AN INTERNATIONAL PERSPECTIVE ON DESIGN

R. I. CAMPBELL
Loughborough University, UK
R.I.Campbell@Lboro.ac.uk

ABSTRACT

The world seems to be an increasingly fast-changing place with many societal trends coming and going each year. However, some world-wide trends seemed to have established themselves as being more long-term in nature, e.g. more widespread expectation of global warming, increasing fear of terrorism and globalisation of economies. Other trends are largely confined to the industrialised economies of North America, Europe and the Pacific Rim. Examples include an ageing population, more demanding customers and increasing disposable income. Different trends will be seen in other regions. The impact of these trends upon designers and design cannot be overstated. They will affect the way consumers purchase, use and dispose of products. The types of products that consumer's buy and the features they will require from their products will change. Designers must respond to this with innovative product designs that make optimum use of the already scarce natural resources available. Likewise, engineers must be innovative in their task of converting these designs into reality.

This paper seeks to identify some of the trends that will have most impact upon product design in a number of global regions. The responses that designers could (or should) make to these are listed together with some examples of products that illustrate the issues involved. The impact upon the way designers think and how they need to be educated is also discussed. Finally, designers' ideas are only pipedreams until they are transformed into reality through the effort of various types of engineers. The paper concludes by describing some of the new challenges that engineers will face as they play their role in responding to global and regional trends. It is highly likely that the challenges will vary somewhat from one region to the next and so it is crucial that locally-adapted solutions are implemented.

Keywords: Trends, Design, Engineering Solutions

1. INTRODUCTION

The world seems to be an increasingly fast-changing place with many societal trends coming and going each year. Many of these trends are relatively short-lived and unpredictable in nature. Examples of these transient trends include clothes fashions, car styling, children's games crazes, dieting fads and the latest "must-have" household items. However, some world-wide trends seemed to have established themselves as being more long-term in nature, e.g. more widespread expectation of global warming, increasing fear of terrorism, globalisation of economies and world population growth. There are other trends which are more regionally-based. All of these will have an impact on consumer attitudes and hence purchasing habits. It is essential that designers recognise this impact and create product designs that cater for the up-to-date requirements of consumers. This will have a knock-on effect upon engineers whose task it is to convert design ideas into physical realities. This paper seeks to outline some examples of global and regional trends together with products

that have been developed in response to these. It goes on to describe how designers and engineers must operate if they are going to exploit trends as potential sources of competitive advantage rather than as unwanted distractions. The paper finishes with some general conclusions that can be used as advice to designers and engineers.

2. GLOBAL AND REGIONAL TRENDS

Global trends are defined as those that are recognised and accepted across the whole world. However, this definition is sometimes rather subjective since trends may be in place for some time before they are universally recognised. For example, Figure 1 shows how average world-wide temperatures have been on the increase since 1970 and yet only quite recently has it become generally accepted that there is a definite trend. If one seeks to investigate the causes of the trend then it can often become a matter of intense argument. Such investigations are beyond the scope of this paper. What is important for designers is to identify the effect that a trend will have upon consumer attitudes and purchasing habits. So, whereas the expectation of global warming may have a more long-term effect upon attitudes, the increasing fear of terrorism may have a much more immediate effect. This was seen in the USA, where in the aftermath of September 11, the sales of duct tape rocketed as a precaution against atmospheric ingress through windows in the event of a nuclear, chemical or biological terrorist attack. Other trends that are well recognised and will have a noted effect upon consumer attitudes are the globalisation of economies and world population growth. The former can lead to employment uncertainty in more developed countries but to increased disposable income in countries to which jobs are being "exported". It also assists in the development of global brands, e.g. Nike and Coca Cola and in the opening-up of new markets as more countries join the World Trade Organisation (WTO). The latter trend seems to be over-burdening the economies of some already impoverished countries and consumer spending upon non-essential products in such circumstances is certain to fall.
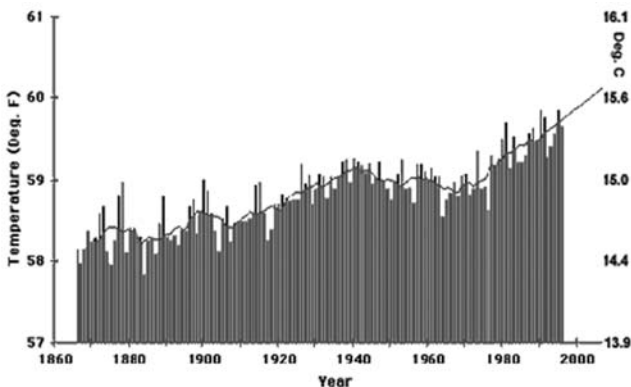

Figure 1: Graph of average world temperature since circa 1865 (Anon, 2004).

