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**Design Workshops of the World:
The production and integration of industrial
Design expertise into the product developemt and
manufacturing process in Norway and the
United Kingdom**

by

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**Design Workshops of the World:
The production and integration of industrial design expertise into the product
development and manufacturing process in Norway and the United Kingdom**

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Abstract

To gain competitive advantage an increasing proportion of companies incorporate design into the product development process; it has become a critical determinant of competitive success. Design expertise is either provided internally or externally. Thus, in common with management consultancy, independent firms are increasingly providing design expertise to clients. Over the last ten years the British and Norwegian governments have emphasised the contribution made by industrial design to national competitiveness. This takes two forms: the export of design services, and the added value that comes from the incorporation of design into products and services. This paper explores the role of design services in the production process and undertakes a preliminary analysis of the structure and geography of the design industry in the UK.

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Design Workshops of the World: The production and integration of industrial design expertise into the product development and manufacturing process in Norway and the United Kingdom

It has become apparent that design, in order to remain useful commercially, must be universal aesthetically. Progressive English designers admit that the domestic quality of some of their designs has closed many markets to English manufacture. The quality of English manufacture is unsurpassed; no designer has the right to handicap a product by restricting its sale in foreign markets simply because an international character is lacking.

(Raymond Loewy, 1941: 233).

[W]hen I became a member (sic) of Parliament I was visiting one of the cities in Europe where there was a British Week. So I went to see what the people of Stockholm were being showed as examples of the things that were being made in Britain. And I will tell you, I was very disappointed because they were all reproductions from the past, both in furniture, in silverware and in kitchenware and I said—I got hold of the organisers and said ‘How can you send all this stuff over’—you know, I usually go straight to the point (!) and they said ‘Well, as a matter of fact this is what sells here’. And I said ‘Look, you’ve got to get them more aware that we in Britain can produce good design’. And after that I went round some of the shops known for good design in Stockholm and began to look and watch for good design. Two of the things which I liked best, and that happened to be in furnishings, I said ‘That is marvellous design’. What I can again remember to this day was a table about the size of this one, and it did double function, it looked a rather nice low coffee table of the kind which you often see in many, many people's sitting rooms, and then it could be brought up to serve also as a dining table for two. Excellent design and beautiful woodwork and it worked. And I said ‘You must have very, very good schools for design here’. ‘Oh’, they said, ‘That’s a British designer. He couldn’t sell it to any company in Britain’. And there you see one learned that we were doing good design, it was going the world over, but we hadn’t yet got to the stage—this was a long time ago—when we were having the best design in Britain, and it was they when I got back, and I started to enquire further, they said ‘But those things don’t sell in Britain.

(Margaret Thatcher, December 9, 1981, n.p).

Design is one of British Industry’s chief resources: we cannot compete in a global market in terms of raw materials land or access to cheap labour, but we can draw on superior knowledge, skills and creativity.

(Lord Freyberg, Lords Hansard, 31 March 1999, Col 470).

International competition and customers’ expectations for quality, ease of use and attractive appearance, emphasize the significance and impact of design when products are developed and profiled. Currently, only one in four Norwegian companies use design in product development, and therefore the Government encourages companies to use design actively and strategically. Strategic use of design has become a necessity in the face of increased international competition. As a response to this policy the Ministry of Trade and Industry on September 22nd 2004 declared 2005 to be the year for design in Norway.

INTRODUCTION

The production process for services and physical products incorporates the exploitation and use of various forms of tacit and explicit knowledge during pre-production, production and post-production (Bryson, *et al.*, 2004 Nonaka and Takeuchi, 1995, Nonaka and Teece, 2001). All three stages involve a complex interplay between internal and external knowledge and expertise. The substantial literature on external knowledge and the knowledge (or information) society stresses the contribution made to the production process by consultants, and especially management consultants (Clark, 1995; Robertson and Swan, 1998; Wood, 2002). There is a general consensus that management consultants have an important role even though it is actually difficult to evaluate outputs that may involve modifications of employee behaviour or replacement of one set of business processes with another. A significant

proportion of management consultancy time involves identifying and distributing best practice or the dissemination/prolongation of the latest management fashion; the latter ranging from total quality management to the current focus on creativity. This type of consultancy tends to involve the more intangible elements of the knowledge economy; it is concerned with business processes and procedures rather than with actual physical products. The focus is on business behaviour, and even business culture, rather than on transformations to material commodities that are in progress or required in the future.

This bias is reflected in the producer service literature that is largely concerned with analysing the production (and consumption) of intangibles; this has diverted attention from those service functions that are directly involved with the development of new physical products or the modification and transformation of existing products. Perhaps the emphasis on services that are intangible, cannot be stored and must be consumed simultaneously was a reaction against manufacturing-dominated accounts of the economy. It is part of the history of economic geography. During the 1970s a number of pioneering scholars began to question the neglect of services in contemporary economic geography; the concern with 'pure' services that followed appears to have cast a shadow over the manufacturing part of the economy and especially those service functions that contribute directly to the production of physical products. Amongst the most important of these are the individuals and firms that are directly or indirectly engaged in the design of physical products as well as the creation of outputs associated with service activities (such as graphic design). This is an important omission from the literature as efficiency, simplicity, economy, and ease of maintenance are the four principles that guide the design process and '[b]etween two products equal in quality, price and function, the one that is aesthetically correct is the one that sells' (Loewy, 1941: 227). Design is fundamental to the production system of advanced capitalism and, when it is done effectively, it can reduce production costs by increasing the overall efficiency of the production process. It is also a method of adding extra value to products and thereby justifying high sales prices that can meet high production costs. In this way successful design can be one way of avoiding transferring production to low-cost production locations.

Individuals experience the world through a visual environment that is largely the result of a multifaceted and evolving interrelationship between a set of design processes and manufacturing systems; in other words an intermingling of service and manufacturing expertise in some type of production process. Design expertise contributes to the development and modification of production processes as well as products. Design is a complex activity that involves innovation, change, invention and creativity and these elements combine together to contribute to the development of new products or the modification of existing products. It is important to distinguish between research and development (R&D) and design. There is an important literature on R&D that has been summarized in the work of Malecki (1997) and Howells and Michie (1997). Much of the R&D literature does not attempt to develop a precise definition of R&D but it is generally accepted that design is a distinctive part of the innovation process. Howells (2000:197), for example, notes that 'the growth in the external sourcing of R&D and other design and technical activities by firms has played an important role in the creation and development of the research and technology 'market''. In this case, design appears to be a separate if related function to R&D.

