustration and disappointment: practitioners complained of 'losing ownership' of their designs (Pryke), or of irreconcilable manufacturing problems (Jordan). For those practitioners applying the reflective dialogue characterising their own practice to the design situation, however, interaction with the manufacturing environment became a creative stimulus. In effect, industrial materials and processes, together with the skills and capabilities of production staff, functioned as a new set of affordances and constraints, which defined the creative process in a manner comparable with the practitioner's chosen medium. Just as new creative possibilities are identified in personal practice through the dialogue between concept and material, here they developed in response to available resources.

In several cases, practitioners considered themselves to have re-defined their own practice and creative self-image by adopting this approach, abandoning the 'arrogance' for which they criticised their less experienced selves (Beebe, Woodman). In this respect, they endorsed the theory that the designer's creative self-image develops through practice, progressing from the 'creative genius' stereotype to that of a creative professional (see 3.7). For these practitioners, the process of developing the new product appeared to be as important to personal fulfilment as its outcome.

It is clear that the iterative methodology characteristic of crafts practice, when transferred to the industrial environment, provides a significant point of differentiation between the work of crafts practitioners and industrial designers working within the same scenario. By applying a crafts-based methodology to design for industry, crafts practitioners can achieve a degree of contextual fit previously unattained by crafts-based manufacturers undertaking NPD activities.

5.2. Factors Influencing Project Outcome

Whilst crafts – industry collaboration is capable of furthering organisational development, its outcomes are dependent upon a multitude of influencing factors. The inter-related nature of the four case studies presented in chapter 4 enables the significance of these factors to be evaluated through comparison, and substantiated through reference to literature and further interview analysis.

Successful projects appear to be characterised by the adoption of an NPD management mechanism which creates conditions conducive to innovation. It is recognised that NPD requires an environment where failure is tolerated, creative conflict is valued and experimentation is encouraged (see 4.2.3). However, there is an acknowledged discrepancy between the flexibility and goal-oriented mentality which are pre-requisites for this creative environment, and the priorities for efficiency and consistency which are necessary in order to retain. The case studies suggest that this conflict between innovation and standard production is exacerbated within the small businesses characterising the crafts-based industries, where the workforce is small and productivity-related pay systems create a particularly strong efficiency orientation. The impact of this conflict on the NPD process are clear in Wentworth's early experiences of collaboration, prior to its introduction of NPD management mechanisms, when designers' attempts to communicate with production staff engendered hostility and reinforced resistance to innovation.

The case studies demonstrate that an appropriate NPD mechanism can enable conditions conducive to both innovation and standard manufacturing operations to co-exist. The nature of this mechanism may be structural, as at Wentworth, where a temporary project team was assembled from key production staff and made autonomous from the standard production team. This approach was particularly appropriate for Wentworth, as the company intended to develop multiple alliances with independent designers and crafts practitioners, and recognised the need to manage their interactions in a manner which was not reliant on the individuals' interpersonal and self-management skills. In practice, the mechanism produced other, unanticipated benefits, increasing the company's capability to undertake new alliances by increasing its knowledge base and problem-solving capabilities, and mobilising latent design skills within the project team, which led to the development of further new products.

Alternatively, the NPD ‘mechanism’ may be intangible, consisting of a strategy for managing the timing, frequency, duration and nature of interactions between the crafts practitioner and the production staff. This approach was adopted by Royce and Beebe (see 4.1), who, recognising the high degree of resistance to change within the workforce, considered it necessary to develop the new product to the pre-production stage before introducing it to production staff. This mechanism also involved motivational strategies, intended to encourage participation in the final stages of the design process, and to transfer ownership of the product to the workforce. Another such strategy was adopted by Beebe at PMC, as a response to the lack of project management activity within the company itself. This involved Beebe undertaking responsibility for her interactions with production staff, rather than behaving in accordance with the managers’ expectations. It also necessitated her attaining a balance between involvement and detachment on both interpersonal and process levels, demonstrating commitment to the project, respect for production staff and openness in her dealings with managers, whilst not becoming involved in personal or organisational politics.

These strategies and mechanisms offer models of best practice with potential application for other companies involved in similar activities, facing similar difficulties. However, it is important to recognise that the common factor uniting the successful projects is the resource-based nature of their strategy. In all cases, and despite the similarity between Wentworth’s project team and theoretical best practice, the chosen NPD mechanisms were not adapted from management theory. Instead, they were derived from evaluations of the total organisational environment, and reflected company culture, structure, strategy and available resources. This in itself represents best practice as defined by organisational learning theory (see 4.2.3).

The process of identifying and introducing an appropriate NPD management mechanism may be undertaken by either the designer / crafts practitioner, or by the company's NPD manager. This observation applies equally to product championing activities, responsibility for which may be assumed by either individual, or divided between the two parties. For example, in Beebe’s collaboration with Nazeing, intra-organisational and project management responsibilities were undertaken by the NPD manager, whilst communication, team motivation and the assimilation of disparate knowledge useful to the product were undertaken by the designer. This division of responsibilities can only be achieved, however, when appropriate skills, knowledge and vision are common to both parties. When these attributes are not necessarily shared by the designer / practitioner, as at Wentworth, then these activities must all be undertaken by the NPD manager; when they are not evident within the management team,

then they must be conducted by the designer / practitioner. The ease with which resistance to change was overcome at Nazeing (4.1) in comparison to PMC (4.4) suggests that managerial support is beneficial in this respect. However, the significant factor here appears not to be which individual undertakes to champion the product or to identify and introduce an appropriate NPD mechanism, but rather that these activities are conducted thoroughly and from a resource-based perspective. This finding is illustrated by Jordan's collaboration with PMC (4.3), in which neither party undertook any responsibility for product championing or project management, and which resulted in irreconcilable manufacturing problems and the deterioration of interpersonal relationships.

