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The role of design in enabling sustainability in small scale textile manufacturing:

A case study of small scale textile manufacture in Wales

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The paper examines the relationship between design and sustainability in a policy context of sustainable development, in Wales, UK, a devolved Government with a legal remit to sustainable development.

A case study approach has been used alongside grounded theory methods; a range of producers being studied, factory production to individual makers. The use of design, and the design expertise of the producers was assessed as were ways the producers are contributing to elements of sustainable development.

Initial findings suggest that the producers fall into three categories: firstly, those who use design strategically to enhance their output and add value. A second group use design without any professional training but continue in business. A third group have used design consciously; they have gone out of business however. The role of design is therefore complex. If design is to play a significant role in sustainability and sustainable development, it is crucial that ways in which this can be executed are identified and articulated.

Introduction: a brief overview of design and sustainable development

This paper draws on doctoral research addressing the question ‘What is the role of design in sustainable development?’ which is examined in the specific context of a selected part of the Welsh textile industry. The context is described below; the central concepts, sustainable development or sustainability and design are firstly discussed. Sustainability and sustainable development can be argued to be different concepts, the one, sustainable development, leading to the other, a state of sustainability. Both are highly contested, both are complex and multi faceted and the subjects of large bodies of literature (Baker, 2006, Dresner, 2002, Redclift, 1987, WCED, 1987, UNCED, 1993). For the purpose of this paper, sustainability and sustainable development are considered to be interchangeable, their differences being discussed by Dresner as follows:

... are sustainability and sustainable development the same thing or are they different? This is a strange question to have to ask. ... In Agenda 21 the terms sustainability and sustainable development were used interchangeably (Dresner, 2002: 65),

Agenda 21 being the report from the 1992 Rio de Janeiro UN conference (UNCED 1993). The key point to understanding both sustainability and sustainable development is that they are composed of different elements that have all to be considered together within a given situation. These are, at a minimum, *economic* aspects, *environmental* aspects and *social* aspects, sometimes expressed at *profit*, *planet* and *people* (Elkington 2001). This three part model of sustainable development is known as the ‘Three pillar’ model and is possibly the most commonly used throughout the literature (Ekins 2000).

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Sustainable development has at its heart, the aim of eliminating inequalities in resource distribution and usage both spatially, that is across the globe, and over time, that is so that resources will be available for future generations. The term was first used extensively with the publication of ‘The Bruntland Report’ whose definition of sustainable development is, even now, the one most widely quoted:

‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED 1987: 43).

This resulted from the debate and negotiation at many global level conferences, for instance the United Nations Conference on the Human Environment held in Stockholm in 1972 (Blewitt 2008: 15) but which then paved the way for discussion to take place between disparate and opposed parties with very different economic or environmental agendas (Adams, 2001: 20). There is also considerable debate about the usefulness of sustainable development as a concept (Luke 2005, Robinson 2004); however, the fact that it has allowed an exchange of views across a range of stakeholders possibly justifies its continued currency (Baker 2006: 27).

The other concept central to this research, design, is also subject to much debate about its meaning (Archer 1974, Cooper and Press 1995, Heskett 2002, Jones 1992, Margolin 1989, Pye 1999). However, in the context of this research, design is taken to be the process of decision making about the manufacture of products or artefacts (Zeisel 2004) including materials, manufacturing process, appearance – size, shape, colour, function, the intended market and aftercare or maintenance. Zeisel also sees a key feature of design being the human – designed object relationship. A feature of the understanding of design is that, in this context, those processes of decision making are not always undertaken by trained or named designers; this is a type of design identified by Gorb and Dumas (1987) as *silent design*.

The context of the research: Wales

The paper examines the relationship between design and sustainability in a policy context of sustainable development. The study is located in Wales, part of the UK that has a devolved Government with a legal remit to sustainable development, see map, figure 1, within a particular selection of textile producers. The reasons for this selection are now discussed.