A designer develops solutions to commercial needs by balancing aesthetic and technical requirements and in this sense a designer is both an artist as well as a technologist. Design is a hybrid activity that involves both objective and subjective elements. The objective elements of the design task relate to satisfying the business needs of clients, for example, production costs, materials, the complexity or simplicity of the production process, cost of a product in relation to competitors, and timing. The subjective or creative element involves understanding and accounting for human behaviour, ergonomics, fashion/taste, aesthetics, appearances and cultural meanings related to visual and other forms of symbolic expression. Marrying technical with aesthetic considerations also involves designers balancing the requirements laid down by their employers against the perceived needs of end-consumers. Satisfying an employer's brief might actually lead to the development of a product that performs poorly in the market. Designers must also balance their own artistic expression with the requirement to develop a commercial product that can be produced within budgetary constraints determined by the client and the market. Industrial designers are engaged in the development and preparation of new or modified products for the market that take into consideration manufacturing, marketing, and financial requirements as well as aesthetic, functional (ergonomic) and ecological/ethical aspects of the product development process. The process involves everything from creating a design to selecting components and materials as well as contributing to the design of factory

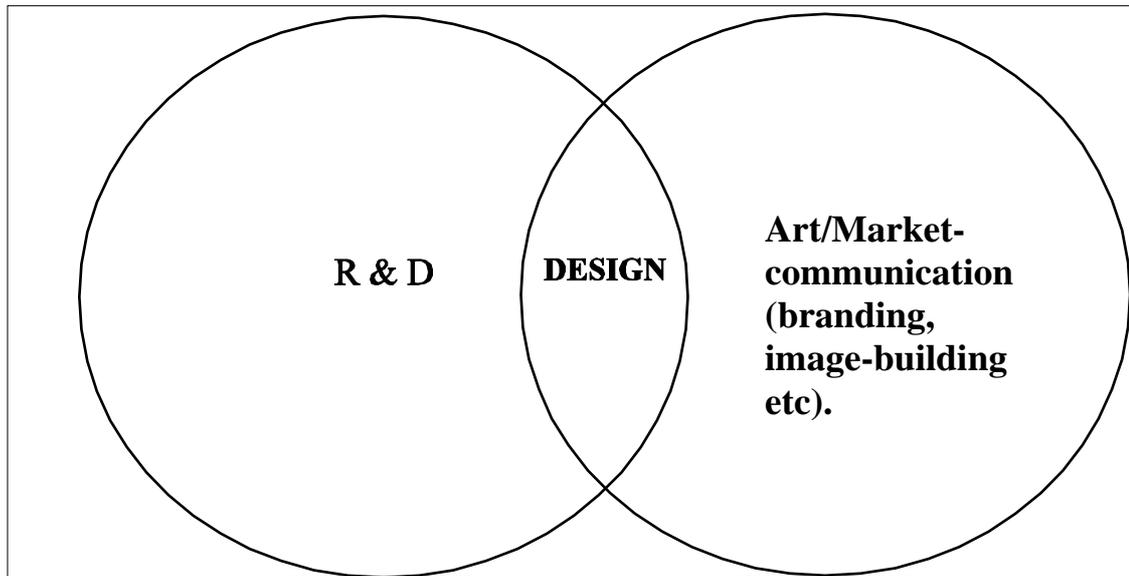


Figure 1: The Hybridity of the Design Function in the Production Process

tooling and the organization of the production process. It is also worth noting that a designer may be involved in refining the product to take into consideration alterations in fashion as well as function linked to the development of new technology.

The Department and Trade and Industry (DTI, London) have developed a definition of R&D for tax purposes that clearly distinguishes ‘design’ from R&D activities. Thus, ‘R&D for tax purposes takes place when a **project** seeks to achieve an **advance in science or technology**’ and the activities which **directly contribute** to achieving this advance in science or technology through the resolution of **scientific or technological uncertainty** are R&D’ (DTI, 2004, bold in original). These guidelines note that it is important to distinguish between design and R&D in the following manner:

When achieving design objectives requires the resolution of scientific or technological uncertainty within a project, work to do this will be R&D. Design activities which do not directly contribute to the resolution of scientific or technological uncertainty within a project are not R&D.

Cosmetic and aesthetic qualities are not of themselves science or technology, and so work to improve the cosmetic or aesthetic appeal of a process, material, device, product or service would not in itself be R&D. However, work to create a desired cosmetic or aesthetic effect through the application of science or technology can require a scientific or technological advance, and resolving the scientific or technological uncertainty associated with such a project would therefore be R&D.

(DTI, 2004: 7)

This means that design is a distinctive activity in relation to R&D, but that some overlap exists. Design can thus be understood to be a function that exists somewhere between scientifically and technologically driven innovation and various forms of market-based communication (branding, advertising, etc) (Bucciarielly, 1994). The hybrid nature of the design process is illustrated in a model that we have developed to highlight the relationship between design, R&D and various forms of market

communications (Figure 1). Methodologically distinguishing between R&D and design activities is a relatively simple task as the two activities can be clearly identified by exploring the institutions, firms and professionals involved in either producing R&D or design inputs into the product development process.

The precise process of design is infinitely varied and complex. It can be expressed through the efforts of one person, for example Philippe Starck's 'juicy lemon squeezer' or Peter Opsvik's 'Tripp Trapp ©' chair, or as the outcome of the efforts of a creative design team (the Aeron © Chair) whether exclusively in-house or as a combination of in-house and external expertise. Much design expertise in large corporations is deemed to be highly confidential as a company's primary competitive advantage may be vested in the resulting proprietary knowledge. Excessive reliance on in-house expertise may, however, limit innovation. To overcome this problem global corporations develop global centres of design expertise but try not to isolate them from highly localised sources of design knowledge. Local designers are used, for example, to modify products so that they become integrated into local consumer cultures. Global companies that rely on internal design expertise will still employ external designers as they realise that they must be open to new forms of knowledge, new experiences that have been formed outside a large corporate environment, and new ways of looking at the world.

There can be no doubt that design consultancy firms are key sources of external knowledge, expertise and innovation in post-industrial economies but their contribution has largely been overlooked in the academic literature on the new knowledge economy (Bryson *et al.*, 2004). The corporate world has become more design aware with design being increasingly integrated into boardroom strategies. For many firms design has become central to the continued evolution of the firm. Enterprise competitiveness is increasingly a function of specialist creative design inputs and the development and continued modification of branded goods and services. While there is certainly a substantial literature on design *per se*, it largely provides an historical (Walker, 1989; Forty, 1995), cultural (Julier, 2000), feminist (Attfield and Kirkham, 1989), gendered (Leslie and Reimer, 2003), commodity chain (Leslie and Reimer, 1999, 2003), marketing or strategic perspective (Kotler *et al.*, 1984; Jevnaker, 2000; Bruce and Whitehead, 1988; Bloch, 1995). The position of design in the clothing fashion industry (McRobbie, 1998) as well as in furniture production (Rusten, 1997) provides some of the few recent industry-specific examples that recognise that it is a source of competitive advantage. In the remainder of this paper we examine the ways in which design services interface with the production process with particular reference to the industrial design expertise that contributes directly to the development or modification of actual products. This is followed by a preliminary examination of the contribution of design services to the UK economy and the evidence showing an uneven distribution of these activities across the UK space economy.

DESIGN WORLDS

The history of industrial design is central to the history of capitalism; capitalism is associated with the creation of surplus value through the manufacture of products and services. Industrial design is a vital element in the relationship between production and consumption as well as being an integral part of the development and continual modification of products. Thus, it would be possible to argue that the history of economic geography is partially a history of industrial design. There have been a number of key moments in design history that have contributed to the on-going development of capitalism of which, perhaps, the most important is the new industrial design idiom that emerged in the United States during the 1930s. Four American designers (Henry Dreyfus, Norman Bel Geddes, Raymond Loewy and Walter Dorwin Teague) played an important role in the development of this new idiom by establishing diversified design practices (industrial, interior and graphic) that embraced commercial pragmatism at a time when European designers were interested in utopian ideals. The new American idiom was associated with a 'streamlining' of products to make them appear more modern (Hiesinger and Marcus, 1993: 113) and it was applied from everything from aeroplanes to consumer products in an attempt to make them more commercially appealing. These designers developed a relativist design ethic in which designs were time and purpose specific. This approach built on the practice of annual design/stylistic changes to products that had been introduced in 1927 by Alfred P. Sloan Jr., president of General Motors (Hiesinger and Marcus, 1993: 116). This policy was based around the simple premise that design obsolescence could be built into products to ensure that old products looked inferior to new. The important point to make is that in many instances product form rather than functionality was altered.