The successful projects appeared to be characterised by individuals who brought additional personal qualities and learned skills to these managerial and product championing roles. At both Wentworth (4.2) and Nazeing (4.1), the NPD manager's enthusiasm, vitality and humour were beneficial in overcoming resistance to the project and securing the support of senior managers, whilst their tenacity, creativity and pragmatism facilitated problem resolution. In both cases, this individual had developed strong relationships across the companies' functional boundaries and hierarchical strata, and was guided by a vision for the company's development in relation to market conditions.

It appears that crafts practitioners / designers working without managerial support require similar personal qualities and learned skills to a successful NPD manager. This is illustrated by Beebe's success in building positive relationships with production staff at PMC, despite the team's mistrust of both managers and designers, following the company's recent redundancies and collaboration with Jordan. However, crafts practitioners / designers working within a structural NPD mechanism appeared to have less need of particular personal skills and attributes, as product championing was undertaken by the NPD manager and interactions with production staff occurred within an environment conducive to NPD activity (4.2). This finding is illustrated by the example of Sarah Jordan, who had little previous experience of collaboration and had not developed product championing capabilities or the skills required to support them. At Wentworth, where work was undertaken without managerial support, Jordan's poor communication skills and perceived arrogance were immaterial. At PMC, where no managerial or structural support was provided, they contributed significantly to the project's failure, by preventing both the development of positive relationships and the formulation of an appropriate NPD strategy.

The crafts practitioner's motivations for collaboration may also be considered to play a significant role in its outcomes. Literary sources suggest that practitioners inexperienced in collaboration tend to initiate alliances with the intention of reproducing existing designs on an industrial scale. In some cases this intention has been derived from the desire to 'convert' a manufacturing company or product to the practitioner's own definition of a morally or aesthetically superior standard. Illustrations of this approach include Michael Cardew's mission to introduce an Orientalist style – with its associated philosophy – to Copeland Pottery, and the Next Interiors project, which attempted to introduce 'good design' and crafts-derived manufacturing techniques, to mass production (see 3.9). In other cases, collaboration is initiated in response to the 'crisis of delegation' characterising crafts businesses: a manufacturer is sub-contracted in order to lower prices or to expand production capacities, in order to meet market demands. Perceptions of collaboration remain negative in these cases, with inexperienced practitioners fearing a loss of the creative autonomy and control which constitutes a primary motivation for making (Ball and Price 1998).

This intention of reproducing existing designs or techniques causes practitioners new to collaboration to adopt the type of linear NPD methodology associated by manufacturers with industrial designers: collaboration is not a creative process, but one of delegation. The interviews demonstrate that it is only through the experience of working with manufacturers, that practitioners develop understanding of the manufacturing and quality problems caused by this way of working, as well as the creative potential of a more collaborative, context-related approach. Design methodologies then tend to become iterative, as practitioners learn to apply the knowledges and cognitive styles developed through crafts practice, as a means of understanding and interacting with the industrial environment (see 4.6.2).

This phenomenon is illustrated by each of the designers / practitioners interviewed, with the exception of Bridgewater, whose lack of technical knowledge necessitated a consultative approach. For Tyssen and Garfoot, the development of an iterative NPD methodology reflected an appreciation of the creative possibilities generated through the assimilation of disparate yet complementary knowledges. For Beebe and Woodman, this appreciation was combined with an acknowledgement of the benefits of production staff support in terms of product quality. For Tchalenko it was adopted as a means of avoiding production staff sabotage, whilst for Pryke it constituted a reaction against the difficulties encountered in attempting to find a manufacturer for an existing design.

It is evident that the ability to apply the cognitive style and knowledges developed through crafts practice tends to be developed through professional experience. This finding endorses the theory that designers typically acquire the social and interpersonal skills necessary to their practice through professional experience rather than education (Fisher 1998). Amongst the interview subjects, it appears that the adoption of an iterative NPD methodology is followed by the development or improvement of skills which assist its implementation. For example, Beebe and Woodman both strove to convey ‘professionalism’ in their interactions with both managerial and production staff, and consciously invested in the development of individual interpersonal relationships within the company, as well as motivational strategies. Tchalenko had also developed motivational tactics, whilst Tyssen, Asquith and Hunt had identified the importance of shared skills and vocabulary in facilitating relationships with production staff. These skills not only assisted in the adoption of an iterative, crafts-derived NPD methodology, but also impacted positively on project outcome, facilitating communication across functional boundaries and enabling the practitioner to assimilate information gained from staff from throughout the organisation.

It appears from the study that, when an appropriate NPD mechanism is employed and the project is effectively managed and championed by an individual with appropriate interpersonal skills, the problems considered by NPD managers to impede innovation in crafts – based manufacturing companies may be overcome. Beebe’s collaboration with PMC, meanwhile, indicates that successful project outcomes can be attained even without managerial support, given appropriate skills on the part of the designer. The examples of Nazeing and Wentworth, meanwhile, demonstrate that both production staff resistance to change and managerial scepticism and apathy can be overcome, enabling the potential for collaboration to improve competitiveness to be fulfilled.

5.3. Redefining Crafts – Industry Collaboration

By identifying significant roles for crafts cognition and knowledges within the NPD *process* (see section 5.1), the study contributes to existing theoretical studies of crafts – industry collaboration, which are primarily concerned with product outcomes.

Theoretical advocacy for such collaboration emphasises the potential impact of crafts knowledges on the designed product, neglecting the influence of crafts cognition on the design process. Practitioners' prototyping skills are therefore valued, as are their proximity to users. Their understanding of materials and processes is valued as beneficial to product aesthetics, as is their ability to develop materials innovations. However, the benefits resulting from their cognitive style and associated linguistic capabilities is not reflected in the literature (see 3.9).

Empirical data suggests that this limited appreciation of the potential for crafts – industry collaboration persists amongst some manufacturers, influencing their expectations for collaboration, and hence its outcomes. For example, Peter Clark of DemaGlass Tableware perceived crafts practitioners solely as makers, incapable of surface pattern design, despite employing graphic designers as 3D glass designers. Williams-Thomas also criticised the narrow breadth of crafts practitioners' skills, condemning their inability to respond creatively to existing markets and manufacturing capabilities. It may be asserted that a limited appreciation of crafts knowledge restricts the potential for collaboration, as Clark did not consider it worthwhile, whilst Williams-Thomas considered his past collaborations to have been unsuccessful.