Regional trends are those that are confined to, or more evident in, particular regions of the world. So, for example, in the industrialised economies of the G7 nations, declining birth-rates and extended life-expectancies are leading to an ageing

population. It is predicted that 40% of the UK population will be aged over 50 by 2025 (Miles, 1999). This will make the principles of "inclusive design" much more important and may also have an impact upon spending power as people have to save more for their retirement. Customers in the G7 countries are becoming more demanding as increased product choice has led to higher expectations. It is no longer acceptable to have just one colour for a product or "one size fits all". Consumers expect their personal preferences to be catered for and with some products there is even a perceived need for individualisation. Also, as disposable income continues to increase so consumers are spending more on non-essentials and convenience products. This tends to be at odds with another trend, i.e. an increasing awareness of environmental issues. This has led some consumers to re-examine their "need" for continual replacement of older items with newer ones. Instead they are looking for products that can "evolve" over time or be re-used in some manner. Energy consumption has also become an issue and so greater efficiency can often be used as a selling point with these consumers.

Different trends will be seen in other regions. For example, the democratisation of Eastern Europe has seen the liberalisation of once-closed markets and an increase in consumerist attitudes. A rise in fundamentalism in some Arab countries has led to wide scale rejection of "Westernising" products such as alcohol and cosmetics. The rise of HIV/Aids in some regions is having a dramatic effect upon the size of the working population and upon the income of families who are left without a "breadwinner". As China opens up its market to imports and to joint ventures, it will bring a host of new opportunities to international companies. This is by no means an exhaustive list of regions, never mind trends, and readers will no doubt be able to add their own examples. On top of this is another layer of local trends that may affect only a single country or a part of it. The common factor here is that trends can be identified and their impact estimated.

3. IMPACT UPON CONSUMERS' ATTITUDES

The impact of these trends upon designers and design cannot be overstated. They will affect the attitudes of consumers towards the purchase of new products. Purchasing habits depend largely on the balance between disposable income, availability of products and lifestyle priorities. The trends described earlier can change one or more of these and therefore alter the balance. For example, if disposable income is rising together with an ageing population, it is likely that there will be increased consumer spending on more sedate leisure activities such as gardening. Designers can take advantage of this by designing new ranges of gardening equipment that are particularly suited to older users who may have less dexterity in their hands or even debilitating diseases such as arthritis.

Trends will not only affect which products are purchased but also how they are used and eventually disposed of. The trend of greater disposable income in the G7 countries seems to have led to a more "disposable society". That is, one where convenience takes priority over economy and products are often purchased to be used once or a few times and then discarded. Examples include convenience foods, single-use contact lenses, occasionally used executive toys and even replacing a car with a new model each year. This does not seem to be a particularly responsible attitude since it could be regarded as a waste of resources and besides, many

countries are running out of landfill sites. Another trend that is working against this is the increase in awareness of environmental issues, especially in some European countries. This has led some consumers to reject the "throw away" society and to look for products that are less damaging to the environment during production, use and disposal. Examples are recycled paper products, low-energy refrigerators, low-water usage dishwashers, rechargeable batteries, recyclable plastic products, refillable containers, etc.

Not only will the type of product purchased by consumers change with a trend but also the features they will require from their products. This is seen in the list of "environmentally" friendly products above but other examples abound. A trend towards individualisation has required manufacturers to offer different colour schemes and user-configurable options. Taken further still, personalised products can be designed to cater for just one individual (see Figure 2). This poses new problems for not only the designer, but also the engineers who need to create a much more flexible manufacturing system. Indeed, if consumers' personal preferences or characteristics are going to be incorporated into the product then some method of integrating them into the product development process must be found. This can be in the form of direct physical involvement (Campbell, 2004) or via a web-based interface (Ford, 2004).
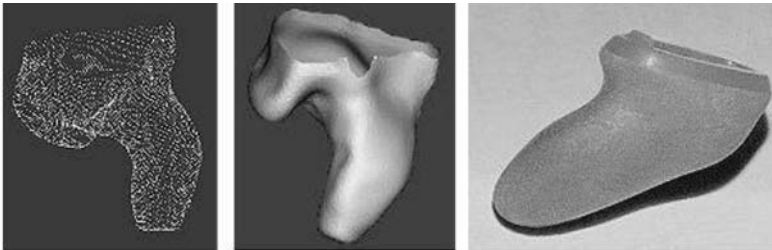

Figure 2: Example of a personalised hearing aid (Materialise, 2002).