The household appliance industry copied the car manufacturers by developing design-rich products that were constantly changed to encourage consumers to replace their 'old' household equipment and furnishings. The classic example of the use of design to encourage obsolescence of form rather than function was the continual redesign of the Sears Roebuck Coldspot 'Super Six' refrigerator by Raymond Loewy. This product was redesigned three times in three successive years (1934-38) with each 'new' model advertised as superior to the old. Loewy's improvements included: removal of the appliance's legs, installing the first non-rusting aluminium shelving ever to be used in a refrigerator, designing a 'feather touch latch' that responded to the lightest pressure, noise reduction and prominent decorative features (vertical lines). 60,000 units were sold in the year before the redesign was introduced whilst in the following year the new design achieved sales of 270,000 units (Loewy, 1979). The new emphasis placed by Americans on industrial design forced European governments to encourage companies to develop in-house design expertise or to employ external designers. Since the end of the World War 2, design has increasingly become one of the primary determinants of the competitive advantage of enterprises. The Chairman and CEO of Sony made a similar point when he noted that:

At Sony, we assume all products of our competitors will have basically the same technology, price, performance, and features. Design is the only thing that differentiates one product from another in the marketplace', (Norio Ohga, quoted in Economic Review Committee, 2002:21).

The increasing importance of design-based competitiveness, combined with the development of enhanced fashion-driven consumption, has meant that the design industry has grown, to such an extent, that recent research indicates that the design budgets of European companies are growing by between 8 and 20 per cent per annum (Gemser and Leenders, 2001: 28; Dutch Design Institute, 1994).

The design of a product is critical for determining whether it is going to be successful. Design elements are wrapped around, as well as being incorporated into, products and take many forms – ergonomics, marketing, technical, aesthetic, and cultural considerations including branding or identity building, for individuals groups or nations. Design can also be part of the way in which a firm creates an image, for example, a concern with sustainability. Design can represent a bridge between products and art, products and history, products and nature or products and culture. A good example of this relationship is found in retro-design in which manufacturers recreate old products for current consumers. The revival of Roberts Radio (UK) based upon 'revival' editions of models that were developed in the 1950s is a good example of this type of design relationship. During the 1960s Roberts developed the concept of the radio as fashion accessory with versions that were gold plated or covered in mink. By the late 1980s the company was in difficulties as it experienced competition from manufacturers like Sony. In 1990, a Martini television advertisement featured an attractive model sitting next to an original 1950s Roberts' Radio. The company was inundated with requests from people wanting to purchase a classic radio. Roberts decided to produce a limited edition of 500 of a radio that they had stopped producing in 1965. Over a six month period they sold 4000 units. The electronics for the radios are sourced in East Asia while the teak or ash cabinets are crafted and finished in leather in the UK. Roberts Revival editions have become objects of desire for fashion-conscious individuals and Roberts has become the dominant suppliers of Radios in the UK. Other companies are also searching for design inspirations from old products, for example, Ikea designers visit museums to obtain inspiration. Retro-products enable manufacturers to draw upon images, fashions and lifestyles associated with an earlier age. Such images can be reflected in product packaging that can identify the product with a lifestyle, nation, history or even nature. In some cases this can be labelled nostalgic design, in others it can be more about developing a style that fits with different stylistic periods. The Norwegian furniture maker, Alf Sture, born in 1915, for example, developed a furniture collection for the Tønning Møbelfabrikk factory (a furniture manufacturer) that has been recognised as timeless. Similarly, the Norwegian designer Solveig Hisdal has developed a knitwear design for the Sivle Sweater that combines current Norwegian culture with a pattern derived from a 700 year old Venetian knight's cloak that was found in a Norwegian church. This knitwear is an example of hybrid design that combines design inspirations from across space and time in the development of a new product.

This implies that design has many meanings that depend upon the context in which the term is used. The extract from Margaret Thatcher's speech draws attention to the role of time and space in design – what is fashionable in one context and time may be unfashionable in another context. Thatcher also highlights that British manufacturers may have to present a product range to a foreign market that would be out of fashion or considered old fashioned in the home market. Exporting design is thus about

tailoring products and images to meet the needs and perceptions of foreign consumers. This does not imply that a design will be successful in all countries. Interviews with Norwegian producers of kitchen fittings revealed that Norwegians tolerated visible knots in wood while such products did not meet the requirements of Danish consumers. The firms also highlighted that German consumers prefer steel and black rather than natural coloured woods (Rusten, 1992).

Industrial design can be defined as ‘the professional service of creating and developing concepts and specifications that optimise the function, value and appearance of products and systems . . . that relate most directly to human characteristics, needs and interests’ (Industrial Designers Society of America, 2003). Industrial designers also maintain a practical concern for technical aspects of manufacture, marketing opportunities and economic constraints, distribution, sales and marketing processes, and are also often retained for consultation on a range of matters associated with a client’s image. These tasks require knowledge of the psychological, physiological and sociological factors influencing the use of industrial design resources as well as how to use materials, technology, legal and regulatory requirements effectively. For engineers, design is about product or process innovations associated with the development or modification of products; it also includes the design of the tools required for production. Design may also be used to describe the process by which a client’s prototype for a new product is converted by ‘designers’ into something that can be manufactured efficiently and effectively.

The process by which marketing experts or designers update and adapt existing products to meet current fashions is yet another meaning of design. It may also involve the development or modification of the graphics and text that are used to advertise products or services. In technical design, attention is focused on the solution to a specific technical feature of a product while architects and interior designers are concerned to arrive at solutions to space problems that either enhance the profit margins of property developers and investors or make a statement about the client’s activities such as the external design of office buildings or an attempt to design the interior of a building in a way that projects the corporate identity of the client. The diversity of meanings of design and design services partly explains the difficulties of incorporating design services into academic debates about the new service economy.

There have been a number of studies that explore the contribution that design makes to the appearance of every-day objects. They form part of the field of design history that is itself a sub-discipline of art history. In common with art history, the focus is on the objects themselves as a product of the work of individual designers or groups of designers, or on the identification of a discourse of design that can be traced through different social periods, movements, and cycles (Gloag, 1946, Sparke, 1987; Heskett, 1997; Sparke, 2004). Much of this literature has been heavily influenced by the consumption or material culture turn that has been prominent in the social sciences over the last ten years and which tends to emphasise consumption over production processes. For example, Sparke (2004: 4) suggests that ‘the culture of consumption makes design necessary’, but it is also the case that the processes and techniques used by designers provide the stimulus for consumption. It is therefore increasingly important not to treat production and consumption processes as separate; they are inextricably intertwined in a complex evolving production system in which production processes enable new design possibilities to become a reality, and in which producers can influence the tastes of communities of consumers. Thus, while the media undoubtedly plays an important role in creating fashions, the manufacturers and designers of so-called ‘designer’ products are themselves also actively stimulating media coverage of their wares. Consumers do not have to be guided by journalists but their writings may influence the decisions of producers as well as governments. It should also be remembered that the media should not be considered as a neutral knowledge circuit; it has to produce publications that will sell and in the process of constructing reviews journalists can be captured by the producers of goods and services (McRobbie, 1998: 151-174). The economics of the media industry is founded on advertising and this operates as a constraint on the types of stories that can be told about the most valuable advertisers.