Literature review suggests that this limited perspective on collaboration reflects an essentially Positivist paradigm, which has persisted through – and been enhanced by – industrialisation and the Modernist era (see 3.2). Whilst Western culture values the explicit and the easily articulated, crafts cognition is considered tacit and resistant to verbalisation, due to its integration of conceptual and bodily intelligences. Whilst value is accorded to deductive analysis and instrumental problem solving, conducted in relation to procedure and logic, crafts cognition is context-specific and non-rational, drawing on practical knowledge gained through experience and stabilised in the bodily domain. In this context, the crafts are valued primarily for the object produced, rather than for the knowledge and cognition embodied within it. Crafts knowledges are defined as those which are evident to the observer, within the crafts object:

skill, materials understanding and aesthetic sensibility, for example. Crafts cognition, meanwhile, remains undervalued, together with the specific forms of linguistic, bodily-kinaesthetic and spatial intelligences which its employment encourages.

In contrast, this study has drawn upon theoretical frameworks which value tacit and experiential knowledge, and which accept craft as a complex and pluralistic practice (see 3.3). Within this paradigm, it has been possible to analyse crafts cognition - as employed by the case study subjects - as a pluralistic intelligence, whereby the reflective dialogue between conceptual and physical domains relies on bodily-kinaesthetic intelligence, yet also encompasses and develops particular forms of linguistic, musical, spatial and logical-mathematical intelligence. This process has elicited cognitive differences between craft and design: whilst the two activities share a common set of core intelligences, it appears that spatial intelligence is dominant in the design dialogue, guiding the development of bodily-kinaesthetic and logical-mathematical intelligences. The implications of this for crafts - industry collaboration are evident in the practitioner's ability to communicate using a verbal - visual - bodily language, as well as in the tactile aspect of the reflective dialogue, which facilitates the assimilation of context-specific information into the NPD process.

5.4. Implications

It was noted in section 1.2. that the objectives of this research had particular relevance in the contexts of the continuing decline of the crafts-based industries, the need for sustained growth within the cultural industries, and the threat to crafts education posed by continuing funding restrictions. This chapter identifies implications of the research findings, for each of these issues.

5.4.1. Implications for the Crafts-Based Industries

The manufacturing sector in general is being increasingly pressurised to improve its competitiveness in response to globalisation, sophisticated consumer demands, and technological developments (see 3.8.1.1). Individual organisations are being encouraged to develop their capabilities as learning organisations, trading on knowledge, skills, quality, service and innovation capacity, rather than on price. As a recent Department of Trade and Industry report states (DTI 1998 p.16),

'Our future prosperity depends on our ability to compete on quality and know-how rather than on cost alone. If UK manufacturing businesses are to maintain a competitive advantage, they must invest to keep ahead of the competition: by being entrepreneurial; by innovating; and by constantly improving the skills of their workers.'

The study found that such problems can be acute within the crafts-based manufacturing sector, where change is often inhibited by conservative perceptions of the company's market and capabilities, as well as by productivity-related pay systems and a high degree of job specialisation. However, the study revealed that collaboration with crafts practitioners can catalyse this shift from commodities to knowledge-based products. As explained in chapter 4 – and reviewed in section 5.1. – collaboration has the potential to overcome cultural resistance to change, and to stimulate learning on both individual and organisational levels.

The implication of this finding is that the crafts manufacturing sector could benefit significantly, were such collaborations encouraged and enabled by appropriate support agencies. The most

appropriate strategies and mechanisms for implementing this finding should be determined through further research and partnership-building, undertaken at a local level in areas where crafts-based manufacturing proliferates. Those involved may be anticipated to include local Business Links, Enterprise Agencies, the Small Business Service, Chambers of Commerce, trade organisations and universities. Their role might be anticipated to include the determining of strategies for the sector's growth, and the development of appropriate support services. Their work could be informed by exemplars already operational in the UK, and perhaps take the form of innovation centres, matching services, trade shows, exhibitions, training schemes or any other activity appropriate to local needs.

Whilst the study has not been primarily concerned with identifying appropriate support services for crafts-industry collaboration, certain findings have implications for the nature of the support offered to manufacturers.

Firstly, the study demonstrates that different forms of design knowledge impact significantly upon NPD within the crafts-based industries, influencing the socialisation processes which catalyse organisational learning and development, as well as the form of the new product (see 5.2). It may therefore be appropriate for managers undertaking training or receiving consultancy services to consider the impact of different design knowledges on NPD outcome, rather than considering the 'designer' as possessing a generic set of skills and knowledges.

Secondly, the study demonstrates the need for specific management expertise to be supplied by key personnel within the organisation, if difficulties inherent in crafts-industry collaboration are to be overcome. These difficulties may be organisational, resulting for example from the conflict between innovation and efficiency characterising NPD in small manufacturing organisations, or from the resistance to change and innovation which often accompanies productivity-related pay mechanisms (see 5.2). They may be cultural, resulting from the differences between crafts practitioner and company staff, in terms of education, gender, class, outlook and experience (see 5.2). Alternatively, they may be caused by unrealistic expectations on the part of crafts practitioners, who may attempt to maintain the degree of control that they are accustomed to in their own work, in an environment which demands a collaborative approach (see 5.2).

The research suggests that manufacturers could benefit from being encouraged to develop skills comparable with those demonstrated by key personnel operating within the successful case

study companies. These capabilities include communication and motivational skills, intra-organisational and project management capabilities, and the ability to assimilate and apply disparate knowledges. They also include the ability to display enthusiasm, vitality, humour, tenacity, creativity and pragmatism in their work (see section 5.2), as well as the ability to understand the impact of the cultural and cognitive differences between crafts practitioners and production staff (see 5.2). The inexperience of NPD evident within many crafts-based manufacturing companies suggests that key staff could also benefit from training in project management skills (see 5.1).