4. IMPACT UPON DESIGNERS' CONCEPTS

There is little that designers can do to influence these trends (although there are some examples where design of a new product has started a trend, e.g. the Sony Walkman started portable personal entertainment). The responses that designers could make to them are threefold. They can either ignore them; try to cope with them as best as they can or they can use them to gain competitive advantage. The first option is not really viable since it is a recipe for reduced sales and even bankruptcy. There are plenty of examples of this in product design history, e.g. British motorcycle manufacturers ignoring the desire to own reliable, multi-cylinder bikes. The second option is a rather negative attitude that treats trends as obstacles that have to be overcome. This is usually achieved through half-hearted product revamps that pay "lip service" to consumers' new requirements but do not place them at the centre of the concept development process. The third option comes from a more positive viewpoint that takes every challenge as an opportunity to out-perform the competition. After all, if the trend is global then every manufacturer will be facing the same problems. Even if it is regional, everyone who wants to continue in that market

will have to respond. Therefore, designers need to create innovative product designs that make optimum use of the already scarce natural resources available while catering for consumers' latest needs. This single aim requires a number of objectives to be met:

1. Designers need to understand the target consumer's attitudes
2. They need to be aware of latest trends that will influence these attitudes
3. They need to be aware of new opportunities in technologies, materials and processes
4. They need to think creatively, i.e. something that may not have been done before

If the target consumer is a middle-aged male purchaser of a family car then the first two objectives may not be so difficult since many designers fall into this consumer category. However, how qualified would they be to determine what makes teenagers buy phones? Some companies pass this responsibility over to a specialist Marketing function but often the richness of the information collected is lost during communication to the design team. For this reason, some companies will even place their designers alongside target consumers for an extended period of time to get to know how they live and how they think. They will see what television programmes they watch and which magazines they read. They want to understand the consumers' priorities and attitudes to enable them to undertake true "user-centred" design.

The third objective is a matter of keeping abreast of what is happening in the world beyond the design studio. This can be done through the Internet, professional publications, conference attendance or personal contact with the engineers and other technologists who should be keeping up to date in their field. However, since there is an incredible amount of new information that could potentially be accessed, it is impossible for any one designer to be completely conversant with everything that could be useful. Either different designers must be given their own specific remits, or an external "technology watch" provider must be used. Some universities will offer this service, e.g. the PRIME Faraday Partnership between Loughborough and Nottingham Universities (PRIME, 2004).

The fourth objective is more difficult to achieve through a formal process or set of techniques. Creativity is often seen as a personal trait that an individual either possesses or lacks. However, designers should have some advantage here in that their whole *raison d'etre* is to generate creative solutions. Nevertheless, such an important aspect of design should not be left entirely to the natural creativity (or otherwise) of the individual designer. There are learning aids available that aim to encourage creativity and "out-of-the-box" thinking, e.g. the use of mind maps. The desired outcome is to arrive at combinations of product form, functionality, human interface, facilitating technology and materials that have not previously been seen. Not all designers have been trained to operate in this way. Conventional design education is largely about acquiring the skills needed to take a concept through to completion. Much more emphasis is required on how to generate new concepts and where to look for them. This must be coupled with a greater awareness of related subjects, e.g. marketing, materials and, of course, engineering.

5. IMPACT UPON ENGINEERS' SOLUTIONS

Designers' ideas are only pipedreams until they are transformed into reality through the effort of various types of engineers. If designers are generating new ideas that have not been previously realised there will be no previous solutions to apply. Therefore, engineers must be innovative in converting these ideas into reality. It is likely that they will need to employ new technologies, e.g. nanotechnology, new materials, e.g. composites or new manufacturing processes such as material addition techniques (i.e. rapid manufacturing). A fruitful way to approach this task is by adapting technologies/materials/processes from one application area to another, e.g. when Bic introduced plastics technology into disposable razors. It is interesting to note that this innovation came from a ball-point pen manufacturer rather than a razor company such as Gillette.