Research on the British fashion industry of the kind undertaken by McRobbie has much in common with Becker’s (1984) work on art. Like Becker, she focuses on the process by which designer fashion is produced and incorporated into the production process rather than on the products of the design process. Becker (1984, x) explores the workings of the ‘art world’ in which this term is used in a:

technical way, to denote the network of people whose cooperative activity, organized via their joint knowledge of conventional means of doing things, produces the kind of art works that art world is noted for.

We are suggesting in this paper that many of the dimensions of Becker's art world are replicated in a 'design world' that is a complex, evolving concept that comprises all the people and firms whose activities are necessary for the production of designed-informed products or services. Just like a work of art, designed products are not solely attributable to the work of an individual designer but rather are 'joint products of all the people who cooperate . . . to bring works . . . into existence (Becker, 1984: 35). This is not to imply that the work of an individual designer only becomes possible when the designer is part of a wider production system; an individual may design a product but the design may have to be altered by a development engineering team in order to enable efficient manufacture.

This does not mean, however, that we are arguing for a 'design-informed' analysis of the economy similar to the call by Marshall and Wood for a "service-informed" analysis of urban and regional development' (1984: 6). As Howells (2000: 224) correctly notes, such an approach might 'suggest that the roles are now reversed, with services leading manufacturing in the innovation process, or that services have gained 'the upper hand' over manufacturing'. The point is that the production process has always involved a mix of different types of tangible and intangible elements and that it is important to focus on understanding the production process as a complex whole rather than by starting from a theoretical position that either implicitly or explicitly privileges one type of expertise over another.

In much of the service literature the focus is on the service aspect of production rather than on firms that are involved in some production process (whether a service or a good). The standard definition of a firm is as a coordinator of some type or element of a production process (Coase, 1937). Firms coordinate decisions that involve resources that they own and control or resources that they consume but do not own although they control for periods of time. Their competitive strength lies in their ownership of resources, access to information, and ability to acquire information and knowledge that provides them with a competitive advantage in the market place. Access to a brand reputation and a history of producing particular types of designed-laden products also represents one of the material resources that firms can exploit directly or indirectly. Casson (2001) draws attention to an important theoretical and methodological problem in that 'decisions are actually taken by people and not by impersonal entities such as firms. What the firm can do, however, is to structure the activities of the different people who participate in the decision-making process, so that their individual contributions to the decision-making process are made in the most effective way' (2001: 79). This raises many of the elements identified by Becker in his investigation of the art world, namely the importance of cooperation, coordination, a focus on the activities of people and on the distributed complex networks that surround the production process.

Becker's basic unit of analysis is an art world, but he argues that the "artness" and the "worldness" are problematic (1984: 37). By this he means that art may be produced via complex cooperating networks or by a single individual and that many works rely on:

materials or other resources provided by others who neither intend to cooperate in the production of that work nor know that they are doing so. Typewriter manufacturers participate in the small worlds of many would-be novelists who have no connection with the more conventionally defined literary world.

(Becker, 1984: 37).

Becker's problem is similar to that faced by followers of Actor Network Theory (ANT) i.e. where to draw the boundaries of a network. There is no solution apart from that imposed by the constraints of time and of methodology but it does highlight the distributed nature of the production process with many different individuals and groups of individuals (firms) contributing to the creation of a product (see also Coombs and Metcalf, 1998). Innovation is rarely the product of a single individual or firm, rather it is produced by individuals and firms coming together either explicitly or implicitly to produce an innovation. Coombs and Metcalf are contributing to an innovation literature that has been established around a manufacturing rather than service innovation paradigm. In this context the development of a 'distributed innovation paradigm' overcomes many of the problems of prioritizing services over manufacturing functions in the production process and vice versa. In this perspective all parties to the innovation may have equal standing in the network as all are important elements in the

innovation process. Sometimes manufacturing firms may inform the innovation, and sometimes service firms.

To summarise, design worlds are complex people-orientated worlds that produce major and minor contributions to the production process of manufactured goods, services and spaces (leisure spaces, urban design and interior design). Design is a cooperative activity that may involve people located in different places. Raymond Loewy, a designer working in America during the last century, noted that:

in 1941 manufactured goods and operations valued at approximately \$850 million would appear that year with a design specification marked "Raymond Loewy". Furthermore, Loewy designed the complete range of Frigidare products manufactured by General Motors (cookers, refrigerators and 'when I say "I design" I wish it to be understood "in collaboration with the very capable engineers of my client companies. In 1940 an increase of 100,000 units sold – i.e. 25 per cent more than the previous year – is attributable in part to design.

(Loewy, 1941: 228).

THE CHANGING NATURE OF THE PRODUCTION PROCESS

Over the last decade, the emphasis has moved away from corporate profitability and competitiveness vested in tangible assets such as buildings, equipment and machines to intangible assets. Amongst the most prominent intangible assets is knowledge, which has always been important in the economy (Castells, 2004: 41). The proportion of value that is produced in an advanced capitalist economy by a whole range of intangible knowledge products – computer software, electronic databases, ownership of copyrights, design, the media, to name just a few has also shifted significantly. Indeed, the production of knowledge is an industry in its own right and includes commercial publishing (books, newspapers, magazines, Internet, TV and movies) as well as countless unpublished documents. There is also an important link between design and film/theatre. Product placement represents an important income stream for film and theatrical companies as manufactures pay for their products to be incorporated into the production (Bryson et al., 1999). For example, in the late 1990s, a British filmmaker produced a detective story based on the daily life and work experiences of people employed in the Norwegian furniture and ship building cluster in Western Norway.

In 1999, knowledge was the most important single export by value from the US accounting for more than \$37 billion in licensing fees and royalties (Stewart, 2001: 8). Corporate expenditure on information and knowledge products has also been increasing dramatically. In 1997, total US corporate equipment expenditure (chairs, buildings, cars, private jets, photocopiers, etc) amounted to \$870 billion, but 47 per cent - \$409 billion – of this was spent on information technology and software. If corporate expenditure on R&D (\$144 billion) and training (\$55 billion) is included in the equation than expenditure on knowledge projects was 20 per cent greater than expenditure on physical products (Stewart, 2001: 9).

These knowledge services and products are part of the 'weightless economy' (Quah, 1999) that is becoming more knowledge intensive in four related ways:

1. The production process requires greater quantities of knowledge – from design to marketing and, of course, software – design, accountancy, stock control, and customer management software.
2. The production process is producing increasing quantities of 'goods' that take the form of knowledge products – from heavily branded and design-laden goods (Chanel, Gucci, etc) to computer software.
3. An increasing proportion of goods incorporate knowledge products. These products range from the symbolic capital incorporated in the products and services that take the form of brand capital to products that do not function without embedded software or sophisticated electronics.
4. Consumption is increasingly about the consumption of knowledge products. This form of consumption operates at many different levels – from buying designer branded products to listening to commercially produced leisure products (music, film, computer games).

The incorporation of increasing quantities of knowledge (technical and design-related) into products shortens their life; the intangible, softer components are updated and become obsolete at a much faster rate than the harder physical elements and products also weigh less. This is the case for nearly all products; mobile 'phones and laptops have become lighter and less bulky but are able to perform more functions or are more powerful. Even buildings require less steel and concrete to enclose the same, or even increased, area. Structural engineers and architects are able to draw on a range of specialist knowledge that did not exist even twenty years ago. The German car company BMW is known for the quality of its products built around a design philosophy of 'functional enhancement' (Dron, 2002: 9). Ten years ago BMW employed a design team of 150, now it employs 300 and according to the head of design:

our budget was a quarter of what it is now. Likewise, the amount of product was a quarter of what we do now. We didn't have motorcycle design here, or ergonomics, or Designworks [BMW's high-tech Californian design/engineering subsidiary] or Motorsport; the MINI studies didn't exist.