Thirdly, the study reveals the need for crafts-based manufacturing companies to develop a resource-based perspective, as the basis for identifying appropriate NPD mechanisms and management styles. This suggests a further role for support providers in assisting manufacturers in evaluating their existing capabilities and strategic direction, before formulating an NPD strategy. The strategies and mechanisms identified by this research may provide useful exemplars, when adapted in response to this evaluation process and guided by a vision for its development in relation to existing capabilities and market conditions.

The research suggests that support providers could assist crafts-based manufacturing companies by introducing their managers to the concept of NPD as a process affecting all aspects of organisational culture and development, rather than simply a means of extending a product range. The research shows that collaborative NPD has the potential not only to create new markets and attract new customers, but also to mobilise latent workforce creativity and learning capabilities. It demonstrates that collaboration with crafts practitioners can enable manufacturers can capitalise upon their inherent strengths in flexibility, quality and customisation capabilities. By emphasising the intangible benefits of the NPD process as well as its product outcomes, training and support providers could encourage the development of the organisational vision required for its potential to be optimised.

Finally, the study reveals that learning in the industrial environment can be catalysed by collaboration between crafts practitioners and production staff. It suggests that the skills and implicit knowledges developed by production staff be considered a major asset of crafts-based manufacturing companies, but one which is commonly under-utilised. Despite high degrees of job specialisation, individuals' skills may often be applicable to problem-solving and NPD activities capable of extending organisational competencies whilst providing personal fulfilment. The study suggests that it is through the making process itself that these capabilities

are developed, disseminated and stabilised, and through collaboration that convention can be challenged and new methods and technologies introduced. This finding creates new opportunities for the development of practice-based vocational training methods.

5.4.2. Implications for Crafts Education

A major finding of the research is that new crafts graduates are typically poorly equipped to engage in collaboration with manufacturers. Those new to such work tend to operate in accordance with conceptual frameworks, working methodologies and creative self-images which inhibit creative collaboration. In addition, they often lack the interpersonal and motivational skills found to be especially important when working with companies lacking in-house design management capabilities (see 5.2). These factors constitute a significant threat to the establishment and continuation of alliances between crafts practitioners and manufacturers, particularly as few crafts-based manufacturing companies are experienced in NPD. They may partially explain the paucity of crafts practitioners working successfully in industry, as few individuals are prepared to invest the considerable time, capital and energy required in order to gain these essential skills and capabilities through experience.

This finding has a broader significance, in relation to the ongoing debate on the value of crafts education. It confirms doubts regarding the transferability of knowledge and skills gained through crafts education (see 1.2.3), whilst reinforcing criticisms of the many crafts courses which continue to operate as vocational training, preparing students solely for self-employment as crafts practitioners (Ball and Price 1999). However, it also demonstrates clearly that craft can have application beyond the making process itself, not only in terms of materials knowledge and aesthetic / tactile sensitivities, but also in terms of the cognitive processes and specific communication skills it develops.

Other theorists have recognised the need for increased transferability (Ball and Price 1999). However, the implication here is that this transferability could be – in part – defined by the capacity to shift knowledge from the individual domain to the collective. This finding suggests a role for crafts education in developing the specific capabilities required for graduates to work in creative collaboration, as well as as autonomous individuals. This strategy may be considered an appropriate means of broadening practitioners' creative outlook, encouraging them to explore the opportunities offered by working in collaboration with other creative

professionals and by engaging with new technologies, and thereby contributing to the blurring of disciplinary boundaries considered characteristic of contemporary crafts practice (see 3.7). The strategy could also improve the transferability of their capabilities to the flexible, diverse vocations followed by crafts graduates (Partridge 1997, Ball and Price 1998, Press and Cusworth 1998): as Schön explains, reflection-in-action – which corresponds to the practitioner’s reflective dialogue – is a skill with broad professional application (see 3.3).

The challenge for crafts educators is to develop pedagogic frameworks and teaching methods which encourage the development of creative collaboration within crafts practice. The study’s findings have implications for those working in this field.

Firstly, the study suggests that the potential for ‘live projects’ – in which a design brief is presented by a manufacturer - is currently unfulfilled, and that emerging paradigms of crafts practice and knowledges create new opportunities for the role of such projects in crafts education to be reconsidered.

It is evident that the experience of collaboration can catalyse the development of practitioners’ skills and creative frameworks. As the empirical data presented here demonstrates, practitioners derive intense personal fulfilment from both the products produced by their collaborations with industry, and the processes involved in working with others with complementary skills. The process itself often became a primary source of creative stimulation, which in turn initiates the development of skills in communication and teamworking.

For many practitioners, creativity is sparked by the process of interacting with people and processes within the industrial environment. In contrast, the ‘live projects’ featured within undergraduate courses typically adopt a sequential format, during which a design brief is issued by the company during a factory visit, and students present the final results to a company representative.

By requiring students to adopt a linear methodology, in which completed designs are presented for ‘manufacture’, rather than developed in collaboration with the company, this approach validates the linear design methodology as an appropriate model for crafts-industry collaboration. It offers little insight into the creative opportunities that the experience can offer, and thereby reinforces the myth of collaboration with manufacturers as a commercial necessity.

In addition, it means that the opportunity is missed for students to discover the transferability of the cognitive skills developed through their education, and to develop valuable ancillary skills.

By extending the scope of the live project in undergraduate courses, students would have an opportunity to extend their capabilities beyond the studio, and to explore through practice the notions of technology and collaboration as creative stimuli. It could become an opportunity for students to evaluate and question their own knowledges, methodological frameworks and creative self-images. In addition, it could begin the development of the communication and interpersonal skills which facilitate collaboration in all aspects of life after graduation.

Secondly, the study suggests that students could benefit from being encouraged to develop awareness of the creative self-images guiding their work. The research demonstrates that practitioners successful in crafts – industry collaboration often undergo a transition in terms of their creative self-image, which parallels their adoption of the crafts-derived design methodology.