Figure 1. Map of Wales

(<http://www.walesdirectory.co.uk/maps/index.htm> accessed 8 May 2008)



Wales is one of the very few governments in the world that has a legal obligation to sustainable development, a policy of the devolved Government. Since devolution in 1997, the National Assembly for Wales (NAW) and the Welsh Assembly Government (WAG), have taken forward a sustainable development agenda. In the most recent policy document, *One Wales: One Planet. The Sustainable Development Scheme of the Welsh Assembly Government* (WAG 2009), this statement is made:

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In Wales, the Welsh Assembly Government is proud that sustainable development is a core principle within its founding statute. We were, and indeed remain, one of the few administrations in the world to have a distinctive statutory duty in relation to sustainable development. This duty, under the Government of Wales Act 2006 (Section 79), requires Welsh Ministers to make a scheme setting out how they propose, in the exercise of their functions, to promote sustainable development (WAG 2009: 8).

The Welsh Assembly Government then has to implement the Scheme in all their actions.

Sustainable Development in the Welsh context is defined as follows:

In Wales, sustainable development means enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations:

- In ways which promote social justice and equality of opportunity; and
- In ways which enhance the natural and cultural environment and respect its limits - using only our fair share of the earth's resources and sustaining our cultural legacy.

Sustainable development is the process by which we reach the goal of sustainability (WAG 2009: 8).

There is an extensive body of policy documents produced by the devolved Welsh Government about its ambitions for sustainable development in Wales. (WAG 2004a, 2004b, 2005, 2006, 2007, 2009). In the most recent of these an account is given of what a 'sustainable Wales' would look like at some time in the not too distant future (WAG 2009: 20-1). The main points indicate changes summarised thus:

- All in society from Government to the individual are aware of the need for sustainable development and have been educated to understand what it is.
- Communities are strong, Wales is bi-lingual (Welsh and English) and wealth is more equally distributed with high levels of employment, often closer to homes.
- Communities take local action on controlling climate change.
- Business has grown around low carbon production and technologies enabling low carbon lifestyles which are used within both Wales and exported.
- Energy efficiency has been improved, especially in the remaining heavy industry in Wales; renewable sources of energy are widely used and water is used more efficiently.
- Waste is taboo; composting and recycling are undertaken as a priority.
- Transport is more dependent on walking and cycling while public transport is more widely available in both urban and rural areas. Transport behaviours have altered to include more sharing and air travel is not seen as a necessity.

(WAG 2009: 20-21)

Welsh textile industry

The study is located within the textile manufacturing industry in Wales; with a population of under four million people, there is still a surviving textile industry, despite competition from low cost producers overseas. Wales has a textile industry with many different constituents, from individual craft manufacture to industrialised production (WDA 2005). It could therefore be said to embrace the notion of development in which the textile industry is a key sector as it moves from domestic production to industrial production through the process of development (Kitching 1982). An element of the textile industry in Wales is related to a historical wool industry which made use of local sheep's wool and water driven machinery. Cloth, garments and household items are still made using techniques of weaving and knitting albeit in largely electrically powered factories and mills (Jenkins 1969, 1987, 2005a, 2005b). In addition to this

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remnant of a historical industry, there is a significant number of small scale producers who make wool goods as designer craftspeople or as part of the creative industries (Makers Guild in Wales 2007, Ecco 2007). It is this range of producers who form the focus of this study. Examples of products of the manufacturers studied are shown in figures 2 and 3, below.

Figure 2. Example of woven goods



Figure 3. Example of knitted goods



(Photos: Angharad Thomas)

Research approach

In order to examine the relationship between design and sustainable development a robust methodology has been constructed. The research is located firmly in the qualitative paradigm. The epistemological position embraces both social constructionism and interpretivism (Schwandt, 2000, Geertz, 1993) underpinning an empirical case study research methodology (Yin, 2003, Langrish, 1993). Grounded theory (Charmaz, 2006, Clarke, 2005, Corbin and Strauss, 2008) and systems theory (Checkland and Poulter, 2006, Open University, 2005) have both informed the research approach. Academic disciplines drawn on include design, geography, development studies and sociology. Given the complex and multifaceted nature of sustainability the methods used to research it have to reflect these qualities of complexity and interconnectedness (Tilbury, 2008).