(Dron, 2002: 8).

For BMW the last ten years have been one of design driven product expansion.

Weaving design into the production process

There are six ways in which design is woven into the production process. First, a functional contribution in which the designer(s) role is to improve some aspect of a complete product. They may even be commissioned to design a complete product that has been imagined by a client. A good example is the work David Carter Associates (DCA) undertook for Stanley Tools (UK). DCA is a multidisciplinary design consultancy specialising in designing products for mass production. They worked with Stanley Tools for over forty years from the 1960s to design simple and complex hand tools. Their involvement ranged from the design of individual tools, taking into consideration ergonomics, to the design of graphics and packaging and the electronic control systems of some of the more specialist measuring devices (Central School of Art and Design, 1982: 13).

Second, design inputs are deployed to create, develop or alter the aesthetics, appearance and styling of a product. Raymond Loewy, a French designer who relocated to America after a period of war service, established himself as an illustrator and designer. In his autobiography he notes that the turning point in his career came in 1929 when he was asked to re-style the already successful Gestetner duplicating machine. He was asked to complete the redesign task in five days and all that could be achieved in such a short time was a visual simplification of the machine. Loewy noted that the Gestetner:

is a classic example of what the profession [industrial design] can contribute to a manufacturer's lasting success. It deserves attention for another reason: it points out the early differences between a straight engineering approach and the designer's attitude when faced with the same problem – in this case note the four protruding tubular supports. As a consumer-conscious designer, I detected the inherent hazards of the four protruding legs in a busy office. While my client, Sigmund Gestetner, seemed hesitant about giving me the redesign assignment, I quickly sketched a stenographer tripping over a leg, paper flying everywhere. This sold him, and I got the job.

(Loewy, 1979).

Loewy's career is a classic example of a designer who spent much of his time providing attractive and serviceable facelifts for existing mechanisms, such as cars, radios and refrigerators that had initially been designed without his expertise. Perhaps the best-known example of his work is the restyling of the Coke bottle to incorporate its famous curved form. Loewy's work was important for his clients because he was able to differentiate generic products in such a way that potential customers considered their existing machines to be obsolete. They were persuaded on the basis of (re)styling rather than improvements in product performance, although in many cases radical styling alterations improved performance.

Firms develop stories related to the design inspirations and histories of their products. This type of story-telling is wrapped up in the development of a brand and is also another way in which a firm can develop distinctiveness in the marketplace. Jens Petter, manager of the Norwegian Ekornes furniture

company, explains that the invention of the 'sacco-sack chair' (a beanbag that can form into many shapes) was inspired by studying the ways his children sat or lay on furniture whilst watching television¹. Similarly, Peter Opsvik, designer of the Norwegian Tripp Trapp chair, a children's chair that has sold over three million, explains that this chair began with Opsvik's two-year-old son who had outgrown his high chair. Opsvik wanted the child to continue to participate in family meals around a table and

'looked for a chair that the boy could use as his own. He was upset not to find any: 'I was upset for about ten minutes, but I was only upset for ten minutes, I am a designer after all'' (Opsvik, quoted in Ryan, 2002: 93).

Several similar stories are told about many other designs and products as an attempt is made to wrap a story associated with an idea (children, nature, the good-old-days etc) around a product. Many of these designer tales are post-rationalizations created for marketing purposes.

Third, designers can be directly incorporated into a product development team in such a way that they become an integral part of the product development process. A good example is the design, development and production of the Aeron © chair. This was developed by Herman Miller, a traditional American manufacturer of residential furniture with factories in the US, Italy and the UK and global sales of \$2.24 billion in 2001. The Aeron © office chair was the culmination of four years of research, development and design work rooted in a further thirty years of research into chair ergonomics. The chair was designed by two independent industrial designers, William Stumpf and Don Chadwick, based in Minneapolis and Santa Monica respectively. During the 1960s, working with specialists in the fields of orthopaedic and vascular medicine, Stumpf embarked on a period of intensive investigation into the ways in which people sit and should sit. In 1974 he was commissioned by Herman Miller to apply this research to office seating which led in 1976 to the production of the Ergon chair, followed in 1994 by the best selling Aeron © chair that has sold over two million since it was released to the marketplace. In 2002, the Aeron © chair was modified by Dr Brock Walker to include a new lower back support which built on the work of the original designers in such a way that 'all three of them form part of a bigger team that marries internal expertise in manufacturing and distribution with a strong business and marketing strategy'².

Fourth, design is part of an orchestrated attempt to construct a brand or a corporate identity. In 1998 British Airways (BA) commissioned *Factory*, a London based design consultancy with a proven record in the design of transport interiors, to redesign the interior of its fleet of Concorde supersonic passenger aircraft. *Factory* worked with Sir Terrace Conran whose team was responsible for the soft elements of the project (colour, fabric and cutlery design). The brief was to create a customer experience that would celebrate the performativity of the Concorde experience (Lovegrove, 2000: 96). This is an example of total design in which a design team was responsible for a complete interior design linked to the identity of an aircraft that, until its withdrawal from service in 2003, was considered by British Airways to be its most important visual statement. In 1997, British Airways employed identity and design consultants (Newell and Sorrell) to replace the Union Jack logo on the BA fleet tailfins with a collection of 'World Images'. This rebranding exercise was based on three years of research undertaken by BA and a further two years of research undertaken by the design consultancy. The intention was to reposition BA towards an identity founded upon world citizenship rather than an association with the UK. This campaign failed and BA subsequently reinstated the Union Jack logo (Lovegrove, 2000: 122).

Fifth, design is about improving the cost or efficiency of the product and/or production process. Smarter design can lead to products that are cheaper to manufacture. A good example is the work of Barry Dipper and his concern for value engineering; minor alterations to the design of a product may result in substantial production economies with no, or limited, impact on product performance. Dipper designed a door latch for the Basta Co. (Sligo, Ireland) that reduced production costs (components and manufacturing) by 35 per cent compared with similar products (Central School of Art and Design, 1982: 31). Another example is the redesign of British Telecom's Phonebooks. This saved £350,000 in printing costs (paper and ink) and enough aluminium to manufacture 91,150 drink cans. (Lords Hansard, 31 March, 1999, Col 470).

¹ It is important to distinguish the Norwegian Sacco-sack from a similar but unrelated product developed in Italy under the name Sacco during the 1960s. The Norwegian product is targeted at the Scandinavian market.

² The information in this paragraph comes from the Herman Miller website (www.hermanmiller.com) and the website of the Design Council (UK). The latter provides a detailed case study of the history of the Aeron chair (www.designcouncil.org.uk). Both sites were accessed on 20 July 2004.

Sixth, industrial design expertise can be applied to the development or modification of new or existing products so that they incorporate cultural, political or ethical features expected by consumers. Designers take a generic product and alter it to meet the precise demands of a particular local consumer culture; an American product might need to be redesigned for British consumers or a product may be re-designed for use by people with various forms of disability. It can also involve ensuring that a product fits within the emphasis placed upon corporate social responsibility, including environmental responsibility. Developing or altering products to include these features differentiates them in the market and might also ensure that corporate procurement units favour a company or a product over less socially responsible suppliers or designers. The Aeron © chair is again a good example in that it is manufactured from 67 per cent recycled parts, principally the incorporation of 100 per cent recycled aluminium. All the parts are labelled with international recycling symbols and the most valuable part of the chair, the aluminium base, is easily disassembled.