Individual testimonies suggest that a certain ‘preciousness’ is common on graduation: crafts-based designers describe themselves as having been ‘arrogant’ and ‘idealistic’ at this stage. Their tendency to adopt a linear design methodology can be partially attributed to this mindset: the need to maintain ‘design integrity’ results, the data suggests, from an educational system which promotes the superiority of the individual aesthetic. This assertion is substantiated by pedagogists, who suggest that art and design education perpetuates the myths of the deified ‘hero’ figure and the intuitive, visual design process, thereby encouraging the development of professional self-images which are increasingly inconsistent with the realities of professional practice (see 3.9.4).

It appears that crafts-based designers undergo a transformation of the creative self-image, in response to their experiences of collaboration with industry, and the conflict between ‘design integrity’ and the realities of manufacturing processes and market forces in particular. Those who persist in working with manufacturers tend to develop a context-related form of creativity, in which their practice becomes responsive to the external environment, as well as to internal factors such as conceptual thinking, and the need for self-expression or the embodiment of aesthetic ideals (see 5.1.2).

This research does not suggest that crafts education and training should value one type of creative self-image above another: crafts practice is inherently pluralistic (see 3.3), and its different forms are applicable to particular contexts: an individualistic type of creativity, for example, may be considered more appropriate for a textile artist than for an art / craft therapist. It is suggested, however, that students could benefit from developing an understanding of the nature and value of their own creativity and creative self-image. This form of self-awareness could be encouraged during the tutorial-type activities common in Higher Education. This process could have a significant impact, informing career choices as well as encouraging the transferability of the creative thinking developed during the course.

Finally, the study confirms Ball and Price's recommendation that students should be encouraged to articulate and conceptualise the nature and value of crafts knowledges and cognitive processes (Ball and Price 1999).

The study demonstrates that the practitioner's capacity to apply working methodologies characteristic of crafts cognition to the industrial environment is a key influencing factor on project outcome. Successful cases are characterised by the practitioner's ability to develop a reflective dialogue between conceptual thinking, and a multi-sensory exploration of manufacturing materials and processes.

However, it is evident from empirical analysis that for many practitioners, this capability develops slowly and unconsciously, through real life experience rather than education or training. Typically, practitioners new to collaboration abandon the methodologies employed in their personal practice, when working in industry. Instead, they adopt the linear methodology considered more characteristic of industrial designers, presenting pre-conceived designs for manufacture, whose poor contextual fit results in manufacturing productions and resistance within the production team. It is only through interacting with manufacturing processes and people in the course of resolving these problems that practitioners recognise the creative potential of the manufacturing environment, and begin to develop an integrative, crafts-derived design methodology. The empirical data presented here suggests that even experienced crafts practitioners lack the ability to articulate and conceptualise their working methodologies, or to compare those employed in different aspects of their professional practice: instead, their experiences of the NPD process are described in terms of events and interactions. This finding may be considered symptomatic of the critique-based assessment system common

within art and design education - which is said to value product outcomes rather than processes (Hall-Jones 1996) – as well as of the fetishisation of the craft object described in section 3.2.2.

The risk inherent in this process of learning through experience is that either party may abandon the alliance before this transition has occurred, due to the high costs incurred by manufacturing problems. There is evidence to suggest that, were practitioners more aware of their own working methodologies, these problems could be averted, or remedied more rapidly: when graduates are able to value and articulate their thinking and working methodologies, they become more self-aware and confident, and are therefore better equipped for a diversity of career options (Ball and Price 1998).

The study therefore supports the assertion that crafts educators have a significant role to play in encouraging students to value creative experimentation and reflective thinking, and develop skills in articulating these processes, as well as in articulating the object and its conceptual significance. Again, tutorial discussions and critiques could be used as a vehicle for discussion, enabling students to describe their working methodologies, and to reflect on and develop their applications in relation to design and other vocational and non-vocational activities.

5.4.3. Implications for the Cultural Industries

As stated in section 1.2.1, the crafts sector is significant to the growth of the cultural industries, not only as a small yet high-output sector in its own right, but also as a supplier of products and services to other industry sectors. However, the growth of individual enterprises has been limited by a ‘crisis of delegation’, which frequently results in the practitioner experiencing a conflict between the economic imperative for collaboration with manufacturers, and a cultural resistance to its demands (see 5.2). For many practitioners, the opportunities for self-expression and a degree of self-sufficiency presented by the ‘designer maker’ lifestyle are primary motivations for their work. Engaging in collaboration with a manufacturer can be seen as contradictory to the ethos of independence and creative autonomy, for which many practitioners endure financial hardship and insecurity.

The study challenges the perception of collaboration as compromise. Instead, it demonstrates its potential as a creative process, in which exploration and reflective experimentation in an industrial environment can complement and extend personal practice. Indeed, for many of the

crafts-based designers interviewed, the experience of collaboration with manufacturers had been at least as important to their creative development, as to the growth of their businesses.

The implication of this finding is that there is a role for local business support agencies eager to support the growth and diversification of the cultural industries, in recognising the creative potential for collaboration as well as its commercial benefits, and in developing means of overcoming cultural resistance to collaboration amongst practitioners.

Again, it is beyond the parameters of this study to make comprehensive recommendations regarding the nature of such activities. However, the suggestions made in relation to crafts education may also be considered relevant to providers of continuing professional development (CPD) programmes targeted at professional practitioners considering collaboration with manufacturers.

In particular, the issues of methodology and creative self-image warrant exploration at any stage of the practitioner's career: because the creative self-image is developed continually through experience (see 3.7.4), it is important for crafts professionals at all levels to undertake ongoing self-evaluation. In addition, CPD initiatives could benefit practitioners by enabling them to develop the interpersonal and managerial skills which have been shown to facilitate collaboration (see 5.2). These skills include project management and product championing capabilities, the ability to communicate effectively across the organisation, and the ability to undertake the organisational evaluation required in order to determine appropriate strategies for collaboration. This form of support might be anticipated to reduce the risks involved in project initiation, increasing practitioners' confidence in their capabilities to undertake the project successfully, as well as optimising their chances of developing a rewarding alliance.