The need to deliver innovative solutions to meet global and regional trends will create some interesting challenges for engineers. Some of these are product related, e.g. mass customised or modular products, the integration of software into products and the need for regional variations in products. Others are related to the processes that will become necessary to support creative design, i.e. rapid product development and re-configurable manufacturing systems. Finally, some of the challenges will concern the way engineers will need to work both as individuals and as team members, e.g. life-long learning and the need to work as part of international partnerships. Some of the challenges will be widespread around the world whereas others will vary somewhat from one region to the next. Examples of these regional challenges are increasing environmental legislation in European Union, e.g. the WEEE (waste electrical and electronic equipment) directive, the drive to use local materials and processes in Africa, the need to escape the "it suits us" attitude in America, e.g. their propensity for gas-guzzling cars and how to keep up with rapidly increasing consumer spending power and expectations in China.

Since the combination of challenges will be different in every region (and even nation) and the resources available will be unique, locally-adapted solutions are essential. There is no single solution that will work everywhere but there are some principles that are transferable, e.g. personnel are an organisation's most valuable asset. Therefore, engineers need to examine the situation they are working in and the challenges they are facing and develop a plan of action to resolve the two. This can be done at a company level but more comprehensive schemes are also possible, involving local or even national governments. A prime example is the DesigNation initiative in South Africa. This is a national government-led initiative to introduce a "national system of design". It aims to transform South Africa from a primary producer to a value-added manufacturer and exporter. It will be implemented at four levels: schools, tertiary education, industry and government (DesigNation, 2004). Like all well-considered schemes, it aims to overcome identified deficiencies while making use of local strengths. Important lessons could be learned by others wishing to face similar challenges.

6. CONCLUSIONS

Designers and engineers have to operate in an ever changing world where various trends are in motion (see Figure 3). The needs (and desires) of consumers are fickle and so designers need to have their "finger on the pulse" to ascertain what are the latest trends effecting their target customers. Design creativity is essential for survival and will be manifested in products that stretch the limits of imagination. Such products are unrealisable unless design creativity is accompanied by engineering innovation. New solutions to existing problems and the solving of new challenges are the "orders of the day". This will be achieved through new technologies, new materials and new manufacturing processes. Designers and engineers will also need to change the way they think and educators will need to re-examine how they can encourage this. Finally, no two regions are experiencing exactly the same set of trends and so indigenous solutions will tend to work best.
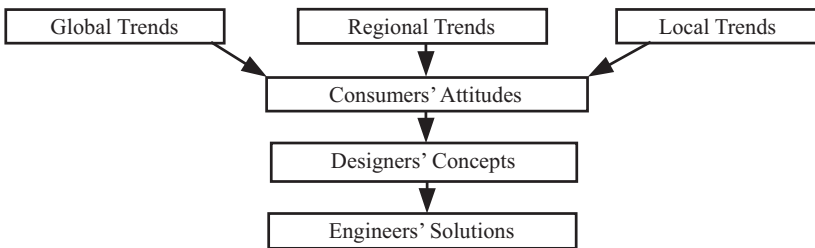
Figure 3: The impact of trends upon consumers, designers and engineers.

7. REFERENCES

Anonymous (2004) http://globalwarming.enviroweb.org/ishappening/warmcentury/ (accessed October 2004).

Campbell, R.I., Cain, R. and Gyi, D.E. (2004) "The role of customer input with the design process". Proceedings of the 2004 Computing and Solutions in Manufacturing Engineering conference, Technical University of Brasov, Romania.

DesigNation (2004) http://www.designation.co.za/ (accessed October 2004).

Ford Motor Company (2004) http://www.jaguarusa.com/us/en/shopping_finance/ build_your_jaguar/introduction.htm (accessed October 2004).

Materialise (2002) "Successful automation project completed for hearing aid design and production". Materialise Gazette, 2002, vol3, p6.

Miles, D. (1999) "Modelling the impact of demographic change upon the economy". The Economic Journal, 109, pp 1-36.

PRIME (2004) http://www.primetechnologywatch.org.uk/index.asp (accessed October 2004).