The six ways in which design is integrated into production process are not mutually exclusive. Different combinations or even all types may be found in the same company and, in some cases, the distinction between the types is artificial in so far as there is a continuum along which a designer may be employed to work on the aesthetics of a product but may also develop alterations that improve functionality rather than just appearance. The complex ways in which design is integrated into production systems is displayed, for example, in the value chain of the Stressless © armchair produced by the Norwegian furniture producer Ekornes'. Design is an integral part of this product, but the production system and the interface between the company and end-consumers is also part of the design process. To maintain production in Norway, a high-cost production location, the company has developed a high-tech robotic manufacturing system that has been inspired by the automotive industry. A product that has within it high 'design intensity' (Lash and Urry, 1994) combined with enhanced productivity enables the company to continue to manufacture in Norway. The Stressless range is extensive with many different variations available (wood, upholstery, arms etc). Like cars, however, customers 'design' their own products by assembling a mix of different elements together. The product is thus customised by the individual and manufactured to order. There are three primary ways in which design is incorporated into the Ekornes production systems – the design of the range of furniture, the design of the manufacturing technology (tools/robotic production systems) and the design of the organization of production and the interface between the firm and the consumer. All these elements are combined together into a complex production system.

Every company producing design-rich products or services will also have to alter the ways in which they incorporate design expertise into a product or into their complete production process. An example is a kitchen manufacturer based in the West Midlands that employs just over hundred people in two factories. The company began as a component supplier to the major kitchen manufacturers, but identified a gap in the market for the production of standardised products that could be used by small and medium-sized kitchen manufacturers. Their clients had the expertise to manufacture kitchen cabinets but were unable to manufacture door and drawer fronts. The company now provides a sophisticated ever-changing range of design-rich products and provides smaller clients with a brochure that is printed under the name of the customer. The products are also supplied pre-packaged under the brand name of the client company enabling client's to market a much larger range of products than they are actually able to manufacture themselves.

In an interview the managing director and owner highlighted that 'design and development is a very important part of our business' and that sales and marketing as well as developing new products were the company's major competitive strengths in the market place while it was relatively weak in manufacturing systems. The company's access to design expertise has also changed and here it is useful to let the managing director describe the ways in which they develop new designs:

... in term of external support, we do use some external design support. The process is, I think, for us to . . . we keep a very careful watch on market trends by going around trade exhibitions, going around kitchen showrooms. I travel quite a lot in terms of business and if I am going past a showroom wherever it is I drop in. We would always be watching what was going on in Europe anyway and I think we have a very good perception through exhibitions of what is going on there. Then there is obviously constant dialogue with one's customers and what they are looking for. So we would identify then sort of market trends and we would select amongst that the sort of way we wanted to go as a company from a marketing point of view. Then it gets more into the detailed design aspect really and we

have a product development manager internally, who actually comes from an engineering background, and his predecessor, who left about 18 months ago, had an arts background which we found that was fine, he was a really creative person but he actually wasn't good at implementing it. So what we now do is that we have the nuts and bolts implementer, as it were, within the company and we engage a consultant designer on a retainer contract and again he goes around the exhibitions as well and he does about 3 or 4 days a month for us on the sort of creative aspects of the designing, he's from a sort of arts school background. Then we would also during the development process use external people to do our photography, for example, and obviously brochures and that sort of thing is all done externally. That's an area where we have grown in usage of that sort of thing quite considerably. We do market research, again a bit more formalised market research and again that's done externally and there we use two companies. One is particularly active in the kitchen sector and we use them to get an overview of how the market's moving and trends within the market on a UK basis and we use a second company to benchmark ourselves against our major competitors and he contacts our 40 top customers and gets feedback about what they are thinking about the company.

(Interview, July 1999)

It is worthwhile considering some of the implications that follow from the way in which this company develops new products. The process involves three stages. First, it identifies market trends by exploring the products available from competitors, visiting other countries, and undertaking research into market trends and customer expectations and needs. This activity involves the use of a mix of internal and external expertise. Second, a creative designer is also involved in identifying market trends but also in developing new products. The designer provides sketches of kitchens that he considers will be successful in the market place. Finally, the product development manager works on the designs to convert them into products that can be manufactured as efficiently and effectively as possible. It is interesting to note that the company experienced problems when they employed a creative development manager without the engineering expertise required to convert a design into a manufactured product. This demonstrates the importance of bringing together a product development team that blends different types of expertise, as well as individuals that are employed full-time by the company and others that operate as external consultants.

Designers often complement the work performed by engineers and often work with them as part of a design team. They may also work with production managers, marketing experts, systems designers, ergonomists and a range of people with other types of expertise. Design expertise can be applied to a range of different situations – from product design to packaging, to the presentation of products in brochures and other forms of advertising. The Design Council (UK) (2003) employed a research company to explore the incorporation of design into the activities of a sample of client companies. This rather straightforward study identified the ways in which design expertise was incorporated into the activities of firms (Table 1). It shows that manufacturing firms are more concerned with incorporating engineering design into their production processes, followed by branding and graphics, whereas service firms are primarily concerned with branding and graphics. This research again highlights the complex ways in which design is integrated into all elements of the production process ranging from the design of a new product, to packaging, branding and even landscaping and interior design.

DESIGN AND NATIONAL COMPETITIVENESS

The inexorable growth of design as a source of regional, national and corporate competitive advantage is also linked with shifts in consumption habits which, for example, have increasingly been driven by fashion and design (Lash and Urry, 1994). Two types of consumer commodity can be identified: *homogeneous commodities* are standardised products that are indistinguishable one from another with product differentiation usually based on price rather than design; *singular commodities*, on the other hand, are sold on the basis of their uniqueness within a range of products; they are branded, heavily designed products often associated with an identifiable national design culture. Singular commodities tend to be wrapped up in a fashion system that provides consumers with a regime of value that controls taste (Slater and Tonkiss, 2001; Bryson *et al.*, 2004). Individual consumption is increasingly about the orchestration of lifestyles based around the purchase of products that are loaded with symbolic and hence design values. Within advanced developed market economies design has thus become the key to competitive success as it is central to the development of 'design-rich' high value products and services.

The UK has a long history and tradition of industrial design that can be traced back to the establishment in 1754 of the *Royal Society for the Encouragement of Arts, Manufacturers and Commerce* (RSA). The RSA stimulates discussion, develops ideas and encourages design innovations. The relationship between geography and the explicit construction of a national design culture intended to improve national competitiveness can be traced back to 1835 when the UK government established a Select Committee to identify 'the best means of extending a knowledge of the arts and principles of design among the people (especially the manufacturing population)'. The British considered that French, Belgian and German manufacturers were better at integrating industrial production processes with art to produce tasteful products. One outcome of this enquiry was the eventual establishment in 1937 of the London School of Design (Naylor, 1995). The Crystal Palace Exhibition of 1851 was the first international exhibition ever to be held in any country with the primary purpose of stimulating trade as well as to stimulate the *art* of manufacture. A century later the Festival of Britain (1951) performed a similar function by trying to unite the country through a shared experience of modern British design.

The development of a new design idiom in the United States during the 1930s had a major impact on the import of goods from the UK by America and on the reinvigoration of design within the British production system and national economy. During World War II trading activities between these countries had been restricted to products that were essential for the war effort. After the war, America emerged as the richest country in the world with a developed and relatively sophisticated consumer market. American products were considered to be better, smarter and more modern than those produced by other countries. To develop and promote their products overseas and to protect domestic markets, from the end of the war, countries began to establish institutions that were intended to promote the development of national design idioms. The first of these, the *Council of Industrial Design* (CID), was established in London in December 1944 and was renamed the *Design Council* (UK) in 1972.