5.5. Summary of the Contribution of this Work

This study has investigated the lived experiences of crafts practitioners and manufacturers involved in collaborative alliances, in relation to a framework derived from the literatures of design management, crafts theory, cognitive psychology, communication and organisational learning. It has fulfilled its objectives in terms of,

- identifying the influence of crafts knowledges on practitioners' approach to NPD, and on its intangible outcomes.
- exploring influencing factors on the outcome of crafts-industry collaboration.

In addition, it has,

- proposed implications for practitioners, manufacturers, educators and training providers.
- proposed strategies for the rejuvenation of the crafts-based industries.
- critiqued theoretical advocacy for crafts-industry collaboration.
- contributed to theoretical understanding of crafts cognition, knowledges and practices, and hence to the perceived value of crafts education.

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7. Appendices

7.1. Appendix 1: Listing of Individuals and Companies

- Abdy, Richard: NPD Manager, A.R.Wentworth Ltd.
- Abdy, Stephen: Managing Director, A.R.Wentworth Ltd. (father of Richard Abdy).
- Al Maglif Corporation: Jeddah-based distributor of teas, tobacco and smoking accessories, owned by Mr.Linjawi.
- Asquith, Brian: prominent silversmith and founder of Asquith Design Partnership.

- Atkinson, Peter: workshop manager, PMC Hadrien International Plc.
- Beebe, Jane: independent designer / crafts practitioner, who has undertaken NPD in collaboration with Royal Brierley Crystal, Nazeing Glassworks, PMC, JM, Cumbria Crystal and Dartington Crystal.
- Bellamy, Sean: metalsmith at Wentworth and member of the company's NPD project team, who has recently developed new products for the company's 'Design Gallery' range.
- Blowzone: small, Stourbridge-based hot glass workshop.
- Bridgewater, Emma: founder and Managing Director of Bridgewater Pottery.
- Bridgewater Pottery: medium-sized manufacturer of domestic earthenware.
- Clark, Peter: senior designer at DemaGlass Tableware, UK's second largest glassware producer.
- Conran Shop, The: high quality, design-oriented furniture and houseware retailer.
- Cumbria Crystal: small producer of traditional cut crystal stemware.
- Dartington Crystal: glassware producer employing craft making processes, with a reputation for high standards of design and product quality.
- Debenhams: mid-market high street department store.
- English Country Pottery: small ceramics manufacturer, employing craft production and decorating techniques, supplying high street retailers with both standard and exclusive designs.
- Flavell, Ray: prominent glass maker, who travelled to the Orrefors factory in Sweden to learn techniques including ariel decoration.

- Garfoot, Stuart: glass designer and educator, who produces his own designs in collaboration with metal and glass workshops, in addition to designing for Rosenthal.
- Garraway, Bob: foreman, Nazeing Glassworks.
- Hajdemack, Charles: Director of Broadfield House Glass Museum, a major collection of UK glassware.
- Heals: high-quality, design-oriented retailer of furniture and household goods.
- Houldsworth, Tony: Marketing Manager, PMC Hadrien International Plc.
- Honiton Pottery: small, Devon-based manufacturer of ceramic ware.
- Hornsea Pottery: small, Yorkshire-based manufacturer of ceramic ware, who worked in collaboration with Martin Hunt.
- House of Fraser: mid-market, high street department store.
- H Samuel: mid-market, high street retailer of shoes and accessories.
- Howard-Jones, Peter: Chairman, PMC.
- Hunt, Martin: Educator and founding partner of design consultancy Queensbury Hunt Levien.
- Ideal Standard: manufacturer of bathroom furniture.
- Sarah Jordan: founder and Managing Director of Jordan Accessories, who has undertaken collaborative alliances with PMC and Wentworth.
- Frances Lambe: PA to Mr. Linjawi of Mada Trading / Al-Maglif Corporation, and the initial point of contact between the companies and Jane Beebe.
- Mr Linjawi: owner of Al-Maglif Corporation and Mada Trading.
- Mada Trading: trading subsidiary of Al-Maglif Corporation.
- Oasis: high street retailer of women's fashions and accessories.
- Orrefors: Swedish glass factory, renowned for its close relationship with crafts practitioners.
- Pryke, Susan: ceramicist who has undertaken NPD in collaboration with IKEA, English Country Pottery and Park Rose Pottery, in addition to sourcing manufacturers for her own product ranges.
- Rosenthal: major German ceramics and glassware manufacturer, with a reputation for high standards of design and product quality.
- Park Rose Pottery: small, Yorkshire-based ceramics manufacturer.
- Ratners: budget, high street retailer of jewellery and accessories.
- Royal Brierley Crystal: Stourbridge manufacturer of traditional cut crystal.
- Royce, David, Marketing Manager (and NPD Manager) at Nazeing Glassworks.

- Sneyd, Jacqui: metal worker, with whom PMC collaborated on an NPD project prior to their involvement with Sarah Jordan.
- Tchalenko, Janice: prominent ceramicist, known for her work for Dart Pottery, who has undertaken NPD in collaboration with Royal Doulton and Park Rose Pottery.
- Thomas: German ceramics manufacturer.
- Timpsons: high street retailer of shoes and accessories.
- Tyssen, Keith: prominent metalsmith, educator and designer, who produces limited edition ranges in collaboration with pewter manufacturers.
- Wilkin, Neil: highly skilled glass blower, who has operated workshops with Rachael Woodman and within the Dartington Crystal factory. Now works to commission for companies including Bridgewater Pottery, and in collaboration with practitioners including Rachael Woodman and Jane Beebe.
- Woodman, Rachael: prominent glass designer and crafts practitioner, who has developed a long and successful association with Dartington Crystal whilst exhibiting internationally.
- Wood, Gill: Managing Director of PMC, with responsibility for NPD.
- Williams-Thomas, David: former Chairman of Royal Brierley Crystal, with responsibility for NPD.