The qualitative approach within a constructivist position was judged to be appropriate for the study of design and sustainable development, given their embeddedness in the social context and was judged appropriate to study situations and relationships such as these that were social and cultural in nature. With the exception of some numerical data, for instance, the indicators of sustainable development, the features examined in the research such as the quality of design or the social aspects of a producer's activity, did not lend itself to quantification, particularly at the small scale level of the individual producers.

The design of the research, as well as the selection of the subject matter, was informed by a number of aspects including professional and personal interests and beliefs of the researcher. These are aspects of

what Rossman and Rallis (1998: 9) call the ‘personal biography’, which shape and contribute to the specifics of a body of research.

Many writers describe the nature of qualitative research (Creswell 2003; Denscombe 2003; Denzin and Lincoln 2000, 2005; Rossman and Rallis 1998; Silverman 2000, 2001; Strauss and Corbin 1998) but eight characteristics outlined by Rossman and Rallis describe the position taken in this research. Each of the eight characteristics is identified by Rossman and Rallis (1998: 7–11):

1. The collection of data was undertaken in the ‘**natural world**’, that is in the workshops and factories of the selected respondents.

2. Data collection was undertaken in the field, in Wales and in the Welsh textile industries. ‘**Multiple methods that are interactive and humanistic**’ were used including interviewing, observing and reading documents of all sorts with these people and at these locations.

3. The researcher made a ‘**focus on context**’ in all aspects of the study. Context was seen to be crucial to the study and contextual information was collected.

4. The researcher **systematically reflects**; therefore alterations and improvements were made to the data collection and analysis at different stages. This also implies that it is not possible for the researcher to be an unbiased observer of events and this aspect was taken into account throughout the research.

5. The fifth feature of qualitative research, as described by Rossman and Rallis, is ‘an **exquisite sensitivity to personal biography**’. The researcher acknowledges her involvement with the research, and the way in which her ‘personal biography’ contributes to it.

6. The researcher did not construct any formal hypotheses before the study began. The ‘**emergent nature**’ of qualitative research was acknowledged as concepts emerged from the study through the process of data analysis.

7. ‘**Sophisticated reasoning that is multi-faceted and iterative**’ has been used throughout the work, to build and connect all the parts that constitute the study as a whole. ‘Plain old hard thinking’ has been of particular value throughout the study.

8. The final, eighth, characteristic, ‘that qualitative research is **fundamentally interpretive**’ particularly resonates with the approach taken to the research, in as much as all information and data collected were subject to interpretation by the researcher. The interpretivist tool for collecting all data into the ‘thick description’, as discussed in the following section, was found to be particularly useful as a means of organising the data into a uniform framework for each case study.

The selection of case studies

A case study approach has been used in collecting the data with which to address the research question, thirteen producers of many sorts, from small factory production to individual makers located on farms. The sector for study was selected using the following the criteria:

- Manufacturing using weaving or knitting as both are techniques used over a long period of time
- And manufacturing from wool or other similar natural fibres, a feature of the historical textile industry
- And manufacturing in Wales

A data base of these producers was constructed consisting of around 40 producers throughout Wales. This selection gave producers across a wide range of types from factory production to individual craftspeople. The producers were located throughout Wales, urban and rural, and included any size of enterprise from one person upwards. Some producers were professional full time workers, while for others textile production was part time or provided a supplementary income.

Data collection and analysis

The use of design in all aspects, and the design expertise of the producers was assessed in the study as were the ways in which the producers were able to contribute to the process of sustainable development. Their activities across a wide range of factors were examined including the economic status, their environmental impact and their social impact.