The CID was established by Hugh Dalton, the Labour minister responsible for introducing Utility furniture during the Second World War. The new body was established to promote improvements in the design of British products and as a response to two pressures. First, it was considered that improved design would contribute to the Labour party's vision of improving the general standard of living experienced by the British population. Second, towards the end of the war a number of people including F.A. Mercer, the editor of the monthly journal *Art and Industry*, and John Gloag (1946), a high profile designer, began to advocate for an emphasis being placed on the role of design in British manufacture. They considered that the UK needed to expand the design profession based on the American approach in which design was an integral part of the production process. Central to the establishment of the CID was a concern with ensuring that British products would be able to compete with those produced by America and most importantly contribute to enhancing the export of British manufactured goods. At the inaugural meeting of the CID, Hugh Dalton, president of the Board of Trade noted that:

Something like an industrial revolution in design has taken place in the United States – a revolution in industrial design. It has made many of our exports old fashioned and less acceptable (Dalton, 1945).

The Netherlands was the second country to establish a government sponsored design centre with the formation of the *Institute of Industrial Design* in 1949 while a German Design Council was established in 1951. The Dutch were inspired by the example set by America and brought the American designer, Henry Dreyfuss, to the Netherlands to give a series of lectures. They also sent a group of Dutch designers to the United States, and had Walter Teague's book 'Design This Day' translated into Dutch. In 1951 Japan invited Raymond Loewy to Japan and his autobiography 'Never Leave Well Enough Alone' was translated into Japanese. This led to the establishment of the *Japanese Design Promotion Council* that, like the Netherlands, sent designers to study in the United States.

Like the UK, the Scandinavian countries have been extremely successfully in developing and projecting a coherent national design culture or idiom. Scandinavian design appeared during the 1930s as an alternative to American streamlining and European functionalism. Many Scandinavian consumer products were based on traditional craft-based production systems and even industrialised production forms contained within them craft-based systems. For example, Finland's primary ceramics manufacturer, Arabia, established an art studio in 1930 in which artists could work within the factory (Hiesinger and Marcus, 1993: 117). This studio enabled Arabia to create unique art as well as mass

produced ceramics. Scandinavian designers tried to develop popular and practical consumer goods based on vernacular design traditions associated with unpretentious simplicity. Part of the appeal of this design idiom was its low cost as useful goods were produced that could be sold relatively cheaply. During the 1930s a series of international design exhibitions were held in which Scandinavian designers played an important role (Milan – 1933, 1936, 1940; Paris – 1937; New York - 1939). These exhibitions presented Scandinavian design to other markets as well as providing designer with opportunities to acquire inspiration from other design communities.

The development of Scandinavian design as a ‘brand’ was the result of a strategic alliance between Sweden, Denmark, Finland, Norway and Iceland which was intended to foster trade and used public relations to enhance the status and popularity of Scandinavian design. Thus the concept of Scandinavian design as an amalgamation of national design traditions that had developed in each of the Nordic countries was constructed from a strategic alliance that was established during the 1950s. This Scandinavian brand was developed for export and foreign consumption and has limited meaning within the individual countries that have their own design traditions and consumption cultures. Between 1954 and 1957 the alliance established a touring exhibition that highlighted the best aspects of Scandinavian design. This exhibition, organized by the heads of the various national design institutions (Iceland was not part of this event), toured the USA and Canada promoting the distinctive craft-based design that is associated with Scandinavia. This event was extremely successful in promoting the countries and their products internationally (McFadden, 1982). The exhibition prevented a unified account of the various national design idioms and by presenting them together encouraged the construction of a new design brand associated with Scandinavian craft-based and industrial modern designs that had a major influence on the international design world. Recent concepts ranges from products meant for everyday life as well as the more special occasion, products public spaces as well those targeting industrial purposes.

THE UNITED KINGDOM’S DESIGN WORLD

Over the last ten years the British government has emphasised the contribution that industrial design makes to the competitiveness of the United Kingdom. This takes two main forms: the export of design services and the added value that comes from the incorporation of design into products and services (Bryson *et al.*, 2003). A study undertaken by the London Business School (1995) showed that the Britain’s design industry generated £12 billion annually in fee income with design consultancies and freelance designers generating £2 billion a year.

Firms in the UK were asked by the Design Council to identify the advantages that they had acquired from using design, creativity and innovation over the last three years. Firms reported that the use of design had improved products and service quality, improved their image, and increased turnover and profitability (Table: 2). These are a predictable set of responses, but the study does underline the importance of design in production. Firms seek assistance with design from design consultants (65 per cent), universities (27 per cent) and the Department of Trade and Industry (DTI) (11 per cent) and need most help with website/e-commerce design (47 per cent), the adoption of innovation (44 per cent) and product design (37 per cent) (Design Council, 2000). Small to medium-sized firms frequently employ private design companies whilst large companies, for example automobile manufacturers, have in-house design departments, but can still employ external designers.

Design is not just about the design of products, it also involves the design of services, for example the paperwork, forms and brands associated with the delivery of a particular service, and the projection of a company’s corporate identity (name to notepaper). A distinction can be made between those design elements of the production process that are seen by consumers (above the line) and those that are wrapped up in the design of the product/service (below the line). Above the line elements include the product itself and its packaging, branding or advertising whilst below the line elements include the engineering processes required to manufacture a product, the design processes to produce a service, the design of manufacturing tools, or the documentation required to provide a service or market research and its interpretation. Specialist UK design companies exist to provide expertise in each of these areas while a large design company or design house is usually able to provide a client with a full range of services.

Part of the growth in the importance of design reflects the greater emphasis placed on fashion by the consumer but it also reflects the expansion of the UK’s tourism and heritage industries which has

become one of the major source of demand for design in Britain throughout the 1980s and 1990s as localities 'packaged' their tourist and leisure spaces (Julier, 2000: 18). The establishment of new museums and art galleries, the growth of events and exhibitions as well as design-related marketing of tourist resorts are now important drivers behind the growth of the design industry. Design is related to the production process in many complex ways. Since the 1980s the emphasis has also steadily shifted away from design for manufacture towards design for the service sector in general. Manufacturing design has not disappeared or even declined, it has simply been eclipsed by the much faster growth of demand for retail design, packaging, corporate identity, design of company documents and events and exhibition design.

Such has been the pace and diversity of these changes that a Creative Industries Taskforce (1998, 2001) was established to undertake a mapping exercise of what have come to be known collectively as the UK's creative industries. This summarised the existing statistical evidence covering a range of cultural/creative occupations, including industrial design and was the first attempt to measure the economic contribution of creative industries to the UK economy. It was partly inspired by the 'Cool Britannia' slogan which surfaced in 1997 and was exploited by politicians as redolent of the 'New Britain'. While the 'Cool Britannia' slogan has now been consigned to history the contribution that the creative industries make to the British and European economy has continued to grow.

Like the other key producer services the last twenty years has witnessed dramatic growth in the number of independent design consultancies and an exponential increase in design incomes: the annual fee income of UK design consultants doubled from £175 million to £350 million between 1985 and 1995 (Julier, 2000: 10). By 1999, the fee income of the top 100 UK design consultancy firms amounted to £480 million (CITF, 2001). Julier notes that when the Yellow Pages was launched in 1966 there were only three design consultants listed in Central London; by 1999 there were 536 (Julier, 2000: 11). Between 1994 and 2001, employment in design (including fashion) had increased by 31.6 per cent whilst employment in all creative industries or occupations grew by 34.9 per cent, creating an additional 505,300 jobs (Table 3).