7.2. Appendix 2: Interview Schedule

interviewee	date	location	outcome
Keith Tyssen	November 20th 1996	designer's home, Sheffield	narrative
Charles Hajdemack	March 25th 1997	Broadfield House Glass Museum, Stourbridge	narrative
Stuart Garfoot	March 25th 1997	designer's home, Hagley	narrative
Brian Asquith	May 5th 1997	Asquith Design Partnership, Youlgreave	narrative
Emma Bridgewater	May 8th 1997	Bridgewater Pottery, Stoke-on-Trent	narrative
Peter Clark	May 16th 1997	DemaGlass Tableware, Chesterfield	narrative
David Williams-Thomas	May 18th 1997	Royal Brierley Crystal, Stourbridge	narrative
Jane Beebe	June 19th 1997	designer's home, Cardiff	case study 1
David Royce	July 9th 1997	Nazeing Glassworks, Broxbourne	case study 1
David Royce	October 14th 1997	Nazeing Glassworks, Broxbourne	case study 1
Bob Garraway	October 14th 1997	Nazeing Glassworks, Broxbourne	case study 1
Frances Lambe	October 22nd 1997	by telephone	case study 1
Jane Beebe	November 10th 1997	designer's home, Cardiff	case study 1
Rachael Woodman	November 10th 1997	Beebe's home, Cardiff	narrative
Susan Pryke	December 2nd 1997	designer's home, London	narrative
Martin Hunt	December 2nd 1997	Queensbury Hunt Levien, London	narrative
Janice Tchalenko	January 23rd 1998	Royal College of Art, London	narrative
Jane Beebe	February 1998	PMC, Sheffield	case study 4
Gill Wood	March 14th 1998	PMC, Sheffield	case study 3 / 4
Tony Houldsworth	March 14th 1998	PMC, Sheffield	case study 3 / 4
Peter Howard-Jones	March 14th 1998	PMC, Sheffield	case study 3 / 4
Sarah Jordan	June 30th 1998	Jordan Accessories, London	case study 2 / 3
Richard Abdy	September 3rd 1998	A.R. Wentworth, Sheffield	case study 2
Stephen Abdy	September 3rd 1998	A.R. Wentworth, Sheffield	case study 2
Richard Abdy	November 9th 1998	A.R. Wentworth, Sheffield	case study 2

7.3. Appendix 3: Glossary of Terms

- **affordance:** the workable capacity of a medium.
- **ariel technique:** glass blowing technique characteristic of the Orrefors factory in Sweden, producing glass decorated with coloured stripes.
- **bisque firing:** the first firing of a ceramic object.
- **Chartered Society of Designers, The:** representative body, offering a searchable directory of designers.
- **constraint:** the limitations of a medium.
- **Corning Museum of Glass, The:** major international glass collection and library.
- **crafts cognition:** the dialogue between the physical and conceptual domains considered characteristic of crafts practice.
- **crafts knowledge:** knowledge generated by crafts practice, considered to be tacit and non-verbalisable.
- **craft object:** the embodiment of crafts knowledge in tangible form, usually a decorative object which may be functional or sculptural.
- **crafts practitioner:** an individual who designs and produces functional, decorative or symbolic artefacts - for sale or for exhibition – using the qualities of a particular material and / or process to inform aesthetic and conceptual development.
- **crafts practitioner / designer:** an individual who combines crafts practice with the production of designs to be manufactured by others.
- **creative industries:** see ‘cultural industries.’
- **creative self-image:** the individual’s unconscious or conscious sense of creative self, derived from motivations, personality and experiences, and influencing behaviour in relation to both creative and professional activities.
- **cross-functional development:** NPD process whereby the design is developed in collaboration between the organisation’s various functions.
- **cultural industries:** industry sector encompassing advertising, architecture, arts and antiques markets, craft, design, designer fashion, film, software, music, radio and television, the performing arts and publishing.
- **designer (in this context):** an individual with a background in crafts practice, who now works primarily as a designer for industry.
- **explicit knowledge:** knowledge which is demonstrable, tangible or easily explained.

- fettling: the process of smoothing ceramic greenware, in particular of removing marks made by the mould during the slip-casting process.
- FHM: For Him Magazine, a monthly mens' lifestyle publication.
- Foundry Project, The: 1980s initiative at Royal Brierley Crystal, intended to promote technology transfer between craft and industry.
- function (in this context): section of the organisation, eg manufacturing, marketing.
- gaffer: leader of a glass blowing team.
- glost firing: the second firing of ceramic ware, undertaken after glaze has been applied to the surface.
- greenware: unfired ceramic ware.
- growth sector: industry sector anticipated to contribute significantly to economic growth in the UK, including ICT, biotechnology, and the cultural industries.
- the hollow-ware industries: all industries concerned with manufacturing vessel forms, ie metal, ceramics, glass.
- hand-building: term describing all ceramic forming techniques other than throwing and slip-casting, ie those used predominantly for craft ceramics.
- hot glass: glass which is blown, rather than kiln-formed.
- implicit NPD 'mechanism': a conscious adoption of certain attitudes or behavioural strategies by particular individuals within the organisation, intended to facilitate NPD.
- industrial designer (in this context): an individual trained or practicing as an industrial designer, who has not learned a specific craft.
- iterative NPD methodology: a non-sequential process, in which the design is refined gradually through on-going consultation between functions.
- Jasperware: the pale blue ceramic body considered characteristic of Wedgwood pottery.
- knowledge stabilisation / institutionalisation: the committing of newly acquired knowledge to the organisation's collective memory.
- knowledge-driven economy: an economy in which organisational competitiveness is derived primarily from knowledges and skills – and their embodiment in products and services – rather than solely from technologies or low unit cost.
- knowledge-based resources: the knowledges and skills residing within an organisation.
- linear NPD methodology: a sequential process, whereby the design is passed from one department to another, typically from marketing to design, to manufacturing.
- NEC Spring Fair: major trade fair for the tabletop, housewares and jewellery industries, held annually at the National Exhibition Centre.