Data collected was of two principal types:

- By means of a semi-structured interview with the textile producer at their site of production.
- Documents and images collected on the field visit.

The data was then organised by the construction of the thick description, a single document that contains all information gathered about each case in a uniform format (Geertz, 1993).

Data analysis is by means of various tools which are judged to be suitable for researching the relationship between design and sustainable development. Firstly this is by means of the construction of diagrams from systems methodology and from situational analysis. The use of diagrams for researching into design processes seems particularly appropriate and has been found to be a useful way of organising and gaining insights into the data.

Further analysis is taking place in a staged process, which is still in progress:

- Coding of the interview transcript in a two stage process, followed by memo writing.
- Analysis of the visual materials collected using coding, followed by memo writing.
- Development and construction of diagrams particular to the research situation and memoing following their construction.

Findings

Findings to date suggest that the producers do contribute to sustainable development by their very continuation in business; they have low environmental impacts and are seeking to lower these; they undertake or fulfil social remits in their communities by a variety of their actions.

An initial classification suggests they can be seen as three groups; those with a high contribution to sustainable development using design as a strategic tool; those with a high contribution to sustainable development using no conscious design input; and those with a high awareness of design but who despite this, have gone out of business and are therefore unsustainable.

Design can therefore contribute to aspects of sustainable development; this is dependent on other factors which may be out of the control of the designer. The personal values of the textile producer, i.e. their agency, is an important aspect of determining their contribution to sustainable development. For example, it appears that some of the individual designer makers do not make large amounts of money; those that live in rural areas do consider that they have a good quality of life, they also see that they are able to do what they love doing, i.e. producing goods by hand. They may contribute to aspects of sustainable development in other ways, for example, by undertaking to provide placement opportunities to local school and university students.

Taken individually, the role of design is different for each producer. The contribution design makes to the elements of sustainable development is also different. However three main relationships between design and sustainable development can be suggested at this point in the research.

Group 1 are those producers who use design strategically and consciously either being trained textile designers or employing a textile designer. This group includes two factory sized operations, and three who are individual designer makers. The factories have been in business approximately 100 years each, being significant employers in their localities, with between 20 and 40 people on the pay roll. The designer – maker producers have been in business over 20 years each and the textile design consultant over five years. They all have a minimal environmental impact which they seek to reduce and they all make contributions to social aspects of their activity. Also in this group are two producers who continue in business with design coming from external sources or design being driven by technical capabilities. One of these is a factory sized operation and one is a crafts maker. These also have a low environmental impact and make a contribution to the community in which they are located. However, neither have any formal design training or education, the former taking design input from customers who have goods woven there and the latter having learnt ‘on the job’. Despite this producer’s opinion that he has a design

training by virtue of having been a maker so long, he is driven by interest in technique, which many, including this researcher would not consider to be a design approach.

Group 2 are the producers who understand and have used design in their business either being textile design graduates or by employing a designer. However, they do not make any contribution to sustainable development as they are now out of business. One of these is a producer in the rural area and one is located in an urban area. The rural business employed a designer for the ranges of garments sold and the urban producer is a graduate designer with professional experience in the fashion industry. The rural producer was unable to carry on in business after personal circumstances meant that a complementary part of the business closed. This was exacerbated by a nearby visitor attraction closing down and limiting the possibility of visitors going from one to the other, an important consideration for the rural tourist or holiday maker in the area. The urban fashion textile designer maker found that her markets in high end boutiques came to an end in the credit crunch of Autumn 2008. Both were subject to factors beyond their control and despite the fact that they understood the value and importance of a design input this was insufficient, in the end, to counter external commercial forces.