It has been noted earlier that design-related functions are performed either directly by a client using their own staff or by employing an external professional. In the UK there are approximately 4,000 independent design consultancies (CITF, 2001) employing 76,000 staff (CTFI, 2001) and generating £6.5 billion in revenue. Just over two-thirds (73 per cent) of design consultancies are small, employing fewer than 20 staff. Furthermore, there are around 108,400 design-related employees based in client companies. The largest design company in the UK, Enterprise IG, had a turnover in 1999 of £45.4 million and employed 203 staff in the UK and 510 overseas. Overall, it was estimated that design-related activity in the UK economy amounts to £26.7 billion in 2000 with exports valued at over £1 billion (CITF, 2001). In common with other producer services, the design industry is concentrated in London and the South East; only 53 of the 306 firms listed in *The Design Business Association Yearbook* are based outside London and the South-East. Design consultancies located in London, the South East, and the South West account for 55 per cent of turnover and 49 per cent of employees. The West Midlands is the location for 6 per cent of design companies (225 firms) (Design Industry Valuation Survey 2001, Daniels and Bryson, 2002).

The British design industry has responded very positively to the pressures and the opportunities offered by globalisation. Within Europe, the UK and Germany are the most important markets for design services with \$2.4 billion and \$2.2 billion spent respectively in 1994. France and Spain follow with an expenditure of \$0.9million. The growth in Germany has been generated by product development and civic design projects whilst in Britain graphic communications and environmental design have dominated revenues. The UK is the most important exporter of design services with an estimated value of over £1 billion in 2000. In 1999, the leading export markets for UK design expertise were the US (26 per cent), the Benelux countries (25 per cent), Germany (22 per cent) and France (16 per cent) (Design Export Survey, 1997; CITF, 2001). The Prime Minister, Tony Blair, has described the UK as 'the design workshop of the world' since it has more world class design firms, defined as a sector that competes regularly and successfully in global markets, than any other country (CITF, 2001: 5).

Small, independent design firms in the UK are able to compete with large design houses by developing informal or formal networks that may also include sole practitioners. Networking with other companies allows experience to be shared, but more importantly can lead to collaborative

partnerships. Such partnerships are created to deliver a co-produced design service to clients. This allows small companies to provide a range of services that can compete with those provided by large companies. Small can also mean 'flexible' as collaborations or temporary coalitions involving different service suppliers can be reconfigured on a client-by-client basis. This enables small companies to deliver a range of expertise but without having to employ full-time specialists. It also enables them to deliver services outside their local area by drawing upon the services of companies located in other parts of the country or even elsewhere in Europe and beyond. An example is Circus, a communications and brand consultancy established in 1998, with 20 employees (Julius (2000: 195)). Circus is unable to provide the range of expertise required to undertake specific design work and it relies on a business model constructed around partnerships established with a network of over 50 design studios and consultancies in the creative industries. This enables Circus to operate as a rather special design company; they work closely with clients to establish their design needs and then use their network to provide a bespoke design service. Circus is operating as a gatekeeper that is trying to bridge the gap between clients' needs and what can be supplied by the creative industries.

CONCLUSION

It has been suggested that research on the role of producer services as intermediate suppliers of knowledge and expertise to firms operating in increasingly competitive national and international markets has failed to acknowledge the contribution of design services in general, and industrial design in particular. Marketing, public relations, product design and a host of other services have become vital inputs to production processes that involve the transformation of existing and completely new products into designer-inspired fashion statements; converting a pair of inexpensive functional jeans, for example, into designer expensive and aspirational jeans or refining the design of portable music systems such as Apple's iPod so that they become highly sought after lifestyle accessories. These are just a few amongst innumerable examples of the way in which even mass-produced products and services must be differentiated by appearance, functionality, portability, low maintenance, or outstanding value for money in order to attract the interest and ambition of ever more discriminating and knowledgeable consumers. Such differentiation is largely the result of the ideas, solutions and related inputs provided by individual designers or sophisticated networks of internal/external design teams rather than the inputs available from management, business, or financial consultants. The latter have been justifiably included in the research agenda for producer services but it is now timely to extend this agenda to include industrial and other forms of design expertise.

Changes in the nature of manufactured goods affect both the internal organisation of manufacturing and service companies as well as their relationships with other organisations (suppliers and competitors) and this may well be reflected in the formation of new and geographically different clusters of economic activity or patterns of inter-industry linkage which have hitherto been overlooked. It has only been possible to explore the geographical dimensions of the rise of design services in a very preliminary way in this paper; there is undoubtedly a place for more research within the UK as well on a comparative basis across Europe. The discussion of the ways in which design services may be interwoven into the production process has reinforced our view that the, endemic blurring of the boundaries of manufacturing organisations with reference to knowledges that lie within the organisation and those lying within the confines of other organisations is being pushed further by design-related imperatives. Effectively, rather than just subcontracting elements of the manufacturing process, companies now subcontract a substantial part of the knowledge component of the complete product to independent business service companies. We argue that this is not the equivalent of a change to a service-informed production process, rather it suggests that a more holistic approach to the analysis of production processes and what this means for organisations and places is now required.

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TABLE 1

The top five design activities by sector

	Manufacturing	Finance and Business Services	Consumer services	Primary, construction and communications
1	Engineering Design	Communications, branding, graphics	Communications, branding, graphics	Architecture, landscaping
2	Communications, branding, graphics	Architecture, Landscaping	Architecture, landscaping	Communications, branding, graphics
3	=Architecture, landscaping =NPD, product industrial design	Multimedia	NPD, product, industrial design	Interior design
4		Exhibitions and events	Interior design	=Multimedia =Engineering design =TV, film, video
5	=Multimedia =Packaging design	TV, film, video	Multimedia	

Source: Design Council, 2003

TABLE 2

Advantages identified by a sample of UK firms of using design, creativity and innovation over the last three years

	1-199 employees (%)	200+ employees (%)
Improved products/service quality	46	73
Improved Image	45	69
Increased Profit/turnover	47	65
Developed New Markets	40	65
Improved Customer Communication	40	65
Increased Market Share	43	56
Cut Costs	24	41
Improved internal communications	16	36

Source: After The Design Council, 2000

TABLE 3

Creative industries employment (000s) in Great Britain

	Advertising	Design (inc fashion)	Music, visual & performing arts	Publishing	IT & comm- unications	Total est. for Creative Employment
1994	186.5	108.4	196.6	297.6	276.3	1,447.8
1995	183.0	107.1	210.3	312.7	309.5	1503.8
1996	183.0	107.1	210.3	312.7	309.5	1503.8
1997	195.7	113.5	232.8	296.3	428.4	1693.2
1998	196.3	115.4	237.7	303.5	504.8	1745.3
1999	224.6	115.7	239.2	300.6	552.8	1846.4
2000	218.2	123.8	219.8	288.9	615.2	1890.9
2001	259.7	142.7	220.5	296.4	626.4	1953.1
Change 1994-2001 (%)	39.2	31.6	12.2	-0.4	26.7	34.9

Employment in creative industries companies

Dec 2001	99	34.2	180.3	216.2	378.4	1,146.3
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Employment in creative occupations outside business in the Creative Industries

Dec 2001	160.7	108.4	40.2	80.2	248.0	806.7
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Source: After Creative Industries Task Force, 2002, figures based on Office for National Statistics Labour Force Survey. The total is an estimate of the number of employed in creative industries or occupations in Great Britain.