- Next Interiors project, The: design initiative led by Next in 1986, in collaboration with The Designers Guild, Fleshpots of Stoke-on-Trent and ceramicists Carol McNicholl and Janice Tchalenko.
- pluralistic intelligence: a form of cognition which requires the individual to draw on two or more of the following: logical-mathematical intelligence, linguistic intelligence, musical intelligence, bodily-kinaesthetic intelligence, interpersonal intelligence, spatial intelligence.
- pluralistic practice: an activity which may take many forms.
- product champion: individual who gains safeguards the development of the new product, gaining support for it within the organisation, facilitating the interpersonal relationships and communication it requires, and assimilating knowledge from outside of the organisation.
- raku: a low-temperature ceramic firing process, whereby the ceramic object is heated rapidly until its glaze is seen to melt, then plunged into water and finally sawdust, resulting in a crazed surface decoration.
- slip-casting: the process traditionally used in industrial ceramics manufacture. Liquid clay (slip) is poured into a plaster mould, which absorbs its moisture, leaving a clay shell.
- SME: Small or Medium Enterprise, defined as having less than 250 employees, and generating either a turnover of less than ECU 40M per annum, or producing a balance sheet total not exceeding ECU 27M per annum.
- structural NPD mechanism: an alteration to an organisation's structure, employed to facilitate the NPD process, eg a project team.
- Tableware International: major trade journal for the tabletop industries, with an emphasis on ceramics, glass and metal.
- tacit / personal knowledge: knowledge which is gained through the experience of participation in an activity, and cannot be wholly articulated in words.
- vulnerable sector: industry sector considered to be in decline, including manufacturing.
- 100% Design: trade fair targeted primarily at design-oriented retailers.

7.4. Appendix 4: Illustration of the Data Analysis Process

The following pages contain photocopies made of original documents used in the analysis of the interview with Sarah Jordan conducted on June 30th 1998.

Firstly, a list of perceived 'contradictions' and issues reveal my initial thoughts on completing the interview transcript. The list demonstrates an initial incomprehension in the discovery of conflicting accounts within the data, and implies a desire to discover 'the truth' which was to be replaced by a desire to preserve the case's multiple perspectives (see chapter 2). The list served a useful purpose, allowing me to capture and temporarily suspend my own judgements before commencing data categorisation.

Secondly, two flow charts illustrate ongoing attempts to refining my understanding of the case study, in response to the data categorisation phase. Many such charts were produced, to accompany the physical grouping and regrouping of data units. The first chart captures an early attempt to identify data categories and to understand the relationships between them. It depicts the search for the motivations and behaviours of the designer / crafts practitioner and manufacturer, and their impact upon the design process and product outcome. The second flow chart expands and develops this theme, whilst also identifying possible causes of the motivations and behaviours previously listed. The project is located within the context of other collaborations undertaken by both parties. Refinement and development of the flow chart continued until an A0 size wall chart was covered with moveable Post-It notes and arrows.

The third page shows a section of the coding system used in re-examining the entire data set in relation to the flow charts and initial codes. The list shows the work at the exploratory stage. Category one is concerned with analysing the designer's description of her own actions, whilst categories two and three attempt to elicit her perceptions of the collaborating manufacturers.

The fourth page consists of an extract taken from the transcript of an interview with Sarah Jordan, and shows how data from all three categories was coded within the text. For clarity, coloured pencils were used on the original documents.

7.5. Appendix 5: Publications Relating to the Research

7.5.1. Refereed Journal Articles

1. Yair K, Tomes A and Press M 'Design through Making: Crafts Knowledge as Facilitator to Collaborative New Product Development' *Design Studies* vol 20 no 6 (November 1999) pp 495 – 516.
2. Yair K, Press M and Tomes A 'Crafting Competitiveness: Crafts Knowledge as a Strategic Resource' *Design Studies* vol 22 no 4 (July 2001) pp 377 – 394.

7.5.2. Refereed Conference Papers Published in Proceedings

1. Yair K, Tomes A and Press M 'Design Through Making' (earlier version of paper 1 above), presented at Quantum Leap Design Research Society Conference, Birmingham (September 1998).
2. Yair K, Press M and Tomes A 'Crafting Competitiveness: Crafts Knowledge as a Strategic Resource' (earlier version of paper 2 above), presented at New Structures for Design Management in the 21st Century, the Design Management Institute Conference held in New York (June 1999).
3. Yair K, Press M and Tomes A 'Crafting Competitiveness: Crafts Knowledge as a Strategic Resource' (earlier version of paper 2 above), presented at Design Cultures, the European Academy of Design held in Sheffield (1999). Proceedings ISDN 902896237.
4. Yair, K. 'The Craft Maker as Designer: an Agent of Change', presented at 'Craftscity: The Role and Potential of the Crafts to Economy, Employment and Environment', the Crafts Council / SHU conference held in Sheffield (March 1999).

7.5.3. Refereed Conference Presentations

1. Yair K, Tomes A and Press M 'Through the Glass Ceiling' (earlier version of paper 1 above), presented at the Symposium on Crafts and Design Management, Kuopio Academy of Crafts and Design, Finland (May 1998).
2. Yair, K. 'Making Meaning: the Role of Crafts Knowledge in Design for Human Experience', presented at Consuming Craft, conference held at Buckingham Chilterns University (May 2000).

7.5.4. Poster Presentations

1. Learning Through Making / Making a Living , Crafts Council, London (October 1998).

7.5.5. Book Chapters

1. Yair, K. Press, M. and Tomes, A. 'Look Who's Talking: Developing Communication and Negotiation Skills through Design Education', Scrivener, S.A.R. Ball, L.J. and Woodcock, A. (eds) (2000) 'Collaborative Design', Springer, London.

7.5.6. Web-site / Video Productions

'Talking Design' video, teaching pack and website. Published at www.shu.ac.uk/schools/cs/talking-design.