Group 3 producers make a contribution to sustainable development, continuing in business, producing textile goods but without any conscious design input. These are one producer of knitwear in an urban area and two produces of goods made from yarn spun from their own flocks of angora (mohair) goats. Consideration is given to the manufacture of goods, for example, choices are made about colour, motif, and construction. Goods can also be made to a clients or customers own specification; again this is a negotiation between factors such as availability of yarn and the capabilities of the machinery used for production. For the farm based producers making garments and household items from the fibre from their livestock is a way of adding value to it; they offer a range and then are guided by what sells in what they produce. Their design input is guided by their personal preferences and what they think their customers will like. They also provide a wide choice of goods both in type of goods and price point thus increasing their chances of appealing to part of the market. The principal customers for their goods are tourists and the provenance of the goods is therefore important in adding value to the goods. In offering goods made in a specific locality in the UK, with its high production costs, the purchaser wants a product with which they can feel a connection through the visit to the place of production.

Further findings suggest that the producers' use of design, whether as a named input or not, is linked to the technology used to produce the goods. Many of the producers use small scale hand or domestic technology which has the advantage of being flexible in what is produced. For instance, several producers can offer a minimum of one item, which means that production can be totally customised. At the other end of the spectrum, a factory produces some of its ranges of socks on the most modern Italian machines. The machines had to be adjusted in order to produce the top of the sock in the way in which it has always been produced using hand methods, and that signature was very important in the decision to transfer the bulk production to those machines. Without it, the production would not have been moved onto the machinery. Socks are still produced on the hand operated machines used by the founder of the company in the late nineteenth century and these socks, usually in cashmere, go to the top end of the American market.

The flexibility of production is also important to a weaving mill, who employ a design input, not only for their stock ranges, but also to make batch production for smaller trade customers such as boutique hotels. Fabrics can be made in quantities that it is possible for the smaller customer to purchase by designing exclusive colourways and patterns. A larger producer would not be able to offer this service and would probably be making overseas, thus making active collaboration in the design consultation difficult. This design service is an aspect of their business they are keen to promote.

All the producers make in batches or individually. They produce the goods using methods that range from fully automated most up to date technology in the case some of the sock production, discussed above, to domestic knitting machines and hand production, weaving, knitting and crochet. Almost all of the production is hand finished in some way. Minimums can be as low as one. This flexibility is a key to the producers' continuation in business and shows an understanding of the relationship between their markets and their methods of production.

Although the producers are small in size, the largest two employing about 20 - 35 people, these have been in business around for about 100 years and it could be argued that they contribute to the local economy in a very sustainable way. Over a long period of time, they will contribute as much as a larger business that only exists for, say, 10 years. Also, the smaller, micro producers, contribute to the economy and to the social fabric of the area in which they are located. In all these instances, design, whether conscious or unconscious plays a part in this sustainability.

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It is anticipated that more relationships relevant to both design and sustainable development will emerge as the data collected is analysed further.

The findings demonstrate some of the complexities of assessing the relationship and role of design to the various aspects of sustainable development. In fact, there are aspects of sustainable development to which it could be argued that design has no role at all, the decision making capacity or agency of the producer being more significant, in particular for the social aspects such as community involvement or the provision of a service. The role of design in ensuring economic sustainability is often cited; however in this study the role of design is again less of a determining factor than the literature would suggest, in two of the cases.

Conclusions and further work

The relationship between design, construed as the process of decision making about the manufacture of goods, and sustainability or sustainable development is complex. If goals for sustainability such as those envisaged in Wales to move to *one planet living* are to be achieved then design in many respects could contribute to this in the production of goods in a more sustainable way, in ensuring that those goods have a longer life and have more meaning for the consumer. The research reported above has not examined consumer motivation or reason for purchase from the producers studied; this could be a useful piece of work in establishing patterns of sustainable consumption. The processes and linkages articulated above might be found to be of relevance to textile producers in other locations, perhaps in Europe where similar small scale textile manufacture is found in, for example, both Ireland and the Basque country of France. Other contexts would have to be studied before any elements of transferability of findings could be suggested however.

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